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VOLUME IX.

DIONYSIUS——ERNE.

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THE PENNY CYCLOPÆDIA

OF

THE SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE.

DIONY'SIUS THE YOUNGER, son of Dionysius the Elder, succeeded him as tyrant of Syracuse, being acknowledged as such by the people. His father had left the state in a prosperous condition; but young Dionysius had neither his abilities nor his prudence and experience. He followed at first the advice of Dion, who, although a republican in principle, had remained faithful to his father, and who now endeavoured to direct the inexperienced son for the good of his country. For this purpose Dion invited his friend Plato to Syracuse about 364 B.C. Dionysius received the philosopher with great respect, and in deference to his advice reformed for awhile his loose habits and the manners of his court. But a faction, led by Philistus, who had always been a supporter of the tyranny of the elder Dionysius, succeeded in prejudicing his son against both Dion and Plato. Dion was exiled under pretence that he had written privately to the senate of Carthage for the purpose of concluding a peace. Plato urgently demanded of Dionysius the recall of Dion, and not being able to obtain it, he left Syracuse, after which Dionysius gave himself up to debauchery without restraint. Aristippus, who was then at his court, was the kind of philosopher best suited to the taste of Dionysius. Dion meantime was travelling through Greece, where his character gained him numerous friends. Dionysius, moved by jealousy, confiscated his property, and obliged his wife to marry another. Upon this Dion collected a small force at Zacynthus, with which he sailed for Sicily, and entered Syracuse without resistance. Dionysius retired to the citadel in the Ortygia, and after some resistance, in which old Philistus, his best supporter, was taken prisoner and put to death, he quitted Syracuse by sea, and retired to Locri, the country of his mother, where he had connexions and friends. His partisans, however, retained possession of Ortygia, and a faction having risen in the town, headed by Heraclides, a demagogue, who proposed an equal distribution of property, which Dion resisted, the latter was deprived of his command, and would have been killed by the excited populace, had not his soldiers escorted him safely to Leontini. In the midst of the confusion, a successful sortie made by the soldiers of Dionysius, who plundered and burnt part of the city, recalled the Syracusans to their senses, and messengers were dispatched after Dion, requesting him to return. Dion obeyed the call, repulsed the enemy, and soon after took the citadel. But the faction of Heraclides conspired against Dion, and had him treacherously murdered, 354 B.C.

Several tyrants succeeded each other in Syracuse, until Dionysius himself came and retook it about 346. Dionysius, however, instead of improving by his ten years' exile, had grown worse; having usurped the supreme power in Locri, he had committed many atrocities, had put to death several citizens, and abused their wives and daughters. (Justinus, Ælianus.) Upon his return to Syracuse, his cruelty and profligacy drove away a great number of people, who emigrated to various parts of Italy and Greece, whilst others joined Iketas, tyrant of Leontini, and a former friend of Dion. The latter sent messengers to Corinth to request assistance against Dionysius. The Corinthians appointed as leader of the expedition Timoleon, who had already figured in the affairs of his own country as a determined opponent of tyranny. Timoleon landed in Sicily 344 B.C., notwithstanding the opposition of the Carthaginians and of Iketas, who acted a perfidious part on this occasion; he entered Syracuse, and soon after obliged Dionysius to surrender. Dionysius was sent to Corinth, where he spent the remainder of his life in the company of actors and low women; some say that at one time he kept a school. Justin (xxi. 5) says that he purposely affected low habits in order to disarm revenge, and that being despised, he might no longer be feared or hated for his former tyranny. Several repartees are related of him in answer to those who taunted him upon his altered fortunes which are not destitute of wit or wisdom. (Plutarch, *Dion.*; Diodorus, xvi.)

DIONY'SIUS, the son of Alexander, an historian and critic, born at Halicarnassus in the first century B.C. We know nothing of his history beyond what he has told us of himself. He states (*Antiq.*, p. 20-24) that he came to Italy at the termination of the civil war between Augustus and Antony (B.C. 29), and that he spent the following two-and-twenty years at Rome in learning the Latin language and in collecting materials for his history. (Phot. *Biblioth.*, cod. lxxxvi.) He also says (*Antiq.*, p. 1725) that he lived in the time of the great civil war. The principal work of Dionysius is his *Roman Antiquities*, which commenced with the early history of the people of Italy, and terminated with the beginning of the first Punic war, B.C. 265. (*Antiq.* i. p. 22.) It originally consisted of twenty books, of which the first ten remain entire. The eleventh breaks off in the year 312 B.C., but several fragments of the latter half of the history are preserved in the collection of Constantine Porphyrogennetus, and to these a valuable addition was made in 1816 by Mai, from an old MS. Besides, the first three books of Appian were founded entirely upon Dionysius; and Plutarch's biography of Camillus must also be considered as a compilation mostly taken from the Roman Antiquities, so that perhaps upon the whole we have not lost much of this work. With regard to the trustworthiness and general value of Dionysius's history, considerable doubts may be justly entertained; for though he has evidently written with much greater care than Livy, and has studied Cato and the old annalists more diligently than his Roman contemporary, yet he wrote with an object which at once invalidates his claim to be considered a veracious and impartial historian. Dionysius wrote for the Greeks; and his object was to relieve them from the mortification which they felt at being conquered by a race of barbarians, as they considered the Romans to be; and this he endeavoured to effect by twisting and forging testimonies and botching up the old legends, so as to make out a *primâ facie* proof of the Greek origin of the city of Rome, and he inserts arbitrarily a great number of set speeches, evidently composed for the same purpose. He indulges in a minuteness of detail which, though it might be some proof of veracity in a contemporary history, is a palpable indication of want of faith in the case of an antient history so obscure and uncertain as that of Rome. With all his study and research, Dionysius was so imperfectly acquainted with the Roman constitution that he often misrepresents the plainest statements about it. (Niebuhr, *Hist. Rome*, vol. ii. p. 13, Engl. tr.) For instance, he imagines that the patricians had all the influence in the centuries, and that the plebeians and equites had nothing to do with the first class. (*Antiq.* vii. 82-87, x. 17. See Niebuhr, *Hist. Rome*, ii. p. 178, Engl. tr.) He thought the original constitution of Rome was a monarchical democracy, and calls the curies the *demus* (δῆμος.) He believed when he wrote his second book that the decrees of the people were enacted by the curies and confirmed by the senate (*Antiq.* ii. 14), and not, as he afterwards discovered, the converse. (*Antiq.* vii. 38.) In a word, though the critical historian may be able to extract much that is of great importance for the early history of Rome from the garbled narrative and the dull trifling of Dionysius, he cannot be regarded as a meritorious writer, or recommended to the student of antient history as a faithful guide. Dionysius also wrote a treatise on rhetoric; criticisms on the style of Thucydides, Lysias, Isocrates, Isæus, Dinarchus, Plato, and Demosthenes; a treatise on the arrangement of words, and some other short essays. His critical works are much more valuable than his history, and are indeed written with considerable power. The criticism on Dinarchus [DINARCHUS] displays good sense and judgment, and shows the great pains which the author took to separate the genuine writings of the Attic orators from the fabrications which passed under their name. The best editions of Dionysius are those of Hudson, *Oxon.*, 1704, 2 vols., in folio; and by Reiske, *Lips.*, 1774-1777, 6 vols., in 8vo. Mai's fragments were first published at Milan in 1816, and reprinted the following year at Frankfort. They also appear in the second volume of Mai's *Nova Collectio*, Rome, 1827. His rhetoric has been published separately by Schott, *Lips.*, 1804, 8vo.; and his remarks on Thucydides by Krüger, *Hal. Sax.*, 1823, 8vo. There is a German translation of the *Roman Antiquities* by J. Lr. Benzler, Lemgo, 1771-1772, 2 vols., 8vo. The only English translation of the *Antiquities* is the following: 'The Antiquities of Dionysius Halicarnassensis, translated into English, with notes and dissertations, by Edward Spelman, Esq.,' 2 vols., 4to., London, 1748.

DIONYSIUS of Byzantium lived before the year A.D. 196. His voyage (Ἀνάπλους) in the Thracian Bosporus was extant in the 16th century, for Gyllius, who died in 1555. has given extracts in Latin from it in his work on the Thracian Bosporus. A single fragment from this work is printed in Ducange's 'Constantinopolis Christiana,' and in Hudson's Minor Greek Geographers. Perhaps there is some confusion between this Dionysius and the author of the 'Periegesis,' whom Suidas (Διονύσιος) calls a Corinthian.

DIONY'SIUS PERIEGE'TES, the author of a Greek poem in 1186 hexameter verses, intitled Τῆς Οἰκουμένης Περιήγησις, or 'a description of the habitable world.' It is not known where Dionysius was born nor where he lived. Perhaps the most probable opinion is, that he was a native of Byzantium and belonged to the latter part of the third or the beginning of the fourth century A. D. As a poem the Periegesis is of little value, and as a geographical work, not worth the trouble of reading. The commentary of Eustathius on the Periegesis possesses some value for the miscellaneous information which is scattered through it. There are two Latin translations of this poem, one by Rufus Festus Avienus, and the other by Priscianus. There are numerous editions of Dionysius. The last and best edition of the Periegesis is by G. Bernhardy, Leipzig, 1828, 8vo., in the first volume of his 'Geographi Græci Minores.'

DIOPHANTUS, a native of Alexandria, the exact date of whose birth is unknown, some authors asserting that he lived in the reign of Augustus, whilst others place him under Nero, or even the Antonines. The fact is that we do not know when he lived. He lived however, as is well ascertained, to eighty-four years of age.

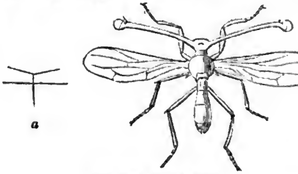
Diophantus left behind him thirteen books of Arithmetical Questions, of which however only six are extant; but from their distinct and peculiar character, in comparison with all the other writings of the Greek mathematicians, these books have given rise to much discussion. It is however scarcely to be conceived that whilst the cumbrous machinery of common language constituted the sole instrument of investigation, the very curious conclusions which we find in this work could have resulted from the researches of one single mind. To suppose that Diophantus was the inventor of the analysis which bears his name, is so contrary to all analogy with experience and the history of mental phenomena, as to be utterly impossible to admit Still, if we inquire into the history of this branch of analysis, and ask who were the predecessors of Diophantus, or whether they were Greeks or Hindus, no satisfactory answer can be given.

Diophantus also wrote a book on Polygon Numbers (περὶ πολυγώνων ἀριθμῶν). Holzmann published at Basle, in 1575, folio, a Latin translation of both the works of Diophantus. The first Greek edition was by Meziriac, Paris, 1621, folio: an improved edition of Meziriac's edition was published by S. de Fermat, Toulouse, 1670, folio. A valuable translation of the Arithmetical Questions into German was published by Otto Schulz, Berlin, 1822, 8vo.; to which is added Poselger's translation of the work on Polygon Numbers.

DIOPSIDE, a variety of PYROXENE.

DIO'PSIS, a genus of Dipterous Insects of the family Sepsidæ. The insects of this genus are remarkable for the immense prolongation of the sides of the head. The head itself is small, and appears as if it were furnished with two long horns, each having a knob at its apex; these horn-like processes however are not analogous to the parts usually termed antennæ, but are in fact prolongations of the sides of the head, the knob at the apex of each being the eye of the insect. They vary in length according to the species. In some they are almost equal to the whole length of the insect, whereas in others they are only about half that length. The antennæ are situated close to the eyes, and are three-jointed: the basal joint is the smallest and is very short; the terminal joint is the largest, of a globular form (or nearly so), and furnished towards the apex with a simple seta; there is also a short seta on the peduncle or eye-stalk, situated about midway between the base and the apex of that process, and on the anterior part. The thorax is somewhat attenuated anteriorly, but approaches to a spherical form, and is generally furnished with two spines on each side; the scutellum is also furnished with two spines. The body is more or less elongated, sometimes nearly cylindrical, but generally increases in diameter towards the apex. The legs are tolerably long—the anterior femora are generally thick, and furnished beneath with minute denticulations, and the four posterior femora are often furnished with a spine at their apex.

For a detailed account of these curious insects we refer our readers to Mr. Westwood's excellent paper in the seventeenth volume of the 'Transactions of the Linnæan Society,' in which twenty species are described.



Diopsis Sykesii, G. R. Gray.
a denotes the natural size.

The illustration is copied from one of that gentleman's figures, and represents the Diopsis Sykesii, one of the largest species of the genus, and which has been selected as possessing the longest *eye-stalks*; these processes in this insect are of a pitchy red colour, and the body is of the same tint. The head and thorax are black and the wings are clouded with brown.

But little is known of the habits of these insects. Lieut.-Colonel W. H. Sykes, who collected great numbers of the above species during his residence in India, furnished Mr Westwood with the following notice respecting their habitat and habits:—

'*Habitat.* The hill fort of Hurreechunderghur, in the western ghauts of the Deccan, at an elevation of 3900 feet above the level of the sea, 19° 23′ N. lat., 73° 40′ E. long.

'This insect affects chasms or ravines in the lofty woods which encircle the mountain in belts. In various places, where the sunbeams occasionally pierce the woods and fall upon isolated or salient rocks in the above localities, they are seen in myriads, either poising themselves in the rays, or reposing on the spots on which the rays fall.'

In addition to this notice we may add that all the known species are from the tropical parts of the Old World.

DIOPTASE or *emerald copper*, a crystallized silicate of copper, the primary form of which is a rhomboid; its colour varies from emerald to blackish green; its lustre is vitreous; it is translucent, and sometimes transparent; it is sufficiently hard to scratch glass, though but feebly; it is brittle; specific gravity 3·278; the streak is green; fracture uneven: and cross fracture flat conchoidal. It is found in Siberia and the Bannat; and, according to Lowitz, it consists of silica 33, oxide of copper 55, water 12.

DIOPTRICS. [OPTICS; REFRACTION.]

DIORA'MA, from the Greek word διορᾷν, to see through, a mode of painting and scenic exhibition invented of late years by two French artists, Daguerre and Bouton, which, although it does not possess some of the advantages of the panorama, produces a far greater degree of optical illusion. It has also one advantage over the panorama, in being equally suitable for architectural and interior views as for landscape; nay even more so, because the positive degree of light is more natural, and the relief of the objects becomes more deceptive. The peculiar and almost magical effect of the diorama arises, in a considerable measure, from the contrivance employed in exhibiting the painting, which is viewed through a large aperture or proscenium. Beyond this opening the picture is placed at such distance that the light is thrown upon it, at a proper angle, from the roof, which is glazed with ground glass, and cannot be seen by the spectator. Besides the light being thus concentrated upon the picture, the effect is materially increased by the spectator being in comparative darkness, receiving no other light than what is reflected from the surface of the painting itself. Another circumstance greatly favouring illusion is the intervening distance; and also the circumstance that the sides of the proscenium or opening are continued inwards towards the picture, so as to screen its extremities, and at the same time assist in confining the light to the scene itself. The contrast thus occasioned, and the exclusion of all other objects of vision save those represented in the painting, so that the eye has no immediate standard of comparison between them and real ones, give to this species of exhibition such extraordinary force that a very moderate degree of light will suffice to show the painting. Hence the light may be diminished or increased at pleasure, and that either gradually or suddenly, so as to represent the change from ordinary daylight to sunshine, and from sunshine to cloudy weather, or to the obscurity of twilight; also the difference of atmospheric tone attending them: all which variations give to the diorama a character of nature and reality beyond that of any other mode of painting. These transitions, in regard to light and atmospheric effects, are produced by means of different folds or shutters attached to the glazed ceiling, which are so contrived that they may be immediately opened or closed to any extent, thereby increasing or diminishing the light just as required, and otherwise modifying it. Further than this, some parts of the painting itself are transparent, and on them the light can occasionally be admitted from behind, thereby producing a brilliancy far exceeding that of the highest lights of a picture upon an opaque ground, which can be made to appear vivid and sparkling only by contrast, not by any positive increase of light on those parts of the surface. Here, on the contrary, such augmented light is admitted *through* it, in addition to that which illuminates the picture generally, an artifice which secures the advantages of painting in transparency without its defects; the objects looking more solid, and the effect being altogether more natural than when the whole of the light passes through the picture. The combination of transparent, semi-transparent, and opaque colouring, still further assisted by the power of varying both the effects and the degree of light and shade, renders the diorama the most perfect scenic representation of nature, and adapts it peculiarly for moonlight subjects, or for showing such '*accidents*' in landscape as sudden gleams of sunshine and their disappearance. It is also unrivalled for showing architecture, particularly interiors, as powerful relief may be obtained without that exaggeration in the shadows which is almost inevitable in every other mode of painting.

Although hitherto employed only for purposes of public exhibition, the diorama might undoubtedly be turned to account for those of embellishment likewise in corridors and other places of that kind, where light can be obtained only from one extremity. For it should be observed that the principle is totally independent of the contrivance adopted for exhibiting two pictures; although this latter in itself enhances the attraction to the public. This may be understood by briefly describing the building erected for the purpose in the Regent's Park, London, after the plans of Messrs. Morgan and Pugin, and first opened in the autumn of 1823.

The spectatory or saloon for the visitors is a rotunda 40 feet in diameter, with a single opening or proscenium about 20 feet wide; and placed within another rotunda having two openings communicating with the picture-rooms, each of which contains a view. When a change of scene takes place the inner rotunda is turned by means of machinery beneath the floor, till the proscenium is gently shifted from the opening into one picture-room to that of the other, the two being quite contiguous. At the next change it is shifted back again, so that the whole space passed over backwards and forwards is about one-third of the entire circumference, or double that portion of the circle forming the proscenium. The diorama at Berlin, executed by Carl Gropius, an eminent scene-painter, is somewhat on the same plan, yet with some slight differences. The peculiar mode just described, of turning the spectatory from one painting to the other, is adopted, as the scenes are much larger than the opening through which they are viewed, and require to be stretched on a framing, so that they cannot be either rolled up, or drawn aside in two halves, as is done with scenes of a theatre. Nevertheless, it would perhaps be found practicable to exhibit a succession of three or four views, in a single 'picture-room,' by making that part of the building sufficiently spacious to allow each scene to be slided backwards or forwards, so as to be entirely out of view when drawn aside.

DIOSCO'REA, the genus of plants which furnish the tropical esculents called yams. They are perennial fleshy-rooted or tuberous diœcious plants, with annual twining stems, broad alternate leaves having a somewhat netted arrangement of their veins, and loose clusters of small green flowers. The corolla and the calyx taken together consist of six small equal segments, which, in the females, stand upon the top of the ovary. The male flowers have six stamens; the females three styles. The seed vessel is a thin compressed three-winged capsule, containing one or two membranous seeds.

The only general account of the species, which at all deserves to be consulted, is that of Dr. Roxburgh, who cultivated seventeen sorts in the Botanic Garden, Calcutta; others are known to botanists, but far from perfectly.

The common West India yam, which is often sold in the shops of London, is produced by *Dioscorea alata*. It is met with in the East Indies also, but only in a cultivated state. A figure of it is given in Rheede's 'Hortus Malabaricus,' vol. vii. t. 38, under the name of katsji-kelengu. Its tubers are oblong, brown externally, white internally, and often of great size, weighing sometimes as much as 30lbs.; they perish after the first year, if left in the ground, having first produced the young ones that are to replace them. 'Besides the tubers the proper roots of all these plants are fibrous, springing from and chiefly about the union of the stems with the tubers, and spreading in every direction.' The stems are furnished with four crested leafy wings, and spread to a great extent twining round trees and bushes; they often bear prickles near the ground. The first leaves that appear on the stem are alternate, the succeeding are opposite, seated on long stalks, deeply heart-shaped at the base, sharp-pointed, smooth, with from five to seven ribs. The flowers are small and green, and appear in compound panicles. The remainder of the species are very similar to this in general characters; a few short notes will sufficiently indicate their differences.

D. globosa, cultivated in Bengal under the name of choo puree aloo, is most esteemed of the Indian yams. Its flowers are highly fragrant; the tubers are white internally; the leaves arrow-headed.

D. rubella, the guranya-aloo, is another Indian sort with large tubers stained with red immediately below the cuticle;

it is much esteemed; its tubers are sometimes three feet long; its flowers are fragrant.

Another valuable kind is D. purpurea, called lal-guranya-aloo in Bengal, whose tubers are permanently stained purple throughout.

At Malacca is cultivated another purple-rooted sort, the D. atropurpurea, whose tubers are large and irregular, and grow so near the surface of the ground as to appear in dry weather through the cracks that they make in the soil by raising the earth over them.

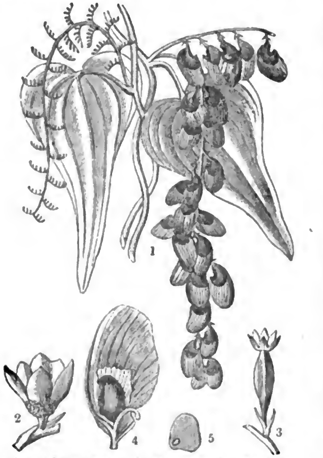
Other eatable sorts are numerous, but are less valuable, and therefore not cultivated. In Otaheite the D. bulbifera, which bears small fleshy angular tubers along the stem in the axils of the leaves, is the favourite species.

It is not a little remarkable that while so many species are nutritious in this genus, some should be highly dangerous; but such is unquestionably the fact. Dioscorea Dæmonum and triphylla, both ternate leaved species, have dreadfully nauseous and dangerous tubers. No genus is more in want of revision than this.

DIOSCOREA'CEÆ, a natural order of endogenous plants, referred to the Retose group, and having the last genus for their type. They are particularly distinguished by the following character.

Flowers diœcious; calyx and corolla superior; stamens six; ovary three-celled, with one or two-seeded cells; style deeply trifid; fruit leafy, compressed, occasionally succulent; embryo small, near the hilum, in a large cavity of cartilaginous albumen.

All the species are twining shrubs, with alternate or spuriously opposite leaves. They consist, with the exception of Tamus, or Black Bryony, of tropical plants, or at least of such as require a mild frostless climate. Some of them produce eatable farinaceous tubers, or yams, as the various species of Dioscorea and Testudinaria; but there is a dangerous acrid principle prevalent among them, which renders the order upon the whole suspicious. It exists in a perceptible degree in Tamus, and is still more manifest in the three-leaved Dioscorea.



1, a shoot of Rajania cordata; 2, a male flower; 3, a female flower; 4, a portion of a ripe fruit with the seed exposed; 5, a section of the seed.

DIOSCO'RIDES, PEDA'CIUS, or PEDA'NIUS, a Greek writer on Materia Medica, was born at Anazarbus, in Cilicia, and flourished in the reign of Nero, as appears from the dedication of his books to Areus Asclepiadeus, who was a friend of the consul Licinius or Lecanius Bassus. In early life he seems to have been attached to the army; and either at that time or subsequently he travelled through Greece, Italy, Asia Minor, and some parts of Gaul, collecting plants with diligence and acquainting himself with their properties, real or reputed. He also gathered together the opinions current in his day concerning the medical plants brought from countries not visited by himself, especially from India, which at that time furnished many drugs to the western markets. From such materials he compiled his celebrated work on Materia Medica, in five books, wherein between 500 and 600 medicinal plants are named and briefly described. He is moreover reputed the author of some additional books on therapeutics, &c.; but in the judgment of Sprengel the latter are spurious, and from the mixture of Latin and Greek names of plants, are probably some monkish forgery.

Few books have ever enjoyed such long and universal celebrity as the Materia Medica of Dioscorides. For sixteen centuries and more, to use the words of one of his biographers, this work was referred to as the fountain-head of all authority by everybody who studied either botany or the mere virtues of plants. Up to the commencement of the seventeenth century the whole of academical or private study in such subjects was begun and ended with the works of Dioscorides; and it was only when the rapidly increasing numbers of new plants and the general advance in all branches of physical knowledge compelled people to admit that the vegetable kingdom might contain more things than were dreamt of by the Anazarbian philosopher, that his authority ceased to be acknowledged.

This is the more surprising, considering the real nature of these famous books. The author introduced no order into the arrangement of his matter, unless by consulting a similarity of sound in the names he gave his plants Thus, medium was placed with epimedium, althæa cannabina with cannabis, hippophæstum (cnicus stellatus) with hippophaë, and so on; the mere separation of aromatic and gum-bearing trees, esculents and corn-plants, hardly forms an exception to this statement. Of many of his plants no description is given, but they are merely designated by a name. In others the descriptions are comparative, contradictory, or unintelligible. He employs the same word in different senses, and evidently attached no exactness to the terms he made use of. He described the same plant twice under the same name or different names; he was often notoriously careless, and he appears to have been ready to state too much upon the authority of others. Nevertheless, his writings are extremely interesting as showing the amount of Materia Medica knowledge in the author's day, and his descriptions are in many cases far from bad: but we must be careful not to look upon them as evidence of the state of botany at the same period; for Dioscorides has no pretension to be ranked among the botanists of antiquity, considering that the writings of Theophrastus, four centuries earlier, show that botany had even at that time begun to be cultivated as a science distinct from the art of the herbalist.

The most celebrated MS. of Dioscorides is one at Vienna, illuminated with rude figures. It was sent by Busbequius, the Austrian Ambassador at Constantinople, to Mathiolus, who quotes it under the name of the Cantacuzene Codex, and is believed to have been written in the sixth century. Copies of some of the figures were inserted by Dodoens in his Historia Stirpium, and others were 'engraved in the reign of the empress Maria Theresa under the inspection of Jacquin. Two impressions only of these plates, as far as we can learn, have ever been taken off, as the work was not prosecuted.' One of them is now in the Library of the Linnæan Society; the other is, we believe, with Sibthorp's collection at Oxford. They are of little importance, as the figures are of the rudest imaginable description. Another manuscript of the 9th century exists at Paris and was used by Salmasius; this also is illustrated with figures, and has both Arabic and Coptic names introduced, on which account it is supposed to have been written in Egypt. Besides these, there is at Vienna a manuscript believed to be still more antient than that first mentioned, and three others are preserved at Leyden.

The first edition of the Greek text of Dioscorides, was published by Aldus at Venice, in 1499, fol. A far better one is that of Paris, 1549, in 8vo. by J. Goupyl; but a better still is the folio Frankfort edition, of 1598, by Sarracenus. Sprengel laments, 'nullum rei herbariæ peritum virum utilissimo huic scriptori operam impendisse.' Nevertheless, there have been many commentators, of whom some, such as Fuchsius, Amatus Lusitanus, Ruellius, Tabernæmontanus, Tragus, and Dalechampius, are of no sort of authority, while others, especially Matthiolus, Maranta, Cordus, John Bauhin, and Tournefort, among the older, with Sibthorp, Smith, and Sprengel, among modern commentators, deserve to be consulted with attention. The last edition of the Greek text is by Sprengel, in the collection of Greek Physicians by Kühn, Leipzig, 1829, 8vo., which has been improved by a collation of several MSS. Dr. Sibthorp, who visited Greece for the purpose of studying on the spot the Greek plants of Dioscorides, must be accounted of the highest critical authority; for it frequently happens that the traditions of the country, localities, or other sources of information throw far more light upon the statements of this antient author than his own descriptions. It will ever be a subject of regret to scholars, that Dr. Sibthorp should have died before he was able to prepare for the press the result of his inquiries; what is known of them is embodied in the Prodromus Floræ Græcæ, published from his materials by the late Sir James Edward Smith, and in the Flora Græca itself, consisting of 10 vols. fol. with nearly 1000 coloured plates, commenced by the same botanist, and now nearly completed under the direction of Professor Lindley. [SIBTHORP.] So far as European plants are in question, we may suppose that the means of illustrating Dioscorides are now nearly exhausted; but it is far otherwise with his Indian and Persian plants. Concerning the latter, it is probable that much may be learned from a study of the modern Materia Medica of India. When the Nestorians, in the fifth century, were driven into exile, they sought refuge among the Arabs, with whom they established their celebrated school of medicine, the ramifications of which extended into Persia and India, and laid the foundation of the present medical practice of the natives of those countries. In this way the Greek names of Dioscorides, altered indeed, and adapted to the genius of the new countries, became introduced into the languages of Persia, Arabia, and Hindostan, and have been handed down traditionally to the present day. Thus Dr. Royle has shown, by an examination of this sort of evidence, that the Kalamos aromatikos of Dioscorides is not a Gentian, as has been imagined; that Nardos Indike is unquestionably the Nardostachys Jatamansi of De Candolle, and that the Lukion Indikon was neither a Rhamnus, nor a Lycium, but as Prosper Alpinus long ago asserted, a Berberis. With regard to the last plant, Dr. Royle states that Berberis is at the present day called in India hooziz hindee, or Indian hooziz; this last word has for its Arabic synonym loofyon or lookyon; therefore the Berberry is still called Indian lycium, with the reputed qualities and uses of which it moreover corresponds.

DIOSMA, a genus of Rutaceous shrubs inhabiting the Cape of Good Hope. They have alternate simple leaves, strongly marked with dots of transparent oil, and diffusing a powerful odour when bruised. Some of the species are to European taste offensive, as the Buckus, with which the Hottentots perfume themselves, and which are chiefly yielded by D. crenata and serratifolia. The flowers of most are white; those of a few are red. Diosma crenata itself, which is reputed a powerful antispasmodic, is thus described:—

An erect shrub, smooth in every part, and growing a foot or so high; branches tapering, purplish, long, lax; branchlets somewhat whorled, ternate, or scattered, angular, purple, twiggy, incurved, loose. Leaves alternate, on short stalks, ovate-oblong, blunt, flat, smooth, deep green above, paler beneath, dotted with sunken glands, the midrib somewhat keeled, the margin scolloped, glandular-dotted, and shining. Flowers solitary, white, middle sized. Peduncles filiform, shorter than the leaves.

By most modern botanists the old genus Diosma is broken up into eight, namely, Adenandra, Coleonema, Diosma proper, Euchætis, Acmadenia, Baryosma, to which the Buckus belong, Agathosma, and Macrostylis.

Diosma crenata (Linn.) and Diosma serratifolia (Vent.) yield leaves which at the Cape of Good Hope are termed buchu, or bucco, and which are sometimes used alone, but more frequently mixed. When bruised they emit a strong peculiar odour, resembling rosemary or rue. The taste is aromatic, but not bitter or disagreeable

Cadet de Gassecourt analysed the leaves, and found no alkaloid, but 6.65 of volatile oil; 21.17 extractive; 2.15 resin; 63 lignin; 1.10 chlorophylle. Brandes considers the extractive to be peculiar, and terms it Diosmin, analogous to cathartin. The volatile oil and the extractive appear to be the active ingredients. They are usually administered in the form of infusion. Buchu leaves have been long known to the Hottentots as a remedy against rheumatism, cramps, and above all in affections of the urinary organs. They have of late years been introduced into European practice. In their action they resemble those of the arctostaphylos uva ursi, but from their containing volatile oil, buchu leaves are in many cases preferable. [BEAR'S WHORTLEBERRY.]

DIP, in magnetism, the angle which the magnetic needle, freely poised on its centre of gravity and symmetrically formed in both its arms, makes with the plane of the horizon. It is more scientifically termed the inclination of the needle, or the magnetic inclination. [INCLINATION and MAGNETISM.]

DIPHILUS. [ATHENS, vol. ii., p. 18.]

DIPHTHONG (δίφθογγος) is the sound of two vowels pronounced in rapid succession, as the German *au* in *maus*, pronounced precisely like the English word *mouse*, the vowel sound consisting of the broad *a* of *father*, followed quickly by the sound of *u* or *oo*. Again, the *i* in the English word *mind*, though represented by a single character, is virtually a diphthongal sound, consisting of the broad *a* of *father*, followed by the vowel sound which is heard in *mean*. The name diphthong however is commonly given to any vowel sound represented by the junction of two vowels, as in *dream*, though the sound produced is not compounded.

All diphthongs are said to be long syllables; and this would be true if they were only employed to mark the union of two vowel sounds. This probably was originally their sole office; for in many English words now written with diphthongs, but pronounced as if they had single vowels, an earlier pronunciation contained the double sound; and indeed this view is often supported by the provincial pronunciation of a word. For example, such words as *meat*, *dream*, are pronounced in many parts of England as dissyllables, *meăt*, *dreăm*. In practice however a diphthong is often used where the vowel sound is not only uncompounded but short, as in *friend*, *breadth*.

Again, diphthongs are occasionally used to represent simple sounds intermediate between the vowels, as in the English word *cough*, and the German sounds represented by *ae*, *oe*, *ue*, commonly written *ä*, *ö*, *ü*, where the dots placed over the vowels are merely a corruption of the letter *e*.

DIPHUCE'PHALA, a genus of coleopterous insects belonging to the Lamellicornes, section Phyllophagi.

This genus appears to be confined to Australia, and the species of which it is composed are distinguished from those of allied genera chiefly by their having the clypeus deeply emarginated; they are of an oblong form; the thorax is attenuated anteriorly, the elytra are somewhat depressed, and the abdomen is very convex. The antennæ are eight-jointed, and the club is composed of three joints; the anterior tibiæ are generally dentated externally; the anterior tarsi of the males have the four basal joints dilated, and furnished with a velvet-like substance beneath, and all the claws are bifid.

A rich golden green appears to be the prevailing colour of these insects, and we understand that they are found on flowers.

Diphucephala sericea (Kirby) is nearly half an inch in length, of a golden green hue, and has a silk-like gloss on the upper parts; the legs are red; the anterior tibiæ have an obtuse tooth-like process on the outer side, near the apex; the head and thorax are very thickly and delicately punctured; the elytra are covered with confluent punctures which are arranged in longitudinal rows, and each elytron has two smooth elevated striæ; the under parts of the body are covered with white scale-like hairs.

This is the largest species known; there are however many which are nearly equal to it in size. The genus Diphucephala forms the subject of a monograph in the first volume of the 'Transactions of the Entomological Society of London,' where sixteen species are described.

DI'PHYDES, DI'PHYDÆ, a family of zoophytes, thus characterized by M. de Blainville, and placed by him between the *Physograda* and the *Ciliograda*.

Body, bilateral and symmetrical, composed of a very small, nucleïform, visceral mass, and two natatory organs, which are contractile, subcartilaginous, and serial; one anterior, in more or less immediate connexion with the nucleus, which it seems to envelop; the other posterior, and but little adherent.

Head, at the extremity of a more or less proboscidiform stomach.

Vent, unknown; a long cirrhiform and ovigerous production, proceeding from the root of the nucleus, and prolonging itself more or less backwards.

M. Bory de St. Vincent, in his voyage to the African coasts, appears to be the first who noticed these animals, which abound in all the seas of warm latitudes, with any degree of certainty. He considered them to be *Biphores* (Salpa). Tilesius also said something of them in the zoological part of Krusenstern's voyage.

But it was Cuvier who first formed these creatures into a separate genus, under the name of *Diphyes*, and he placed them at the end of his *Hydrostatic Acalephans*, immediately after *Stephanomia* of Péron. Cuvier describes the genus as very singular, consisting of two individuals, which are always together, one including itself in a hollow of the other (l'un s'emboîtant dans un creux de l'autre), an arrangement which nevertheless permits their separation without the destruction of life. They are, he observes, gelatinous, transparent, and move very nearly like the *Medusæ*. The including individual (l'emboîtant) produces from the bottom of its hollow a chaplet (chapelet), which traverses a demi-canal of the included individual (l'emboîté), and would seem to be composed of ovaries and of tentacula and suckers like those of the preceding genera. Cuvier then goes on to state the divisions established by MM. Quoy and Gaimard, according to the relative forms and proportions of the two individuals. Thus, in the *Diphyes*, properly so called, the two individuals are nearly alike, pyramidal, and with some points round their opening, which is at the base of the pyramid. In the *Calpes*, the included individual has still the pyramidal form, but the including individual is very small and square. In the *Abyles*, the included individual is oblong or oval, and the including rather smaller and bell-shaped. In the *Cuböides*, it is the included individual which is small and bell-shaped; the including individual is much larger and square. In the *Navicules*, the included individual is bell-shaped; the including individual large also, but slipper-shaped (en forme de sabot). Cuvier concludes by remarking that there are many other combinations, and refers to the memoir of MM. Quoy and Gaimard, in the 'Annales des Sciences Naturelles,' tome x. This, then, is the account given by Cuvier in his last edition of the 'Règne Animal;' but it was in the first that he established the genus, and in that edition he evidently knew of only one species from the Atlantic, for which he refers to M. Bory's 'Voyage,' and places the genus among his free Acalephans, between *Cestum* of Lesueur and *Porpita* of Lamarck. It is to the first edition that M. de Blainville refers in his 'Actinologie,' and he there says that in fact M. Lesueur, more than a year previously, had sent him the drawing of a genus of the same family, to which Lesueur had given the name of *Amphiora* (Amphiroa?), and which M. de Blainville observes was, from what he now knows of the *Diphyes*, very nearly approximated to them, to say the least; but the want of information as to the characters of the genus prevented him (De Blainville) from publishing it. He remarks, that he ought to add that Lesueur was more fortunate than Cuvier, inasmuch as the former had at his disposal a complete and living animal; while the latter characterized as one *Diphyes* an animal composed of two individuals, giving as the type the anterior moiety only, to which he attributes two apertures, one for the mouth and the other for the exit of the cirrhigerous production which he regards as the ovary. M. de Blainville then, after some further observations as to the place assigned to the animal by Cuvier, refers to the 'Memoir of MM. Quoy et Gaimard,' above mentioned, and states that during the rest of their voyage those zoologists had met with more *Diphydæ*, of which they had formed distinct genera, and had submitted them to his examination; that he had also obtained some beautiful drawings of these animals, made by Lesueur in the Gulf of Bahama; and that M. Paul-Emile Botta, placed by his recommendation on board a merchant ship about to make a voyage round the world, had also communicated to him the observations which he (Botta) had been able to make on the genus; so that, difficult as the study of these singular animals may be, he thinks that he has been able to arrive at their true natural relations, aided, above all,
by an examination of certain species of *Physsopho*
Blainville then states that the body of a *Diphy*
sight, and especially as it appears during life, se
composed of two polygonal, subcartilaginous, t
parts, placed one after the other, the posterior por
trating more or less into an excavation of the ant
tion. These two parts, constantly more or less
have this in common: viz., that they are ordina
or less profoundly hollowed out by a blind cavit
externally by a very large and regular, though d
aperture. Adding to this a production regard
ovary by Cuvier, and which comes out of the supe
of the anterior cartilaginous part, we have the
had been remarked about the *Diphydæ* before th
of Quoy and Gaimard, who have described numer
which they have observed, very nearly like Cuv
this modification, however, that they have consi
two parts as belonging to the same animal: but
of the differences of form necessary for the esta
of the new genera which they have proposed, and
the good figures which they have given, have ena
to go further, and to see in the *Diphydæ* somethin
the two subcartilaginous parts. In fact, taking fo
the *Calpes*, and especially the *Cucubali* and the
is seen that the bodies of the *Diphydæ* form tru
situated at the anterior part of the entire mass,
the nucleus is composed of a proboscidian œsopha
a mouth having a cupping-glass-like termination
touse), continuing itself into a stomach surroun
green hepatic granules, and sometimes into a seco
with air. There is, moreover, to be remarked, at
part, a glandular mass, which is probably the ovar
in more or less immediate relation with the cir
and perhaps oviferous production, which is prolong
wards. This nucleus would seem to be more or
veloped by the anterior cartilage, which offers to it,
cavity sometimes distinct from the second (which
mentioned above), serving for locomotion, and
times confounded with it; it is, besides, in intim
nexion with its tissue by filaments, which M. de B
believes to be vascular. It has been already remar
the posterior part of the body is hollowed out by
cavity, which is continued nearly throughout its
and it is from the bottom of this cavity that a prolo
perhaps equally vascular, proceeds, which goes ab
root of the oviferous production, and unites itself,
doubt, with the nucleus. 'Thus,' continues M. de
ville, 'it would appear to me certain that this par
belongs to the *Diphyes;* but it is easy to conceive
may be detached by the slightest effort, because th
is only effected by a single filament.

After this statement of the organization of *Diphy*
may see that the part which M. Cuvier regarded as
constituting the animal, is only an organ of minor
ance; that there must be added to it the posteri
which was regarded as a distinct individual; but ab
that it is necessary to take into the account the
nucleus, which, with the oviferous production, for
essential part of the animal. From this analys
Diphyes, it is evident that it cannot be an animal
type of the *Actinozoaria;* but in order to establish it
ral relationship, let us see what the observers above
have recorded of its manners and habits.

'The Diphyes are very transparent animals, so
is often very difficult to distinguish them in the se
even in a certain quantity of water taken from it.
especially at considerably great distances from the
that they are met with in the seas of warm climate
often very numerous. They float and swim apparen
all directions, with the anterior or nucleal extremit
most, and getting rid of the water which they take
the contraction of the two subcartilaginous parts;
aperture, consequently, is always directed back
When the two natatory organs are equally provided
a special cavity, it is probable that the locomotion is
rapid; it can, finally, be executed by either the one
other, in proportion to their size. The posterior p
attached to the nucleus with so little solidity, that it
happens that it detaches itself from it accidentally; so
M. Botta believed that an entire *Diphyes* was only fo
by one of these parts, he having but very rarely found
animals complete. During locomotion the cirrhigerous
oviferous production apparently floats extended back

lodging itself partly in a gutter, into which the inferior edge of the posterior natatory organ is hollowed out; but it has not the same length, the animal being able to contract it powerfully and even to the extent of withdrawing it inwards entirely; from this it is evident that this organ is muscular. But what is very remarkable is, that throughout its length, and placed at sufficiently regular distances, are found organs which MM. Quoy and Gaimard regarded as suckers, and which possessed, in fact, the faculty of adhesion and bringing the animal to anchor, as M. Botta was satisfied. I dare not decide what this organ is; but I am strongly inclined to believe either that it is a prolongation of the body analogous to that in the *Physsophoræ*[*], or that it is, if not an ovary, at least an assemblage of young individuals, a little like what takes place in the *Biphores*.

'In the actual state of our knowledge with regard to the *Diphyes*, it seems to me that they are, so to speak, intermediate between the *Biphores* and the *Physsophoræ*. They approach the first, whose cartilaginous envelope is sometimes tripartite, as M. Chamisso has taught us, inasmuch as that the visceral mass is nucleiform, that it is contained in great part in this envelope, that the latter has two apertures, and that it is by contraction that it executes locomotion. We find, on the other hand, a mode of approximating the *Diphyes* to the *Physsophoræ*, in regarding the natatory organs as analogous to those which we have seen in *Diphysa*, which has the smallest before and the largest behind, both the one and the other being perfectly bilateral. The mouth is also at the extremity of a sort of proboscis. There is sometimes a bullöid swelling full of air: finally, the body is terminated by a cirrhigerous production, which is perhaps oviferous. For the rest we are obliged to agree that these approximations require, before they are freed from doubt, a more complete knowledge than we at present possess, not only of the organization of the *Diphyes* and *Physsophoræ*, but also of the *Biphores* themselves. According to the views of M. Mertons, chief naturalist in the last circumnavigation of the Russians, the *Diphyes* would be no other than *Stephanomiæ;* in which case the oviferous and cirrhigerous productions of the *Diphyes* must be considered the analogues of the posterior and tubular part of the *Stephanomiæ*. We have already said that MM. Quoy and Gaimard, in their memoir on the *Diphydæ*, had established many new genera, having in view principally the form and the proportion of the two natatory organs or parts of the body. M. Lesueur has also established genera, some of which may be incorporated with those of the zoologists of the Astrolabe; unfortunately our knowledge of these genera is confined to figures only. Lastly, M. Otto has proposed one or two, but they are founded on detached parts or incomplete animals. The greater part of these genera are not, in reality, very distinct; we adopt them nevertheless provisionally at least in order to facilitate the study of beings so singular. The *Diphydæ* seem to us capable of division into two great sections, according as the anterior part is provided with a single or double cavity. M. Eschscholtz, in his systematic distribution of the species of *Diphydæ*, has regard to the number of cavities of the anterior natatory organ, and to the presence of one or more suckers in the tubular production. From this test have resulted genera otherwise circumscribed, and not less numerous than from our manner of viewing the subject.'

The following is M. de Blainville's arrangement.

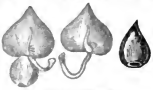
a.

Diphydæ whose anterior part has but a single cavity.

Genera, Cucubalus.

Body, provided with a large proboscidiform exsertile sucker, with a bunch (grappe) of ovaries at its base, lodged in a large single excavation of a natatory anterior cordiform organ, receiving also the posterior, which is also cordiform and hollowed into a cavity with a posterior and sub-oval orifice.

Example, *Cucubalus cordiformis*, the only species cited of the genus established by MM. Quoy and Gaimard. Length, two lines. Differs from the other *Diphydæ*, first, in having the nucleus much less hidden and sunk in the anterior natatory body, which has moreover only one large cavity in which it is plunged; secondly, in having the oviferous production very short; and, lastly, in the mode of locomotion, for the animal always swims vertically

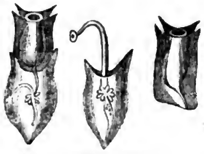


Cucubalus cordiformis.

Cucullus.

Body furnished with a great, exsertile, proboscidiform sucker, with a bunch of ovaries at its base, lodged in a deep excavation, the only one in the anterior natatory organ, in form of a hood, in which the posterior is inserted (s'emboîte); the latter is tetragonal and pierced behind with a rounded terminal orifice.

Example, *Cucullus Doreyanus* (Quoy and Gaimard). Locality, New Guinea.



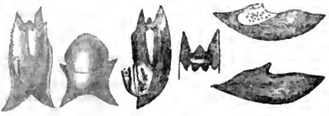
Cucullus Doreyanus.

M. de Blainville observes that this genus does not really differ from the preceding, excepting in the form of the natatory organs, and he doubts the propriety of retaining it, especially as it consists but of one species. M. Botta, he observes, who had occasion frequently to observe in nearly all the seas of warm climates, from the coast of Peru to the Indian archipelago, a great number of animals resembling the *Cucullus* of MM. Quoy and Gaimard, and having found them sometimes free and at other times forming part of the cirrhigerous and oviferous production of the ordinary *Diphyes*, has been led to think that the *Cuculli* may be only a degree of development of a *Diphyes*. Although, concludes M. de Blainville, this is conceivable up to a certain point, inasmuch as in the *Cuculli* there is no cirrhigerous production, which seems to prove that they are not adults, the difference nevertheless of the natatory organs is so great that he dares not come to this decision.

Cymba (Nacelle).[*]

Body furnished with a large exsertile proboscidiform sucker, having at its base a mass of ovariform organs, lodged in the single and rather deep cavity of a naviform natatory organ, receiving and partially hiding the posterior natatory organ, which is sagittiform, pierced behind with a rounded orifice crowned with points, and hollowed on its free border by a longitudinal gutter.

Example, *Cymba sagittata* (Quoy and Gaimard); *N.*[†] *sagittata* (De Blainville). Locality, Straits of Gibraltar.



N. sagittata.

M. de Blainville remarks that he ought to observe that M. Eschscholtz says that this genus, to which he unites the two following genera, possesses an anterior natatory organ with two cavities, and of these the natatory cavity projects in the form of a tube. M. de Blainville further observes that this genus does not differ from the *Cuculli*, except in the form of the natatory organs; in fact, the disposition of the nucleus in the bottom of the single cavity into which the anterior organ is hollowed, and the penetration of the posterior organ into this same cavity are absolutely the same as in the two preceding genera, as M. de Blainville has been able to satisfy himself from the examination of many individuals preserved in spirit.

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[*] This (says M. de Blainville) is the opinion of M. Eschscholtz, who gives to this part the name of *ductus nutritorius* (nourishing canal), which, he says, is simple, or provided with a single sucker, in the first section, and complex or provided with many suckers, in the second.

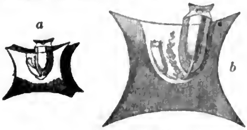
[*] Mr. Broderip had appropriated this name to a subgenus of Volutidæ. See Sowerby's 'Genera of recent and fossil Shells,' No. 28, and Mr. B.'s Monograph in Mr. Sowerby's 'Species Conchyliorum.'

[†] Navicula?

Cuböides.

Body nucleiform, provided with a large proboscidiform sucker, surrounded by an hepatic mass, having at its base an ovary, whence proceeds a filiform ovigerous production, contained in a large, single, hemispherical excavation of an anterior, cuböid, natatory organ, much larger than the posterior one, which is tetragonal, and nearly entirely hidden in the first.

Example, *Cuböides vitreus* (Quoy and Gaimard). Locality, Straits of Gibraltar.



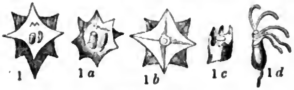
Cuböides vitreus.
a, nat. size; b, magnified.

This again, according to M. de Blainville, is a genus scarcely distinguishable from the preceding genera, and only by the form and proportion of the natatory organs. 'As,' says M. de Blainville, 'I have had a considerable number of individuals at my disposal, I have been able to satisfy myself as to the characteristic which I have given of them. I have in fact clearly recognized that the great and single cavity of the anterior and cubic organ contained a considerable visceral nucleus, in which I have been able to distinguish a sort of proboscidiform stomach, surrounded at its base with an hepatic organ; and further backward, a granular ovary, contained in its proper membrane, and whence escaped a long ovigerous production. I have also been equally able to satisfy myself that the natatory posterior organ, of the same conformation, as far as the rest, as in the true *Diphyes*, was entirely hid in the excavation of the anterior organ with the visceral mass.

Enneagona.

Body nucleiform, provided with a large exsertile sucker, having at its base an assemblage of ovaries, whence proceeds an oviferous production. Anterior natatory organ enneagonal, containing with the nucleus in a single? excavation the posterior organ, which is much smaller, with five points, and canaliculated below.

Example, *Enneagona hyalina* (Quoy and Gaimard).



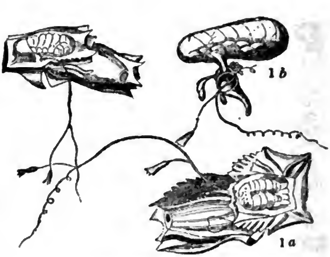
Enneagona hyalina.
1, 1 a, 1 b, Enneagona hyalina under different aspects; 1 c, visceral part; 1 d, nucleus.

Amphiroa.*

Body nucleiform, of considerable volume, furnished with a proboscidiform stomach, having at its base a bunch of ovaries, prolonged into a long filament, contained in an anterior, polygonal, short, natatory organ, cut squarely, with a single cavity in which the posterior organ, which is equally short, polygonal, and truncated, is inserted.

Example, *Amphiroa alata* (Lesueur). Locality, Seas of Bahama.

M. de Blainville observes that this genus is only known by the beautiful figures sent by M. Lesueur, and of which one reached M. de Blainville more than ten years ago, but without description, the want of which prevented him from publishing it. Nevertheless it is evident, he remarks, on referring to these figures, that the *Amphiroæ* are *Diphydæ*, but with natatory organs of a particular form and proportion. Another species, he adds, *Amphiroa truncata*, would appear to approximate nearly to the *Calpes* of MM. Quoy and Gaimard, by the great disproportion of the two parts.



Amphiroa alata.
1, 1 a, Amphiroa alata; 1 b, its nucleus extracted.

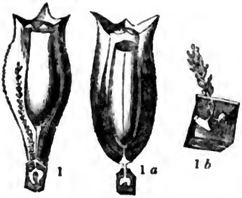
β.

Diphydæ whose anterior part is furnished with two distinct cavities.

Calpe.

Body nucleiform, without an exsertile proboscis, having a sort of aeriferous vesicle, and at its base an ovary? prolonged into a long cirrhigerous and oviferous production. Anterior natatory organ short, cuböid, having a distinct locomotive cavity; posterior natatory organ very long, truncated at the two extremities, not penetrating into the anterior organ, and provided with a round terminal aperture.

Example, *Calpe pentagona* (Quoy and Gaimard). Locality, Straits of Gibraltar?



Calpe pentagona.
1, Calpe pentagona (profile); 1 a (under side); 1 b, nucleus.

M. de Blainville observes that this genus is really sufficiently distinct from the true *Diphyes*, with which it ha nevertheless many relations, not only by the great differenc of the two locomotive organs, but because the posterio organ is only applied against the anterior one, and does no penetrate into the visceral cavity. He remarks that he ha examined some individuals well preserved in spirit, and ha easily seen that the nucleus is composed of a sort of stomac with a sessile mouth and with a small hepatic plate (plaque of a green colour applied against it, and besides of a sor of aeriferous bladder situated behind. At the lower root o the stomachal swelling is the ovary, formed by a mass o granules, and which seems to prolong itself backwards int a long production charged with oviform bodies, and other longer and more bell-shaped. This production proceed from the anterior natatory organ, and passes under th posterior one in following the gutter into which it is ho lowed on its lower surface. Finally, this posterior orga equally truncated at the two extremities, is hollowe nearly throughout its length into a great cavity, from th bottom of which a vessel which is continued to the root the ovary of the nucleus may be clearly seen to proceed.

Abyla.

Body nucleiform, inconsiderable, with a very long cirrh gerous and oviferous production. Anterior natatory bo much shorter than the other, subcuböid, with a distin cavity for the reception of the anterior extremity of the posterior natatory body, which is polygonal and very long.

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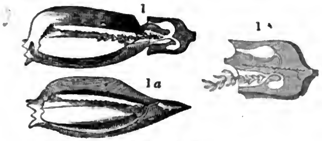
* The term Amphiroa is also employed by Lamouroux and others to distinguish a genus of Corallinea.

Example, *Abyla trigona* (Quoy and Gaimard). Locality, Straits of Gibraltar.



[Abyla trigona.]

1, Abyla trigona; 1 a, posterior part; 1 b, anterior or visceral part.

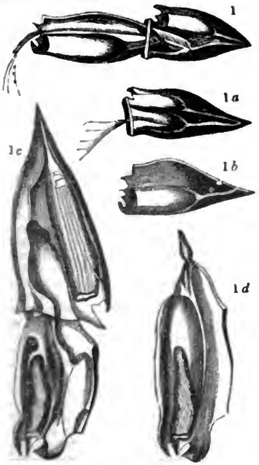
M. de Blainville observes that this genus does not really differ from the preceding, excepting in the form of the natatory organs, and above all in that the anterior part is pierced with a depression sufficiently considerable for the lodgment of a part of the other, which has a long inferior furrow (sillon) and a posterior terminal opening. To this genus M. de Blainville refers a species of *Diphydæ*, found by MM. Quoy and Gaimard in Bass's Strait, and of which they had provisionally formed the genus *Bassia*, which does not seem to M. de Blainville to be sufficiently characterized.

M. Eschscholtz, remarks M. de Blainville, rightly unites this genus with the preceding, as well as the genus *Rosacea* of Quoy and Gaimard, the latter perhaps erroneously.

Diphyes.

Body nucleiform indistinct, situated in the bottom of a deep cavity, whence proceeds a long tubular production, furnished throughout its extent with proboscidiform suckers, having at their root granular corpuscles and a cirrhiferous filament. Natatory bodies nearly equal and similar; the anterior with two distinct cavities, the posterior with a single one, with a round aperture provided with teeth.

Example, *Diphyes Bory* (Quoy and Gaimard); *Diphyes campanulifera* (Eschscholtz).



[Diphyes Bory.]

1, The entire animal (profile); 1 a, anterior part of the same; 1 b, posterior part; 1 c animal magnified; 1 d, posterior part of the same.

M. de Blainville observes that the denomination of *Diphyes*, employed by M. Cuvier for a single species, which is the most common and the most generally spread in all seas, is used in the work of MM. Quoy and Gaimard for species which have the natatory organs nearly equal in form and size, the first whereof has two deep cavities, of which the one receives a part only of the other which has a long inferior ridge for the lodgment of the cirrhigerous production. M. Lesueur, he adds, who has equally adopted this division of the *Diphydæ*, gives it the name of *Dagysa* adopted by Solander, and also by Gmelin; but M. de Blainville asks, is it certain that the animal seen by Solander was a *Diphyes*, and not a *Biphore?* He adds, that M Lesueur has figured five species belonging to this genus perhaps all new, and from the seas of South America.

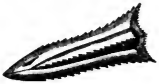
γ.

Doubtful species, or those with one part only.

Pyramis.

Body free, gelatinous, crystalline, rather solid, pyramidal, tetragonal, with four unequal angles, pointed at the summit, truncated at its base, with a single rounded aperture communicating with a single deep cavity, towards the end of which is a granular corpuscle.

Example, *Pyramis tetragona* (Otto).



[Pyramis tetragona.]

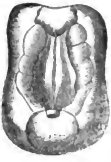
This genus was established by M. Otto, and M. de Blainville admits that he knows no more of it than is to be collected from M. Otto's description and figure. He seems to doubt, however, whether the genus may not have been founded on the posterior natatory organ of a *Diphyes*, perhaps of the division properly so called.

M. Eschscholtz makes this organized body a species of his genus *Eudoxia*, which comprehends *Cucubalus* and *Cucullus* of Quoy and Gaimard, admitting that the two natatory organs are intimately united so as to form, apparently, but one.

Praia.

Body? subgelatinous, rather soft, transparent, binary, depressed, obtuse, and truncated obliquely at the two extremities, hollowed into a cavity of little depth, with a round aperture nearly as large as the cavity, and provided with a large canal or furrow above.

Example, *Praia dubia* (Quoy and Gaimard).



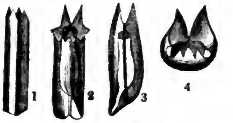
[Praia dubia.]

M. de Blainville describes, from personal observation, this provisional genus of MM. Quoy and Gaimard as being subgelatinous, rather soft, and transparent. Its form, he remarks, is regularly symmetrical, and it seems to be divided into two equal parts by a great furrow which traverses it from one end to the other. It has a shallow cavity with a rounded aperture, without denticles or appendages at its circumference. In the tissue M. de Blainville perceived a mesial vessel, giving off two lateral branches, with very similar ramifications; and he is inclined to think that the form is only the natatory organ of some large species of *Physsophora:* the substance is too soft for a true *Diphyes.*

Tetragona.

Body? gelatinous, transparent, rather solid, binary, of an elongated, parallelopiped, tetragonal form canaliculated below, truncated obliquely anteriorly, pierced behind by a gaping orifice furnished with symmetrical points, and leading into a long blind cavity.

Example, *Tetragona hispidum* (Quoy and Gaimard).



[Tetragona hispidum.]

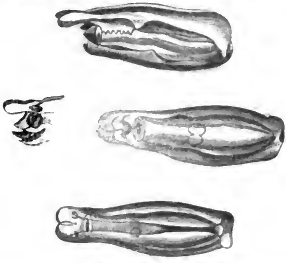
1. Tetragona hispidum ; 2, 3, 4, details of the same.

M. de Blainville is of opinion that this is only the posterior or inferior natatory organ of a true *Diphyes*.

Sulculeolaria.

Body ? subcartilaginous, transparent, elongated, cylindröid, traversed throughout its length by a very large furrow, bordered with two membranes, truncated at the two extremities, with a posterior aperture, with appendicular lobes on its circumference and leading into a very long and blind cavity.

Example, *Sulceolaria quadrivalvis* (Lesueur). Locality, Mediterranean (Nice).



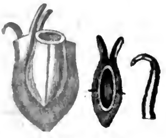
[Sulculeolaria quadrivalvis.]

A genus characterized by De Blainville, who found it established in the figures of Lesueur, from those figures; but the former is strongly inclined to believe that the genus is founded on the part of an animal, and not on an entire one. If these bodies should turn out to be merely organs or parts, M. de Blainville thinks they ought to belong to the genus *Calpe* of Quoy and Gaimard.

Galeolaria.

Body gelatinous, rather firm, perfectly regular, symmetrical, subpolygonal or oval, compressed on the sides and furnished with two lateral rows of extremely fine cirrhi. A large posterior aperture pierced in a sort of diaphragm with appendicular lobes, binary above, leading into a large cavity with muscular walls. An ovary at the anterior superior surface, coming out by a mesial and bilabiated orifice.

Example, *Galeolaria australis*, *Beröides australis* (Quoy and Gaimard).



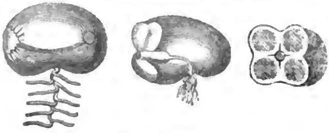
[Galeolaria australis.]

Known to M. de Blainville from the drawings of Lesueur, who gave the form the name of *Galeolaria*, which the former adopts in preference to *Beröides*, the term employed by Quoy and Gaimard. *Galeolaria* however is the name given by Lamarck to a genus of his *Serpulidæ*. From the manuscript memoir of Quoy and Gaimard lent by them to De Blainville, he ascertained the peculiarity of the two rows of cilia on each side. Botta sent him also in spirit many individuals obtained in the course of his circumnavigation. It seemed to De Blainville that these animals differed really from the *Diphydæ*, and approached the *Beröes*. To confirm this approximation it would have been necessary to find the posterior aperture of the internal canal, of which, he remarks, no observer has spoken; but it appears to him that the existence of the two series of cirrhi, their relation with a canal which follows their root, the distinct and muscular walls of the cavity, and the position of the ovary, are sufficient to show in these animals a passage at least towards the *Beröes*.

Rosacea.

Body free, gelatinous, very soft, transparent, suborbicular, with a single terminal aperture at one of the poles leading into an oval cavity which communicates with a depression, whence proceeds a cirrhigerous and oviferous production.

Example, *Rosacea Ceutensis* (Quoy and Gaimard).



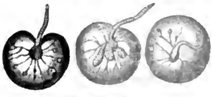
[Rosacea Ceutensis.]

Eschscholtz unites this genus with those of *Calpe* and *Abyla* under the first appellation. De Blainville, who states that he only knows the form from the figures and description given by Quoy and Gaimard, is at a loss to determine positively what it is, but he supposes it to be a *Physsophora* rather than a *Diphyes*.

Noctiluca.

Body free, gelatinous, transparent, spheröidal, reniform with a sort of infundibuliform cavity, whence proceeds a proboscidiform, contractile production.

Example, *Noctiluca miliaris*, Lamarck.



[Noctiluca miliaris]

M. Surriray, a doctor of medicine, while investigatin the cause of the phosphorescence of the sea-water at Hâvr appears to have been the first who observed and calle attention to the genus *Noctiluca*, which he described an figured in the memoir that he communicated to the cla of sciences of the French Institute. Its size hardly equa that of a small pin's head, and it is as transparent crystal; he found it very common in the basins at Hâvr sometimes in such abundance as to form a considerab thick crust (croûte assez epaisse) on the surface of t water. Lamarck adopted the genus, placing it betwe *Beröe* and *Lucernaria*, which last, in his system, imm diately precedes *Physsophora*. To these minute anima Dr. Surriray attributes the phosphorescence of the sea Hâvre.

M. de Blainville states that he has often had occasion observe these minute beings with Dr. Surriray, aided by t microscope. 'It appeared to me,' says De Blainvill speaking of *Noctiluca miliaris*, 'nearly regularly spheric but somewhat notched (fendu), or excavated on its anteri part so as a little to resemble a cherry. From the midd of the excavation proceeds a sort of long cylindrical te tacle diminishing little in size throughout its extent, a terminating in an obtuse extremity. During life this orga moves in all directions somewhat after the manner of elephant's trunk (en se repliant, un peu a la manière de trompe de l'elephant). It seemed to me, in fact, to composed of annular fibres and traversed by a can throughout its length, so that it may be supposed to terminated by a sucker. The body is enveloped in a tran parent membrane, forming sometimes irregular plait Within may be perceived a kind of funnel-like œsophag (espèce d'œsophage en entonnoir) commencing anterior towards the proboscis and terminating posteriorly by a sort of spherical stomach. I was unable to determine whether there was an intestinal canal with an anal opening. In some individuals, but, as it would appear, at a certain period of the year only, may be seen in the interior many groups, or small masses irregularly placed and composed of a transparent envelope, containing small globules of blackish brown, which M. Surriray considers to be eggs. At a more advanced period, which M. Surriray supposes to be that of spawning, the water becomes of a red colour (d'un rouge lie de vin), and then there are found a certain number of individuals which have the proboscidiform production twice its usual length (du double plus long), and which he regards as newly-born animals. The general movements of these small animals appear to be very slow, and are essentially executed by means of the species of trunk which is continually moving from right to left. M. Surriray, who had frequently occasion to observe them, has seen them sometimes disencumber themselves entirely of their membranous envelope even to the tentacula. During life the *Noctilucæ* are excessively phosphorescent, and I have verified with M. Surriray the fact that at Hâvre the phosphorescence of the sea is owing to these animals; also, that in passing it through a strainer (à travers une étamine), it loses this property, which is much the strongest in warm and stormy weather, much weaker in the winter, and null under a west wind.'

De Blainville remarks that though he arranges this animal provisionally in this section, he is far from considering that it is its true place, and that it seems to him, in fact, to have much relation with that form of which MM. de Chamisso and Eisenhardt have made their genus *Flagellum*, and which MM. Quoy and Gaimard have also designated under a particular denomination: he asks, in conclusion, whether *Noctiluca* may not be an animal near the *Cucubali* and *Cuculli*, whose natatory organs have been reduced to the membranous envelope?

Doliolum.

Body? gelatinous, hyaline, cylindrical, truncated, and equally attenuated at the two extremities, which are largely opened and without apparent organs.

Example, *Doliolum Mediterraneum* (Otto).

[Doliolum Mediterraneum.]

M. Otto describes the organism on which he has established this genus as swimming by ejecting and absorbing the water by means of the alternate dilatation and contraction of its two orifices. M. Delle Chiaje (*Mem.*, tom. iii.) seems inclined to believe that the *Doliolum* of Otto is merely a fragment of a species of *Holothuria*, which he names *Holothuria inhærens*. De Blainville observes that if Otto's description of the motion, &c., above stated, be correct, it is probable that the animal is a true *Biphore;* but if, by any chance, there should be but one opening, then it would be the organ of some *Physsophora*, which would agree better with the total absence of internal organs.

M. de Blainville's 'Manual' was published in 1834, and in his 'Nouvelles Additions et Corrections,' dated at the Paris Museum, December, 1836, he declares his persistence in the belief that the *Physograda*, *Dyphidæ*, and *Ciliograda*, ought not to be comprised in the type of the *Actinozoairia*, but that they ought to form an 'entretype,' under the denomination of *Malactinozoaria*, indicating that they are, so to speak, intermediate between the *Mollusca* and the *Radiata*. With regard to the *Diphydæ*, in particular, he remarks that since the appearance of his 'Manual,' MM. Quoy and Gaimard have published their observations on this group of animals, and that they have abandoned the different generic distinctions (coupes génériques) which they had established in their first memoirs; distinctions, in fact, which scarcely rested on more than the difference of form and the proportion of the natatory organs. They have, moreover, observed that their polymorphous *Biphore* (Uranie, *Zoolog.*, pl. 73, fig. 4) is certainly nothing more than a part of their *Diphyes Abyia*.

M. de Blainville then continues thus:—'The structure of the *Physsophora*, which I have named *Diphyes*, by reason of the existence of two natatory organs only, which are median and placed one before the other, and of rows of cartilaginous *squamellæ* upon the root of the cirrhigerous productions, does not permit a doubt of the great relationship which exists between the *Diphyes*, properly so called, and the *Physograda;* and that these two great genera ought to be united under the same family, as has been previously stated. M. Brandt has proposed to establish two subgenera only among the *Diphyes*, the first consisting of those in which the cartilaginous scales of the cirrhigerous production are scattered or distant, as in *Diphyes dispar*, and the second, which he names *Diphyomorpha*, in which the scales are so close-set as to be imbricated, as is seen in the new species observed by Mertens, and named by him *Diphyes Stephanomia*. Among the genera *incertæ sedis*, which, wrong or right, have been connected with *Physsophora* or *Diphyes*, without even being very certain that they are animals, we shall cite the two following genera intentionally omitted in our work.'

De Blainville then mentions the following:

Cupulites (Quoy and Gaimard), placed among the *Physsophoræ*, whose capsules are disposed on each side of a very long axis, established on an organized body, figured pl. 87, fig. 4—16 in the zoological part of the Voyage of the Uranie. Not having met with this animal in their second voyage, MM. Quoy and Gaimard doubt (Astrolabe, Zoolog., t. iv. p. 53 n.) whether it is an incomplete *Physsophora* or a *Stéphomonise* (*Stephanomia?*) with hollow natatory organs. Cuvier places the genus between *Hippopus*[*] and *Racemis*.

Polytoma (Quoy and Gaimard, Zool. of the Uranie, pl. 87, fig. 12, 13), which may be defined to be an oval mass of globular trivalvular corpuscles (corpuscules globuleux comme trivalves), and which MM. Quoy and Gaimard conceive to be rather a *Biphore* than a *Physograde*.

Tetragona (p. 10), Quoy and Gaimard, Zool. of the Uranie, pl. 86, fig. 11). This the authors themselves (Astrolabe iv. p. 103) have recognized as being nothing more that the posterior point of *Diphyes hispida*.

Racemis (Delle Chiaje, Cuvier), figured by Delle Chiaje, Mem. tab. 50, f. 11, 12, and described as a globose vesicle endowed with a very quick motion, and disposed towards an ovate shape; but, observes De Blainville, the figures and description are too incomplete to afford a supposition of what it is; in fact, Delle Chiaje confines himself to stating that his *Racemis ovata* executes all the rotatory and rapid motions at the surface of the water, and that those of each vesicle are so lively that it has been absolutely impossible to perceive the aperture with which, according to Delle Chiaje, they are provided. Cuvier only adds to the description of Delle Chiaje, who also places *Racemis* near the *Physsophoræ*, a small membrane with which each vesicle is furnished. M. De Blainville concludes by observing that he had seen a drawing, by M. Laurillard, which had been taken at Nice from one of these organized bodies while alive, and that he supposed that it might well be a mass of eggs of *Mollusca*.

From the difficulties with which the distinguished zoologists above quoted have found this subject surrounded, and the differences of opinion expressed by them, the reader will perceive that the natural history of these extraordinary organized bodies is anything but complete; and we have laid before him the information above given in order that he may see what has been done and how much remains to be elucidated.

DI'PHYES. [Diphydes.]

DIPHYLLI'DIA. [Inferobranchiata.]

DIPHY'SA. [Physograda.]

DIPLECTRON. [Pavonidæ.]

DIPLOCTE'NIUM. [Madrephylliœa.]

DIPLODA'CTYLUS, a genus of Lizards established by Mr. Gray, and regarded by him as forming a new genus in the family of *Geckos*.

Generic character.—*Scales* subconformable, minute, smooth; the abdominal scales rather large; the caudal scales annulate and larger; the labial scales moderate, distinct, the three anterior ones on each side much the largest; no gular scales. *Tail* cylindrical, ventricose. *Toes* 5, 5, simple, subequal, subcylindrical, the points subdilated, bifid beneath, with two oval, oblique, smooth, fleshy disks claws 5, 5, small, very retractile. No *femoral pores*. (Gray.)

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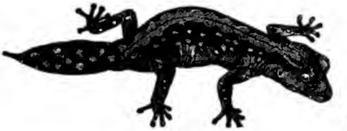
[*] Cuvier quotes this as the generic name of Quoy and Gaimard. 'Hippopus' had been preoccupied by Lamarck to distinguish a genus of conchifera of the family Tridacnidæ (Les Tridacnes of Bruguière).

This genus differs from *Phyllodactylus* of the same zoologist in having the under sides of the tips of the toes furnished with two rather large oblong tubercles truncated at the tip and forming two oval disks placed obliquely, one on each side of the claw, instead of having, as in *Phyllodactylus*, two membranaceous scales. The scales of *Diplodactylus* are, moreover, uniform, whilst in *Phyllodactylus* there is a row of larger scales extending along the back.

Example, *Diplodactylus vittatus*.

Description. Brown, with a broad longitudinal dorsal fillet; limbs and tail margined with rows of yellow spots.

There are two rows of rather distant small spots on each side of the body. the spots become larger on the upper surface of the tail, and are scattered on the limbs. Length of head and body 2 inches, that of the tail 1½ inch. Locality, New Holland, whence it was brought to England by Mr. Cunningham. (*Zool. Proc.* 1832.)



[Diplodactylus vittatus *.]

DI'PLODON, Spix's name for a genus of fresh-water conchifers, Naïades of Lea. [Naïades.]

DIPLOMACY is a term used either to express the art of conducting negotiations and arranging treaties between nations, or the branch of knowledge which regards the principles of that art and the relations of independent states to one another. The word comes from the Greek diploma, which properly signifies any thing doubled or folded, and is more particularly used for a document or writing issued on any more solemn occasion, either by a state or other public body, because such writings, whether on waxen tablets or on any other material, used antiently to be made up in a folded form. The principles of diplomacy of course are to be found partly in that body of recognized customs and regulations called public or international law, partly in the treaties or special compacts which one state has made with another. The superintendence of the diplomatic relations of a country has been commonly entrusted in modern times to a minister of state, called the Minister for Foreign Affairs, or, as in England, the Secretary for the Home Department. The different persons permanently stationed or occasionally employed abroad, to arrange particular points, to negotiate treaties commercial and general, or to watch over their execution and maintenance, may all be considered as the agents of this superintending authority, and as immediately accountable to it, as well as thence deriving their appointments and instructions. For the rights and duties of the several descriptions of functionaries employed in diplomacy, see the articles Ambassador, Charge d'Affaires, Consul, Envoy.

DIPLOMATICS, from the same root, is the science of the knowledge of antient documents of a public or political character, and especially of the determination of their authenticity and their age. But the adjective, diplomatic, is usually applied to things or persons connected, not with diplomatics, but with diplomacy. Thus by diplomatic proceedings we mean proceedings of diplomacy; and the *corps diplomatique*, or diplomatic body, at any court or seat of government, means the body of foreign agents engaged in diplomacy that are resident there.

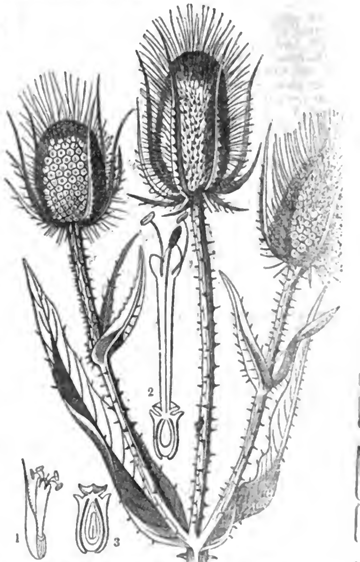
Some of the most important works upon the science of diplomatics are the following:—'Ioannis Mabillon de Re Diplomatica,' lib. vii., fol., Paris, 1681-1709, with the 'Supplementum,' fol., Paris, 1704; to which should be added the three treatises of the jesuit, Barthol. Germon, addressed to Mabillon, 'De Veteribus Regum Francorum Diplomatibus,' 12mo., Paris, 1703, 1706, and 1707:—Dan. Eber. Baringii 'Clavis Diplomatica,' 2 vols. 4to., Hanov., 1754; Ioan. Waltheri 'Lexicon Diplomaticum,' 2 vols. fol., Götting., 1745-7; 'Nouveau Traité de Diplomatique,' par les Bénédictins Tassin, &c., 6 vols. 4to., Paris, 1750-65; 'Historia Diplomatica,' da Scipione Maffei, 4to., Mant., 1727; Io. Heumann von Teutschenbrunn 'Commentarii de Re Diplomatica Imperiali,' 4to., Nurem., 1745; Dom de Vaines, 'Dictionnaire Raisonné de Diplomatique,' 2 vols. 8vo., Paris, 1774; J. C. Gatterer 'Abriss der Diplomatik,' 8vo., Götting., 1798; and C. T. G. Schoenemann 'Versuch eines vollständigen Systems der allgemeinen besonders ältern Diplomatik,' 8vo., Götting., 1802.

DIPPER. [Merulidæ.]

DIPPING-NEEDLE, an instrument, the essential part of which is the magnetised needle employed to ascertain the Dip or inclination. [Inclination.]

DIPROSIA. [Pœcilopoda.]

DIPSA'CEÆ, a small natural order of exogenous plants, with monopetalous flowers, nearly allied to Compositæ (otherwise called Asteraceæ), from which it differs in the ovule being pendulous instead of erect, in the embryo being inverted, in the anthers being distinct, not syngenesious, and in the corolla having an imbricated, not valvate æstivation. In habit the species are similar to Compositæ, having their flowers constantly arranged in heads. None of the species are of any importance except the common teazle, Dipsacus Fullonum, whose prickly flower-heads are extensively employed in carding wool. Many of the species have handsome flowers, especially the Scabiouses, and are cultivated in the gardens of the curious. Purple and starry Scabions are common hardy annuals.



A portion of the upper part of Dipsacus Fullonum.

1, a flower with the hard spiny bract from which it springs; 2, a corolla with two of the stamens, and the ovary containing a pendulous ovule much magnified; 3, a longitudinal section of a fruit, with the pendulous seed and the inverted embryo.

DIPSAS (Laurenti), *Bungarus* (Oppel), a genus of serpents placed by Cuvier under the great genus Coluber.

Description. Body compressed, much less than the head. Scales of the spinal row of the back larger than the others.

Example, *Dipsas Indica*, Cuvier; *Coluber Bucephalus*, Shaw.

Description. Black, annulated with white.

The subjoined cut, from Guerin (*Iconog.*) will illustrate the form.

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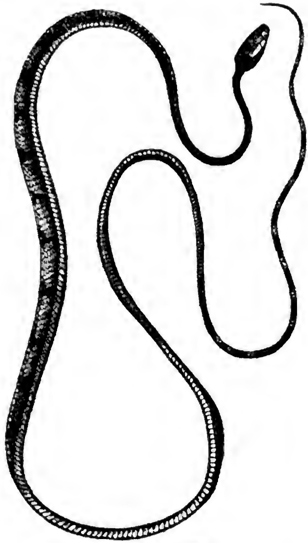
* We are indebted to Mr. Gray for the figure of this animal.



[Dipsas cyanodon (*Iconog*).]

The term *Dipsas* is also used by Dr. Leach to distinguish a genus of fresh-water conchifers; and he states that its systematic situation is between *Unio* and *Anodonta* (Anodon); *Unio* of Sowerby; *Naïades* of Lea. [NAÏADES.]

DIPSASTRÆA. [MADREPHYLLIŒA.]

DI'PTERA, one of the orders into which insects are divided. This name was first applied by Aristotle, and has subsequently been adopted by almost all entomologists to designate those insects the most striking characteristic of which is the possession of two wings only.

The common house-fly and blue-bottle fly afford familiar examples of this order. Some dipterous insects, however, are destitute of wings (such as the species of the genera *Melophagus*, *Nycterobia*, &c.); hence it is necessary that we should here notice other peculiarities observable in these insects.

The Diptera have six legs, furnished with five-jointed tarsi, a proboscis, two palpi, two antennæ, three ocelli, and two halteres or poisers.

The wings are generally horizontal in their position and transparent; their nervures are not very numerous, and are for the most part longitudinally disposed, a character in which the wings of dipterous insects differ from those of the orders Neuroptera and Hymenoptera.

The proboscis, situated on the under part of the head, is generally short and membranous, and consists of a sheath (or part analogous to the under lip or labium in mandibulate insects), which serves to keep in situ other parts of the mouth, which, when they are all present, represent the mandibles, maxillæ, tongue, and labium.

There are however considerable modifications in the structure of the proboscis: in some it is long, slender, and corneous, and the number of enclosed pieces, which are generally very slender and sharp, varies from two to six.

It is evident that this structure of mouth is adapted only to the extraction and transmission of fluids; and when these fluids are contained within any moderately tough substance, the parts enclosed by the sheath of the proboscis are used as lancets in wounding and penetrating so as to allow the escape of the fluid, which by their pressure is forced to ascend and enter the œsophagus.

The palpi are situated at the base of the proboscis. The antennæ are placed on the fore part of the head, and approximate at their base; they are generally small and three-jointed; the last joint, however, is often furnished with an appendage, called the stylet, which is considerably diversified, not only in form but in its position.

In some of the insects of this order, the *Tipulidæ* for instance, the antennæ are long, and composed of numerous joints; and in the *Culicidæ* they resemble little plumes.

The eyes in dipterous insects are generally large, especially in the male sex, where they often occupy nearly the whole of the head.

The halteres or poisers are two small organs of a slender form, and furnished with a knob at their apex, situated at the base of the thorax on each side, and immediately behind the attachment of the wings. These organs have been considered by many as analogous to the under wings of four-winged insects. Latreille and others, however, have come to a different opinion, from the circumstance of their not being attached to the same part of the thorax. The use of these organs is not yet ascertained; it is however supposed by some that the little knob which we mentioned is capable of being inflated with air, and that they serve to balance the insect during flight, at which time these organs are observed to be in rapid motion.

As regards the thorax, it is only necessary here to observe that the chief part of that which is visible from above consists of the mesothorax; the prothorax and metathorax being comparatively small.

The scutellum varies considerably in form, and is sometimes armed with spines; we find it developed in an extraordinary manner in the genus Celyphus* (Dalman), where it is very convex and covers the whole abdomen.

The abdomen seldom presents more than seven distinct segments; its form is very variable.

Dipterous insects undergo what is termed a *complete* transformation: their larvæ are devoid of feet, and have a head of the same soft substance as the body and without determinate form. The parts of the mouth exhibit two scaly pointed plates. The stigmata are nearly all placed on the terminal segment of the body. When about to assume the pupa state, they do not cast their skin (as is the case with the larvæ of most insects), but this becomes gradually hardened, and after a time the animal assumes the pupa state within, so that the skin of the larva forms as it were a cocoon.

There are however exceptions to this rule, for many change their skin before they assume the pupa state, and some spin cocoons.

We may here observe, that in some of the species of the genus Sarcophaga the eggs are hatched within the body of the mother, whence the insect first makes its appearance in the larva state; and in the Pupipara, not only are the eggs hatched within the body of the parent but the larvæ continue to reside there until their transformation into pupæ.

As regards the habits of dipterous insects, they will be found under the heads of the several families and genera; we shall therefore conclude by noticing the two great sections into which this order is divided by Macquart. These are the Nemocera and the Brachocera.

The species of these two sections are distinguished chiefly by the number of joints of the antennæ and palpi. Their characters are as follows:—

Section 1. *Nemocera.* Antennæ filiform or setaceous, often as long as the head and thorax together, and composed of at least six joints. Palpi composed of four or five joints; body generally slender and elongated; head small; proboscis sometimes long and slender, and inclosing six lancets; sometimes short and thick, and having but two lancets; thorax large and very convex; legs long; wings long, and with elongated basal cells.

Section 2. *Brachocera.* Antennæ short, composed of three joints; the third joint generally furnished with a stylet; palpi composed of one or two joints; head usually hemispherical, and as broad as the thorax; proboscis either long, slender, coriaceous, and protruded, or short, thick, and retracted, and containing either six, four, or two lancets; thorax moderately convex; legs usually of moderate length, wings with the basal cells rather short.

The principal works on dipterous insects are, Wiedemann

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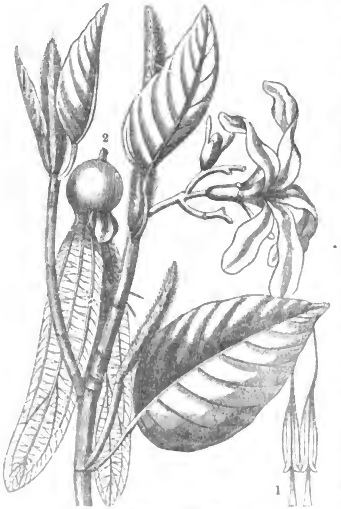
* The great development of the scutellum in the insects of this genus has its parallel in the order Hemiptera, for in the genus Tetyra the scutellum also covers the abdomen.

Diptera Exotica, 1 vol. 8vo. 1821, Meigen, *Systematische Beschreibung der bekannten Europäischen zweiflügelingen Insekten*, 6 vols. 8vo. with figures; Macquart, in the *Suites à Buffon, Histoire des Insectes*, 'Diptères,' 2 vols. 8vo.

DIPTERA'CEÆ or DIPTEROCARPEÆ, an important order of East Indian exogenous polypetalous trees, allied to Malvaceæ. They have a tubular unequal permanent calyx, with five lobes, which after flowering become leafy and very much enlarged, surmounting the fruit without adhering to it. There are five petals, with a contorted æstivation, an indefinite number of awl-pointed narrow anthers, and a few-celled superior ovary, with two pendulous ovules in each cell; of these all are eventually abortive, except one, which forms the interior of a hard dry leathery pericarp. The seed is solitary, contains no albumen, and has an embryo with two large twisted and crumpled cotyledons, and a superior radicle. The leaves are long, broad, alternate, rolled inwards before they unfold, with strong straight veins running obliquely from the midrib to the margin, and oblong deciduous stipules rolled up like those of a Magnolia.

The different species produce a number of resinous, oily, and other substances; one a sort of camphor (*Dryobalanops*); another a fragrant resin used in temples; a third Gum Animi; while some of the commonest pitches and varnishes of India are procured from others.



[Dipterocarpus gracilis.

1, two of the stamens; 2, a ripe fruit surrounded by the calyx whose segments have become large and leafy, and very unequal.

DIPTERAL. [Civil Architecture.]

DIPTERIX. [Coumarouna.]

DIPTEROCARPUS, a genus of East Indian, and chiefly insular, trees, of which Blume gives the following as the essential character: 'Calyx irregularly five-lobed at the mouth: the two opposite segments very long and ligulate. Petals five, convolute when unexpanded. Stamens numerous; anthers long, linear, terminating in an awl-shaped point. Nut rather woody, and one-celled and one-seeded by abortion, inclosed in the enlarged calyx.' The species are described as enormous trees, abounding in resinous juice, with erect trunks, an ash-coloured bark, strong spreading limbs, and oval leathery entire leaves, with pinnated veins. The flowers are large, white or pink, and deliciously fragrant. The pubescence is always stellate when present. The resinous juice of D. trinervis, a tree from 150 to 200 feet high, inhabiting the forests of Java, is made into plaisters for ulcers and foul sores; and when dissolved in spirit of wine, or formed into an emulsion with white of egg, acts upon the mucous membranes in the same way as balsam of copaiva. Dryobalanops Camphora, the Camphor tree of Sumatra, is usually referred to this genus; but, according to Blume, is really a distinct genus. [Dryobalanops.]

DIPUS. [Jerboa.]

DIPYRE or *leucolite*, a silicate of alumina and lime, which occurs in small slender prisms, the primary form of which has not been determined; their colour is greyish or reddish white, and fasciculated into masses. Internally the lustre is shining; vitreous; opaque; hardness sufficient to scratch glass; specific gravity about 2·6. It is found in the Western Pyrenees. By analysis it yielded—silica 60, alumina 24, lime 10, and water 2. When heated by the blow-pipe it becomes milk white, and then fuses into a blebby colourless glass.

DIRECT and RETROGRADE, two astronomical terms, the former of which is applied to a body which moves in the same direction as all the heavenly bodies except comets; the second to one which moves in a contrary direction. The motions of the planets round the sun, of the satellites round their primaries, and of the bodies themselves round their axes, all take place in one direction, with the exception only of the comets, of which about one-half the whole number move in the contrary direction. The course of these celestial motions is always from west to east, which is the *direct* course. The *retrograde* is therefore from east to west. The real diurnal motion of the earth being direct, the apparent motion of the heavens is retrograde, so that the orbital motion of the sun and moon has, so far as it goes, the effect of lessening the whole apparent motion: or these bodies appear to move more slowly than the fixed stars. With regard to the planets, the effect of the earth's orbital motion combined with their own, makes them sometimes appear to retrograde more in the day than they would do from the earth's diurnal motion only. [Planetary Motions.] In the Latin of the seventeenth century, the direct motion is said to be *in consequentia*, and the retrograde *in antecedentia*. The most simple way of remembering direct motion, is by recalling to mind the order of the signs of the zodiac. From Aries into Taurus, from Taurus into Gemini, &c., up to from Pisces into Aries, is direct motion; while from Taurus into Aries, from Aries into Pisces, &c., is retrograde motion.

DIRECTION, a relative term, not otherwise definable than by pointing out what constitutes sameness and difference of direction. Any two lines which make an angle point in different directions; a point moving along a straight line moves always in the same direction. Permanency of direction and straightness are equivalent notions. A body in motion not only changes its direction with respect to other bodies, but also the direction of other bodies with respect to it.

The most common measure of direction, for terrestrial purposes, refers to the north as a fixed direction, and uses the points of the compass. But any line whatever being drawn from the point of view, the directions of all other points may be estimated by measuring the angles which lines drawn from them to the point of view make with the standard line.

When a point describes a curve, it cannot at any one moment be said to be moving in any direction at all; for upon examining the basis of our notion of curvature, we find that it consists in supposing a line to be drawn, no three contiguous points of which, however near, are all in the same straight line. But this is a mathematical notion, which is contradicted in practice by any attempt at a curve which we can make on paper. For it is found that, as must be the case from the proposition mentioned in the article Arc (vol. ii., p. 256), when two points of a curve are taken very near to each other, and joined by a chord, the widest interval between the chord and the arc disappears or becomes imperceptible long before the chord and arc disappear. Hence arises the notion that a curve may in fact be composed of very small straight lines, each of which has of course a definite direction. But though such notion must be abandoned in geometry, yet it leads to the stricter notion of a Tangent [see also Contact], or of a straight line of which, as soon as the term is explained, we unhesitatingly admit: 1. That if a line moving on a curve be said to have a direction at all at any point, the direction must be that of a tangent at that point; 2. That it is highly convenient to say that a point moving in a curve is moving in a *continually varying* direction. Here, as in other cases [VELOCITY, CURVATURE, &c.], we obtain exactness by making definitions drawn from the inexactness of our senses apply, not to the notions which first gave them, but to the final limit towards which we see that we should approach if our senses were made more and more exact; but which, at the same time, we see that we should never reach as long as any inexactness whatsoever remained.

DIRECTOIRE EXECUTIF was the name given to the executive power of the French republic by the constitution of the year 3 (1795), which constitution was framed by the moderate party in the National Convention, or Supreme Legislature of France, after the overthrow of Robespierre and his associates. [COMMITTEE OF PUBLIC SAFETY.] By this constitution the legislative power was entrusted to two councils, one of five hundred members, and the other called 'des anciens,' consisting of 250 members. The election was graduated: every primary or communal assembly chose an elector, and the electors thus chosen assembled in their respective departments to choose the members for the legislature. Certain property qualifications were requisite for an elector. One-third of the councils was to be renewed every two years. The Council of Elders, so called because the members were required to be at least forty years of age, had the power of refusing its assent to any bill that was sent to it by the other council. The executive power was entrusted to five directors chosen by the Council of Elders out of a list of candidates presented by the Council of Five Hundred. One of the five directors was to be changed every year. The directors had the management of the military force, of the finances, and of the home and foreign departments; and they appointed their ministers of state and other public functionaries. They had large salaries, and a national palace, the Luxembourg, for their residence, and a guard.

The project of this constitution having been laid before the primary assemblies of the people was approved by them. But by a subsequent law the Convention decreed that two-thirds of the new councils should be chosen out of its own members. This gave rise to much opposition, especially at Paris, where the sections, or district municipalities, rose against the Convention, but were put down by force by Barras and Bonaparte on the 13th Vendemiaire (4th of October, 1795). After this the new councils were formed, two-thirds being taken out of the members of the Convention, and one-third by new elections from the departments. The councils then chose the five directors, who were Barras, La Réveillère-Lépaux, Rewbell, Letourneur, and Carnot; all of whom, having voted for the death of the king, were considered as bound to the republican cause. On the 25th of October the Convention, after proclaiming the beginning of the government of the laws, and the oblivion of the past, and changing the name of the Place de la Révolution into that of Place de la Concorde, closed its sittings, and the new government was installed. Its policy was at first moderate and conciliatory, but it stood exposed to the attacks of two parties, the royalists, including those who were attached to the constitutional monarchy of 1791, and the revolutionists, or jacobins, supported by the mob. In September, 1796, a conspiracy of the latter, headed by Babeuf, who proclaimed 'the reign of general happiness and of absolute democracy,' proposing to make a new and equal distribution of property, made an attack on the Directory, which was repulsed by the guard, and Babeuf and other leaders were tried, condemned, and executed. By the elections of May, 1797, for a new third of the members of the councils, the royalists of various shades obtained many seats in the legislature. The policy of the Directory, both domestic and foreign, was now strongly censured in the councils, who asked for peace and economy, and for a repeal of the laws against the emigrants and the priests. The conduct of Bonaparte towards Venice was animadverted upon. Camille Jordan, a deputy from Lyon, made a speech in favour of the re-establishment of public worship. The club of Clichi was the place of meeting of the partisans of the opposition. Barthelemy, who had been meantime appointed director, inclined to the same side, as well as General Pichégru, Barbé Marbois, and others. Carnot, another director, endeavoured to mediate between the two parties, but to no effect. The Directory being alarmed, called troops to the neighbourhood of Paris, which was an unconstitutional measure. At length Augereau came with a violent message from Bonaparte and the victorious army of Italy, offering to march in support of the Directory, and threatening the disguised royalists in the councils, meaning the opposition. This was the first direct interference of the armies in the internal affairs of France. The majority of the Directory, consisting of Barras, Rewbell, and La Réveillère-Lépaux, appointed Augereau military commander of Paris, who surrounded the hall of the councils, arrested Pichégru, Willot, Ramel, and prevented by force the other opposition members from taking their seats. The remainder of the members being either favourable to the Directory, or intimidated, appointed a commission which made a report of some conspiracy, and a law of public safety was quickly passed, by which two directors, Barthelemy and Carnot, and fifty-three members of the councils, were exiled to French Guiana. Carnot escaped to Germany, but Barthelemy was transported. The Directory added to the list the editors of thirty-five journals, besides other persons. Two new directors, François de Neufchâteau and Merlin de Douai, were chosen in the room of the two proscribed. This was the coup d'état of Fructidor (September), 1797. There was now a partial return to a system of terror, with this difference, that imprisonment, transportation, and confiscation of property, were substituted for the guillotine. The laws against the priests and emigrants were enforced more strictly than ever. By a law of the 30th of September, 1797, the public debt was reduced to one-third, which was called consolidated, and was acknowledged by the state, the creditors receiving in lieu of the other two-thirds bons, or bills which could only be employed in the purchase of national property, and which fell immediately to between 70 or 80 per cent. Forced loans, confiscations, and the plunder of Italy, were the chief financial resources of the government. The paper money had lost all value. [ASSIGNATS.] Government lotteries, which had been abolished by the Convention, were re-established by the Directory. A ministry of police was created, which interfered with the locomotion of individuals, by requiring passports and cartes de sureté, and made arrests and domiciliary visits under pretence of suspicion. The periodical press was arbitrarily interfered with. In the midst of all this the Directory was mainly supported by the influence of Bonaparte's Italian victories, followed by the peace of Campoformio with Austria. But an act which threw the greatest obloquy upon the Directory was its unprovoked invasion of Switzerland in 1798. Carnot, from his exile in Germany, was loud in his denunciations of this political crime, which he said 'verified the fable of the wolf and the lamb.' The republicans in the interior were also greatly dissatisfied with the directorial dictatorship, and as by the new elections of 1799 they mustered strong in the councils, they openly assailed the government, which was no longer supported by the presence of Bonaparte, then in Egypt. At the same time a new coalition was formed against France, consisting of Austria, Russia, England, and Turkey, and the French armies met with great reverses both in Italy and on the Rhine. In one short campaign they lost all Italy except Genoa. All this added to the unpopularity of the Directory, which that year consisted of Barras and La Réveillère-Lépaux, both of the first nomination, and Treilhard, Merlin de Douai, and Sieyes. The councils demanded the dismissal of Treilhard on the score of informality in his nomination, and of La Réveillère and Merlin de Douai on account of several charges which were preferred against them. All the three gave in their resignation, and were replaced by Gohier, Roger Ducos, and Moulins, three obscure men. This change took place in June, 1799. At the same time the councils circumscribed the authority of the Directory, re-established the supremacy of the legislature, and removed the restrictions on the press. But soon after, July 1799, they passed a measure worthy of the worst times of the revolution. This was the 'law of hostages,' by which the relatives of the emigrants, the ex-nobles, priests, &c., were made answerable for any revolts or other offence against the republic, and liable to imprisonment at the discretion of the local authorities, sequestration of their property, and even transportation. The authority of the Executive Directory had now become very weak and the councils themselves began to be divided between the violent republicans or jacobins, who were for measures of terror, and the moderate republicans who wished to act legally according to the constitution of the year III. The policy of the government was consequently vacillating. Talleyrand, the minister for foreign affairs, gave in his resignation. All parties had exhausted themselves by ineffectual struggles, while the mass of the people stood passive, being weary of agitation: this general prostration prepared the way for Bonaparte's ascendency in the following Brumaire, when the constitution of the year 3 and tho Directory were overthrown, after four years' existence. The principal charges against the Directory are stated under the head **Barras**. See also *Histoire du Directoire Exécutif*, 2 vols. 8vo., Paris, 1802. The law of tho conscription was passed under the administration of the Directory.

DIRECTRIX. (*Linea directrix*, a directing line.) This term is applied to any line (straight or curved) which is made a necessary part of the description of any curve, so that the position of the former must be given before that of the latter is known. Thus in the question, 'required the curve described by a point in a straight line the two ends of which must be on two fixed straight lines,' the two fixed lines are directrices. Custom has sanctioned the special application of this term to lines connected with a few curves, and particularly with the ellipse, hyperbola, and conchoid of Nicomedes. But in reality, with the exception of the circle, there can be no curve which is without one or more lines to which the name of directrix might be given.

DIRGE, in music, a hymn for the dead, a funereal song. This word is a contraction of *Dirige*, the first word of the antiphona, 'Dirige, Domine Deus,' chanted in the funeral service of the Catholic church. The abbreviation seems to have crept into use about the middle of the sixteenth century.

DISABILITY (Law), an incapacity in a person to inherit lands or enjoy the possession of them, or to take that benefit which otherwise he might have done, or to confer or grant an estate or benefit on or to another. All persons who are disabled from taking an estate or benefit are incapable of granting or conferring one by any act of their own, but many persons who are by law incapable of disposing of property may take it either by inheritance or gift.

Disability is ordinarily said to arise in four ways: By the act of the ancestor; by the act of the party himself; by the act of the law; or by the act of God.

By the act of the ancestor, as where he is attainted of treason or murder, for by attainder his blood is corrupted, and his children are made incapable of inheriting. But by the stat. 3 and 4 W. IV., c. 106, § 10, this disability is now confined to the inheriting of lands of which the ancestor is possessed at the time of attainder: in all other cases a descent may be traced through him.

By the act of the party himself, as where a person is himself attainted, outlawed, &c., or where, by subsequent dealings with his estate, a person has disabled himself from performing a previous engagement, as where a man covenants to grant a lease of lands to one, and, before he has done so, sells them to another.

By the act of law, as when a man, by the sole act of law without any default of his own, is disabled, as an alien born, &c.

By the act of God, as in cases of idiotcy, lunacy, &c., but this last is properly a disability to grant only, and not to take an estate or benefit—for an idiot or lunatic may take a benefit either by deed or will.

There are also other disabilities known to our law, as infancy, and coverture; but these also are confined to the conferring of interests.

Married women, acting under and in conformity to **Powers**, and formerly by fine, but, since the 3rd and 4th W. IV., c. 74, by deed executed under the provisions of that statute, may convey lands; and infants, lunatics, and idiots, being trustees, and not having any beneficial interest in the lands vested in them, are by various statutes enabled to dispose of them under the direction of the Court of Chancery.

Particular disabilities also are created by some statutes; as, for instance, Roman Catholics, by the 10 Geo. IV., c. 7 (the Emancipation Act), are disabled from presenting to a benefice; and foreigners (although naturalized) cannot hold offices, or take grants of land under the crown. [**Denizen.**] (Cowel's *Interp.*; *Termes de la Ley.*)

DISBUDDING, in horticulture, consists in removing the buds of a tree before they have had time to grow into young branches. It is a species of pruning which has for its object not only training, but also economy with regard to the resources of a tree, in order that there may be a greater supply of nourishment for the development of those buds which are allowed to remain.

If the roots are capable of absorbing a given quantity of nutritive matter for the supply of all the buds upon a stem, and if a number of those buds be removed, it must be evident that those which remain will be able to draw a greater supply of sap and grow more vigorously than they otherwise would have done. This fact has furnished the idea of disbudding.

This kind of pruning has been chiefly applied to peach and nectarine trees, but the same principle will hold good with all others of a similar description, and might be practised upon them if they would repay the labour so expended.

The French gardeners about Montreuil and in the vicinity of Paris have carried this practice to a great extent, and with considerable success.

Several of their methods have been described by Dr. Neill, the secretary of the Caledonian Horticultural Society, in his horticultural tour. In one of them, termed *à la Sieulle*, and invented by Sieulle, gardener at Vaux Praslin, near Paris, the training is made to depend entirely upon the exactness of disbudding.

The peculiarity of Sieulle's method is as follows:—After the stock has been budded, two branches are trained at full length to a trellis or wall: late in autumn or in winter all the buds, with the exception of four on each shoot, are neatly cut out, or disbudded; these four in their turn form shoots in the succeeding summer, which are cut down to about one-third of their length in autumn, and also disbudded in the same manner as the two principal branches of the preceding year. This kind of pruning being always performed prevents a superfluous development of buds and the consequent necessity of cutting them out as branches in the following season. Du Petit Thouars, whose opinions are entitled to much respect, passes a high eulogium upon this system of Sieulle: he says, 'by this method the young tree is more quickly brought to fill its place upon the espalier; it is afterwards more easily kept in regular order: many poorer flower-buds are allowed to develop themselves, but the necessity of thinning the fruit is thus in a great measure superseded, and the peaches produced are larger and finer.'

Dumoutier's system of disbudding is somewhat different from Sieulle's. Instead of performing this operation late in autumn, he defers it until spring, when the buds are unfolded: all those upon the young shoot of the previous year, with the exception of the lowest and the one above the highest blossom, are then carefully removed; of the two which are left, the first is termed the *bourgeon de remplacement* for the next year, and the latter is allowed to remain to draw up the sap for the maturing of the fruit. This method of pruning, as far as disbudding is concerned, is precisely the same as that practised by Seymour, of Carleton Hall, in England.

It must not be thought however from this statement that the training of Dumoutier and Seymour is the same, or that their trees assume precisely the same appearance: for example, Dumoutier's branches proceed from two principal arms, Seymour's from one in the centre: in the system of the former, the fruit-bearing branches are on both sides of the old wood; while in that of the latter they are only allowed to grow from the upper sides.

Disbudding in spring is frequently and beneficially practised by many intelligent gardeners, both in England and Scotland, upon English fan-trained peach-trees, with a view to thinning the young wood, taking care to leave enough for the production of fruit in the following year.

When spurious buds can be removed from peach or nectarine trees before development, with the certainty of those succeeding which are allowed to remain, it must be of material consequence, as the latter will not only be better supported, but will also receive a greater quantity of light, so essential to mature and ripen the young wood. Unfortunately however Sieulle's plan cannot be practised with any degree of success in England: those buds which are left, and upon which so much dependence is placed, often do not grow; a vacancy is the consequence, and the tree is deformed. The climate of Montreuil is much more favourable to the growth of the peach-tree than that of Britain, and although the winters of Paris are severe, yet the mean degree of summer heat is much greater there than in any part of England; and perhaps the peculiar nature of the soil renders peach-trees much more yielding to art there than in this country.

For these reasons, however useful the plan of disbudding in autumn or winter may be in the gardens of France, it would be improper to practise it to any extent in those of England. The system has been fairly tried in the garden of the London Horticultural Society, but has long since been discontinued.

It has however been proved, both there and from the long experience of men in private situations, that a judicious thinning of the buds after they have been unfolded in spring (when an experienced individual can foresee the strength of those which he is about to leave, and to which he looks for his fruit in the following year), is of great utility.

DISC (*discus*, *δίσκος*), is used for the face of a circular plate, and frequently for a thin plate of any substance. Thus we speak of the sun's disc (referring to the appearance of the sun), and also of a disc of metal.

DISCIPLINE, MILITARY, the series of duties which are to be performed by military men. It also signifies a conformity to the regulations by which those who serve in the army are governed in all matters relating to the practice of their profession.

DISCLAIMER (Law), a plea by a tenant in any Court of Record in which he disclaims to hold of his lord. This disclaimer of tenure is a forfeiture of the lands to the lord upon reasons most apparently feudal. And so likewise if in any Court of Record the particular tenant does any act which amounts to a virtual disclaimer, as if he claims a greater estate than was granted to him, or takes upon himself those rights which belong only to tenants of a superior class, or if he affirms the reversion to be in a stranger, by attorning as his tenant, collusive pleading, and the like, such behaviour amounts to a forfeiture of his particular estate. The writ of right sur disclaimer was the old form in which the lord took advantage of the forfeiture; but as it was decided that the tenant might be treated as a trespasser, and that notice to quit was not necessary, the more convenient action of ejectment was generally used, and now, since the stat. 3 & 4 W. IV., c. 27, the proceeding by writ of right sur disclaimer is abolished.

Where a person by his plea denied that he was of the blood of another, he was also said to disclaim; and there is a disclaimer of goods as well as lands, as where on an arraignment of felony a man disclaims the goods, in which case, though he should be acquitted, he loses the goods.

One of the pleadings in a suit in Chancery is also called a disclaimer, as where a defendant, in his answer to the complainant's bill, disclaims all interest in the matter in question. [Equity.]

And where an estate is given either by deed or will to a person, he may by deed (which need not be enrolled, or, as it is called, made matter of record) disclaim all interest thereunder; but it seems that for this purpose a deed is necessary, and that a parol disclaimer would not be sufficient.

An executor is said to disclaim when he renounces probate of the will of his testator; and this is generally effected by verbal renunciation before some judge spiritual, or by simple writing under his hand, in either case the disclaimer being recorded in the spiritual court; but where the will contains a devise of lands to the executor, the disclaimer is generally made by deed, for although a disclaimer by the before-mentioned means would, it seems, be operative, yet the deed is preferred as affording evidence, in deducing a title to the lands, of the fact of disclaimer.

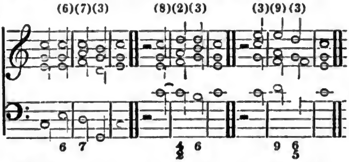
DISCONTINUITY (Algebra, &c.). Continuous changes are those which are so made that no two states exist without every possible intermediate state having been in existence between them. Thus the square on a line of 4 inches contains 16 square inches, while that on a line of 5 inches contains 25 square inches; and there is no possible area between 16 and 25 square inches which is not equal to the square described on some line between 4 and 5 inches. That is, if a straight line increase continuously, the square described on it increases continuously.

The first introduction of discontinuity arises from the attempt to represent all magnitudes by numbers. Arithmetical symbols cannot represent continuous change of magnitude. If a foot be divided into 2, 3, 4, &c. equal parts, and so on *ad infinitum*, there exist infinite numbers of lengths which will not be represented by any whatsoever of the resulting fractions of a foot. Hence the difficulties of [Incommensurable] magnitudes, which arise from the failure of the attempt to represent flowing or continuous changes by the means of changes which always suppose finite intervals, as in passing from number to number.

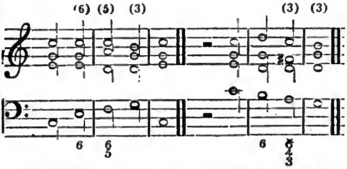
But the arithmetical difficulty, being introduced antecedently to the express consideration of discontinuity, is rarely treated as belonging to this subject. In the higher parts of mathematics the necessity for the consideration of discontinuous expressions began with the investigation of partial differential equations. In the introduction of the arbitrary functions which those equations require, discontinuous functions were thought to be admissible by Euler, an opinion which was controverted by D'Alembert, and supported, conclusively, it has always been thought, by Lagrange. It is our own opinion that not only the arbitrary function of a partial equation, but even the arbitrary constant of a common equation, may be allowed to be discontinuous, unless the contrary be a condition of the problem, expressed or implied. By a discontinuous constant, we mean one which preserves one value between certain limits of the value of the variable, which then suddenly changes its value, preserving the new value till the variable attains another limit, and so on.

The subject has begun to force itself on the attention of mathematicians, and several remarkable cases have been pointed out in which erroneous conclusions have been arrived at for want of considerations connected with discontinuity. There is a full account of the state of this question in Mr. Peacock's 'Report on Analysis.' (*Rep. Brit. Ass.*, 1834.

DISCORD, in music, a sound which, when heard with another, is disagreeable to the ear, unless treated according to the rules of art. Discords are the 2nd, sharp 4th (Tritonus), flat 5th (Semidiapente), minor or flat 7th, and major or sharp 7th. The ratios of these are 9 : 8, 45 : 32, 64 : 45, 9 : 5, and 15 : 8. The 9th (9 : 4) is also a discord, and though only the octave to the 2nd, is considered in harmony as a very different interval, and treated in a different manner. The 4th (4 : 3) is either discord or concord, according to the manner in which it is accompanied. [Concord.] Discords commonly, but not always, are *prepared; i. e.*, the note which is to become the discord, is first heard as a concord: and their *resolution* is absolutely necessary: *i. e.*, the discord must pass into a concord, though the resolution is occasionally retarded. Examples:—



The perfect 5th in the chord of $\substack{6\\5}$, and the 3rd in the chord of $\substack{4\\3}$, are treated, so far as regards resolution, as discords. Examples —



DISCOUNT, a sum of money deducted from a debt in consideration of its being paid before the usual or stipulated time. The circumstance on which its fairness is founded is, that the creditor, by receiving his money before it becomes due, has the interest of the money during the interval. Consequently, he should only receive so much as, put out to interest during the period in question, will realize the amount of his debt at the time when it would have become due. For instance, 100*l*. is to be paid at the end of three years, what should be paid now, interest being 4 per cent.? Here it is evident that if we divide the whole debt into 112 (or $100 + 3 \times 4$) parts, 100 of these parts will make the other 12 in three years (at simple interest), whence the payment now due is the 112th part of 10,000*l.* or 89*l.* 5*s.* 9*d.* The rule is, n being the number of years (a fraction or number and fraction), r the rate per cent., and D the sum due,

$$\text{Present value} = \frac{100\,D}{100+nr}; \text{ discount} = \frac{D\,n\,r}{100+nr}.$$

In practice, it is usual not to find the real discount, but to allow interest on the whole debt in the shape of abatement. Thus it would be considered that, in the preceding example, three years' discount upon 100*l.* at 4 per cent. is 12*l.*, or 88*l.* would be considered as the present value.

In transactions which usually proceed on compound interest, as in valuing leases, annuities, &c., the principle of discount is strictly preserved. The present value in the preceding case is, in its most usual form,

$$\frac{D}{(1+\rho)^n}, \text{ and the discount } D - \frac{D}{(1+\rho)^n};$$

where ρ is the rate per pound (not per cent.: thus it is ·04 for 4 per cent.). But recourse is usually had to the tables of present values which accompany all works on annuities or compound interest. [INTEREST.]

The name of discount is also applied to certain trade allowances upon the nominal prices of goods. In some branches of trade these allowances vary according to the circumstances which affect the markets, and what is called discount is in fact occasioned by fluctuations in prices which it is thought convenient to maintain nominally at unvarying rates. This system is practised in some branches of wholesale haberdashery business, and we have now before us a list of prices furnished to his customers by a manufacturer of tools at Sheffield, in which the nominal price of each article is continued the same at which it has stood for many years, while to every different species of tool there is applied a different and a fluctuating rate of discount, this fluctuation constituting in fact a difference of price between one period and another: the rates of discount in this list vary from 5 to 40 per cent. upon the nominal prices of the different articles.

The term discount is also employed to signify other mercantile allowances, such for example, as the abatement of 12 per cent. made upon the balances which underwriters, or insurers of sea risks, receive at the end of the year from the brokers by whom the insurances have been effected. The word discount is further used, in contradistinction to premium, to denote the diminution in value of securities which are sold according to a fixed nominal value, or according to the price they may have originally cost. If, for example, a share in a canal company upon which 100*l.* has been paid is sold in the market for 98*l.*, the value of he share is stated to be at 2 per cent. discount.

DISCOVERY, in Law. [EQUITY.]

DISCUS (*δίσκος, discos*), a quoit of stone, brass, or iron, with which the Greeks and Romans diverted themselves in the public games. The word is Greek. The discus, when perforated like our modern quoit, was thrown by the help of a thong, put through the middle of it. It was at other times of a solid piece, and was then hurled directly from the hand. This last method is illustrated by the celebrated statue of the Discobolus, or quoit thrower, attributed to Myro, an antient copy of which is among the marbles of the Townley Gallery. The figure is represented in action at the precise moment of delivering the discus. Ovid (*Metam.*, li. x., *v.* 175) and Statius (*Theb.*, vi., *v.* 646) have both described the diversion of the discus; see also Petri Fabri *Agonisticon, sive de Re Athletica, Ludisque Veterum*, 4to., Lugd. 1595, li. ii., c. i.

The term discus was likewise applied to circular shields or bucklers, of a large size, placed in the temples, on which great actions were represented, or the names of those who had devoted themselves to the service of their country inscribed. One of the former of these is in the Townley Gallery at the British Museum, Room iii., No. 36, containing the names of the ephebi of Athens under Alcamenes, when he held the office of cosmetes. Such too was the shield of Scipio Africanus, found in the Rhone in 1656, engraved in Spon's 'Miscellanea Eruditæ Antiquitatis,' edit. 1685, p. 152. Anacreon has an ode on a disk of silver, representing Venus rising from the sea: Od. 51, **Εἰς Δίσκον ἔχοντα Ἀφροδίτην.** See likewise Montfaucon, *Supplem. de l'Ant. Expliq.*, liv. iii., p. 64.

DISDIAPA'SON, the name given by the Greeks to a scale of two octaves. [DIAPASON.]

DISK, a term in botany signifying any ring or whorl of glands, scales, or other bodies that surround the base of an ovary, intervening between it and the stamens. In its most common state it is a fleshy wax-like ring as in the orange; it frequently forms a yellowish lining to the calyx, as in the plum and cherry, and not unfrequently rises up like a cup around the ovary as in the tree pæony. The latter renders it probable that the disk is nothing but an inner whorl of rudimentary stamens. Previously to the expansion of the flower the disk contains fæcula, and is dry and brittle; but after the blossom unfolds it perspires a sweet honey-like fluid, and becomes tough, absorbing oxygen and parting with carbonic acid. This phenomenon is similar to what occurs in the germination of seeds, and has led M. Dunal to the opinion that the conversion of the fæcula of the disk into sugar is for the purpose of forming a store of nutritive matter for the stamens and ovary at the time of fertilization, just as the same phenomenon in the germination of seed is for the purpose of supplying food to the young embryo.

DISLOCATION. Various parts of the body are liable to be displaced by the direct application of violence or by more gradual causes. But the term *dislocation* is commonly appropriated to displacements occurring about the joints. In this sense it is nearly synonymous with *luxation*, but not entirely; for the latter term carries with it more of the idea of external force, and is not quite so generally applied. It is usual, for instance, to speak of the *dislocation*, not the *luxation*, of the internal cartilage of the knee; and the latter term is seldom if ever used in describing the displacements of the small bones of the wrist or instep, or of single vertebræ.

The injuries classed under this title may be effected by external violence, or by the undue contraction of muscles, or by both of these causes combined; and they result in some instances from disease within the joints themselves, by which their ligaments are weakened or destroyed, and their sockets rendered insecure by ulceration and other gradual changes.

When, by the protrusion of the bone through the skin or otherwise, the dislocation is complicated with an external wound exposing the cavity of the joint, it is said to be *compound:* and, as in the parallel case of fracture, this aggravation of the injury is very serious, and the most skilful management is required to save the life or limb, where the injury happens to one of the larger joints.

The particular dislocation takes its name either from the joint itself or from the furthest bone; and various terms are added to indicate the direction of the displacement, or the new situation of the head of the bone. Thus the most common form of the accident at the hip is called 'a dislocation of the head of the *femur*' (thigh-bone) '*backwards* upon the *dorsum ilii*' (flat part of the haunch-bone).

Any bone may be displaced in any direction, but the accident happens most frequently in those joints and directions in which the extent of motion is the greatest. Thus the most common dislocation is that of the shoulder, which is the most movable joint; and its most frequent variety is that in which the head of the *humerus* (or bone of the upper arm) is drawn downwards into the *axilla* (or arm-pit) by the sudden contraction of certain strong muscles. This happens when the arm is raised to the utmost, as in reaching to close a window; that is when it has moved through an angle of 180° degrees from its natural position. The most usual dislocation of the hip is that, already mentioned, on the *dorsum ilii* for the same reason. It is generally produced by sudden pressure or a blow on the knee when the thigh is bent upon the abdomen; the head of the *femur* is thus driven backwards from the socket, and is then drawn farther back and upwards by the powerful muscles of the buttock.

The jaw is sometimes thrown out of joint by the mere act of yawning; and that accident happened to a gentleman known to the writer in opening his mouth to make the usual response at church. The word was cut short at the first syllable; for in such cases the chin suddenly drops and is thrown forward, and it is impossible by any effort to shut the mouth. This distressing but irresistibly ludicrous accident may be relieved immediately by any bystander wrapping a napkin round his thumbs and placing

them firmly against the back teeth, so as to press them downwards, while with the fingers and palms the chin is steadily raised and pushed backwards. But the operator should be on the alert to withdraw his hands the moment the jaw snaps back into its place, or he may receive a very unpleasant intimation of the success of his efforts.

It will be easily seen from these instances how important a part is played by the muscles in determining both the occurrence and direction of these accidents. Hence arises in part their infrequency, often wondered at, during infancy and childhood; for though the flexible joints of the young have a greater extent of motion than those of the adult, their muscular power is not only weaker as compared with the strength of their ligaments, but is much more tardily thrown into action, as may be observed in their tottering gait. The fragility of their bones is another cause of this infrequency, by rendering them more liable to be broken than displaced by external violence. The only dislocation that is at all common in children is that of the hip, which is the consequence of scrofulous ulceration of the ligaments and the socket, and of the ball-shaped head of the femur within it.

The reader will be prepared by what has been said to learn that the spasmodic and violent contraction of the muscles consequent upon these displacements is the chief or only obstacle to their reduction.

This object is effected by a process technically called *extension*, consisting in the application of force in a proper direction, and steadily kept up till the muscles are fatigued. The head of the bone is thus drawn down a little below the level of the joint; and being lifted over the edge of the socket, slips easily into its place upon slightly relaxing the extending force. This force is often required to be very considerable, and in such cases it is customary to make use of a block of pullies, the bone which contains the socket having been first securely fixed to a staple in the wall by proper bandages. Luxation of the hip is here supposed; for the other joints are so inferior to that in strength that their displacements may generally be reduced by less imposing means. It is sometimes necessary to favour the relaxation of the muscles by emetics, warm baths, and bleeding, and it is reckoned a point of good management to call off the attention of the patient during the extension by annoying him with questions and even exciting him to anger.

Almost all dislocations arising from accident may be reduced in this way, and the joint rendered nearly or quite as perfect as before: but this can only be done on condition of perfect rest during a period sufficient for the firm union of the ruptured ligaments; for if this precaution be not strictly observed, and the ligaments are suffered to be stretched by motion while the uniting substance is soft and extensible, the accident is ever afterwards liable to recur. No time should be lost in seeking assistance, for the swelling that comes on soon renders the nature of the accident obscure, and the reduction extremely difficult and painful. When a joint has been unreduced for a certain time, which varies with the particular joint, and with the bodily strength of the individual—the weaker having the advantage in this respect—it is unwise to make any attempt at reduction. The parts have now become consolidated and adapted to their new situation, and either the limb is permanently fixed or a new joint is under process of formation. In the latter case the substitute is often better than might be expected; and as this curious provision of nature cannot be improved upon by art, it is better to leave it alone.

The most dangerous dislocations are those of the vertebræ or bones of the spine, because in that case all the parts of the body below the injury are paralyzed. But the vertebræ are so curiously locked together, and have singly so little motion, and are at the same time so well supported by ligaments and muscles, that they are seldom dislocated unless by a force sufficient to break as well as to displace them. Such an injury is almost always fatal, and instantly so in general when it takes place above the origin of the nerves of respiration, that is, above the fourth vertebræ of the neck. The object of the executioner in hanging a criminal is to produce this effect, but he more often fails than succeeds.

It would be out of place in this work to describe the various dislocations more particularly. The reader will find some additional information on the subject under the head of JOINTS. The best English treatise upon it is the large work of Sir Astley Cooper.

DISMAL SWAMP. [CAROLINA, NORTH; VIRGINIA.]

DISPART, the difference between the semidiameter of the base ring, at the breech of a gun, and that of the ring at the swell of the muzzle.

On account of the dispart, the line of aim, which is in a plane passing through the axis of the gun, always makes a small angle with the axis; so that the elevation of the latter above the horizon is greater than that of the line of aim: an allowance for the dispart is consequently necessary in determining the commencement of the graduations on the tangent scale, by which the required elevation is given to the gun.

DISPENSARY, an institution supported by voluntary contributions for the supply of the poor with medical and surgical advice, and with medicines gratuitously. Institutions of this kind are of very recent origin. They differ from hospitals in this, that the sick, when too ill to attend personally at the institution, are visited at their own homes by the medical officers of the charity. Each dispensary indeed is restricted to a certain district, beyond the limits of which the patients are not visited at their own houses. To every dispensary there are always attached one, and sometimes two physicians; one surgeon, and often a consulting surgeon, and a resident medical officer who dispenses the medicines prescribed by the physicians and surgeons. Every subscriber to the institution who pays annually a certain sum is called a governor, who is entitled to have at least one patient always on the books; a person who subscribes a larger amount in one sum is called a life-governor, who may have two or more patients on the list. The medicines, which are commonly purchased in considerable quantities at a time and at wholesale prices, are dispensed in unexpensive forms, and in this manner the extent of the relief afforded is great, while the cost is trifling. No other kind of charity affords so much real assistance at so small an expense, and perhaps fewer objections apply to this than to any other mode of giving eleemosynary aid to the poor. Its peculiar excellence is that it enables the sick poor to obtain advice on the very first day of their illness. Even the great metropolitan hospitals are often so full that urgent cases are constantly obliged to wait days and even weeks before admission can be obtained; but by means of the dispensary poor families, and even the heads of such families in regular employment, may procure medical and surgical assistance without leaving their occupation even for a day. It would be a great improvement in the principle of these institutions if some contribution towards their support on the part of the poor themselves were required to entitle them to avail themselves of the advantages which they afford. This would remove the only objection that can be urged against such establishments, and would enable the independent labourer, without asking charity, to procure the best advice for his sick family at a much cheaper rate than he can possibly do at present.

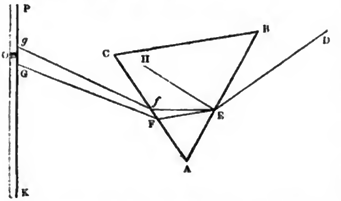
DISPENSATION (Law). The only kind of dispensation now used is that by which the bishop of a diocese licenses a clergyman within his jurisdiction to hold two or more benefices according to their value, or to reside out of the bounds of his parish, or dispenses with some other particular of his strict duty.

Formerly, not only in ecclesiastical jurisprudence, but also in the civil and criminal codes, the subject of dispensations occupied a large space. They formed a great source of the revenue of the court of Rome; for the pope's dispensations prevailed against the law of the country in many if not most instances, indeed in all of an ecclesiastical nature; this abuse was however abolished by the statute 25 Henry VIII., c. 21; and the power of the pope to grant dispensations not contrary to the law of God, but only to the law of the land, was granted to the archbishop of Canterbury under certain restrictions. It is hardly necessary to state that from the spirit of the times this power is never exercised in civil cases, and but in a few cases of purely ecclesiastical cognizance, and in those the usage has become the law rather than the exception. This right of the archbishop in some cases, as to grant special licences of marriage, &c., has been expressly recognized by the legislature.

Formerly also the crown claimed a dispensing power, by which it could exempt a person from the ordinary liabilities to the laws of the realm: the limits of this power were never exactly defined, but in consequence of the gross abuse of it during the reign of James II., it was expressly abolished by the Bill of Rights on the accession of William and Mary.*

DISPERSION. Light, as we receive it from the sun or from other original sources as a star, a fire, a candle, &c., appears to the senses as a simple undecomposable element by the instrumentality of which objects are perceived; and as for the peculiar colours of bodies, we naturally consider them, according to our early impressions, as belonging to the bodies themselves, or inherent in them. We are partly undeceived in this view by the changing colours of birds' feathers, soap-bubbles, compound silk textures, &c., but we are enabled to trace the immediate cause of the colours of bodies, whether permanent or transient, by the analysis of light furnished by the well-known experiments of the glass-prism.

The triangular prism used for this purpose is a solid, terminated by two equal and exactly similar triangles, and having besides three plane faces of a rectangular form, contained by the sides of the triangles and by right lines or edges joining corresponding angles of the two triangular bases above-mentioned; and any imaginary right line within it parallel to these edges around which the prism is capable of revolving is called the *axis of the prism*.



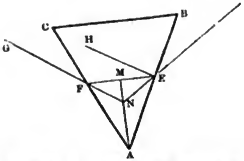
In the annexed figure the triangle B A C represents a section of the prism parallel to its basis or perpendicular to its axis. D E we shall suppose to be a ray or exceedingly narrow beam of solar light incident from *vacuo* or air on the prism at E; this ray of white light enters the prism at that point, and having undergone refraction by the dense medium of the glass, no longer proceeds as a simple ray E F, but is *dispersed* or divided into various rays of different colours over the space represented in the figure by *f* E F, and emerging at *f* F from the prism, undergoes another refraction, such that the portion *f g* of the ray proceeding from *f* is still more refracted than the portion F G from F, since the sines of the angles of incidence and refraction being in a constant ratio, that portion will be most refracted which has the greatest incidence: let now this dispersed beam *g f* F G be intercepted by a screen or wall P K, and from which extraneous light is as much as possible excluded, we shall then find the elongated space F G brilliantly painted over with tints passing gradually and insensibly from deep red to an attenuated violet, in the following order, as described by Newton, and since very generally concurred in,—red, orange, yellow, green, blue, indigo, violet. This experiment, which first opens the analysis of light, is easily made by letting a beam of light pass through a small circular hole in a shutter, in a darkened room, on a glass prism such as above described, the refracted and dispersed ray being received on the opposite wall, ceiling, or floor, according to the position of the prism. It would be still more effective by concentrating the light incident on a double convex lens in its focus, so that the beam E F may emanate more nearly from a point than it can when received through the hole of a shutter; for in the latter case rays are admitted which are inclined to each other at the angle subtended by the sun's disc to the eye. This primary experiment is, however, so familiar to almost all amateurs of science, that it will not be here necessary to enter into details respecting its most successful application.

When the image of the sun or a star, candle, &c., is thus formed by admission through a small hole or narrow line, and the refraction of the prism, the coloured space G *g*, which has the same angular breadth as the object in a direction parallel to the axis of the prism (the screen being supposed also parallel to it), but which is considerably elongated in the perpendicular direction, is called the *spectrum*; and that angle of the prism B A C the sides containing which B A, A C, have been traversed by the ray D E F G is called the *refracting* angle of the prism.

Suppose, now, that a small orifice O is made in the screen at some point of the spectrum, so that rays of any particular colour, green for example, may be transmitted through it; and let the transmitted portion be again subjected to refraction through another prism, this beam being supposed very small, to ensure its purity or near uniformity of colour. It will not, after refraction, be again decomposed, or undergo any alteration of colour, except in respect to brilliancy, arising from absorption by the second prism: thus showing that light incident on the first prism, when once decomposed into homogeneous elements by refraction, is then, at least by refraction, not further decomposable.

If the original prism B A C be turned gradually round its axis, preserving always to the incident light the same refracting angle A, the spectrum G *g* may be made to descend towards K, but after arriving at a certain point where the deviation, that is the inclination of D E produced to F G, is a minimum, it then reascends, and it is usual to make the chromatic experiments in this definite position of minimum deviation. This occurs when the position of the prism is such that the angles of incidence and emergence, or their complements D E B, G F C, are equal; for when the moving point G has reached its lowest place, it is for a moment in the condition of a fixed point like the point D, through which we may suppose the incident beam admitted; hence rays proceeding from D, notwithstanding a small variation of incidence arising from the rotation of the prism, reach G, as if it were a fixed point; and since in dioptrics it is of no consequence to the *path* in what direction we suppose the rays to move, it follows that rays proceeding from G, notwithstanding a small alteration of the angle C F G, would arrive at the fixed point or orifice D; and consequently the *data* for the determination of the angles D E B, G F C, in the position of minimum deviation, are precisely the same, and therefore these angles must then be equal.

This being premised, the following easy calculus will give the necessary angle of incidence to produce a minimum deviation



Since the angles of incidence and emergence are equal, the angles formed by the interior ray E F with both sides of the prism are equal, or the triangle A E F is an isosceles; let 2α be the refracting angle of the prism, then drawing A M perpendicular to E F, we have $\angle$ E A M $= \alpha$, which, being the complement of A E M, is necessarily the angle of refraction; if therefore μ be the index of refraction for rays of any given colour, the angle of incidence P, corresponding to a minimum deviation, is given by the equation,

$$\text{Sin. }(P) = \mu \text{ sin. }(\alpha)$$

For distinctness, suppose the preceding index of refraction μ to belong to the extreme red rays, and let μ' be the index for the extreme violet rays of the spectrum; then, if P' denote the angle of incidence corresponding to the minimum deviation of the latter, we have

$$\text{Sin. } P' = \mu' \text{ sin. } \alpha\,;$$

and since α is always less than a right angle, and μ' is greater than μ, therefore P' is greater than P. In other words, when the red rays of the spectrum, having arrived at their lowest position on the screen, begin to reascend by the continued rotation of the prism, the violet rays will still descend a little before they arrive at their lowest position. Under these circumstances, the extent of the spectrum contracts from both ends, and an angle of incidence P, intermediate to P and P', which do not greatly differ, corresponds to the minimum or brightest spectrum; and it would be probably useful to observe what class of rays, defined by Fraunhofer's lines, had then obtained their minimum deviation: that is, such whose index of refraction is $\frac{\text{Sin. P}}{\text{Sin. } a}$.

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* For the history of this abuse see Prynne's 'Animadversions on the Fourth Institute;' Petyt's 'Jus Parliam.', c. 7; and 'Ladies Tracts,' 327; the 'Birth and Parentage, Rise and Fall, of Nonobstante.'

We have seen that compound light, the sun's for example, may be decomposed into its homogeneous constituent rays by refraction through a transparent prism. Conversely it may be recompounded into light similar to the original, merely by making the rays, thus separated, by another refraction to occupy the same place. This may be effected by placing a prism of exactly similar material and form to that already used, with its refracting angle turned in a direction opposite to that of the former, so that the near faces of both prisms may be parallel; for the rays entering the second prism are in the same condition as if we supposed their direction inverted, that they may repass through the first; and therefore they emerge in a similar compound ray with the original, which may also be easily confirmed by experiment.

The rays issuing from the second face of the refracting prism may also be collected by means of a double convex lens, so as all to meet very nearly in its principal focus, where, if the image be received on a sheet of paper, the original compound light will be reproduced.

When the light of the sky, admitted through a small hole in a shutter in a dark room, is refracted by a prism, if an eye is placed behind the prism in the position which the spectrum would occupy on a screen, the hole will appear of the particular colour of the ray which reaches the eye, changing continually from one colour to another as the eye occupies different parts of the spectrum.

The prismatic analysis of light, together with the phenomena relative to the transmission and absorption of light, enabled Newton to conclude that the colours of natural bodies are not inherent qualities of those bodies, but depend on their powers of reflecting, transmitting, or absorbing the rays of some colours more than others from the compound light incident on them; for all bodies placed in homogeneous light of any colour appear themselves to be of that colour, though the vividness of tint is greatest when placed in that coloured light which they reflect most copiously. Hence also arise the different colours of the liquids exhibited frequently in chemists' shops, according as they are viewed by transmitted or reflected light which would necessarily be complementary colours if no absorption or extinction of light occurred in its passage through the fluid.

Many of the prismatic colours may be imitated by mixing colours taken as in the spectrum of greater and less refrangibility, as orange from red and yellow, &c., but such compound colours are not identical with the homogeneous light of the same colour, being immediately decomposable when viewed through a prism.

It would be difficult, if not altogether impracticable, to judge of the *dispersive powers* of transparent media by measuring the length of the spectra which they produce in a prismatic form, in consequence of the indefiniteness of their *termini*. The light at the violet end is so feeble that it requires some continued application of the eye to perceive a colour where we had first imagined the spectrum terminated: and, on the other hand, the influence of imagination, after we have recognised it, is apt to extend it momentarily far beyond its limits. Fortunately Nature has herself furnished a scale of definite limits in the beautiful discovery made by Wollaston and Fraunhofer of the existence of dark spaces, bands transverse to the length of the spectrum, and now generally designated Fraunhofer's lines.

These bands are best observable by forming the spectrum of a luminous line instead of a point, by means of a prism of great purity, and viewing it through a telescope of good magnifying power, though some of them may, when carefully pointed out, be recognised by the unassisted eye, and after one recognition are in future easily found. They are spaces totally deficient of light, of very unequal width, and exceedingly numerous; the large bands near the extremities of the spectrum serve, however, as definite limits, so as to furnish the requisite criteria for the dispersive powers of different substances; it is also very remarkable that these bands, always the same in number and relative position for the same light, are different when the source of light is varied. Thus sun-light, moon-light, planet-light, sky-light, derived from a common source, have the same lines, but they are different from those of star-light, fire light, candle-light, &c., each essentially different source having a peculiar system of deficient rays.

Substances which have not a great difference of refractive powers possess frequently very different dispersive powers, and the angular dispersion by a medium is not proportional to the angular deviation, and therefore by a system of prisms, two or more, white light incident on the first may be reproduced from the last, though on the whole refracted from its original direction. Such a system is called *achromatic.*

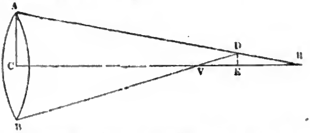
Conversely, by forming an achromatic system experimentally, where the angles of the prisms are small, and in the position of minimum deviation, if the dispersive power of the material of one of them be taken as a standard, that of the other may be readily obtained, the dispersion being measured by $\frac{\delta\mu}{\mu-1}$, μ being the index of refraction, and $\delta\mu$ the difference of its extreme values for any class of rays. This method has been much used in practice, particularly by Dollond.

The formulæ for achromaticity in systems of prisms or lenses, though not difficult of investigation, are in general too complicated and tedious for a popular work; (see *Mémoires de l'Acad. de Sciences*, 1765; *Mém. par* D'Alembert.)

The rainbow is a beautiful natural exhibition of the dispersion of light into the spectral colours. [RAINBOW.]

To find the longitudinal chromatic aberration of a lens, or the interval of the axis between the foci of extreme red and violet rays:

Let the red rays converge to the point R, and the violet to the point V in the axis.



Let f, F be respectively the focal distances for the given system of rays, and a parallel system; then the fundamental equations for lenses (neglecting their thickness), give $\frac{1}{f}-\frac{1}{\text{F}}=$ constant, since the rays of all colours in the compound incident beam have a common origin; now differentiate relative to μ, the variable index of refraction: hence,

$$\frac{df}{d\mu}=\frac{f^2}{\text{F}^2}\cdot\frac{d\text{F}}{d\mu};$$

but since F is proportional to $\mu-1$, therefore $\frac{1}{\text{F}}\cdot\frac{d\text{F}}{d\mu}=\frac{1}{\mu-1}$; and if $\delta\mu$ denote the total variation of μ from extreme red to violet, and δf the corresponding variation of f, or longitudinal aberration, and finally h, the dispersive power of the medium, we have

$$\delta f=\frac{df}{d\mu}\cdot\delta\mu=\frac{f^2}{\text{F}}\cdot\frac{\delta\mu}{\mu-1}=h\cdot\frac{f^2}{\text{F}}.$$

To find, in the same case, the radius of the circle of least chromatic dispersion

By referring to the same figure, we may observe that the foci R V are respectively the vertices of red and violet conical surfaces, having the lens as a common base. Let these surfaces intersect in a circle, of which the radius is D E; then it is plain that all the intermediate coloured rays pass through this circle. It is therefore that of least dispersion:

The preceding figure, representing a plane section of the whole system taken through the axis, it is obvious that, from the smallness of R V relative to C R, the angles C V B, C R A, are sensibly equal, or the triangle V R D is exceedingly nearly isosceles, and therefore D E bisects V R, or $\text{E R}=\frac{\delta f}{2}$, and $\text{D E}=\text{E R}\cdot\frac{\text{C A}}{\text{C R}}=\frac{h}{2}\cdot\frac{f}{\text{F}}\cdot\text{C A}$, and for parallel incident rays $\text{D E}=\frac{h}{2}\cdot\text{C A}$.

DISSECTION. The art of separating the parts of organized bodies in such a manner as to display their structure

It is an art equally applicable to both divisions of the organic kingdom, and indispensable alike to the discovery of the structure of plants and animals. The grounds on which, for the well-being of the community, every facility should be afforded to the cultivation of this art, as far as regards human dissection, have been already fully stated. [Anatomy.] It is satisfactory to observe that the prejudices which formerly obstructed this practice are rapidly disappearing, and that even the most uneducated are beginning to appreciate its great importance and its signal utility.

DISSEISIN. [Seisin.]

DISSENTERS, the general name for the various Protestant religious sects in this country that disagree in doctrine, discipline, or mode of worship with the established church. The Jews and Roman Catholics are not commonly called dissenters. The origin of Protestant dissent from the church of England is usually traced back to the year 1548, in the reign of Edward VI., when a controversy arose among the adherents of the new Reformation in consequence of the excellent Hooper (afterwards the martyr) scrupling to be consecrated as bishop of Gloucester in the customary canonical habit, which he deemed objectionable as a relic of Romanism. Hooper eventually received consecration without being attired in canonicals. At this time the two parties received the names of Conformists and Nonconformists. Very soon after that of Puritans came into use as the general appellation of the dissenters; and it continued to be that by which they were commonly distinguished down to the close of the civil wars in the next century. The toleration of the dissenters, even in the most limited extent, dates only from the Revolution; during the century and a half that elapsed between the Reformation and that event, with the exception only of the short period of the Commonwealth, during which first the Presbyterians and afterwards the Independents had the ascendency, they continued to be persecuted by a succession of restrictive and penal laws of almost constantly increasing severity. It has taken almost the century and a half more, that has passed since the revolution, to raise the dissenters from being a merely tolerated body to a free participation in the rights of their fellow subjects by the abolition of the Test and Corporation Acts, in 1828. If the relaxation of the marriage law, that has since taken place, shall be followed by the abolition of church rates, the dissenters will be placed as nearly on an equality in all respects with the adherents of the established church as it is possible that they should be, without the established church itself being abolished. In the early times of dissent the great classes of dissenters were the Presbyterians, the Independents, the Baptists, and the Quakers, and they still continue to be the most numerous sects, unless we are to include the Methodists, or followers of Wesley and Whitfield, some of whom are avowedly dissenters, and others not, and are also subdivided into Wesleyan Methodists, Primitive, &c. The minor sects of dissenters now make a long list; but many of them may be considered as only subdivisions of or included in the four leading denominations. From an examination of the best materials (which are however very imperfect) that exist for the statistics of dissent, Mr. Macculloch is inclined to think that the entire number of Protestant dissenters in England and Wales does not exceed 2,200,000, or, at most, 2,500,000, even including the Methodists, who may amount to about 1,200,000. (*Statistical Account of the British Empire*, ii., 413, 416.) But this estimate, we are inclined to think, is too low. The most numerous classes of dissenters in Scotland originated in a separation from the established church in 1740. They are called generally Seceders, and are divided into Burghers, Anti-Burghers, Original Burghers, and Original Seceders. There are also the body of dissenters called the Relief Church, who separated from the establishment in 1758. The only considerable body of Scottish dissenters of older standing, with the exception of the Episcopalians, are the Cameronians, or Reformed Presbyterian Synod, who are the representatives of the Covenanters of the seventeenth century. Mr. Macculloch calculates the whole number of dissenters in Scotland (exclusive of about 140,000 Roman Catholics) at about 360,000 or 380,000 persons. In Ireland, exclusive of the Roman Catholics, who alone outnumber the adherents of the established church in the proportion of 7½ to one, the principal dissenters are the Presbyterians, who are mostly confined to the province of Ulster. The Irish Presbyterians amount to between 600,000 nd 700,000, and are more than twenty times as numerous as all the other bodies of dissenters in that country taken together. (*Report of Commissioners of Religious Instruction in Ireland*, 1835.) [Doddridge.]

DISSEPIMENTS, the partitions in the inside of a fruit which are formed by the union of the sides of its constituent carpels. Dissepiments are therefore necessarily alternate with the stigma. When partitions which do not bear this relation to the stigma occur in the inside of a fruit they are called phragmata or spurious dissepiments, as in the cathartocarpus fistula where they are horizontal, and in verbena where they are vertical.

DISSONANCE, in music, a term synonymous with discord. [Discord.]

DISTANCE. The only remark which we need make upon this common word is that it is very frequently applied to *angular* distance, meaning the angle of separation which the directions of two bodies include. Thus the spectator's eye being at O, the angle AOB is the angular distance (frequently simply called the distance) of the two points A and B. In the apparent sphere of the heavens, distance always means angular distance. The term *apparent* distance is frequently applied in the same case.

DISTEMPER, an inferior kind of colouring used for both internal and external walls, but principally for the former, instead of oil colour, being a cheap substitute.

It is composed of whitening mixed with size of a coarse quality, in the proportions of twelve pounds of whitening to one of size. The size is boiled and reduced to a proper working consistency by the addition of water, after which the colour is added to form the necessary tint. Coarser colours are used for distemper than are employed in oil painting and colouring. Scene painting is executed in distemper, and paper stainers employ distemper colour in printing and staining papers for walls. The colours used in these cases are however of a better quality, and the size employed is made from the hide of the buffalo, or parchment cuttings. The proportions of size and whitening in paper staining depend on the strength of the size. In five quarts of distemper, if the size is strong, one-fourth part will be sufficient; if weak, about one-half. In mixing the size and whitening much depends on the judgment of the workman. The distemper is used in a chilled state. Five quarts will stain about eighty-four yards of paper.

DISTHENE, a variety of **Kyanite**.

DISTICHOUS, a term in botany, signifies arranged in two rows, as the grains in an ear of barley, and the florets in a spikelet of quaking-grass.

DISTILLATION is a chemical process for applying a regulated heat to fluid substances in covered vessels of a peculiar form called **Alembics**, in order to separate their more volatile constituents in vapour: and for condensing them immediately by cold into the liquid state, in a distinct vessel, styled a *refrigerator*.

The Arabians seem to have practised, in the remotest ages, the art of extracting the aromatic essences of plants and their flowers, in the form of distilled waters, to supply the luxuries of oriental baths. They are also supposed to have been the first to extract from wine a colourless intoxicating liquor by distillation. The term alcohol, now applied to such distilled spirit, and which is supposed to be Arabic*, appears at first sight to favour that idea, but as it was antiently employed to designate merely the extremity, tenuity, or impalpable state of pulverulent substances, it affords no just ground for the above conclusion. From certain passages in Pliny and Galen there can be no doubt that the Greeks and Romans were well acquainted with the distillation of aromatic waters. Indeed Nicander, a Greek poet and physician who lived 140 years before the Christian æra, employs the terms ἄμβιξ *ambix* and distillation in describing the preparation of rose-water. From ambix, which signifies a pot, the Arabic name alambic or alembic is derived. The words *pot* and *poteen* are used in the same way by the modern Irish to designate a still and its spirituous product. It is obvious that distillation must have been a familiar process to the countrymen of Avicenna, since, in his treatise of catarrh, he compares the human body to an alembic; he regards the belly as the cucurbit or body, and the head as its capital, through which the humours distil, passing off by the nostrils as its beak.

Arnoldus de Villa Nova, a chemical physician of the thirteenth century, is the first author who speaks explicitly of an intoxicating spirit obtained by the distillation of wine, and he describes it as a recent discovery. He considers it to be the universal *panacea* so long sought after in vain. His disciple Raymond Lully, of Majorca, declares this admirable essence of wine to be an emanation of the Divinity, an element newly revealed to man, but hid from antiquity because the human race were then too young to need this beverage, destined to revive the energies of modern decrepitude. He further imagined that the discovery of this *aqua vitæ*, as it was called, indicated the approaching consummation of all things—the end of the world. However much he erred as to the value of this remarkable essence, he truly foresaw its vast influence upon the condition of man, since to both civilized and uncivilized nations it has realized infinitely greater evils than were threatened in the fabled box of Pandora.

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* The true etymology of alcohol is uncertain. The Arabic word kohl, with the article al prefixed, signifies 'antimony reduced to a fine powder, and used as a collyrium for the eyes.'

In his 'Chemical Theatre,' written towards the conclusion of the thirteenth century, Raymond Lully describes the distillation of ardent spirits thus:—

'Limpid and well-flavoured red or white wine,' says he, 'is to be digested during 20 days in a close vessel by the heat of fermenting horse-dung, and to be then distilled in a sand bath with a very gentle fire. The true water of life will come over in precious drops, which, being rectified by three or four successive distillations, will afford the wonderful *quintessence* of wine.'

'To prove its purity,' adds he, 'if a rag be dipped in it, and kindled, it will not become moist, but consume away.'

All the older writers imagined that *aqua vitæ* imbibed from the fire its inflammable, heating, and exhilarating qualities; so in order to increase these qualities to the utmost, they prescribed tedious and repeated warm digestions of the wine before it was put into the alembic, and an exceedingly slow distillation that each drop might come over instinct with fire.

In the present article we shall consider distillation solely in reference to the production of alcohol. The process, when applied to distilled waters, æthers, and oils, belongs to pharmacy, chemistry, perfumery, &c.

The subject naturally divides itself into two branches: 1, the formation of the alcohol; 2, its elimination from the ingredients with which it is mixed.

The only substances employed in this country in the manufacture of ardent spirits upon the great scale are different kinds of corn, such as barley, rye, wheat, oats, buckwheat, and maize. Peas and beans also have been occasionally used in small quantity. The principles in these grains from which the spirits are indirectly produced are starch and a little sweet mucilage, which, by a peculiar process called *mashing*, are converted into a species of sugar. It is the sugar so formed which is the immediate generator of alcohol, by the process of fermentation. Hermstädt estimated that two pounds of starch properly treated would yield one quart of whiskey, of specific gravity 0.9427. The following kinds of corn afford of spirits of the said strength the quantities annexed to them in the scale:

100 pounds of	wheat .	40 to 45 pounds of	whiskey.
"	rye .	36 to 42	"
"	barley .	40	"
"	oats .	36	"
"	buckwheat	40	"
"	maize .	40	"

We may therefore conclude, says Hermstädt, that 100 pounds of corn will yield, upon an average, 40 pounds of spirits of the above specific gravity. We shall presently see that 100 pounds or two bushels of corn produce much more alcohol in the British distilleries.

In mashing one or more kinds of corn, a greater or smaller proportion of malt is always mixed with the raw grain, and sometimes malt alone is used, as in the production of malt whiskey.

The process of malting is that incipient growth called germination, in which, by the disengagement of a portion of the carbon of the starch, in the form of carbonic acid, the ultimate vegetable elements become combined in such a proportion as to constitute a species of sugar. Malting is the most effectual method of converting starch into sugar. But it is known from the researches of Saussure, that if starch in solution be digested for some time at summer temperatures with gluten, it will undergo a remarkable change, nearly one-half being converted into a species of sugar, and one-fifth into gum. A similar change is more rapidly effected upon starch by boiling its pasty solution with one-hundredth part of its weight of sulphuric acid. The recent discovery of diastase by Persoz and Payen has enabled us to effect this curious conversion with much greater certainty, and to a greater extent than was possible by the gluten or the acid. If 8 or 10 parts of ground malt be mixed with 100 parts by weight of starch previously diffused through 400 parts of water, at 140° Fahr., and if this mixture be kept at a temperature of from 158° to 166° for three or four hours, the nearly insipid pasty liquor will become a limpid syrup, which may be evaporated by a gentle heat into an uncrystallizable sugar, capable of being used as a substitute for ordinary sugar, not only in the vinous fermentation, but in many operations of the confectioner. The same change which takes place upon pure starch in the above experiment is effected in the process of mashing as carried on in breweries and distilleries. A larger or smaller proportion of the *fecula* of the corn is thereby converted into sugar, and thus brought into a state fit for producing alcohol by fermentation.

The manufacture of whiskey or ardent spirits consists of three distinct operations: first, mashing; second, fermentation; third, distillation.

1. *Mashing.*—Either malt alone, or malt mixed with other grains, and coarsely ground, is put into the mash-tun along with a proper proportion of hot water, and the mixture is subjected to agitation by a mechanical revolving apparatus, exactly similar to that employed in the breweries for the manufacture of beer. When malt alone is used, the water first run into the mash-tun among the meal has usually a temperature of 160° or 165° Fahrenheit, but when a considerable proportion of raw grain is mixed with the malt, the water is let on at a lower temperature, as from 145° to 155°, for fear of making such a pasty magma as would not allow the infusion or worts to drain readily off.

The following are the quantities of malt and raw grain mixed which have been found to afford a good product of whiskey in a well-conducted Scotch distillery:—

252	bushels of	malt,	at 40	pounds	per bushel.
948	do.	barley,	53¾	do.	do
150	do.	oats,	47½	do.	do.
150	do.	rye,	53¾	do.	do
1500					

From each bushel of the above mixed meal 2⅓ gallons of proof whiskey (specific gravity 0.921) may be obtained, or 18⅔ gallons per quarter. A few distillers are skilful enough to extract 20 gallons from a quarter of that mixture. Ten imperial gallons may be considered a fair proportion of water to be introduced into the mash-tun for every bushel of meal at the first infusion. After two or three hours' agitation, the whole is left to repose for an hour and a half, and then the worts are drawn off to about one-third the volume of water employed, the rest being entangled in a pasty state among the farina. About two-thirds of the first quantity of water is now let into the tun, but at a temperature somewhat higher, and the mashing motion is renewed for nearly half an hour. A second period of infusion or repose ensues, after which these second worts are drawn off. Both infusions must be cooled as quickly as possible down to the temperature of 80° or 70° Fahr., otherwise they are apt to run into the acetous fermentation by the rapid absorption of atmospheric oxygen. This refrigeration is usually effected by exposing the wort for some time in large shallow cisterns, called coolers, placed near the top of the building, where it may be freely exposed to the aerial currents. But it is sometimes cooled by being passed through serpentine tubes surrounded with cold water, or by the agency of ventilators blowing over its surface in extensive cisterns only three or four inches deep.

After the second wort is drawn off, a third quantity of water, fully as great as the first, but nearly boiling hot, is run into the mash-tun, and well incorporated with the magma by agitation; after repose, this third wort is also drawn off, cooled, and either directly mixed with the preceding worts, or after it has been concentrated by boiling down; in most cases however it is reserved, and used instead of water for the first infusion of a fresh quantity of meal.

As a revenue of five and a half millions sterling is derived from the whiskey distilleries, their operations are subjected to a very strict code of regulations, which are administered and enforced by the excise. One of these prescribes the range of specific gravity at which the worts may be lawfully let down into the fermenting tuns. The distiller must give notice to the excise officer in attendance, before commencing a *round*, whether he intends to distil from malt alone, or from a mixture of it with raw grain, and of the density he intends his worts to be when introduced into the fermenting backs. He may change this notice at the end of a month or six weeks, when, upon another notice of six days, he may change his specific gravities. In England the law restricts the distiller to the densities between 1.050 and 1.090; in Scotland, between 1.030 and 1.075, which, for brevity's sake, are called 50, 90, 30, and 75, omitting the 1.000 common to them all. At these densities the quantities of solid saccharum contained in one barrel of 36 imperial gallons, are 47.25 lbs., 85 lbs., 28 lbs., and 70.3 lbs. respectively.

The mashing and fermentation are jointly called *brewing*, and the period in which they are carried on is by law kept quite distinct from the *distilling* period, the one occupying usually one week, and the other another in rotation. About 150 gallons of wort or wash are obtained from each quarter of corn employed.

The first of the above worts will have generally the density of 1.078 when the grain is good and the mashing is well managed, and the second a density of 1.054, so that the mixture will have a specific gravity somewhat above 1.060, and will contain about 60 pounds of extract per barrel. Now, by the excise rules, 100 gallons of such wort ought to yield one gallon of proof spirit for every five degrees of attenuation which its specific gravity undergoes in the fermenting tun, so that if it falls from 1.060 to 1.000, 12 gallons of proof spirit are supposed to be generated, and must be accounted for by the distiller. If he understand his business well, he will be able to produce from 5 to 10 per cent. more than the law requires. Mr. Smith, in his examination before the Molasses Committee of the House of Commons in 1831, states that in one year, reckoning by computation from the above data, he showed produce for 60,000 or 70,000 gallons more than the presumed quantity, and paid duty accordingly; and that in 1830 he was charged for 80,000 gallons of spirits actually produced beyond the presumptive charge, according to the attenuated gravity of the worts.

In consequence of an alteration in the excise laws about twelve years ago, the distillers were allowed to ferment worts of less density than they previously could, and have been able to effect a more productive fermentation. They have been also enabled thereby to reduce the proportion of malt in the mixed meal. Formerly they were accustomed to use three parts of malt to four parts of barley, or two to three, but they soon diminished the malt to one-fifth, and latterly to one-eighth, or one-tenth, of the whole grain. One principal use of malt, besides its furnishing the saccharine ferment called diastase, is to keep the mash magma porous, and facilitate the drainage of the worts.

The cost at which whiskey may be made in England is thus stated by Mr. Smith:—When barley is 38*s.* per quarter, he reckons that one gallon of proof spirits costs 2*s.* for corn or meal, 1*s.* 2*d.* for the charge of manufacturing, 2*d.* as the duty on malt employed, and 7*s.* 6*d.* as the duty on spirit, amounting altogether to 10*s.* 10*d.* If we consider that from 18 to 20 gallons of proof spirits may be made from eight bushels or one quarter of mixed grain, we must think this statement of Mr. Smith's somewhat overcharged. Indeed good proof spirits may be bought from some distillers at a considerably less price, which proves either that they can manufacture the article more economically, or that they make a profit at the expense of the revenue.

II. *Fermentation.*

This is undoubtedly the most intricate, as it is the most important process in distillation, but unfortunately one hitherto studied with too little regard to scientific precision by the distiller. Experiments have proved that the quantity of saccharine matter converted into alcohol is dependent upon the proportion of ferment or yeast introduced into the worts; if too little be used a portion of the sugar will remain undecomposed, and if too much, the spirits will contract a disagreeable taste. In general, the worts are let down at the specific gravity of 1.050 or 1.060, and at a temperature varying from 60° to 70° Fahr., and for every 100 gallons one gallon of good porter yeast is immediately poured in and thoroughly incorporated by agitation with a stirrer. When by the attenuation the density is diminished to 1.035 one half gallon more is added, and another half gallon at the density of 1.025, after which the worts usually receive no further addition of yeast. The temperature of the fermenting mass rises soon after the introduction of the yeast 8 or 10 degrees, and sometimes more; so that it reaches in some cases the 85th or 90th degree of Fahrenheit's scale. From the appearance of the froth or scum the experienced distiller can form a tolerably correct judgment as to the progress and quality of the fermentation. The greatest elevation usually takes place within thirty-six hours after the commencement of the process. The object of the manufacturer of spirits is to push the attenuation as far as possible, which so far differs from that of the beer-brewer, who wishes always to preserve a portion of the saccharine matter undecomposed to give flavour and body to his beverage. The first appearance of fermentation shows itself by a ring of froth round the edge of the vat usually within an hour after the addition of the yeast; and in the course of five hours the extrication of carbonic acid from the particles throughout the whole body of the liquor causes frothy bubbles to cover its entire surface. The temperature meanwhile rises from 10 to 15 degrees according to circumstances. The greater the mass of liquid, the lower the temperature at which it was let down into the tun, and the colder the surrounding atmosphere, the more slowly will the phenomena of fermentation be developed under a like proportion of yeast and density of the worts. In general large vats afford a better result than small ones, on account of the equality of the process. It is reckoned good work when the specific gravity comes down to 1.000, or that of water; and superior work when it falls 4 or 5 below it, or to 0.995.

After thirty-six hours upon the moderate scale the yeasty froth begins to subside, and when the attenuation gets more advanced, the greater part of it falls to the bottom on account of its density relatively to the subjacent fluid. In from forty-eight to sixty hours the liquor begins to grow clear, and becomes comparatively tranquil. It has been deemed advantageous towards the perfection of the fermentation to rouse up the wash occasionally with a proper stirrer, and in some cases to increase its temperature a few degrees by the transmission of steam through a serpentine pipe coiled round the sides of the vat. Some have imagined that a considerable portion of spirit is carried off by the great volume of carbonic acid evolved, and have proposed to save it by covering the vats air tight, and conducting the gas through a pipe in the lids into a vessel containing water. The economy of this apparatus is not worth the expense and trouble which it occasions. The distillers content themselves with enclosing their vats after the first violence of the action under tolerably tight covers.

Mr. Octavius Smith, the eminent distiller of Thames Bank, states in his examination before the Molasses Committee, that the acetous fermentation is always proceeding simultaneously with the vinous fermentation; for judging by the usual tests there is always a slight degree of acidity in fermenting wash; that vinegar is in fact forming along with alcohol, or that while the attenuation is increasing, acetic acid is being formed. This important fact, which agrees with our own experience, serves to show how very fallacious a test the attenuation or diminution of density is of the amount of alcohol generated and existing in a fermented wash. The acetic acid along with the undecomposed mucilaginous starch may, in fact, so far counteract the attenuating effect of the spirits as to produce a specific gravity which shall indicate 10 or 15 per cent. less spirit than is actually present in the wash. Hence the excise officers should be instructed to use test-stills in order to verify upon a small aliquot part the real quantity of distillable alcohol contained in each back of wash. After due agitation of the wash three samples should be taken by the dipping cylinder, or sinking-jar, one from the bottom, one from the middle, and one from the top; which being mixed and distilled would denote exactly the whole quantity of spirit that could possibly be extracted.

This test-still was clearly described and forcibly pressed upon the attention of the exchequer by Dr. Ure in his several examinations before the said Molasses Committee. The distillers in general, as might have been expected, scouted the idea of the possibility of ascertaining the quantity of spirits in a large back, from the distillation of a quart or a gallon of the wash; but Mr. Steel showed that by the distillation of 1000 grains in a glass retort (about one-tenth of a pint), he had obtained a produce of spirit corresponding very nearly with the result of the distillation of ten gallons of the same wash in a proper still. And Mr. O. Smith, when closely questioned, admitted that means might be devised to enable an excise officer to perform the above analytical distillation with as great precision as the scientific man who had contrived the apparatus for him. The preventive check, or attenuation, as it is called, which the excise apply to the fermented wash, is good for very little against a fraudulent distiller, because he can so easily introduce immediately before the visit of the officer, towards the end of the fermentation, such a quantity of salt as will so alter the density as completely to disguise and conceal seven or eight per cent. of the spirit, without in the least injuring its quality in the act of distillation. In fact, Mr. O. Smith acknowledges to its full extent the futility, or rather nullity, of that check, for he says, 'I conceive that any check which does not approximate any nearer to the fact than that just alluded to (the attenuated gravity), is almost useless, inasmuch as a distiller willing to evade the duty, could do so, as the difference between the charge of the saccharometer and the actual spirit produced, allows ample room for the most exorbitant smuggler.'[*] Mr. William Baker, surveying-general examiner of excise, describes a mode of smuggling the spirits which would enable the distiller to make the quantity run off coincide with the quantity shown by the above fraudulent density. 'There was a pipe fastened before it came to the end of the worm, and it was carried through the wall into another part of the building.'[†] Any person may perceive how easy it is, with the actual distillatory apparatus, to lead a small branch tube from any point of the worm through the side or bottom of the worm-tub into a concealed subterraneous receiver.

It is curious to contrast the actual insecurity of the revenue from the distillation of whiskey with the multiplicity of precautions taken to prevent frauds; self-interest on the one hand being so much stronger and sharper than duty on the other. 'Examinations with us are constantly making; for example, we are surveyed this morning at six o'clock, the officers take their accounts and gauges, make calculations, and do a great deal of work, occupying several hours: at ten o'clock they again survey, going over the whole ground, where they continue a considerable time, frequently until the succeeding officer comes on duty: at evening too another survey takes place, similar to the former, but not by the same people; then at evening, six, the survey is repeated: at evening, ten, there comes another survey, by an officer who had not been engaged in any of the previous surveys of that day. He is not relieved until morning, six, of the day following; in addition to which, we are subject to frequent and uncertain visits of the surveyor and general surveyor: we are never out of their hands.'[‡]

It is computed that every 5 degrees of attenuation, as it is called, that is, every diminution of the number 5 upon the specific gravity in the third place of decimals, ought to produce 1 per cent. of proof spirit, or 1 gallon out of 100, as formerly stated; so that if the wort be set at 1.055, and come down to 1,000, 11 gallons of proof spirits are chargeable upon each 100 of such wash. In the fermentation of sugar worts, 1 gallon of proof spirits was calculated for every four similar degrees of attenuation. But distillation from sugar or molasses-wash is now illegal. With corn-wash, there is never more than four-fifths of the saccharine matter decomposed into alcohol and carbonic acid, in the best-managed fermentation, and frequently indeed much less. In fact, each pound of real sugar may be resolved by a successful process into half a pound of alcohol, or into about one pound of proof spirit, and hence as a solution of sugar at the density of 1·060, contains 15 per cent. by weight, or 16 per cent. by measure, which is nearly 1.7 pounds per gallon, it should yield nearly 170 pounds from 100 gallons, or 180 pound measures equal to 18 gallons of proof spirit; whereas 100 gallons of corn-wash, fermented at the above density, are computed by the excise law to yield only 12 gallons, and seldom produce more than 13 and a small fraction. There is thus therefore a wide difference between the produce of spirit from real saccharine matter as fermented by the man of science, and the produce obtained by our best malt and grain distillers. The main defect lies undoubtedly in the very imperfect saccharification of the fecula of the corn in the mashing process, which, in our opinion, would require to be entirely remodelled, and conducted upon sounder and more scientific principles.

In the huge fermenting vats used by the corn distillers of this country, the fermentation goes on far more slowly than when conducted upon the moderate scale referred to in the account of this process given above. About 1 gallon of yeast is added at first for every 100 gallons of wort, and a half gallon additional upon each of the succeeding four days, making in the whole 3 per cent.; when less can be made to suffice, the spirits will be better flavoured. The fermentation goes on during from six to twelve days, according to the modifying influence of the circumstances above enumerated. After the fifth or sixth day, the tuns are covered in, so as to obstruct, in a certain degree, the discharge of the carbonic acid, as it is supposed that this gas in excess favours fermentation. The temperature is usually greatest on the fourth or fifth day, when it sometimes rises to 85° Fahr., from the starting pitch of 60° or 56°. Whenever the attenuation has reached the lowest point by the hydrometer, the wash ought to be distilled, since immediately afterwards the alcohol begins to be converted into acetic acid. This acidification may be partially repressed by the exclusion of atmospheric oxygen.

III. *Distillation.*

There is no chemical apparatus which has undergone so many metamorphoses as the still and condenser. In its simplest form it has been already represented and described. [ALEMBIC.] It may be considered to have reached its highest point of perfection, as to power and rapidity of work, in Scotland, when the distillers paid a stipulated sum per annum to the revenue for the privilege of a still of a certain size, and when therefore they derived a profit proportionable to the quantity of spirits they could run off in a given time. In the year 1799, from a report presented to the House of Commons, it appears that the Scotch distillers at that time were able to work off 80 gallons of wash in eight minutes, and the duty was levied accordingly; but very soon afterwards they contrived means of doing the same thing in about three minutes. The stills made for such rapid operation were shallow, and exposed a great surface to the fire. One of them is figured and described in Ure's 'Dictionary of Chemistry.' Since the year 1815, the whiskey duties have been levied on the quantity distilled, independent of the capacity of the still. This change has introduced a modification in the distilling apparatus, with the view of combining purity of product with economy of time. The body of the still is still comparatively flat, so as to expose a large surface to the fire; but the tapering upper part, corresponding to the capital of an alembic, is made very long, rising sometimes 15 or 20 feet before it terminates in the worm pipe or refrigeratory for condensation.

Great distilleries are usually mounted with two stills, a larger and a smaller. The former is the *wash* still, and serves to distil from the fermented worts a weak crude spirit called *low wines;* the latter is the low-wine still, and rectifies by a second process the product of the first distillation. In these successive distillations a quantity of fetid oil, derived from the corn, comes over along with the first and last portions received, and constitutes by its combination what is styled the strong and weak *faints* in the language of the distilleries. These milky faints are carefully separated from the limpid spirit by turning them as they begin to flow from the worm-end into distinct channels, which lead to separate *receivers.*

From these receivers the various qualities of spirit, low wines, and faints, are, for the purpose of redistillation, pumped up into charging backs, from which they are run in gauged quantities into the low-wine and spirit stills. The pumps afford many facilities to the fraudulent distiller for abstracting spirits without the cognizance of the excise, and thus injuring at once the fair dealer and the revenue. It would be easy to arrange a distillery so that pumps would be quite superseded, with their numerous joints and screws, and to conduct the spirituous liquids from the appropriate receivers to the chargers and stills, on successive levels, through a series of pipes, without external orifice.

One of the greatest improvements in modern distillation is the accomplishment of this essential analysis of the impure spirit at one operation. Chemistry had been long familiar with the pneumatic apparatus of Woulfe, without thinking of its adaptation to distillery apparatus, when Edouard Adam, an illiterate operative, after attending by accident a chemical lecture at Montpellier, where he saw that apparatus, immediately employed it for obtaining fine brandy, of any desired strength, 'at one and the same heat.' He obtained a patent for this invention in July, 1801, and soon afterwards was enabled by his success to set up in that city a magnificent distillery, which attracted the admiration of all the practical chemists of the day. In November, 1805, he obtained a certificate of improvements whereby he could extract from wine, at one process, the whole of its alcohol. Adam was so overjoyed after making his first experiments, that, like another Archimedes, he ran about the streets telling every body of the surprising results of his new invention. About the same time, Solimani, professor of chemistry at Montpellier, and Isaac Berard, distiller in the department of Gard, having contrived two distinct systems of apparatus, each most ingenious, and obtaining results little inferior to those of Adam, became in consequence formidable rivals of his fame and fortune.

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[*] Report on the use of Molasses, &c., 1831, p. 185, Q. 2720.

[†] Ibid., p. 179, Q. 2612.

[‡] Thomas Smith, Esq., of Whitechapel-road, distiller, in *Molasses Committee Report*, p. 148, Q. 2199.

Into the description of these stills, of those of Derosne, Baglioni, &c., on the continent, or of their many modifications in this country, the limits of this article do not allow us to enter. In the treatises of Lenormand and Dubrunfaut, the construction of stills is described with a minuteness of detail sufficient to satisfy the most curious inquirers. We shall content ourselves with investigating the scientific principles of a perfect spirit still, and with a delineation of its outlines.

The boiling point of alcohol varies with its strength, in conformity with the numbers in the following table.

Specific Gravity.	Boiling point by Fahrenheit's Scale.	Specific Gravity.	Boiling point by Fahrenheit's Scale.
0·7939	168·5°	0·8575	181·0
0·8034	168·0	0·8631	183·0
0·8118	168·5	0·8765	187·0
0·8194	169·0	0·8892	190·0
0·8265	172·5	0·9013	194·0
0·8332	173·5	0·9126	197·0
0·8397	175·0	0·9234	199·0
0·8458	177·0	0·9335	201·0
0·8518	179·0		

Hence the lower the temperature of the spirituous vapour which enters into the refrigerator, the stronger and finer will the condensed spirit be, because the noxious oils are less volatile than alcohol, and come over chiefly with the aqueous vapour. A perfect still should therefore consist of three parts · first, the cucurbit or boiler; second, the rectifier for intercepting the greater part of the watery particles, and the whole of the corn oil; and third, the refrigerator. Such a construction is represented in *fig.* 1, 2, and 3, in which the resources of the most refined French stills are combined with a simplicity and solidity of construction suited to the grain distilleries of the United Kingdom. Three principal objects are obtained by this arrangement · first, the extraction from fermented wort or wine, at one operation, of a spirit of any desired cleanness and strength; second, a great economy of time, labour, and fuel; third, freedom from all danger of blowing up or boiling over by mismanaged firing. When a mixture of the alcohol, water, and essential oil, in the state of vapour, is passed upwards through a series of winding passages, maintained at a regulated degree of heat, from 170° to 180°, the alcohol alone, in notable proportion, retains the elastic form, and proceeds onward into the refrigeratory tube, in which these passages terminate, while the water and the oil are in a great measure condensed and retained in these passages, so as to drop back into the body of the still, and be discharged with the effete residuum.

The system of channels shown in *fig.* 2 is so contrived as to bring the compound vapours which rise from the alembic A into intimate and extensive contact with metallic surfaces, immersed in a water-bath, and maintained at any desired temperature by a self-regulating *thermostat* or heat-governor. The neck of the alembic tapers upwards as shown at B, *fig.* 1; and at C, *fig.* 2, it enters the bottom or ingress vestibule of the rectifier C F. F is its top or egress vestibule, which communicates with the under one by parallel cases, or rectangular channels D, D, D, whose width is small compared with their length and height. These cases are open at top and bottom, where they are soldered or riveted into a general frame within the cavity, inclosed by the two covers F, C, which are secured round their edges E, E, E, with bolts and packing. Each case is occupied with a numerous series of shelves or trays, placed at small distances over each other, in a horizontal or slightly inclined position, of which a side view is given in *fig.* 3, and cross sections at D, D, D, *fig.* 2. Each shelf is turned up a little at the two edges and the one end, but sloped down at the other end, so that the liquor admitted at the top may be made to flow backwards and forwards in its descent through the system of shelves, as indicated by the spouts in *fig.* 3. The shelves of each case are framed together by two or more vertical metallic rods, which pass down through them, and are fixed to each shelf. On removing the cover, the sets of shelves may be readily lifted out of the cases to be cleaned; and are hence called *moveable.*

Fig. 3.

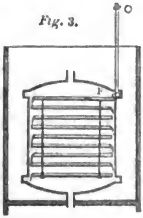


Fig. 2.

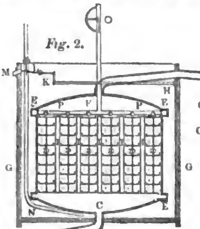


Fig. 5.

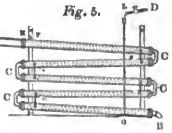


Fig. 1.

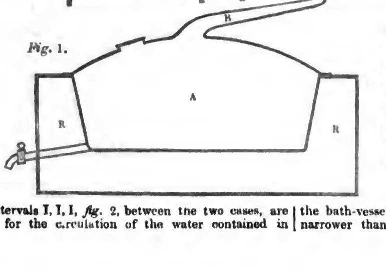
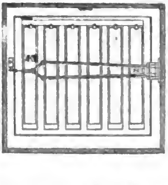


Fig. 4.



The intervals I, I, I, *fig.* 2, between the two cases, are left free for the circulation of the water contained in the bath-vessel G, G; these intervals being considerably narrower than the cases. *Fig.* 4 represents in plan ne surface of the rectifying cistern, shown by two different sections in *figs.* 2 and 3. H, K, *figs.* 2 and 4. is the thermostat or heat-governor, shaped somewhat like a pair of tongs. Each leg is a compound bar, consisting of a flat bar or ruler of steel, and one of zinc alloy, riveted facewise together, having their edges up and down. The links at K are joined to the free ends of these compound bars, which receding by increase of temperature, and approaching by its decrease, act through a lever upon the stop-cock L, fixed to the pipe of a cold water reservoir, and are so adjusted by a screw-nut, that whenever the water in the bath-vessel G, G rises above the desired temperature, cold water will be admitted through the stop-cock L and pipe N into the bottom of the cistern, and will displace the over-heated water by the overflow pipe M. Thus a perfect equilibrium of caloric may be maintained, and alcoholic vapour of correspondent uniformity be transmitted to the refrigeratory.

Fig. 5 is the refrigeratory, consisting of a double tube, placed in a zigzag direction, but in one plane, and supported by the two upright beams. The alcoholic vapour enters at the orifice K, and descends along the inner tube marked by dotted lines till it becomes condensed by the countercurrent of water continually ascending in the annular space between that block-tin or copper tube, and the outer castiron pipe F. The water of condensation enters into that annular space at the point G, being supplied by the pipe D, and the nose of the stop-cock L. The funnel into which the cold water is poured must be somewhat higher than the point K, from which that water is discharged, after having been heated to the same temperature as that of the alcoholic vapour last exposed to its influence.

When water has its particles kept by any means at rest, it becomes a very bad conductor of caloric; it acquires its maximum, conducting or cooling power, only when its particles are set in rapid and continuous motion. The present construction of worm is calculated to effect the most complete refrigeration of the vapours with the smallest expenditure of cold water, and to turn out the spirit at B in the coolest state. It has, moreover, two subsidiary recommendations, one to the distiller, and another to the revenue. Its interior may be most easily cleaned by unscrewing the bolts of the joints C C, and running sponge-rammers through the several straight pipes of which the series consists; no offset or branch pipe can be taken from it secretly, as is often practised upon the worms immersed in worm-tubs for fraudulent purposes. The number of turns in this serpentine may be increased at the pleasure of the distiller; a few only being represented in the figure for the sake of illustration. If a small portion of the overflow hot water be made to trickle down and moisten the outside surfaces of the two or three upper lengths of the serpentine, it will by evaporation produce a considerable degree of coolness, and thereby save cold water.

The preceding still apparatus is worked as follows: into the alembic put as much fermented liquor as will protect its bottom from being injured by the fire, when it is not plunged in a bath of muriate of lime, but exposed directly to the fuel. As soon as the ebullition in the alembic has raised the temperature of the water-bath G G to the desired rectifying pitch, whether 170° or 180°, the thermostatic instrument is to be adjusted by its screw-nut, and then the communication with the charging back or cistern is to be opened by moving the index of the stop-cock O over a proper portion of its quadrantal arch. The wash will now descend in a regulated stream through the pipe O F, thence spread into the horizontal tube P P, and issue from the orifices of distribution into the respective flat trays or spouts. The manner of its progress is shown for one set of trays in *fig.* 3. The direction of the stream in each shelf is evidently the reverse of that in the shelf above and below it; the turned-up end of one shelf corresponding with the discharge slope of its neighbour.

By diffusing the cool wash or wine in a thin film over such an ample range of surfaces, the constant tendency of the bath to exceed the proper limit of temperature is counteracted to the utmost without waste of time or fuel; for the wash itself *in transitu* becomes boiling hot, and experiences a powerful steam distillation. Thus also a very moderate influx of water through the thermostat stopcock suffices to temper the bath; such an extensive vaporization of the wash producing a far more refrigerant influence than its simple heating to the boiling point. It deserves peculiar remark, that the greatest distillation with the least fuel is here effected without any pressure in the alembic; for the passages are all pervious to the vapour, whereas, in almost every wash-still heretofore contrived for similar purposes, the spirituous vapours must force their way through successive layers of liquid, the total pressure from which causes undue elevation of temperature, obstruction to the process, and forcing of the junctures. Whatever supplementary refrigeration of the vapours in their passage through the bath may be deemed proper will be administered by the heat-governor.

The bath regulated by the thermostat may however be used for obtaining fine spirits at one operation, without transmitting the wash or low wines down through its interior passages; in which case it becomes a simple rectifier. The empyreumatic taint which spirits are apt to contract from the action of the naked fire on the vegetable gluten in contact with the bottom of the still, is somewhat counteracted by the rotation of chains in the large wash-stills; but it may be entirely prevented by placing the still in a bath of strong solution of muriate of lime R R, *fig.* 1, regulated by a thermometer or, still better, a thermostat. Thus a safe and effectual temperature of from 270° to 290° Fahr. may readily be obtained. For further details, see the specification of Dr. Ure's patent still.

The quantity of proof spirit which paid duty in 1836 was twenty-seven millions of gallons, thirteen millions of which were made in Great Britain, and fourteen millions in Ireland. Of the latter, a considerable quantity was imported into this island. The manufacture of whiskey does not seem to have been diminished in this country as it has been in the United States by the influence of the temperance societies.

In 1832 .. 20,778,521 gallons paid excise duty
1834 .. 23,397,806 „
1836 .. 27,137,000 „

showing an increase which is far out of proportion with that of the population. We may add to the last quantity three millions of gallons on the score of smuggling, in licensed and illicit distilleries; making thirty millions to be the real amount of whiskey consumed by our population of twenty-four millions. [BRANDY, GIN, RUM, THERMOSTAT, WHISKEY.]

DISTORTION. Deformity of the person may be advantageously classed for the purpose of discussion under two principal heads: *malformation* and *distortion*. The former is, for the most part, congenital, and is usually characterized by the deficiency or redundancy of parts, or by imperfections and irregularities of structure. The latter, arising generally after birth, comprises all permanent deviations from the natural shape or position which are effected by the influence of external or internal force in parts originally soft and flexible, or such as have acquired unnatural pliancy by accident or disease.

It is to the latter class of deformities only that our attention is for the present directed. But even thus limited, the subject is so extensive that we must once for all refer the reader for more precise information on several of its most interesting subdivisions to other professional works.

I. Every part of the body capable of independent motion is furnished with two sets of muscles, acting in contrary directions, the purpose of which is obviously to bring the part back to its place after movement in either direction. In the position of equilibrium these muscles are not in a state of absolute relaxation even during sleep; on the contrary, they continue to act with considerable energy, each exactly counterbalancing the other. This is called their tone or tension, and it is calculated to give great steadiness to the part thus held at rest between opposite forces. But if one set of the muscles should be suddenly cut across, the tension of their antagonists still remaining in action, the consequence would be a movement in obedience to the latter till the contraction had reached its limit; and the part in question would permanently retain the position into which it had thus been moved. The same effect would result if the muscle, instead of being divided, were paralyzed by the interruption of its nervous communication with the brain. Again, if the tone of one muscle were increased by spasm or otherwise, so as to give it a decided preponderance over its antagonist, the result would be similar. These considerations will sufficiently explain the nature of one large class of distortions, namely, those which result from affections of the *brain*, *muscles*, and *nerves*.

1. The simplest of these is the *drawn mouth*, or *hemiplegia*. It arises in this way: in consequence of an extravasation of blood or some other cause, the functions of one side of the brain are interrupted; the muscles of the cheek on the same side, deriving their nerves from that part of the brain, are paralyzed, and the retractors of the opposite angle of the mouth being no longer balanced by an equal force, draw it up towards their origin, and retain it in that position.

2. *Strabismus*, or squinting, is frequently produced in the same way by a partial paralysis of that muscle the office of which is to turn the globe of the eye in the opposite direction, or it may arise from undue contraction of the muscle on the same side.

3. It is remarkable that *hysteria* is sometimes accompanied by a distortion of the last-mentioned kind, produced by a spasmodic contraction of the flexor muscles of one of the joints, commonly the knee or hip. For months or years this painful condition may last without mitigation: yet it may vanish all at once under the influence of some powerful impression of the body or mind. The entire loss of the voice, which sometimes comes on suddenly in similar constitutions, and after long resisting every remedy, as suddenly departs, is probably an analogous affection of the muscles of the larynx.

4. *Wry-neck* is a distortion also due to irregular muscular action. It generally comes on gradually in infancy, and consists in a shortened and contracted state of the *sterno-mastoid* muscle, of that side to which the head is inclined and *from* which the face is turned. *Club-foot* is often nothing more than a similar contraction of the muscles of the calf, which draw up the heel and eventually disturb the integrity of the ankle joint. This complaint also comes on at an early age, and is sometimes congenital. By proper means they both admit of relief, and often of a cure.

The list of distortions depending on a morbid condition of the muscular or nervous functions might easily be extended.

II. But by far the most common and important class of these affections is that which originates in disease of the bones.

1. The firmness and rigidity of the bones depends upon the due proportion of the earthy matter, phosphate of lime, that enters into their composition. If the proportion of this ingredient be too great, as in old age, and in the disease called *fragilitas ossium*, they become brittle, and are broken by the slightest causes; if it be too small, they become unnaturally pliant, and are distorted by the pressure of the superincumbent weight, or the contraction of the muscles.

The latter condition is prevalent with other structural changes in the disorder called *rickets*. The medical name of this complaint is *rachitis* (from ῥάχις, the spine), and was given to it by Glisson, who first described it, partly because he conceived the vertebræ to be the bones most commonly implicated; but chiefly, it would appear, from the resemblance to the English name. His doctrine was erroneous; and the error perpetuated by the misnomer has led to serious mistakes in practice as well as theory. The spine is undoubtedly liable to partake with the rest of the skeleton in the morbid condition of rickets, but certainly not in a greater degree than the other bones.

This malady seldom appears within the ordinary period of lactation, or after puberty. It is ushered in and attended throughout by general febrile disturbance, and is closely connected with a peculiar morbid condition of the nutritive functions. The opinion that it is of scrofulous origin has lately been strongly controverted, and does not in reality appear to be well supported by facts. It is most common among the poor, and in closely-peopled districts, as all the diseases of children are; but it is by no means confined to either, or to children whose constitutions are apparently the most feeble in other respects. Indeed it is a frequent remark, that the most robust and powerful men exhibit tokens of having been rickety in their childhood. Among such indications are smallness of the pelvis, with inward or outward curvature and disproportionate shortness of the lower limbs. This sudden check to the development of the skeleton, constantly observed in rickety children, with the distortion arising from the unnatural softness of the bones, is the most usual cause of the short stature, as well as the proverbial ugliness, of dwarfs.

In extreme cases of this complaint the head is generally small and pointed: no longer supported by the yielding and shortened neck, it sinks down between the shoulders; the occiput is thrown back and almost touches the hump formed by the incurvated spine behind the chest: the chin is thrust forward, giving an expression to the features very characteristic of the dwarf, and rests upon the breast bone, which is very prominent: on each side the ribs are flattened, and bulge in upon the lungs. The shoulders, losing the support of the wreathed and twisted clavicles, approach towards each other in front, drawing with them the scapulæ, which stick out laterally, and add considerably to the deformity as seen from behind; the arms, though bent and in reality shortened, seem of disproportionate length; the lumbar spine is thrust inwards; the pelvis is small and flattened; the thighs are bowed forward; the knees, with their patellæ at the side instead of in front of the joint, touch or overlap each other; while the feet are set wide apart, a sudden twist above the ankle still permitting the soles to be set to the ground. Such are some of the varied changes which exhibit a melancholy proof of the prevalence of the disease in every part of the bony frame, and almost defy description. Of course such extreme cases of rickety distortion are comparatively rare; yet almost daily instances are seen by those whose duty calls them into the unwholesome courts and alleys of the metropolis, and slighter examples of the affection are extremely common.

Recovery, even from considerable degrees of this affection, is more frequent and rapid than might be imagined; but the pelvis and lower limbs, which, as above mentioned, are the most commonly and extensively implicated, seldom completely regain their natural proportions. This fact, as it regards the female pelvis, is worthy of notice, being the cause of by far the most dangerous kind of difficult parturition. It is in extreme cases of this sort that the Cæsarean section has been practised.

Independently of rickety distortion, there are two other kinds of curvature of the spinal column which demand a brief notice.

The first, which has frequently been mistaken for rachitis, is usually called *lateral* curvature, to distinguish it from the more serious kind of distortion next to be considered, which is called *angular* curvature.

2. Unlike rickets, which almost always commence in infancy or early childhood, lateral curvature of the spine seldom appears before the tenth year. The external deformity consists in the prominence of one hip (generally the right), and elevation of the corresponding shoulder, the blade of which sticks out in unsightly protuberance behind. The opposite hip and shoulder are respectively flattened and depressed; and the symmetry of the chest is destroyed, one side being larger than the other, and both twisted and misshapen. On examination the spine is found to have a double curvature sideways so as to resemble the letter S, but generally turned the other way, the concavity of the lower curve being on the right, and the upper on the left side. It arises from weakness in the spinal muscles and local elongations of the ligaments of the vertebræ, from the habit of resting the weight in sitting or standing more on one side than the other; and that side is usually the right. The position is more easy than the upright one, and when not corrected by fitting exercise and change in the nature of the employment, it becomes habitual, and the twist of the person permanent and increasing. The subjects of this kind of distortion are chiefly slender and delicate girls in the middle and upper classes, the poor being comparatively exempt. It comes on insidiously, the attention not being awakened by any particular derangement of the health beyond a certain degree of languor and susceptibility of fatigue, and perhaps a sluggish state of the digestion. The first symptom that betrays its presence is usually a tendency of the dress to slip off the left shoulder. It is much promoted by means often used to prevent it, such as confinement and restraint of the person and posture by stays, backboards, high-backed chairs, reclining on a board, and other contrivances to improve the figure, and restrain the development of the natural form; as well as by the sedentary habits and inappropriate exercises of the academy or school-room. Nature is not to be coerced with impunity by fantastic caprices and contrivances: a good figure as well as good health must be found, if anywhere, in the open air of the fields, in loose and easy clothing, and in unconstrained exercise of the limbs, such as children will always adopt, if left to choose for themselves, in ways much better suited to their age and strength than any that can be invented for them.

3. Angular curvature of the spine is a deformity very

different in its nature and appearance from the last described. It arises for the most part from ulceration of a scrofulous kind in the bodies of the vertebræ. The support in front being thus lost, the spine is sharply bent forwards so that one or more of the spinous processes project behind, indicating the position of the diseased vertebræ. This complaint is attended with incomplete paralysis of the lower extremities, and is not unfrequently fatal. In case of recovery the bodies of the contiguous vertebræ are approximated and consolidated with what remains of those which were diseased by the deposition of bony matter. It is in this species of spinal complaint only that rest and the recumbent posture are expedient. The observance of these essential precautions concurrently with other means frequently brings about a cure; the distortion however is permanent.

Diseases of a similar kind frequently occur in the bones and joints of other parts of the body; they require similar treatment, and are followed by analogous consolidations and distortions.

4. Rheumatism, and other disorders, and even common inflammations, occurring in a high degree within the joints or in their neighbourhood, occasionally produce like effects.

III. Distortions are sometimes occasioned by the contraction of other parts than those which are concerned in motion.

1. Such are those of the fingers which arise from chronic inflammation and permanent contraction of the palmar aponeurosis, or fascia, a strong inelastic and fibrous membrane attached to the projecting points of bone, and stretched beneath the skin of the palm for the protection of the nerves and other soft parts during the act of forcible grasping. There is a similar aponeurosis in the sole of the foot, which is subject, but not so frequently, to the same shortening. Under this division may be also classed those distortions which arise from burns and other extensive destructions and ulcerations of the skin, in consequence of the contraction of the scar in the process of healing. When these injuries take place in the front of the neck and face, the resulting deformity is sometimes frightful. The space between the chin and the breast is filled up by a tense discoloured and corrugated cicatrix, which bows the head forward and draws down the features so as to expose the inner surface of the lower eyelid and keep the mouth constantly open. When they occur in the flexures of the joints, as in front of the elbow, the cicatrix extends in the form of a hard and rigid web between the humerus and fore-arm, the joint being permanently bent. Such deformities may sometimes be partly removed by an operation; but it is extremely painful, and often unsuccessful.

2. A slight injury of the face below the eye, or the simple contraction from some other cause of the skin of that part may produce the deformity called *ectropium*, or eversion of the lower lid; and the opposite state of inversion (*entropium*, or *trichiasis*) may result from a similar contraction of the edge of the eyelid itself. Severe inflammation, and even blindness, may be the consequence of the latter affection from the friction of the lashes against the globe. Both of these deformities may be remedied by a slight operation.

IV. Another class of distortions may arise from external pressure; as of the bones and cartilages of the chest from tight stays; or of the phalanges of the toes from ill-made shoes. Instances of this kind of distortion must be familiar to all; and call for no particular explanation or remark.

DISTRESS, 'districtio,' in the jurisprudence of the Middle Ages, denotes legal compulsion generally, whether ecclesiastical or civil. One mode of compulsion extensively adopted among the nations of Teutonic origin was the taking possession of the whole or a part of the property of the offender or defaulter, and withholding it from him until the requirements of the law had been complied with. This species of distress was called 'naam,' from nyman, nehmen, to take—a verb common to the Anglo-Saxon, German, and other cognate languages. The modern distress is the 'naam,' restricted to the taking of *personal* chattels; and in its most simple form it may be stated to be—the taking of personal chattels out of the possession of an alleged defaulter or wrong-doer for the purpose of compelling him, through the inconvenience resulting from the withholding of such personal chattels, to perform the act in respect of which he is a defaulter, or to make compensation for the wrong which he has committed.

Some rights to which the law annexes the remedy by distress, have been considered as too important to be left to the protection afforded by the mere detention of the *distress* (by which term the thing taken is also designated), and more efficacious means of dealing with it have been introduced; and in certain cases a sale of the property taken by way of distress is allowed, if, after a certain interval, the party distrained upon continues to be unwilling or unable to do the act required.

Distresses are either for some duty omitted, some default or nonfeasance,—or they are in respect of some wrongful act done by the distrainee.

I. *As to distresses for omissions, defaults, or nonfeasance.*—These may be grounded upon noncompliance with some judicial requirements, or they may be made by private individuals in vindication of certain rights, for the withholding of which the law has entrusted them with this remedy.

The process out of courts of record ordering such distresses to be made is called a writ of *distringas*, which, when legal proceedings were in Latin, was the word used to direct the sheriff or other officer to make the distress.

Another class of judicial distresses is where, upon refusal or omission to pay a sum in which a party is convicted upon a summary proceeding before justices of the peace, such justices are empowered to grant a warrant authorizing and directing the levying of the amount by distress and sale of the goods of the offender.

Another species of judicial distress is that awarded and issued upon a judgment recovered in an inferior court, not of record. In these cases the execution or remedy for obtaining payment of the sum recovered is by distress. A precept issues to the officer of the court, commanding him to take the goods of the party, and to impound them until he satisfies the debt. Such process issues at the command of the sheriff or of the lord of the manor, &c., in whose name and by whose authority the courts are holden.

So a distress lies, subject to certain restrictions, for fines and amercements imposed in the sheriff's tourn and in a court-leet. [Leet; Tourn.]

A penalty inflicted for the breach of a bye-law [Bye Law] may be levied by distress, in cases where that remedy is appointed at the time of the making of the particular bye-law. But a bye-law establishing a distress cannot authorize the sale of the distress.

Another species of judicial distress is a distress taken for poor-rates. [Poor.]

In the foregoing cases the right or duty withheld has been ascertained by some judicial determination before a distress can be resorted to. But many payments and duties having their origin in feudal rights, may be enforced by distresses taken by the sole authority of the parties claiming such payments or duties. The rights, of which the vindication is thus in the first instance entrusted to the parties themselves, are connected immediately or mediately with feudal superiority; and it is observable that to feudal superiority, jurisdiction and magisterial authority were always incident.

Among the feudal duties which may be enforced by distress, at the mere will of the party claiming to be entitled to such duties, one which though seldom exacted, is still of the most extensive obligation, is fealty. Fealty is a promise confirmed by an oath, to be faithful in the performance of those engagements into which the party doing the fealty (as the act of taking the oath is termed) has expressly or impliedly entered upon becoming tenant to the party receiving the fealty.

A distress also lies for suit of court, *secta ad curiam*, or the attendance which freehold tenants owe to their lord's court-baron, or freeholders'-court, and which tenants in villenage or copyholders owe to the lord's customary court; and it is not unusual for lessees for years to covenant to attend the lord's courts, though unless they also fill the situation of freeholders of the manor, they are not qualified to sit as suitors and judges in the court baron; and unless they are copyholders they cannot be sworn upon the homage or jury in the customary court. This suit is sometimes called suit-service, to distinguish it from suit real, which is that suit of court which the resiants, or those who dwell within a hundred or a leet, owe to the sheriff's tourn or to the court-leet. [Leet; Suit.]

A distress lies for suit of mill (secta ad molendinum), an obligation, still existing in some manors, to grind at the lord's mill.

So for frankfoldage, or a right in the lord to require his tenants to fold their sheep upon his lands.

So, if land be holden by the tenure of repairing a bridge, or a highway, or of doing suit to a leet, or filling some office within the leet, a distress will lie for nonperformance of the service, although no fine or amercement may have been imposed in the court leet.

The most important feudal duty for which a distress may be taken is *rent*. Rent, in its original and still most usual form, is a payment rendered by the tenant to his landlord as an equivalent or a compensation for the occupation of land, &c. Such rent is denominated rent-service. It comes in lieu of, and represents the profits of the land granted or demised, and is therefore said to *issue* out of the land. To rent-service the law annexes the power of distress, although there be no agreement between the parties creating that remedy. But a rent reserved upon a grant or demise ceases to be a rent-service if it be disannexed from the ultimate property in the land, called in some cases the reversion, in others, the right of reverter. Thus, if the owner of land in fee demises it for a term of years, reserving rent, and afterwards assigns the rent to a stranger, retaining the reversion, or grants the reversion, retaining the rent, the rent being disconnected from the reversion is considered as a branch severed from the trunk, and is called a dry rent or rent-seck, to which the common law annexed no power of distress. So, if the owner of the land, without parting with the land, grants to another a rent out of the land, the grantee having no reversion had only a rent-seck, unless the grant expressly created a power of distress, in which case the rent would be a rent-charge. But now, by statute 4 Geo. II. c. 28, s. 5, the like remedy by distress is given in cases of rent-seck, as in the case of rent reserved upon lease.

And as all rents, though distinguished by a variety of names derived from some particular circumstance attached to them, are resolvable into rent-service, rent-seck, or rent-charge, a distress lies at this day for every species of rent, though a practical difference still subsists as to the mode of dealing with distresses taken for the one or for the other. As to the several species of rent, and as to the creation, transfer, apportionment, suspension, and extinction of rents, and as to the estate or interest of the party necessary to support a distress for rent, and as to the cases in which this remedy may be exercised by the personal representatives of such parties, see Rent.

A heriot appears to have been originally a voluntary gift by the dying vassal to his chieftain or lord (herr, herus) of his best horse or armour. It has now become a legal liability to deliver the best animal of the deceased tenant to be selected by the lord, or sometimes a dead chattel or a commutation in money. Where heriot is due by usage within a particular district, in respect of all tenants dying within that district, without reference to the property held, it is heriot-custom; and as there is no particular land charged with the heriot, the lord cannot distrain, but may seize the heriot as his own *property*, his election being determined by the bare act of seizure. But heriot due in respect of the estate of the tenant in the land is heriot-service; and for this the lord may either distrain upon the land to compel the tenant to deliver or procure the delivery of the heriot due upon the death of his predecessor, or he may choose for himself, and seize the heriot as his own property (the right of property vesting here also upon the election exercised and signified by the seizure).

As heriot is something rendered upon the death of a tenant, so relief is a payment made by the heir upon the taking up (relevatio) by him of the inheritance. Strictly speaking, relief was payable in those cases only where the tenure was by knight's service. But the name was afterwards extended to a payment in the nature of a relief made by the heir in socage, by doubling the rent for the first year after the descent of the land,—in other words by paying one year's additional rent. For this payment a distress lies.

Toll is a charge or impost upon goods in respect of some benefit conferred or right forborne with relation to those goods, by the party claiming such toll.

Tolls of fairs or markets are a duty payable to the owners of the fair or market as a compensation for the mischief done to the soil by the holding of such fair or market.

Toll-traverse is a compensation paid in some cases to the owner of the soil in respect of the transit or passage of goods.

Toll-thorough is a toll for the transit of goods along a street or highway repaired by the party claiming the toll.

Port-tolls, more commonly called port-duties, are tolls payable in respect of vessels coming to or sailing from a port or a wharf of which the parties claiming the tolls, or those from whom they derive their title to such tolls, are the owners.

In all these cases if the toll be withheld, any part of the property chargeable therewith, may be seized and detained as a pledge for the payment of such toll.

II. *Distress for damage-feasant.*—Besides distresses for omissions, defaults, or nonfeasance, this remedy is given in certain cases as a mode of obtaining reparation for some wrong done by the distrainee. Cattle or dead chattels may be taken and detained to compel the payment of a reasonable sum of money by way of satisfaction for the injury sustained from such cattle or dead chattels being wrongfully upon property in the occupation of the party taking them, and doing damage there, either by acts of spoliation or merely by incumbering such property. This is called a distress of things taken damage-feasant (doing damage).

The occupier of land, &c., is allowed not only to defend himself from injury by driving out or removing the cattle, &c., but also to detain the thing which did the injury till compensation be made for the trespass; for otherwise he might never find the person who had occasioned the trespass. Upon referring to Spelman and Ducange, it will be seen that a similar practice obtained on the continent amongst the Angli, Werini, Ripuarii, and Burgundians.

The right to distrain damage-feasant is given to all persons having an immediate possessory interest in the soil or in its produce, and whose rights are therefore invaded by such wrongful intrusion. Thus, not only the occupier of the land trespassed upon, but other persons entitled to share in the present use of the land or of the produce, as commoners, &c., may distrain. But though a commoner may always distrain the cattle, &c., of a stranger found upon the common, it would seem that he cannot, unless authorized by a special custom, distrain the cattle, &c., of the person having the actual possession of the soil. Nor can he distrain the cattle of another commoner who has stocked beyond his proportion, unless the common be stinted, *i. e.* unless the proportion be limited to a certain number. In the more ordinary case of rights of common in respect of all the cattle which the commoner's enclosed land can support during the winter, cattle exceeding the proportion cannot be distrained.

Cattle found trespassing may be distrained damage-feasant, although they have come upon the land without the knowledge of their owner and even through the wrongful act of a stranger. But if they are there by the default of the occupier of the land, as by his neglecting to repair his fences, or to shut his gates against a road or a close in which the cattle lawfully were, such negligent occupier cannot distrain unless the owner of the cattle suffer them to remain on the land after notice and time given to him to remove them; and if cattle trespass on one day and go off before they are distrained, and are taken trespassing on the same land on another day, they can be detained only for the damage done upon the second day.

Cattle, if once off the land upon which they have trespassed, though driven off for the purpose of eluding a distress, cannot be taken even upon immediate pursuit. The occupier is left to his remedy by action.

III. *What may be distrained.*—Not only cattle and dead chattels, but wild animals in which no person has any property may be distrained damage-feasant. In distresses for rent and other duties, that which is taken must be something in which a valuable property may exist. But animals of a wild nature, if reclaimed and become valuable (as deer kept in a private park), may be distrained. Whether animals reclaimed for the purpose of pleasure only can be distrained appears to admit of doubt. Lord Coke mentions dogs among the animals upon which no distress can be taken; but in the old work called the Mirror, to which he refers, the restriction would appear to be confined to cases where other distress could be taken.

Fixtures and growing crops not being personal chattels were not at common law subject to distress. But it would appear that those fixtures which are removable, as between landlord and tenant, would be also liable to be taken as a distress; and by 11 Geo. II. c. 19, s. 8, distress for rent-service may be made of all sorts of corn and grass, hops, roots, fruit, pulse, or other product whatsoever growing in any part of the land demised.

By the common law nothing could be distrained upon for rent or other duty that could not be restored in as good plight as at the time of the distress being taken; and therefore fruit, milk, and other matters of a perishable nature could not be distrained, nor money unless in a bag, because the identical pieces could not be known so as to be restored to the distrainee; nor could grain or flour be taken if out of the sack, or hay not being in a barn, or corn in the sheaf, because the quantity could not be easily ascertained, and they might be scattered or injured by the removal. None of these could be taken as a distress except for damage-feasant, though the same articles when contained in bags, boxes, carts, or buildings might be distrained upon for rent. But now by 2 W. & M. sess. 1, c. 5, s. 3, distress may be made of sheaves or cocks of corn, or corn loose or in the straw, or hay lying or being in any barn or granary, or upon any hovel, stack or rick, or otherwise, upon any part of the land.

Where a stranger's cattle are found upon the tenant's land they may be distrained upon for rent-service, provided they are there by the act or default of the owner of such cattle. If they come upon the land with the knowledge of their owner, or by breaking fences which are in repair, or which neither the landlord nor the tenant is bound to repair, they are immediately distrainable; but if they come in through defect of fences which the lord or tenant is bound to repair, the lord cannot take them for rent reserved upon a lease until they have lain for a night upon the land, nor until after notice given to the owner, if he can be discovered, to remove them. But in the case of a lord not bound to repair the fences distraining for an antient rent or service, and also in the case of a rent-charge, the cattle may be taken, after they have lain a night upon the land, without notice to their owner.

Things necessary for the carrying on of trade, as tools and utensils,—or for the maintenance of tillage, as implements of husbandry, beasts of the plough, and sheep as requisite to manure the land, are privileged from distress whilst other sufficient distress can be found. But this rule does not extend to a distress for a toll or duty arising in respect of the thing taken as a distress, or of things connected with it; as a distress of two sheep for market-toll claimed in respect of the whole flock, or of the anchor of a ship for port-duty due in respect of such ship.

For the protection of tradesmen and their employers in the necessary transactions of society, property of which the distrainee has obtained the possession with a view to some service to be performed upon it by him in the way of his trade, is absolutely privileged from distress; as a horse standing in a smith's shop to be shod, or put up at an inn, or cloth sent to a tailor's shop to be made into clothes, or corn sent to a mill or market to be ground or sold. The goods of a guest at an inn are privileged from distress; but this exemption does not extend to the case of a chariot standing in the coach-house of a livery-stable keeper; nor does it protect goods on other premises belonging to the inn but at a distance from it; and even within the inn itself the exemption does not extend to the goods of a person dwelling there as a tenant rather than a guest. Goods in the hands of a factor for sale are privileged from distress; so goods consigned for sale, landed at a wharf, and placed in the wharfinger's warehouse.

Beasts of the plough may be distrained where no other distress can be found. And it is sufficient if the distrainor use diligence to find some other distress. A distress is not said to be found unless it be accessible to the party entitled to distrain, the doors of the house being open, or the gates of the fields unlocked. Beasts of the plough may be distrained upon where the only other sufficient distress consists of growing crops, which though now subjected to distress, are not, as they cannot be sold until ripe, immediately available to the landlord.

A temporary privilege from distress arises when the chattel is in actual use, as an axe with which a man is cutting wood, or a horse on which a man is riding. Implements in trade, as frames for knitting, weaving, &c., are absolutely privileged from distress whilst they are in actual use, otherwise they may be distrained upon if no other sufficient distress can be found.

By 7 Ann. c. 12, s. 3, process whereby the goods of any ambassador or other public minister of any foreign prince or state, or of their domestic servants, may be distrained, seized, or attached, is declared to be null and void. But the privilege of a domestic servant of an ambassador does not invalidate a distress for the rent, rate, or taxes of a house occupied for purposes unconnected with the service.

By 6 Geo. IV. c. 16, s. 74, no distress for rent made and levied after an act of bankruptcy upon the goods of any bankrupt shall be available for more than one year's rent accrued prior to the date of the fiat; but the party to whom the rent is due shall be allowed to come in as a creditor for the overplus of the rent due, and for which the distress shall not be available.

Where a tenancy for life or at will is determined by death or by the act of the landlord, the tenant, or his personal representatives, may reap the corn sown before such determination, and therefore such corn though sold to a third person, cannot be distrained upon for rent due from a subsequent tenant. [Emblements.]

Neither the goods of the tenant nor those of a stranger can be distrained upon for rent if they are already in the custody of the law, as if they have been taken damage-feasant, or under process of execution. But although the landlord cannot distrain, yet by 8 Ann. c. 14, he has a lien or privilege upon the goods of his tenant taken in execution for one year's rent. [Execution.]

IV. *Time of making a distress.*—Rent is not due until the last moment of the day on which it is made payable. No distress therefore can be taken for it until the following day. And as a continuing relation of landlord and tenant is necessary to support a distress for rent-service, there could at common law be no distress for rent becoming due on the last day of the term. But now, by 8 Ann. c. 14, s. 6 and 7, any persons having rent in arrear upon leases for lives, for years, or at will, may, after the determination of such lease, distrain for the arrears, provided that such distress be made within six calendar months after the determination of the lease and during the continuance of the landlord's title or interest, and the possession of the tenant from whom such arrears are due. If the possession of the tenant continue in fact, it is immaterial whether that possession be wrongful and adverse, or whether it continues by the permission of the landlord; and if a part only of the land remain in the possession of the tenant, or of any person deriving his possession from the tenant, a distress for the whole of the arrears may be taken in such part during the six months. Where a tenant is entitled by the terms of his lease, or by the custom of the country, to hold over part of the land or buildings for a period extending beyond the nominal term, the original tenancy will be considered as continuing with reference to the land, &c. so retained, and the landlord may distrain at common law for the arrears during such extended period in the lands, &c. so held over, and he may distrain under the statute during six months after such partial right of possession has entirely ceased.

When different portions of rent are in arrear the landlord may distrain for one or more of those portions, without losing his right to take a subsequent distress for the residue; so, although the first distress be for the rent last due. But if there be a sufficient distress to be found upon the premises, the landlord cannot divide a rent accruing at one time into parts, and distrain first for a part and afterwards for the residue. If however he distrain for the entire rent, but from mistaking the value of the goods takes an insufficient distress, it seems that a second distress for the deficiency will be lawful although there were sufficient goods on the premises to have answered the whole demand at the time of the first taking; and it is clear that he may take such second distress upon goods which have come upon the premises subsequently to the first taking, if in the first instance he distrain all the goods then found thereon and for the entire rent, the amount of which exceeds the value of the goods first taken.

A distress for rent or other duties or services can be taken only between sunrise and sunset; but cattle or goods found, damage-feasant may be distrained at any time of the day or night.

By the common law the remedy by distress was in general lost upon the death of the party to whom it accrued. But the king and corporations aggregate never die; and as the law authorizes a surviving joint tenant to act as if he had been originally the sole owner, he may distrain for rent or other services accruing in the lifetime of his companion.

The statutes of 32 H. VIII. c. 37, and 3 and 4 W. IV. c. 42, have extended the remedy by distress to husbands and executors in respect of rent accruing due to their deceased wives or testators. [Rent.]

No distress can be taken for more than six years' arrears of rent; nor can any rent be claimed where non-payment has been acquiesced in for twenty years, 3 and 4 W. IV. c. 27.

V. *In what place a distress can be made.*—The remedy being given in respect of property, not of the person, a distress for rent or other service could at common law be taken only upon the land charged therewith, and out of which such rent or services were said to issue

But this restriction did not apply to the king, who might distrain upon any lands which were in the actual occupation of his tenant, either at the time of the distress or when the rent became due.

The assumption of a similar power by other lords was considered oppressive, and it was ordained by the statute of Marlbridge, that no one should make distress for any cause out of his fee, except the king and his ministers thereunto specially authorized. The privilege of distraining in all lands occupied by the party chargeable, is communicated by 22 Car. II. c. 6; 26 Geo. III. c. 87; 30 Geo. III. c. 50; and 34 Geo. III. c. 75, to the purchasers of certain crown rents.

At common law if the tenant or any other person seeing the lord or his bailiff come to distrain for rent or other service, drove the cattle away from the land holden, they might be distrained off the land. Not so when the cattle without being driven went off before they were actually taken, though the lord or bailiff saw the cattle upon the land (which for some purposes is a constructive possession). Nor if after the view the cattle were removed for any other purpose than that of preventing a distress. On the other hand, cattle of which the lord or bailiff has no view whilst they are on the land, although the tenant drove them off purposely to avoid a distress, could not be distrained.

Under 8 Ann. c. 14, and 11 Geo. II. c. 19, where a lessee fraudulently or clandestinely carries off his goods in order to prevent a distress, the landlord may within five days afterwards distrain them as if they had still continued on the demised premises; provided they have not been (*bonâ fide*) sold for a valuable consideration.

And by the 7th section of the latter statute, where any goods fraudulently and clandestinely carried away by any tenant or lessee, or any person aiding therein, shall be put in any house or other place, locked up or otherwise secured, so as to prevent such goods from being distrained for rent, the landlord or his bailiff may, in the day time, with the assistance of the constable or peace officer (and in case of a dwelling-house, oath being also first made of a reasonable ground to suspect that such goods are therein), break open and enter into such house or place, and take such goods for the arrears of rent, as he or they might have done if such goods had been put in an open field or place.

To entitle the landlord to follow the goods, the removal must have taken place after the rent became due, and for the purpose of eluding a distress. It is not however necessary that a distress should be in progress, or even contemplated. Nor need the removal be clandestine. Although the goods be removed openly, yet if goods sufficient to satisfy the arrears are not left upon the premises, and the landlord is turned over to the barren remedy by action, the removal is fraudulent and the provisions of these statutes may be resorted to. These provisions apply to the goods of the tenant only. The goods of a stranger or of an under-tenant may be removed at any time before they are actually distrained upon, and cannot be followed.

Where two closes are let by separate demises and separate rents, though such demises be made at the same time and are even contained in the same deed, a distress cannot be taken in one close for both rents.

If a rent-charge or rent-service also issue out of land which is in the hands or separate possession of two or more persons, a distress may be taken for the whole rent upon the possession of any one of them.

The lord may enter a house to distrain if the outer door be open, although there be other sufficient goods out of the house. It is not lawful to break open outer doors or gates; but if the outer door be open, an inner door may be forced. And where the lord having distrained is forcibly expelled, he may break open outer doors or gates in order to retake the distress. If a window be open, a distress within reach may be taken out at it.

At common law a distress might be taken for rent in a street or other highway being within the land demised. But now, by the statute of Marlbridge, private persons are forbidden to take distresses in the highway. This statute applies only to distresses for rent or for services and not to toll. Nor does the statute make the distress absolutely void; for though the tenant may lawfully rescue cattle distrained in the highway, or may bring his action on the case upon the statute, yet if he brings trespass or replevin, it seems to be no answer to a justification or an avowry made in respect of the rent.

No rent can be reserved out of an incorporeal hereditament; and therefore at common law the lord could not distrain for rent in a place in which the tenant had merely an incorporeal right—as a right of common. By 11 Geo. II. c. 19, s. 8, landlords are enabled to take a distress for rent upon cattle belonging to their tenants feeding upon any common appendant or appurtenant to the land demised. But in cases not within this enactment, the rule of the common law applies; and therefore upon a demise of a wharf and the appurtenances, with liberty to land and load goods, the landlord cannot distrain the tenant's barges lying opposite and attached to the wharf.

VI. *Mode of making a distress.*—A distress may be made either by the party himself or his agent, and as distresses in manors were commonly made by the bailiff of the manor, any agent authorized to distrain is called a bailiff. The authority given to the bailiff is usually in writing, and is then called a warrant of distress; but a verbal authority, and even the subsequent adoption of the act by the party on whose behalf the distress is made, is sufficient. In order that the distrainee may know what is included in the distress, an inventory of the goods should be delivered, accompanied, in the case of a distress for rent, by a notice stating the object of the distress, and informing the tenant that unless the rent and charges be paid within five days, the goods and chattels will be sold according to law. This notice is required by 2 W. & M., sess. i. c. 5, s. 2, which enacts, 'that where any goods shall be distrained for rent due upon any demise, lease, or contract, and the tenant or owner of the goods shall not, within five days next after such distress taken, and notice thereof with the cause of such taking, left at the chief mansion house, or other most notorious place on the premises, replevy the same, with sufficient security to be given to the sheriff,—that after such distress and notice and expiration of the five days, the person distraining shall and may, with the sheriff or under-sheriff, or with the constable of the place, cause the goods to be appraised by two sworn appraisers, and after such appraisement may sell the goods distrained towards satisfaction of the rent, and of the charges of distress, appraisement, and sale, leaving any surplus in the hands of the sheriff, under-sheriff, or constable, for the owner's use.'

At common law, goods distrained were, within a reasonable time, to be removed to and confined in an enclosure called a pound, which is either a pound covert, *i. e.* a complete enclosure, or a pound overt, an enclosure sufficiently open to enable the owner to see, and, if necessary, to feed the distress, the former being proper for goods easily removed or injured, the latter for cattle; and by 5 and 6 Will. IV. c. 59, s. 4, persons impounding cattle or animals in a common open or close pound, or in enclosed ground, are to supply them with food, &c., the value of which they may recover from the owner. By 11 Geo. II. c. 19, s. 10, goods distrained for any kind of rent may be impounded on any part of the tenant's ground, to remain there five days, at the expiration of which time they are to be sold, unless sooner replevied. The landlord is not however bound to remove the goods immediately after the expiration of the five days; he is allowed a reasonable time for selling. After the lapse of a reasonable time he is a trespasser if he retain the goods on the premises without the express assent of the tenant, which assent is generally given in writing.

The 1 and 2 Ph. & M., c. 12, requires that no distress of cattle be removed out of the hundred, except to a pound overt in the same county, not above three miles from the place where such distress is taken, and that no cattle or other goods distrained at one time be impounded in several places, whereby the owner would be obliged to sue out several replevins.

The 2 Will. & Mary, sess. 1, c. 5, s. 3, directs that corn, grain, or hay distrained be not removed, to the damage of the owner, out of the place where the same shall be found or seized, but be kept there until replevied or sold; and 11 Geo. II. c. 19, which gives a distress for rent-service upon growing crops, directs, ss. 8 and 9, that they shall be cut, gathered, and laid up, when ripe, in the barn or other proper place on such premises, or if none, then in some other barn, &c., to be procured for that purpose, and as near as may be to the premises, giving notice within one week of the place where such crops are deposited; and if the tenant, his executors, &c., at any time before the crops distrained are ripe and cut, pay or tender the rent, costs, and charges, the goods distrained are to be restored. In all other cases, if the rent or other duty be paid, or performed, or tendered to be paid or performed before the distress is impounded, a subsequent detainer is unlawful, and a subsequent impounding or driving to the pound is a trespass.

The statutes authorising the sale of distresses extend only to those made for rent. At common law distresses cannot in general be either sold or used for the benefit of the party distraining. But a distress for fines and amerciaments in a court leet, or for other purposes of public benefit, may be sold; and a special custom or prescription will warrant the sale of a distress in cases where the public has no immediate interest.

VII. *Rights and Remedies of the Distrainee.*—A distress made by a party who has no right to distrain, or made for rent or other service which the party offers to pay or perform, or made in the public highway, or upon goods privileged from distress either absolutely or temporarily, is called a *wrongful distress*. Where no right to distrain exists, or where the rent or duty is tendered at the time of the distress, the owner of the goods may rescue them or take them forcibly out of the possession of the distrainer, or bring an action of replevin, or of trespass, at his election. In replevin, the cattle or goods taken are to be redelivered to the owner upon his giving security by a replevin bond, for returning them to the distrainer, in case a return shall be awarded by the court; and therefore in this action damages are recovered only for the intermediate detention and the costs of the replevin bond. [Replevin.] In the action of trespass the plaintiff recovers damages to the full value of the goods; because upon such recovery, the property in the goods is transferred to the defendant.

The 2 W. & M., sess. i. c. 5, s. 5, provides 'That in case of any distress and sale for rent pretended to be due, where in truth no rent is due, the owner of the goods so distrained and sold may, by action of trespass or upon the case, recover double the value of such goods, with full costs of suit.'

For a wrongful distress in taking goods protected by being in a street or highway, or goods privileged from distress, the remedy is by an action on the statute, in which the plaintiff is entitled to an immediate return as in replevin.

If the cattle or goods distrained cannot be found, the sheriff may take other cattle or goods in wither-nam (by way of counter-distress) of the same or of a different kind, belonging to the distrainor, and deliver them to the distrainee instead of his own.

Another species of wrongful distress is *recaption*, or the taking of the same or other goods of the distrainee for the same causes pending an action of replevin, in which the legality of the first distress is questioned.

Wherever a distress is wrongful, the owner of the goods may rescue them from the distrainer; but after they are actually impounded, they are said to be in the custody of the law, and must abide the determination of the law.

Whether goods are rightfully or wrongfully distrained, to take them out of the pound is a trespass and a public offence. The proceeding by action is a more prudent course than making a rescue, even before an impounding, where any doubt exists as to the lawfulness of the distress. Independently of the danger of provoking a breach of the peace by the rescuer's thus taking the law into his own hands, he will be liable to an action for the injury sustained by the distrainer by the loss of the security of the distress, should the distress ultimately turn out to be lawful; and in such action, as well as in the action for poundbreach, the rescuer will be liable, under 2 W. & M. sess. i. c. 5, s. 4, to the payment of treble damages and treble costs.

A distress for more rent, or greater services than are due, or where the value of the property taken is visibly disproportionate to the rent or other appreciable service, is called an *excessive distress*, for which the party aggrieved is entitled to recover compensation in an action on the case; but he cannot rescue, nor can he replevy or bring trespass.

Upon a distress rightfully taken being afterwards irregularly conducted, the subsequent irregularity at common law made the whole proceeding wrongful, and the party was said to be a trespasser ' ab initio. But now, by 11 Geo. II., c. 19. where distress is made for rent justly due, and any irregularity or unlawful act is afterwards done by the party distraining or his agent, the distress itself is not to be deemed unlawful nor the party making it a trespasser; but the person aggrieved by such irregularity, &c., may recover satisfaction for the special damage sustained. And see Bradby on *Distresses*; Gilbert, *Distr.*; Bracton; Fleta, Coke upon Littleton; Bacon, Comyns, and Viner's *Abridgments*; Willes's *Reports*; 6 Nevile and Mann 606.

DITCH. [Bastion.]

DITHMARSH (**DITMARSKEN**, Dan.), the most westerly of the four districts of the Danish duchy of Holstein, has the German ocean for its western boundary, and Holstein Proper for its eastern, to which last it was united in 1459. On the north the Eider separates it from the duchy of Schleswig, and on the south the Elbe divides it from the Hanoverian duchy of Bremen. Its area is about 500 square miles, and its population about 47,000. It is protected against the inroads of the sea by strong dykes, is very productive in corn, pulse, linseed, &c., and rears a considerable number of cattle. Its subdivisions are the bailiwicks of North and South Dithmarsh. North Dithmarsh has thirteen parishes and four market-towns, with a population of about 22,500. The principal town is Heyde, in the heart of the bailiwick, which has a spacious market-place, a church, and public school, with about 2900 inhabitants, and is the seat of administration: the three other towns are Lunden, near the Eider, with a church and school, and about 430 inhabitants; Büsum, on the sea, with a church and harbour, and about 320 inh.; and Weslingbüren, not far from the sea, with a church and public school, and about 640 inh. Close to the latter is Schülpe, a spot well known to navigators, at the mouth of the Eider South Dithmarsh is divided into thirteen parishes, and contains four market-towns, with a population of about 24,900. The chief town is Meldorf, at the mouth of the Miele; it is well built, and was formerly fortified, has a handsome church, a grammar-school, three other schools public gardens, and about 2020 inhabitants. The other towns are Wörden, on an arm of the sea, with a small harbour, a church, public school, and about 850 inhabitants; Brunsbüttel, on the Elbe, across which there is a royal ferry, with a church, custom-house, a public school, and about 1500 inhabitants; and Marne, with a church and public school, and about 750 inhabitants.

DITHYRAMBUS, the name of a hymn in honour of Bacchus, sung by a chorus of fifty men or boys as they danced round the blazing altar of the god: from this peculiarity it was also called the *cyclic* or *circling* chorus. The original subject of the song was the birth of Bacchus, as the name seems to have implied. (Plato, *Legg.* iii.) The music was Phrygian, and the accompaniment originally the flute. (Aristot. *Polit.* viii. 7, 9.) The Dithyrambus is particularly interesting from the circumstance that Aristotle attributes to it the origin of the Greek tragedy. 'Tragedy and comedy,' says he (*Poet.* iv. 14), 'having originated in a rude and unpremeditated manner, the first from the leaders in the Dithyrambic hymns, the other from the Phallic songs, advanced gradually to perfection.' These leaders (ἐξάρχοντες), and not as has been wrongly inferred from the words of Aristotle, the whole chorus, recited trochaic tetrameters, and are to be considered as the immediate predecessors of the actors. [Drama.] In the Appendix to Welker's Treatise on the Trilogy (*Nachtrag zur Schrift über die Æschylische Trilogie*, p. 228, and following), the reader will find a learned disquisition on the Dithyrambus, deformed however by some serious errors. After the leading properties of the Dithyrambus had merged in the Greek tragedy, it became very bombastic, and in the Greek and even in modern languages the epithet Dithyrambic is a synonym for turgid and hyperbolical expressions. The etymology of the word is unknown.

DITRU'PA, a genus of Annelids, founded by the Rev M. J. Berkeley, and which, from its having been previously confounded with the species of an entirely distinct genus (*Dentalium*), and some circumstances respecting its capture in a living state, requires particular notice.

Generic Character.—*Shell*, free, tubular, open at both ends

Operculum fixed to a conical pedicellated cartilaginous body, thin, testaceous, concentrically striate.

Branchiæ, twenty-two in two sets, not rolled up spirally flat, broadest at the base, feathered with a single row of cilia.

Mantle rounded behind, slightly crisped, denticulated in front, strongly puckered on either side.

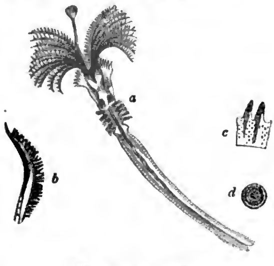
Fascicles of bristles, six on each side. (Berkeley.)

Mr. Berkeley states that a few of the specimens of sand, gravel, &c. from different parts of the great bank running parallel with the north-west coast of Ireland, obtained by Captain A. Vidal, R.N., during the extensive soundings made by that officer in the summer of 1830, whilst in search of Aitkin's Rock, were placed in his hands, when he found among them several specimens of the shell of a testaceous animal, which proved to be the *Dentalium subulatum* of Deshayes, and identical with the Madeira specimens, the only points of difference being a paler hue, and an almost total absence of the constriction near the orifice, the former being, as Mr. Berkeley observes, exactly such as might be expected from the occurrence of the species in a higher latitude, and the latter so variable as not to throw any doubt on its specific identity. Having previously been convinced, from Mr. Lowe's specimen, that the animal was not a *Dentalium*, but an *Annelid*, Mr. Berkeley requested Captain Vidal to preserve in spirit during the following summer, when operations on the bank were to be resumed, whatever animals he should procure alive in sounding, and, if possible, specimens of the so-called *Dentalium*, at the same time noting the depth at which they were taken. The result was the capture of the shell with the included animal, which enabled Mr. Berkeley to establish the genus named at the head of this article. The animals of the Madeira and British specimens proved to be perfectly identical.

Habits, depth, &c.—It appears from Mr. Berkeley's paper, that the shells first handed to him by Captain Vidal occurred in fine sand, at various distances from the coast, in lat. 55°, at great depths—from 60 to 120 fathoms. After speaking of the animals preserved in spirit, and stating that Captain Vidal noted the depth at which each specimen was taken, Mr. Berkeley remarks that the so-called *Dentalium* did not occur at any less depth than 63½ fathoms, and twice (on one occasion off St. Kilda) it occurred at 171 fathoms. Nothing could be concluded as to habit, from the manner in which the shells were imbedded in the tallow (with which the lead was armed); but this was of the less consequence, says Mr. Berkeley, because it had appeared, from Mr. Lowe's information, that the animals are found in great numbers together, in masses of a conglomerate (if it may be so called) of mud and various marine substances, the broader end only appearing above the surface. Mr. Berkeley infers, from the great difference in the diameter, that the narrow or posterior end is gradually absorbed in the course of growth.

Geographical Distribution.—Madeira, British seas, and probably a much more extensive range.

Place in the Animal Series.—Mr. Berkeley is of opinion that, notwithstanding the resemblance of the shell to that of true *Dentalia*, it is most nearly allied to *Serpula*; but evidently distinct, in having an unattached shell (for there is no evidence to lead to a suspicion that it is attached, even in infancy), and especially in possessing a posterior as well as anterior aperture. He thinks that other species of so-called *Dentalia* may be found to belong to the genus *Ditrupa*. One at least, he observes, does so belong, viz., *Dentalium Gadus*, Mont. (*Dent. coarctatum*, Lam.). Mr. Berkeley thinks it highly probable that the other minute British *Dentalia* will prove to possess an animal of like structure, though possibly, even in that case, it would be requisite to place them in a distinct genus.



Ditrupa subulata, magnified.

a, the animal; *b*. one of the branchiæ; *c*, a portion of the anterior part of the mantle; *d*, operculum. (*Zool. Journ.* vol. v.

Example. *Ditrupa subulata*, Berkeley; *Dentalium subulatum*, Deshayes.

DITTANY OF CRETE, the common name of the woolly labiate plant called Origanum Dictamnus or Amaracus Dictamnus.

DITTON, HUMPHREY, an eminent divine and mathematician, was born at Salisbury, May 29, 1675. He was an only son; and manifesting good abilities for learning, his father procured for him an excellent private education. It does not appear that he was ever at either of the universities, a circumstance owing, probably, to the religious principles of his parents. Contrary, it is understood, to his own inclination, but in conformity with his father's wishes, he chose the profession of theology; and he filled a Dissenting pulpit for several years at Tunbridge with great credit and usefulness.

His constitution being delicate, and the restraints of his father's authority being removed—he also having married at Tunbridge—he began to think of turning his talents into another channel. His mathematical attainments having gained for him the friendship of Mr. Whiston and Dr. Harris, they made him known to Sir Isaac Newton, by whom he was greatly esteemed, and by whose recommendation and influence he was elected mathematical master of Christ's Hospital. This office he held during the rest of his life, which, however, was but short, as he died in 1715, in the 40th year of his age.

Ditton was highly esteemed amongst his friends; and great expectations were entertained that he would have proved one of the most eminent men of his time. He however attained a high degree of celebrity, and published several works and papers of considerable value, of which the following list contains the principal.

1. On the Tangents of Curves, &c., 'Phil. Trans.,' vol. 23.
2. A Treatise on Spherical Catoptrics, in the 'Phil. Trans.' for 1705; from whence it was copied and reprinted in the 'Acta Eruditorum,' 1707.
3. General Laws of Nature and Motion, 8vo. 1705. Wolfius mentions this work, and says that it illustrates and renders easy the writings of Galileo, Huygens, and the 'Principia' of Newton.
4. An Institution of Fluxions, containing the first Principles, Operations, and Applications of that admirable Method, as invented by Sir Isaac Newton, 8vo. 1706.
5. In 1709 he published the 'Synopsis Algebraica' of John Alexander, with many additions and corrections.
6. His 'Treatise on Perspective' was published in 1712 In this work he explained the principles of that art mathematically; and besides teaching the methods then generally practised, gave the first hints of the new method, afterwards enlarged upon and improved by Dr. Brook Taylor, and which was published in the year 1715.
7. In 1714 Mr. Ditton published several pieces, both theological and mathematical, particularly his 'Discourse on the Resurrection of Jesus Christ' and the 'New Law of Fluids, or a Discourse concerning the Ascent of Liquids, in exact Geometrical Figures, between two nearly contiguous Surfaces.' To this was annexed a tract to demonstrate the impossibility of thinking or perception being the result of any combination of the parts of matter and motion: a subject which was much agitated about that time. To this work was also added an advertisement from him and Mr Whiston concerning a method for discovering the longitude, which it seems they had published about half a year before. This attempt probably cost our author his life; for though it was approved and countenanced by Sir Isaac Newton before it was presented to the Board of Longitude, and the method has since been successfully put in practice in finding the longitude between Paris and Vienna, yet that board determined against it. The disappointment, together with some ridicule (particularly in some verses written by Dean Swift), so far affected his health, that he died in the ensuing year, 1715

In the account of Mr. Ditton, prefixed to the German translation of his discourse on the Resurrection, it is said that he had published, in his own name only, another method for finding the longitude; but this Mr. Whiston denied. However, Raphael Levi, a learned Jew, who had studied under Leibnitz, informed the German editor that he well knew that Ditton and Leibnitz had made a delineation of a machine which he had invented for that purpose, that it was a piece of mechanism constructed with many wheels like a lock, and that Leibnitz highly approved or it for land use, but doubted whether it would answer on shipboard, on account of the motion of the ship.

DIURETICS are agents which augment the urinary secretion and facilitate its expulsion from the bladder. They constitute an extensive class of substances which, however, are very uncertain in their action, and require to be varied very frequently on account of the effects which their long continued use produces on the stomach and digestive function. The uncertainty of their operation is owing probably less to causes inherent in them than to our want of acquaintance with or attention to the circumstances which influence their action. Some writers disavow their belief in the existence of a distinct class of substances entitled to be called diuretics, considering them as mere general stimulants; but such a view is inadmissible, as many of them, far from being stimulants, are decidedly sedative, while some of the feelings which cause diuresis, such as fear or terror, and the external application of cold, are likewise sedative in their effects on the system.

In attempting to ascertain or account for their mode of action, we must constantly bear in mind the nature of the functions of the kidneys, viz., not only to remove from the body a considerable quantity of its fluid contents, but at the same time a great number of saline and other principles, the retention of which, for any considerable time, in the system, causes serious departure from its healthy state, and in some instances speedy death. Not only therefore must the quantity of fluid eliminated be in due proportion, but the quality or chemical constitution of it must also be of a proper kind. Any variation in these conditions requires the interference of medicine to rectify it. In endeavouring to accomplish this object, it must be borne in mind that, according to the state of the system, sometimes an acid diathesis predominates, sometimes an alkaline. The means which we employ to attain our object may be classified according to their primary modes of action on the system. Some are stimulant, such as gamboge, cytisus scoparius, alcohol, spiritus ætheris nitrici, oil of juniper, oil of turpentine, &c. Some, again, are sedative, such as lactuca virosa, leontodon taraxacum, digitalis, squil, colchicum, &c.: others are refrigerant, of which some render the urine acid, such as the dilute mineral acids; some, on the opposite hand, render the urine alkaline, such as the carbonate of potass, acetate, tartrate and bitartrate of potass; while certain saline diuretics do not render it either acid or alkaline, such as nitrate of potass, bichlorate of soda, &c.

The more acrid diuretics seem to act upon the lower sphere of life, or what may be considered the vegetative system, such as the cellular tissue, the fatty structures, and the internal mucous coats, the secretion of which they render thinner as well as more abundant, but at the same time they interfere much with the assimilative process as well as with that of digestion, even when given in small doses; and hence arises the impossibility of prolonging their employment beyond a very limited time. Whatever be the agent we select it is by no means necessary that, to cause a diuretic effect, the substance should be decomposed; but it is important to remember that, when saline diuretics are decomposed, the alkali is carried to the kidneys as the emunctory by which it is to be ejected from the system, and hence their use speedily renders the urine alkaline, which, when in a high degree, may prove very hurtful to the system generally, and to the bladder and urinary passages in particular.

Numerous as are the agents termed diuretics, none of them will act as such unless the patient be under certain conditions. If a very inflammatory state of the system exist, no article will act as a diuretic till this be lessened, and hence the necessity of employing venesection and saline cathartics before administering any of the class of diuretics; and under such circumstances colchicum is perhaps the best to begin with. Even such inflammation as exists in some forms of dropsy must be removed by antiphlogistic means before diuretics will have a beneficial effect. (Blackwall *on Dropsy*.)

When a very great quantity of fluid is present in the body, some of it must be carried off by other means before diuretics can act, as the absorbents under such circumstances do not furnish a supply to the kidneys—the activity of absorption being always in an averse ratio to the smallness of the quantity of fluid present. (Majendie.) If there be great general debility of the system, and particularly of the absorbents, this state must be obviated either by the exhibition of tonics previous to or along with the diuretic remedies. Lastly none of the saline diuretics, which are susceptible of decomposition, will act, if any considerable catharsis be going on, and hence that action, if arising from other causes, should be moderated or checked; and care should be taken not to exhibit such of them as are also purgatives in such doses as to act upon the bowels. This observation is not intended to prohibit the exhibition of a single purgative previous to commencing the use of diuretics, as this is often beneficial, or to forbid their occasional use when required to obviate particular symptoms. It must never be forgotten that if the patient be kept very warm, the action will more probably be directed to the skin than to the kidneys; hence the patient should not, if possible, remain in bed; the medicines should be given during the day, and the air of the apartment should be cool, and the clothing light. Indeed cold itself is a powerful diuretic, and sometimes succeeds where every other fails. The drinking of diluents likewise promotes the action of the kidneys: it is therefore unwise as well as cruel to withhold water from dropsical patients. [DILUENTS.]

DIVAN. [DÎWÂN.]

DIVERGENCY, DIVERGENT. [CONVERGENT.]

DIVERS, COLY'MBIDÆ, a family of swimming birds (Natatores), having a smooth, straight, compressed, and pointed bill.

Willughby assigned the family a place in his fifth section ('whole-footed birds, with shorter legs'),* under the name of '*Douckers* or *Loons*, called in Latine *Colymbi*,' and he divided them into 'cloven-footed *Douckers* that have no tails,' the Grebes, and the 'whole-footed Douckers with tails,' the true Divers. The following is Willughby's description 'of *Douckers* in general.' 'Douckers have narrow, straight, sharp-pointed bills, small heads, and also small wings; their legs situate backwards, near the tail, for quick swimming and easier diving; broad flat legs, by which note they are distinguished from all other kinds of birds; broad claws, like human nails. Of these Douckers there are two kinds; the first is of such as are cloven-footed, but fin-toed, having lateral membranes all along the sides of their toes, and that want the tail: the second is of those that are whole-footed and caudate, which do nearly approach to those birds we call *Tridactylæ*, that want the back toe. These are not without good reason called *Douckers*, for that they dive much, and continue long under water, as soon as they are up dropping down again.'

Ray, in his 'Synopsis,' arranges the cloven-footed and whole-footed *Colymbi*, *Grebes*, and *Divers*, under his 'Palmipedes tetradactylæ digito postico soluto, et primò rostro recto angusto acuto, brachypteræ et Urinatrices, *Colymbi* dictæ.' He also includes the genus *Mergulus*. [AUK.]

Linnæus placed both the *Divers*, properly so-called, and the *Grebes* under his genus *Colymbus*, which stands in his system under the order *Anseres*, between the genera *Phaëton* (tropic birds) and *Larus* (gulls).

Pennant followed Brisson in separating the *Grebes* from the *Divers*. The first he placed next to the *Coots*, and immediately before the *Avosets*; and the *Divers* between the *Guillemots* and the *Gulls*.

Under the term '*Plongeurs ou Brachyptères*,' Cuvier arranges those *Palmipèdes*, 'a part of which have some relation to the *Water-hens*. The legs placed more backward than in any of the other birds, render walking a difficult operation, and oblige them, when on land, to keep themselves in a vertical position. As the greater part of them are, besides, bad fliers, inasmuch as some of them cannot fly at all on account of the shortness of their wings, they may be regarded as almost exclusively attached to the surface of the waters. In accordance with this destination their plumage is more close-set, and sometimes it even offers a smooth surface and silvery hue. They swim under the water, aiding themselves with their wings, nearly as if they were fins. Their gizzard is sufficiently muscular, their *cæca* are moderate, and they have each a peculiar muscle on each side of their lower larynx.' The following are the genera comprehended under this family by Cuvier.—the *Grebes*, Brisson; (*Podiceps*, Latham; *Colymbus*, Brisson and Illiger). The *Divers* (*Plongeons*), properly so-called (*Mergus*, Brisson; *Colymbus*, Latham; *Eudytes*, Illiger). The *Guillemots* (*Uria*, Brisson and Illiger). The *Auks* (*Pingouins*), *Alca* of Linnæus. The *Penguins* (*Man-*

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* Willughby observes, 'Under the name of *whole* or *web-footed* we comprise some birds which have indeed their toes divided, but membranes appendant on each side: such are some of the Divers or *Loons*. These might more properly be denominated *fin-toed*, or *fin-footed*, than *whole-footed*.

shots), *Aptenodytes* of Forster, consisting of the subgenera *Aptenodytes*, Cuvier; *Catarrhactes*, Brisson; and *Spheniscus*, Brisson.

Temminck places the *Grebes* (*Podiceps*) next to the *Phalaropes*, at the end of his fourteenth order, the *Pinnatipedes*, or fin-footed birds; and the *Divers* (*Colymbus*, Latham), between the *Pelicans* and the *Guillemots* in his fifteenth order, the *Palmipedes*.

Mr. Vigors makes his fifth order of birds (Natatores) comprise the following families—

Anatidæ, Leach.
Colymbidæ, Leach.
Alcadæ.
Pelecanidæ, Leach.
Laridæ, Leach.

Or, with reference to the typical groups—

Normal group.

With short wings, which are sparingly feathered, and with feet placed behind the equipoise of the body . . .	*Colymbidæ*. *Alcadæ*.

Aberrant group.

With longer and well-feathered wings, and feet especially placed within the equipoise of the body . . .	*Pelecanidæ*. *Laridæ*. *Anatidæ*

He considers the genus *Mergus*, of Linnæus, the species of which carry the powers of swimming and diving to the greatest extent, making use of their wings also in their progress through the water, and, at the same time, exhibiting a constrained and embarrassed mode of walking, in consequence of the backward position of the legs, as forming the passage from the *Anatidæ* to the *Colymbidæ*. 'The distinctively marked character,' writes Mr. Vigors, in his paper 'on the natural affinities that connect the orders and families of birds'* 'of the lobated hind toe, which prevails among the latter groups of the family we have just quitted, conducts us to *Podiceps*, Latham, that commences the family of *Colymbidæ*, where the same character is strongly developed. The difference between the bills of the types of these two families is softened down by the intervention of that of *Mergus*, which is intermediate between the broad and depressed bill of *Anas* and the narrow and sharp-pointed bill of *Podiceps*. This last genus, in conjunction with *Colymbus*, Linn., from which it differs chiefly in the construction of the foot, composes the family of the *Colymbidæ*. These two well-known groups, differing but little among themselves in external characters, form one of those normal groups of the order where a deficiency is exhibited in the powers of flight by the shortness of their wings, and in the faculty of walking by the backward position of their legs. These deficiencies in the groups before us are compensated for by their capability of remaining for a length of time under water, and by their superior powers of diving. For this latter purpose the structure both of their wings and legs is admirably adapted; the former by their strength assisting them as oars under water, and by their brevity not interfering with their progress; the latter by their compressed and sharpened edge offering no resistance to the water as they are drawn up to effect the stroke which accelerates the movements of the bird. From their superiority in these characters and powers, the birds themselves have obtained *par excellence* the name of *Divers*. In these particulars we may observe them to be united with the *Alcadæ* which succeed them, and from which they are chiefly separated by the presence of the hind toe, conspicuous here, but deficient in the family to which we now proceed.' Mr. Vigors then goes on to the Auks (*Alcadæ*), which he enters by means of the genus *Uria* [GUILLEMOT], originally included in the *Colymbus* of Linnæus, and from which it has been separated chiefly on account of the tridactyle conformation of its foot. This character distinguishes the greater part of the Alcadæ, a family which, in addition to *Uria* and *Alca*, contains, according to Mr. Vigors, the genus *Aptenodytes* of Linnæus.

M. Lesson, in his Manual, makes the *Colymbidæ* (*Plongeurs ou Brachyptères*, Cuv., *Urinatores*, Vieillot), the first family of the sixth order of birds, *Les Palmipèdes*, *Natatores* of Illiger and Vieillot; and the family comprises the genera *Podiceps*, Lath., *Colymbus* (part), Linn., and *Cephus*, Cuv.

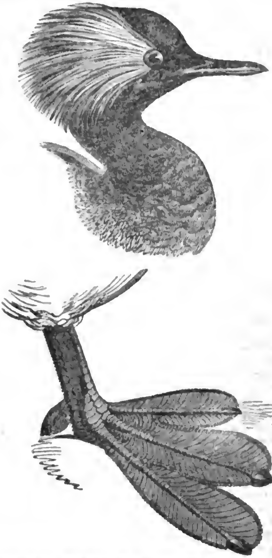
The Prince of Musignano (Charles Lucian Bonaparte) places *Podiceps* under his order Anseres in the family *Lobipedes*, and *Colymbus* under the same order in his family *Pygopodes*.

In 'Fauna Boreali-Americana,' *Podiceps* is placed at the head of the order *Natatores*, and is immediately succeeded by *Sterna* (the Terns): the position of *Colymbus* is between *Pelecanus* and *Uria*, which last-mentioned genus concludes the order.

COLYMBIDÆ.

Genera. Podiceps.

Bill longer than the head, robust, slightly compressed, or nearly cylindrical, subulated, straight, entire, pointed; *upper mandible* straight, or hooked at the point; *nostrils* oblong, half-closed. *Wings* short, the three first *quills* of equal length and longest. *Tail* none. Toes bordered with large fimbriations; *hallux* pinnated.



Head and foot of the male Eared Grebe; summer plumage; the head from Mr. Gould's British birds, the foot from a specimen in the Museum of the Zoological Society.

Habits, &c. The Grebes haunt the sea as well as the rivers, are excellent swimmers, and dive frequently, as all who have watched the Dabchick or Little Grebe (Podiceps minor), and have been amused by its quickly-repeated plungings well know. They feed on small fishes, frogs, crustaceans, and insects, and their nests, formed of a large quantity of grass, &c., are generally placed among reeds and *carices*, and rise and fall with the water.

Geographical distribution. Very wide. Five European species are enumerated, and the foreign species are very numerous. The form seems capable of adaptation to great varieties of climate. In the 'Tables' published in the 'Introduction to Fauna Boreali-Americana,' we find *Podiceps cornutus* and *Podiceps Carolinensis* among the birds which merely winter in Pennsylvania, and migrate in summer to rear their young in the Fur Countries; and *Podiceps cristatus*, *P. rubricollis*, and *P. cornutus* in the list of species common to the Old World and to the Fur Countries. Mr. Sabine gives a description of a mature individual of *Podiceps rubricollis* killed at Great Slave Lake, and of a specimen of *Podiceps Carolinensis* killed at the same place, both in Sir John Franklin's first expedition, and in May, 1822 and

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* 'Linn. Trans.,' vol. xiv., p. 395.

Dr Richardson notes *Podiceps cristatus* as having been killed on the Saskatchewan, and *Podiceps cornutus* at Great Slave Lake ('Fauna Boreali-Americana'). *Podiceps Chilensis* and *Podiceps Americanus* are natives of the warm parts of America; the first, as its name implies, having been found in the bay of Concepçion, and the second on the Brazilian waters (Rio Grande and S. Paolo); and we select, as an example, *Podiceps occipitalis* of Lesson, from the rivers of the Malouin Islands (Isles Malouines).

Description. This Grebe, according to M. Lesson, is remarkable for the delicate tints of its plumage, which is slate-grey (gris ardoisé) above and of a satiny white below. The cheeks and forehead are of a light grey; a bundle of loose plumes (plumes effilées) springs behind each eye, and is prolonged backwards and on the sides of the neck. A *calotte* of deep black rises from the occiput, and is prolonged on the posterior part of the neck half way down it. The throat is of a pearled grey, which becomes lighter, so that the front of the neck and the sides are of a pure white, as well as the rest of the lower part of the body. The back and wings are of a deeper slate colour, and this tint, mingled however with white, prevails on the feathers of the rump. The tarsi, toes, and the considerably large membranes which fringe them, are greenish. The bill is short and black. The iris is of a most lively red, so brilliant as to call forth from Père Dom Pernetty, whose *Petit Plongeon à Lunettes* it is, the expression that 'diamonds and rubies have nothing to offer equal to the fire of the eyes of a species of Plongeon which is frequently found on the edge of the sea.' The total length of this Grebe is eleven inches and two or three lines; from the forehead to the point of the bill, eight lines; tarsi, seventeen lines; external toe, two inches.

The form of the bird is so well known from the common Dabchick, that it would have been superfluous to give a figure of an entire Grebe.

Colymbus (*Mergus*, Brisson — *Urinator*, Lacépède — and *Eudytes*, Illiger).

Bill moderate, strong, straight, very much pointed, compressed; *nostrils* concave, half closed. *Wings* short; the first *quill* longest. *Tail* short, rounded. Three front *toes* very long, entirely palmated; *hind toe* bordered with a small supple membrane.

Habits, &c. The Divers bear a close resemblance to the Grebes, from which they differ but little, excepting in their palmated feet. On the water they are at their ease: on land they, as well as the Grebes, are awkward and beset with difficulties in their locomotion.

Geographical distribution. Principally the northern latitudes, where they nestle in the wildest and most desert spots. In the tables in 'Fauna Boreali-Americana,' we find *Colymbus glacialis* and *C. septentrionalis* in the list of species which merely winter in Pennsylvania, and migrate in summer to rear their young in the Fur Countries, and *Colymbus septentrionalis* in the list of birds (migratory) detected on the North Georgian Islands and adjoining seas, lat. 73° to 75° north, on Sir Edward Parry's first voyage. *Colymbus glacialis* and *C. septentrionalis* occur in Captain Sabine's list of Greenland Birds and *Colymbi glacialis, arcticus*, and *septentrionalis*, in Dr. Richardson's list of species common to the Old World and to the Fur Countries.

Example, *Colymbus glacialis.*

Description of a specimen killed on Great Bear Lake.—*Colour.* Head, neck, and upper tail-coverts, glossed with deep purplish-green, on a black ground. A short transverse bar on the throat, a collar on the middle of the neck, interrupted above and below, and the shoulders white, broadly striped on the shafts with black. Whole *upper plumage*, wings, sides of the breast, flanks, and under tail-coverts, black; all, except the quills and tail, marked with a pair of white spots near the tip of each feather: the spots form rows, and are large and quadrangular on the scapulars and interscapulars, round and smaller elsewhere, smallest on the rump. *Under plumage* and inner wing-coverts white, the axillaries striped down their middles with black. *Irides* brown.

Form. Bill compressed, strong, tapering; its rictus quite straight; its contour very slightly arched above; lower mandible channelled beneath, appearing deepest in the middle; its gonys sloping upwards to the point; margins of both mandibles, but particularly of the lower one, inflected. *Inner wing-coverts* very long. *Tail*, of twenty feathers, much rounded. Total length thirty-six inches; extent of wing forty-eight inches. Dr. Richardson, whose description this is, observes, that specimens in mature plumage vary considerably in total length, upwards of an inch in length of wing, and more than half an inch in the length of the tarsus.

Young of the year. Temminck remarks, that these differ considerably from the old birds. The head of the young, the occiput, and the whole posterior part of the neck are of an ashy-brown; on the cheeks are small ashy and white points; throat, front of the neck, and other lower parts pure white; feathers of the back, of the wings, of the rump and flanks, of a very deep brown in the middle, bordered and terminated by bluish ash; upper mandible ashy grey, lower mandible whitish; iris brown; feet externally deep brown, internally, as well as the membranes, whitish. In this state Temminck says that the bird is the *Colymbus Immer*, (Gmel. Syst. Lath. Ind.); *Le Grand Plongeon* of Buffon, (but the plate enl. 914 represents a young individual of *Colymbus Arcticus*); *Mergo Maggiore o Smergo*, (Stor. deg. ucc.,) with a good figure. He thinks that the *Imber Taucker* of Bechstein (Naturg. Deut.) is probably a young of this species on account of its large dimensions, and remarks that under the name of *Colymbus Immer* the young of this species are often confounded with those of *Colymbus Arcticus.*

At the age of a year, according to the same author, the individuals of both sexes show a transverse blackish brown band towards the middle of the neck, about an inch in length, forming a kind of collar; the feathers of the back become of a blackish tint, and the small white blotches begin to appear. In this state it is the *Grand Plongeon* of Brisson, (vol. vi., p. 105, pl. 10, f. 1,) a very exact figure.

At the age of two years the collar is more defined; this part, the head and the neck, are varied with brown and greenish-black feathers; the numerous blotches on the back and wings become more prevalent, and the band under the throat, and the nuchal collar also, are marked with longitudinal brown and white lines.

At the age of three years the plumage is perfect.

According to Montagu, *Colymbus glacialis* is the *Colymbus maximus caudatus* of Ray; *Mergus major nævius* and *Mergus nævius* of Brisson; *L'Imbrim* of Buffon; *Greatest speckled Diver or Loon* of Willughby; and *Northern Diver* of Pennant, (Br. Zool.): and the *Female** is *Colymbus Immer* of Linnæus; *Colymbus maximus Gesneri* of Ray; *Mergus major* of Brisson; *Le Grand Plongeon* of Buffon; *Ember Goose* of Sibbald; and *Imber Diver* of the British Zoology. It is the *Colymbus torquatus* of Brunnich; and not to weary the reader with more scientific names, it is the *Schwarzhalsiger Seetaucher, Eis-Taucher, Grosse Halb-Ente*, and *Meer-Noering* of the Germans; *Brusen* of the Norwegians; *Turlik* of the Greenlanders; *Eithinnew-Moqua* of the Cree Indians; *Talkyeh* of the Chipewyans; *Kagloolek* of the Esquimaux; *Inland Loon* of the Hudson's Bay residents; and *Trochydd mawr* of the antient British; it is provincially called by the modern British *Gunner* and *Greater Doucker.*

Habits, &c.—Fish is the principal *food* of this species, and the herring in particular, the fry of fish, crustaceans and marine vegetables. It *nestles* in small islands, and on the banks of fresh waters, and the female lays two eggs of an Isabella white, marked with very large and with small spots of a purplish ash. Dr. Richardson gives the following description of its manners:—'Though this handsome bird is generally described as an inhabitant of the ocean, we seldom observed it either in the Arctic Sea or Hudson's Bay; but it abounds in all the interior lakes, where it destroys vast quantities of fish. It is rarely seen on land, its limbs being ill fitted for walking, though admirably adapted to its aquatic habits. It can swim with great swiftness, and to a very considerable distance under the water; and when it comes to the surface, it seldom exposes more than the neck. It takes wing with difficulty, flies heavily, though swiftly, and frequently in a circle round those who intrude on its haunts. Its loud and very melancholy cry, like the howling of the wolf, and at times like the distant scream of a man in distress, is said to portend rain. Its flesh is dark, tough, and unpalatable. We caught several of these birds in the fishing nets, in which they had entangled themselves in the pursuit of fish.' The species is sometimes taken even in the south of England. Montagu mentions one which was kept in a pond for some months. In a few days it became extremely docile, would come to the call from one side of the pond to the other, and would take food from the hand. The bird had received an injury in the head, which had deprived one eye of its sight, and the other was a little impaired; but, notwithstanding, it could, by incessantly diving, discover all the fish that were thrown into the pond. When it could not get fish it would eat flesh; and when it quitted the water, it shoved its body along upon the ground like a seal, by jerks, rubbing the breast against the ground; and returned again to the water in a similar manner. In swimming and diving the legs only were used, and not the wings, and by their situation so far behind, and their little deviation from the line of the body, it is enabled to propel itself in the water with great velocity in a straight line, as well as turn with astonishing quickness. In the winter of 1813-14, according to Mr. Graves, during the intense frost, two fine individuals were taken alive in the Thames below Woolwich, and were kept in confinement for some months. They eagerly devoured most kinds of fish or offal. At the approach of spring they began to show great uneasiness in their confinement, though they had the range of an extensive piece of water, from whence they ultimately escaped in the month of April. The distance of the river from the pond in which they were confined was several hundred yards; but they made their escape, and two birds resembling them in colour were seen on the river in that neighbourhood for several days after they were missed, and though repeatedly shot at, they escaped by diving.

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* But see Temminck's description of the varying plumage according to age above given, &c.

Geographical position.—The arctic seas of the New and Old World; very abundant in the Hebrides, Norway, Sweden, and Russia; accidental visitors along the coasts of the ocean. The young in winter are very rare on the lakes of the interior, in Germany, France, and Switzerland: the old birds are never seen there. (Temminck.) It is a rather rare visitant to these islands, especially to the southward.

[Colymbus glacialis.]

Lesson arranges the genus *Cephus* Moehring, Cuvier; *Colymbus*, Linn.; *Uria*, Temm.; *Mergulus*, Ray, Vieillot, under the *Colymbidæ*, observing that it forms the passage from the *Divers* to the *Auks*. [AUK, vol. iii., p. 100, subgenus *Mergulus*.]

DIVIDEND, in arithmetic, any quantity which is to be divided (dividendum). Thus in the sentence '100 divided by 20 gives 5,' the dividend is 100.

DIVIDEND, in commerce, is a word having two distinct meanings. In its more general employment it is understood to express the money which is divided, *pro rata*, among the creditors of a bankrupt trader, out of the amount realised from his assets. [BANKRUPT.]

The other meaning attached to the word dividend is not so appropriate as that which has just been explained. It is used to signify the half-yearly payments of the perpetua and terminable annuities which constitute the public debt of the country, and does not therefore strictly express tha which the word is made to imply. The payment of those so called dividends is managed on the part of the government by the bank of England, which receives a compensation from the public for the trouble and expense attending the employment. The exact number of individuals who are entitled to receive these half-yearly payments is not known. The following statement exhibits the number of distinct sums paid by different warrants to various classes of annuitants at the last four periodical payments, but the number of annuitants is not nearly so great as the number of distinct warrants, because many individuals are possessed of annuities due at the same periods of the year, which are included under different heads or accounts in the books of the Bank, as bearing different rates of interest, or being otherwise under different circumstances; and besides, many persons hold annuities which are payable at both half-yearly periods. It is clear, however, from the following figures, that the greater part of the public creditors are entitled to annuities for only small sums, more than nine-tenths of the payments being for sums not exceeding 100*l*., and nearly one-half for sums not exceeding 10*l*.

Sums included in the Warrants.	5 July, 1836.	10 Oct. 1836.	5 Jan. 1837.	5 April, 1837.
	Number of Warrants.	Number of Warrants.	Number of Warrants.	Number of Warrants.
Not exceeding £5	58,113	28,122	59,501	28,080
———— 10	30,405	14,350	30,898	14,502
———— 50	65,072	32,550	66,115	32,890
———— 100	17,362	8,880	17,518	8,536
———— 200	10,006	4,761	10,049	4,789
———— 300	3,123	1,419	3,074	1,421
———— 500	1,922	830	1,932	853
———— 1000	930	420	939	418
———— 2000	265	131	271	133
Exceeding 2000	120	68	108	66
	187,318	91,531	190,405	91,688

DIVING-BELL. [SUBMARINE DESCENT.]

DIVINING ROD, a forked branch, usually, but not always, of hazel, by which it has been pretended that minerals and water may be discovered in the earth, the rod, if slowly carried along in suspension, dipping and pointing downward, it is affirmed, when brought over the spot where the concealed mine or spring is situated. Other mysterious powers, such as that of discovering the lost boundaries of lands, and even of detecting the birth-place and parentage of foundlings, have also been attributed to the divining rod. The rod is sometimes called the Virgula Divina, or the Baculus Divinatorius, or the rod of Aaron, or the Caduceus (after the wand of Mercury). But, although a rod or wand has been the distinguishing ensign of the professors of magic in all ages and countries, and rabdology, or divination by the rod, was familiar to the antient nations, the form, the material, and the mode of using the divining rod of the modern miners and water-finders, seem to be superstitions of comparatively recent introduction. Many persons with some pretensions to science have been believers in the powers ascribed to the divining rod. George Agricola, the able and learned German metallurgist of the sixteenth century, and in later times John Sperlingius and Theodore Kirchmaierus, who have both written *Disputatiunculæ* on the rod, all say the devil is in it. Richelet, in his Dictionary (art. *Baguette Divinatoire*), confesses that after what he has seen he cannot entertain any doubt as to its possessing the wonderful qualities ascribed to it. The learned Morhoff, who was eminent for his scientific as well as literary knowledge, admits that it is not clear to him whether the effects be natural or the result of demoniac agency. A. M. Thouvenot published at Paris, in 1781, a Memoir on the relation of the phenomena of the Divining rod to those of Electricity and Magnetism; and our countryman Pryce, in his 'Mineralogia Cornubiensis' (fol., 1778) has collected accounts of numerous successful experiments which he says were performed by the instrument. Some remarks on the rod and on the attempts that have been made to explain its fancied operation may be found in the Marquis le Gendre's 'Traité de l'Opinion,' liv. iii chap. 6, and liv. iv. chap. 2; and there is a discussion of the subject, which is well worth reading, both for the reflections and some curious facts which it contains, in Bayle's 'Dictionary,' in the notes to the article *Abaris*. See also Morhoff, *Polyhist*, tom. ii. p. 310.)

DIVINITY. [Theology.]

DIVISIBILITY, DIVISOR. Any number or fraction admits of division by any other, in the extended arithmetical sense which considers *parts* of a time as well as times. Thus 12 contains 8 a time and half a time, or 12 divided by 8 gives 1½. The adjective *divisible* is nevertheless applied, not to any number as compared with any other, but only as compared with such numbers as are contained a whole number of times in the first. Thus 12 is said to be divisible by 6, and is said to be not divisible by 8. Or, both in arithmetic and algebra, divisible means 'divisible without introducing fractions into the result.'

The number of divisors which any number admits of is found as follows. Ascertain every prime number which will divide the given number, and how many successive times it will do so. Add one to each of these numbers of times, and multiply the results together. Thus, the number 360 is made by multiplying together 2, 2, 2, 3, 3, 5; or is divisible by 2 three times $(3+1=4)$, by 3 twice $(2+1=3)$, and by 5 once $(1+1=2)$. And $4 \times 3 \times 2 = 24$, the number of divisors which 360 admits of. But among the 24 divisors are included 1 and 360.

DIVISION, the process of ascertaining how many times and parts of times one number is contained in another. The usual arithmetical rule consists in a continual approximation to the result required. We write underneath,—1, the common process; 2, that of which it is an abbreviation; 3, a short summary of the *rationale*.

```
8)23475(2934⅜        8)23475(2000
  16                     16000   900
  ——                     —————
   74                     7475    30
   72                     7200     4
   ——                     ————
    27                     275
    24                     240
    ——                     ———
     35                     35
     32                     32
     ——                     ——
      3                      3
```

The whole contains a number as often as all its parts put together contain that number: and 23 meaning 23,000, and 16 being the highest multiple of 8 below 23, then the 16,000, which is part of 23,000, contains 2000 eights, and it is left to be seen how often the remaining 7000, and the 475 (making 7475) contain 8. The 74 is 7400, and 9 times 8 being 72, the 7200 which is part of 7400, contains 900 eights, and it is left to be seen how often the remaining 200 with the 75 (making 275) contains 8. The 27 is 270, of which the part 240 contains 30 eights, and the remaining 30 together with the 5 (making 35) is left. Of this, 32 contains 4 eights, and the remaining 3 does not contain 8 so much as one time, but the eighth part of 3 units is three times the eighth part of a unit, or ⅜: whence the answer.

In finding how many times, or parts of times, one fraction is contained in another, the following principle is applied. If two numbers or fractions be multiplied by any number, the number of times, or parts of times, which the first contains the second, is not altered. Thus 7 contains 2 just as 14 contains 4, or as 21 contains 6, &c. If then we take two fractions, such as $\frac{3}{7}$ and $\frac{2}{11}$, it follows that $\frac{3}{7}$ contains $\frac{2}{11}$ just as 77 times $\frac{3}{7}$ contains 77 times $\frac{2}{11}$, or as 33 contains 14: that is, 2 times and $\frac{5}{14}$ of a time. This may easily be shown to give the common rule.

The division of one decimal fraction by another presents a difficulty, slight indeed, but quite sufficient to prevent most persons from becoming expert in the use of tables. The rules given are frequently incomplete, and always such as would render even a practised computer liable to mistake. The question is how to place the decimal point rightly in the result, and this may be best done as follows:—

1. Alter the dividend or divisor by annexing ciphers, until both have the same number of decimal places. This being done—

2. Annex as many ciphers to the dividend, or take away as many from the divisor (or partly one and partly the other) as there are to be decimal places in the result: then divide as in whole numbers, and mark off the given number of decimal places.

Example I. Find out, to three decimal places, how often ·076 is contained in 32·1.

First step: ·076 and 32·100.
Second step: ·076 and 32·100000.

76)32100000(422368—rem. 32.
Answer. 422·368.

Example II. Find out, to 7 decimal places, how often (what fraction of a time) 236·5 is contained in ·001.

First step· 236·500 and ·001.

Second step: 236·5 and ·00100000; namely, *two* ciphers struck off the divisor and *five* annexed to the dividend (making *seven*).

2365)100000(42—rem. 670
Answer. ·0000042.

In making complicated divisions, it is much the shortest plan, and very much the safest, to begin by forming the first nine multiples of the divisor by continued addition (forming the tenth for proof).

DIVORCE (divórtium, a divertendo, from diverting or separating), the legal separation of husband and wife. Divorce is of two kinds, *à mensâ et thoro*, from bed and board; and *à vinculo matrimonii*, from the bonds of the marriage itself. The divorce *à mensâ et thoro* is pronounced by the spiritual court for causes arising subsequent to the marriage, as for adultery, cruelty, &c.: it does not dissolve the marriage, and the parties cannot contract another marriage. [Bigamy.] In fact it is equivalent only to a separation.

The divorce *à vinculo matrimonii* can be obtained in the spiritual courts for causes only existing before the marriage, as precontract, consanguinity, impotency, &c. This divorce declares the marriage to have been null and void, the issue begotten between the parties are bastardized, and the parties themselves are at liberty to contract marriage with others.

From the curious document preserved by Selden (Uxor Ebraica, c. xxx., vol. iii., 845, folio ed. of his works), whereby John de Cameys, in the reign of Ed. I., transferred his wife and her property to William Paynel; and also, from the reference to the laws of Howel the Good, at the end of this article, it would seem that in the early periods of English law a divorce might be had by mutual consent; but all trace of such a custom is lost. We know however (3 Salk. *Rep.* 138) that, until the 44th Eliz., a divorce *à vinculo matrimonii* might be had in the ecclesiastical courts for adultery; but in Foljambe's case, which occurred in that year in the Star Chamber, Archbishop Bancroft, upon the advice of divines, held that adultery was only a cause of divorce *à mensâ et thoro*.

The history of the law of divorce in England may perhaps be thus satisfactorily explained. Marriage being a contract of a civil nature, might originally be dissolved by consent. When, in the progress of civilization, various regulations were prescribed, the ordinary courts of justice asserted their jurisdiction over this as well as every other description of contract. At length, the rite of marriage having been elevated to the dignity of a sacrament by Pope Innocent III., A.D. 1215, the ecclesiastical courts asserted the sole jurisdiction over it. In the course of time the power of these courts was again controlled, and the sole jurisdiction for granting divorces for matter arising subsequently to the marriage, was vested in the superior court of the kingdom, the House of Lords, where it was less likely to be abused than by the ecclesiastical authorities, who, it is notorious, granted these and other dispensations for money.

Marriage is now, by the law of England, indissoluble, for matter arising subsequently, by the decree of any of the ordinary courts, but divorce *à vinculo matrimonii* may still for adultery, &c., be obtained by act of parliament. For this purpose it is necessary that a civil action should have been brought in one of the courts of law against the adulterer [Adultery], and damages obtained therein, or some sufficient reason adduced why such action was not brought, or damages obtained, and that a definitive sentence of divorce *a mensâ et thoro* should have been pronounced between the parties in the ecclesiastical court; which sentence cannot be obtained for the adultery of the wife, if she recriminates, and can prove that the husband has been unfaithful to the marriage vow; and further, to prevent any collusion between the parties, both houses of parliament may, if necessary, and generally do require satisfactory evidence that it is proper to allow the bill of divorce to pass.

The first proceeding of this nature was in the reign of Edward VI., and bills of divorce have since greatly increased; above seventy such bills have been passed since the commencement of the present century. Where the injured party can satisfy both houses of Parliament, which are not bound in granting or withholding the indulgence by any of those fixed rules which control the proceedings of ordinary courts of judicature, a divorce is granted. It is a cause of complaint that the expenses of the proceeding are so considerable as to amount to an absolute denial of the relief to the mass of society; indeed from this circumstance divorce bills have not improperly been called the privilege of the rich. There is an order of the House of Lords that, in every divorce bill on account of adultery, a clause shall be inserted prohibiting the marriage of the offending parties with each other; but this clause is generally omitted: indeed it has been inserted but once, and that in a very flagrant case. But it is not unusual for parliament to provide that the wife shall not be left entirely destitute, by directing a payment of a sum of money, in the nature of alimony, by the husband, out of the fortune which he had with the wife. By the divorce *à vinculo matrimonii* the wife forfeits her dower. [DOWER.]

The causes admitted by various codes of laws as grounds for the suspension or dissolution of the contract of marriage, as well as the description of the tribunal which had or in some degree has jurisdiction over the proceedings, are various, and indicative of the degree of civilization of the nations among whom they prevailed.

According to the law of Moses (24 *Deut.* i.), 'When a man hath taken a wife and married her, and it come to pass that she find no favour in his eyes, because he hath found some uncleanness in her, then let him write her a bill of divorcement and give it in her hand, and send her out of his house.' After 90 days, the wife might marry again. But after she had contracted a second marriage, though she should be again divorced, her former husband might not take her to be his wife. About the time of our Saviour, there was a great dispute between the schools of the great doctors Hillel and Shammai as to the meaning of this law. The former contended that a husband might not divorce his wife but for some gross misconduct, or for some serious bodily defect which was not known to him before marriage; but the latter were of opinion that simple dislike, the smallest offence, or merely the husband's will, was a sufficient ground for divorce. This is the opinion which the Jews generally adopted, and particularly the Pharisees, which explains their conduct when they came to Jesus 'tempting him, and saying unto him, Is it lawful for a man to put away his wife for every cause?' (*Matth.* xix.) The answer was, 'Moses, because of the hardness of your hearts, suffered you to put away your wives, but from the beginning it was not so.' From this it is evident that Christ considered that the law of Moses allowed too great a latitude to the husband in his exercise of the power of divorce, and that this allowance arose from 'the hardness of their hearts;' by which of course we are to understand that they were so habituated to previous practices, that any law which should have abolished such practices would have been ineffectual. All it could do was to introduce such modifications, with the view of diminishing the existing practices, as the people would tolerate. The form of a Jewish bill of divorcement is given by Selden, *Uxor Ebraica*, lib. iii., ch. 24; and see Levi's *Ceremonies of the Jews*, p. 146.

As the customs of oriental nations do not change, but have continued the same from the earliest periods, we may conclude that the usages in the matter of divorce now existing in Arabia are the same, or nearly so, as when Mohammed endeavoured to reform them among the tribes for which he legislated. An Arab may divorce his wife on the slightest occasion: he has only to say to her 'Thou art divorced,' and she becomes so. So easy and so common is this practice, that Burckhardt assures us that he has seen Arabs not more than 45 years of age who were known to have had 50 wives, yet the Arabs have rarely more than one wife at a time.

By the Mohammedan law a man may divorce his wife orally and without any ceremony; when this is done, he pays her a portion, generally one-third of her dowry. He may divorce her twice, and take her again without her consent; but if he divorce her a third time, or put her away by a triple divorce conveyed in the same sentence, he cannot receive her again until she has been married and divorced by another husband, who must have consummated his marriage with her.

Here then we see that the Jewish lawgiver required a written bill of divorcement to insure due consideration; and he absolutely prohibits the return of the wife after a marriage contracted with another man. The Arabian legislator required the words 'Thou art divorced to be repeated three times before the marriage was irrevocably dissolved by the husband. And again, working on the feelings of delicacy inherent in man's nature, after such irrevocable divorce, he required a marriage with another man, actual consummation, and subsequent divorce, before the first husband could take back his wife. Moses, on a somewhat different principle, absolutely prohibited the remarriage of the parties to the first marriage after a second had been contracted.

By the Jewish law it appears that a wife could not divorce her husband; but under the Mohammedan code, for cruelty and some other causes, she may divorce him; and this is the only instance in which Mohammed appears to have been more considerate towards women than Moses.

(Sale's *Koran*; Lane's *Modern Egyptians*; Hamilton's *Hedaya*, and the *Mishcat ul-Masâbih*; Selden's *Uxor Ebraica*; and see the case of *Lindo* v. *Belisario*, 1 Hagg. 216, before Lord Stowell.)

Among the Hindoos, and also among the Chinese, a husband may divorce his wife upon the slightest grounds, or even without assigning any reason. Some of the rules mentioned by the Abbé Dubois, as laid down in the 'Padma Purana,' one of the books of highest authority among the Hindoos, show their manner of thinking concerning the conduct of their wives. 'In every stage of her life, a woman is created to obey. At first she yields obedience to her father and mother; when married, she submits to her husband and her father and mother-in-law; in old age, she must be ruled by her children. During her life she can never be under her own control. If her husband laugh, she ought to laugh; if he weep, she will weep also; if he is disposed to speak, she will join in conversation. When in the presence of her husband, a woman must not look on one side and the other; she must keep her eyes on her master, to be ready to receive his commands. When he speaks, she must be quiet, and listen to nothing besides. When he calls her, she must leave every thing else, and attend upon him alone.' And in the Hindoo code it is said, 'The Creator formed woman for this purpose, viz., that children might be born from her.' The reasons for which, according to the Brahmanic law, a man may divorce his wife, may be seen in Colebrooke's *Digest of Hindoo Law*, vol. ii. p. 414, &c., 8vo. edit.; and Kalthoff, *Jus Matrimonii veterum Indorum* (Bonn, 1829, 8) p. 76, &c.

The laws in the several Grecian states regarding divorce were different, and in some of them men were allowed to put away their wives on slight occasions. The Cretans permitted it to any man who was afraid of having too great a number of children. The Athenians allowed it upon small grounds, but not without giving a bill containing the reasons for the divorce, to be approved (if the party divorced made an appeal) by the chief archon. The Spartans seldom divorced their wives; indeed the ephori fined Lysander for repudiating his wife. Ariston (Herod. vi. 63) put away his second wife, but it seems to have been done rather to have a son, for his wife was barren, than according to the custom of the country. Anaxandrides (Herod. v. 39) was strongly urged by the ephori to divorce his barren wife, and on his not consenting, the matter was compounded by his taking another wife: thus he had two at once, which Herodotus observes was contrary to Spartan usage.

By the laws of the early Romans, the husband alone was permitted to dissolve the marriage, but not without just cause, and a groundless divorce was punished by the forfeiture of the husband's effects, one-half of which went to the wife. Adultery, drunkenness, or counterfeiting the husband's keys, were considered good causes of divorce. For about 500 (Dion. Hal., ii. 25; Gellius, iv. 3; Plutarch, *Vit. Rom. et Num.*, &c.) years after the foundation of the city there was no instance of this right being exercised by the husband; but afterwards divorces became very frequent, not only for sufficient reasons, but on frivolous pretexts, and the same liberty was enjoyed by the women as by the men.

The maxim of the civil law was, that matrimony ought to be free, and either party might renounce the marriage union at pleasure. It was termed *divortium sine causâ*, or *sine ulla querela*, i.e., divorce without cause, or without question; and the principle, *bona gratia matrimonium dissolvitur*, matrimony is dissolved at pleasure, is solemnly laid down in the pandects. The abuse of divorce prevailed in the most polished ages of the Roman republic, though, as has been said, it was unknown in its early history. The Emperor Augustus is said to have endeavoured to restrain this abuse by requiring the observance of certain ceremonies to a valid divorce, according to the manner in which the marriage had been celebrated: thus, if there had been a marriage contract, it was torn in the presence of seven witnesses, the keys were taken from the wife, and a certain form of words was pronounced by the husband or by a freed man; but this check was overpowered by the influence and corruption of manners. Voluntary divorces were abolished by one of the *novels* of Justinian, but they were afterwards revived by another *novel* of the Emperor Justin. In the *novel* restoring the unlimited freedom of divorce the reasons for it are assigned; and while it was admitted that nothing ought to be held so sacred in civil society as marriage, it was declared that the hatred, misery, and crimes, which often flowed from indissoluble connexions, required as a necessary remedy the restoration of the old law by which marriage was dissolved by mutual will and consent. This practice of divorce is understood to have continued in the Byzantine or eastern empire till the ninth or tenth century, and until it was finally subdued by the influence of Christianity.

On a divorce for infidelity, the wife forfeited her dowry; but if the divorce was not made for any fault of hers, her whole dowry was restored, sometimes all at once, but usually by three different payments. In some instances, however, where there was no infidelity on the part of the wife, only part was restored. On the Roman divorce and dowry, see *Dig.* xxiv. tit. 2. 3.

Among the antient Britons, it may be collected from the laws of Howel the Good that the husband and wife might agree to dissolve the marriage at any time; in which case, if the separation took place during the first seven years of the marriage, a certain specified distribution of the property was made, but after that period the division was equal. No limit was set to the husband's discretion in divorcing his wife, but the wife could only divorce her husband in case he should be leprous, have bad breath, or be impotent, in which cases she might leave him and obtain all her property. The parties were at liberty to contract a fresh marriage; but if a man repented of having divorced his wife, although she had married another man, yet if he could overtake her before the consummation of the marriage, or, as the law expresses it, 'with one foot in the bed of her second husband, and the other outside,' he might have his wife again.

Adultery was punishable by fine.

The laws of Scotland relating to divorce differ widely from those existing in England: there, a divorce *à vinculo matrimonii* is a civil remedy, and may be obtained for adultery, or for wilful desertion by either party, persisted in for four years, though to this a good ground of separation is a defence. But recrimination is no bar to a divorce as it is in England.

In the Dutch law there are but two causes of divorce *à vinculo matrimonii*, viz., adultery and desertion.

In Spain the same causes affect the validity of a marriage as in England, and the contract is indissoluble by the civil courts, matrimonial causes being exclusively of ecclesiastical cognizance. (*Instit. Laws of Spain.*)

The law of France, before the Revolution, following the judgment of the Catholic Church, held marriage to be indissoluble; but the legislators of the early revolutionary period permitted divorce at the pleasure of the parties, where incompatibility of temper was alleged. In the first three months of the year 1793, the number of divorces in the city of Paris alone amounted to 562, the marriages to 1785, a proportion not much less than one to three; while the divorces in England for the previous century did not amount to much more than one-fifth of the number. (Burke's *Letters on a Regicide Peace.*) Burke further states that he followed up the inquiry through several subsequent months till he was tired, and found the results still the same. It must be remembered however that Burke wrote in the spirit of an advocate; that the period he chose was that immediately following the promulgation of the law, when all couples previously discontented with each other obtained divorces; and that if his calculations had fully borne out his statement, he would have given them in his pamphlet, which was written for a political purpose, and he would not have rested satisfied with indefinite allegations. It was generally admitted however that the license was too great. The Code Napoleon accordingly restricted the liberty, but still allowed either party to demand a divorce on the ground of adultery committed by the other; for outrageous conduct, or ill usage; on account of condemnation to an infamous punishment; or to effect it by mutual consent, expressed under certain conditions. By the same code a woman could not contract a new marriage until the expiration of ten months from the dissolution of the preceding.

On the restoration of the Bourbons a law was promulgated (8th May, 1816), declaring divorce to be abolished; that all suits then pending for divorce, for definite cause, should be for separation only, and that all steps then taken for divorce by mutual consent should be void; and such is now the law of France.

It must be borne in mind, however, that the Roman Church, for the purpose of increasing its revenue, has at all times claimed the right to dissolve marriage by dispensation; and therefore this power of divorce still exists in France, and all Roman Catholic countries, independent of the law of the land. It has since been decided by the Cour de Cassation that the conjugal infidelity of the husband is a bar to a suit instituted by him for divorce on the ground of the wife's adultery. (M'Kenna's *Notes on the Code Civil.*)

In the United States, marriage, though it may be celebrated before clergymen as well as civil magistrates, is considered as a civil contract. The causes of divorce, and the facility or difficulty of obtaining it, are by no means the same in the several states. The more general causes of a divorce *à vinculo matrimonii* are, former marriage, physical incapacity, or consanguinity; by the Connecticut law, fraudulent contract; and by the New York code, idiotcy and insanity, and either party being under the age of consent. Adultery is also a cause of divorce *à vinculo matrimonii;* and the laws of some of the states prohibit the guilty party from marrying again. If the husband or wife is absent seven years, or, by the laws of some States, three years, and not heard from, the other is at liberty to marry again; and in some states, if the husband desert the wife, and make no provision for her support during three years, being able to make such provision, the wife can obtain a divorce. Extreme cruelty in either party is also generally a cause of divorce *à vinculo matrimonii.* In many of the states applications to the legislature for divorce, in cases not provided for by the statutes, are very frequent. In New York and New Jersey, divorce is a subject of Chancery jurisdiction, from which, as in other cases, questions of law may be referred to a jury for trial. In New Hampshire, joining the religious society of Shakers, who hold cohabitation unlawful, and continuing in that society for three years, is sufficient cause for a divorce. But in most of the States the courts of law have cognizance of divorce. The laws prescribe the provision to be made for the wife in case of divorce, confiding to the courts however some degree of discretion in fixing the amount of alimony.

It is very questionable, says Chancellor Kent, whether the facility with which divorces can be procured in some of the States be not productive of more evil than good: and he states that he has had reason to believe, in the exercise of a judicial cognizance over numerous cases of divorce, that adultery was sometimes committed on the part of the husband for the very purpose of the divorce.

(Kent's *Comm.; Ency. Americ.* Upon the general advantages of indissolubility, as opposed to an unlimited right of divorce, see Hume's *Essay on Polygamy and Divorce;* Paley's *Moral Philosophy;* and the judgment of Lord Stowell in Evans *v.* Evans, 1 Hagg. *Repts.*, 48; Milton, in his famous treatise, advocates the increased facility of obtaining a divorce; and see Gibbon, *Decl. and Fall*, c. 44.)

DÎWÂN is a Persian word familiar to readers of works relating to the East, in the sense of—1st. a senate, or council of state; and, 2nd., a collection of poems by one and the same author. The earliest acceptation, however, in which we find it employed is that of a muster-roll, or military paybook. The Arabic historian, Fakhreddin Râzi, informs us that when, in the caliphat of Omar, the second successor of Mohammed, the conquests of the Mussulmans assumed an extensive character, the equal distribution of the booty became a matter of great difficulty. A Persian marzbân, or satrap, who happened to be at the head-quarters of the caliph at Medinah, suggested the adoption of the system followed in his own country, of an account-book, in which all receipts and disbursements were regularly entered, along with a list duly arranged, of the names of those persons who were entitled to a share in the booty. With the register itself, its Persian appellation (dîwân) was adopted by the Arabs. (Freytag, *Locmani Fabulæ et plura loca ex codd. historicis selecta*, &c., pp. 32, 33; Henzi, *Fragmenta Arabica*, St. Petersburg, 1828, p. 36, et seq.) Whether a council of state was subsequently called dîwân, as having originally been a financial board appointed to regulate the list (dîwân) of stipendiaries and pensioners, or whether it was so called as being summoned according to a list (dîwân) containing the names of all its members, we are unable to determine. The opinion that a body of councillors should have received this appellation, as has been asserted by some, in consequence of the expression of an antient king of Persia, *înân dîwân end*, 'these (men) are (clever like) devils,' will scarcely be seriously entertained by any one. The word 'dîwân' is also used to express the saloon or hall where a council is held, and has been applied to denote generally a state chamber, or room where company is received. Hence probably it has arisen that the word 'divan,' in several European languages, signifies a sofa. Collections of poems in Persian, Arabic, Turkish, Hindustani, &c., seem to have received the appellation 'dîwân' from their methodical arrangement, inasmuch as the poems succeed one another according to the alphabetic order of the concluding letters of the rhyming syllables, which are the same in all the distichs throughout each poem.

DIXMUIDEN. [Flanders, West.]

DIZIER, ST., a town in France, in the department of Haute Marne, on the right north bank of the Marne, and on the road from Paris by Meaux and Châlons to Bar le Duc, Nancy, and Strasburg. It is 118 miles east by south of Paris in a straight line, or 138 miles by the road; in 48° 38′ N. lat., and 4° 56′ E. long.

In 1544 St. Dizier made a vigorous resistance against the Emperor Charles V., who had invaded France, but was obliged to surrender: it was restored at the subsequent peace. In later times its fortifications have been neglected. Two engagements were fought near St. Dizier, in 1814, tween the French and the allies who had invaded France.

The town is agreeably situated, and is well built; it is surrounded with public walks: the houses were formerly of wood, but after a great fire which happened about sixty years ago they were mostly rebuilt of stone. The town-hall is a handsome building of modern erection; in front of it is a covered market.

The population, in 1832, was 5957 for the town, or 6197 for the whole commune. The inhabitants carry on a considerable trade in wood and iron: the forests round the town furnish excellent timber for ship-building. The navigation of the Marne commences here. Oil-cloth and some iron goods are manufactured, and formerly (if not at present) hosiery, hats, linen and hempen cloths, and casks. Stone is quarried near the town; and there is coal, but we are not aware whether it is worked.

DMITRIEV, IVAN IVANOVITCH, was born in 1760, in the government of Simbirsk, where his father, who was himself a man of superior information, possessed an estate. After being educated at Kazan until his twelfth year, he was pursuing his studies at Simbirsk, when that part of the empire was thrown into an unsettled state by Pugatchev's rebellion, in consequence of which his family determined to leave it, and he was sent to St. Petersburg, where he was entered in the Semenovsky regiment of guards, and within a short time put on active service, in which he continued until the reign of the emperor Paul, when an appointment in the civil service was bestowed upon him. After the accession of Alexander he was made successively minister of justice and privy councillor, and finally retired from public life with a pension and the order of St. Vladimir of the first class. Although a life passed in such occupations was little favourable to literary pursuits, particularly the earlier part of it, a strong natural attachment to them led him to devote himself to them as sedulously as circumstances would permit, and with such success, that, after Karamzin, he was, among contemporary writers, the one who most contributed to polish the Russian language, imparting to it ease and gracefulness of style and elegance of diction. His poems, which have passed through many editions, and are deservedly popular, consist principally of odes, epistles, satires, tales, and fables, in which last-mentioned species of composition—a very favourite one with his countrymen—he particularly excelled; and if we except Krilov, he occupies the first rank among the Russian fabulists. By some he has been styled the Lafontaine of Russia, as well on account of the refined tone of his subjects as the studied simplicity of his language. In his poetical tales he stands almost alone—certainly unrivalled—among his countrymen, not less for the playfulness and shrewdness of his satire than for the peculiar happiness and finish of his style. His odes likewise possess considerable merit; but as a lyric poet he falls short of Lomonosov, Derzhavin, and Petrov.

DNIEPER, DNYEPR, or DNEPR, also called the *Ousi* by the Tartars, one of the largest rivers of European Russia, and, next to the Danube, the most considerable of the streams that discharge themselves into the Black Sea. It rises in the circle of Viasma, in the northern part of the government of Smolensk, near the sources of the Dwina and Volga, and among the swamps of the Alansk or Alaunian hills on the southern declivity of the Volkonsky forest. It flows generally in a south-south-west direction till it approaches the town of Smolensk, where it inclines more to the west, and makes its way to Orsza, whence it has a southerly course through the government of Mohileff, which it divides in part from that of Minsk. In this part of its course it is increased by numerous tributary streams; among others the Druetz, Sosja, Berezina, which last is united to the Dwina by means of a canal, Merya, and Gryaza. After forming the boundary between parts of the governments of Minsk and Tshernigoff, it enters that of Kieff, where it immediately receives the Przupiez, which the Muchaviec and Orginski canals connect with the Vistula and Niemen, and before it reaches Kieff, the Desna Usha, Osler, and other rivers. Continuing its course south-eastwards, the Dnieper, below Kieff, forms the western and south-western limit of the government of Pultava, and next passing between the governments of Ekaterinoslaf and Cherson, it bends again to the south-west; its waters south of Kieff having been increased by the Rope, Bazatlonk, Psjol, Vorskia, Orel, Samara, and other streams. It then flows between the governments of Duchoborzen (the Nogay Steppes) and Cherson, and at length forms, in conjunction with the Bog, a large liman, or swampy lake, nearly fifty miles long, and from one to six broad, by which it discharges itself into the Black Sea. This liman extends from Cherson to Oczakoff.

The entire length of the Dnieper with its windings is about 1000 miles: in a straight line it is about 650 from its source to its mouth. Its upper basin comprises nearly fourteen degrees of longitude; from 24° to about 37½° east. Its average width is estimated at 700 paces, and the surface which this river and its tributaries drain is exceeded only among European streams by that of the Danube. The Dnieper flows for the most part between high banks, the greatest elevation of which is along the eastern side. The upper part of its course is through a marshy country, and in the middle and lower course it passes over many rocks. It is broader, deeper, and more rapid than the Don, and is navigable from Smolensk to Kieff; but below the latter town, near Kidack, the navigation is interrupted for about forty miles by thirteen cataracts called Poroge, as well as by enormous blocks of stone; this space is passable for vessels of small draught during the spring months only, for which reason all merchandize intended for Cherson or the Black Sea is unladen at Old Samara, whence it is conveyed by land to Alexandrofsk, at the mouth of the Moscofska, a distance of about forty-six miles by land. From this spot to the mouth of the Dnieper, a distance of about 260 miles, the navigation is unimpeded. Below the cataracts, and as far as the liman of this river, upwards of seventy islands occur; in fact the Dnieper in this interval has no open water for seven miles together. Kaiskaya and Jedosa-Ostroma, the largest of these islands, became a place of refuge to the Zaporogue-Cossacks, who established their Setcha, or head camp upon them The islands produce a grape called Birioussa, which resembles the currants of Corinth. They are full of serpents, and abound in a sort of wild cat, which hunts the shrew-mouse

As the Dnieper flows through more than nine degrees of latitude (from near 56° to 46½° N. lat.), there is great diversity of climate in various parts of its basin: at Smolensk the waters freeze in November, and continue ice-bound until April; at Kieff they are frozen from January to March only. The river abounds in fish, particularly the sturgeon, carp, pike, and shad. There are bridges across it at Smolensk and Kieff the latter, which is 1638 paces in length, and constructed with rafts, is removed about the end of October and replaced in the spring, as it would otherwise be destroyed on the breaking up of the ice. This river is the Borysthenes of the Greeks and Danapris of the middle ages. It is first mentioned by Herodotus (iv. 53), who, though professing his ignorance of its source, has shown very clearly that he was well acquainted with the river. He says that it was known for forty days' sail upwards, but no farther: the large fish which he mentions as used for salting is probably the sturgeon. With the exception of the more southerly parts, its banks have long been inhabited by races of Sclavonian origin. Towards the mouth, from the Ross on the right, and the Vorska and Soula on the left bank, the country was for a long time nothing better than a steppe, where the nomadic tribes of the Petcheneges and afterwards of the Poloftis fed their numerous flocks.

Since the last peace with Turkey and the partition of Poland, both banks of the Dnieper are become the property of Russia. The principal towns on its banks are Smolensk, Mohileff, Kieff, Ekaterinoslaf, and Cherson.

DNIESTER, DNYSTER, or **DNESTR,** one of the principal rivers of European Russia, has its source in a small lake on the Miedoborczek, one of the north-eastern declivities of the Carpathian mountains lying in the circle of Sambor, in the Austrian kingdom of Galicia, and in about 49° N. lat. Within this kingdom the Dniester receives the Tismenica, Stry, Swica, Lomnica, and Bistritza, on its southern, and the Lipa, Stripa, and Sered, on its northern bank. After passing the town of Sambor, it pursues a south-easterly course to Halicz, Mariampol, and Zaleszcyki. Thence it runs in an E.S.E. direction to Chotym, at the north-western extremity of Bessarabia, where, leaving the Austrian, it enters the Russian territory. At Chotym it receives the Podhorze, which separates Galicia from the government of Podolia, and thence flows north-east, with numerous windings, to Kameniecz, the capital of that government. After passing Kameniecz, it has no tributaries of any great importance; the chief are the Smoritza, Yaurlik, Kurtshugan, Rent, and Botna. From Kameniecz it runs eastwards to Ushitza, and soon afterwards flows again south-easterly; forming in its descent to the Black Sea the boundary line first between Bessarabia and Podolia, and afterwards between the governments of Bessarabia and Cherson. From Ushitza it passes the towns of Mohiloff, Yampol, Dubossari, Kishenoff, the once important fortress of Bender, and Tiraspol, which is on the opposite bank. It enters the Black Sea by a broad liman, about nineteen miles in length and five in breadth, but not more than seven feet in depth, the mouth of which lies between Akerman and Ovidiopol. In front of the mouth is a long neck of low sand, which the sea, by forcing a passage at several points, has formed into islets.

The current of the Dniester is exceedingly rapid. The navigation commences at Halicz, but is interrupted at Porohy, two miles below Yampol, by two considerable falls and several whirlpools; and it does not become free again until it reaches Bender. As far as Old Sambor it flows through a deep broad valley, which afterwards expands on its eastern bank into an extensive plain; while on its right bank it is occasionally skirted by offsets from the Carpathian chain, varying from 180 to 250 feet in height. These elevations accompany its course as low down as Chotym, from which point it flows through an open flat country. The bed is muddy, and its waters, which are turbid and of a yellowish hue, and often broken by masses of rock, are frequently covered with foam; they rise and fall several times in the course of the day. The direct distance between the source of the Dniester and its mouth is estimated at about 420 miles, but, including its windings, its whole length is not less than 510 miles. Its average breadth is said to be 172 paces.

Before the left bank was in the possession of Russia the navigation of the Dniester was rendered very insecure by the predatory habits of the Turks and Tartars, but it is now become a safe means of transporting wood, grain, and merchandise from the Russian provinces to Odessa. The principal places at which vessels load and unload are Stria and Saletchi on the Austrian, and Zranetz and Dubossari on the Russian side. The Dniester abounds in fish, particularly the sturgeon.

The Dniester was known to Herodotus (iv. 51), Ovid (Pont. iv. 10, verse 50), and the later Greeks by the name of the Tyras; and it was subsequently called Danastris.

DO, in music, the name given by the Italians and the English to the first of the syllables used in solmization, and answering to the *ut* of the French.

DOAB. A word signifying *two waters*, which is used in Hindustan to denote any tract of land included between two rivers. There are several Doabs in Hindustan, but the district to which the name is most generally applied is situated between the Ganges and the Jumna. This district has its eastern extremity at Allahabad, whence it proceeds in a north-west direction to the hilly country in northern Hindustan, the northern frontier of the district of Saharunpore in the province of Delhi forming its north-western boundary. The length of this tract is more than 500 miles, and its mean breadth about 55 miles; it comprehends the districts of Saharunpore, Merut, Alighur, Furruckabad, Kanoje, Etaweh, Korna, Currah, and Allahabad. The prevailing character of the Doab is flatness and nakedness. A few clusters of trees are occasionally seen near the more considerable villages, but in other places many miles may be passed over without meeting with a tree. The only fuel consists of a low shrubby plant called palass, which is very inferior in quality. The principal productions are millet and barley, sugar, cotton, tobacco, and indigo. The straw of the millet is very serviceable as provender for cattle. One of the chief branches of industry, especially in the northern parts of the Doab, is the manufacture of coarse cotton cloths: the indigo produced is inferior in quality to that of Bengal. The temperature of the air in this part of India is liable to sudden and violent alternations; the range of the thermometer between the morning and afternoon is frequently 30, and sometimes as much as 40 degrees. In April and May, when the hot winds prevail, the thermometer often rises higher than 120 degrees in the shade, and at other seasons the temperature at daybreak is sometimes below the freezing point.

The southern part of the Doab came into the possession of the English in 1801, when it was acquired from the king of Oude. In 1803 the more northern part was ceded to the English by Dowlut Rao Scindia. The population is of a very mixed character, and consists of Jhats, Rajpoots, Patans, Thugs, and various other tribes, who, previous to the acquisition of the country by the English, had been much addicted to plunder, and dacoity or gang robbery was of frequent occurrence: this has since been greatly remedied. Three other districts to which the name of Doab is applied are situated in the province of Lahore. One of these, the Doab or Doabeh Barry, is included between the Ravey and Beyah rivers, and contains the cities of Lahore and Amritsir; the second, the Doabeh Jallinder, is included between the Beyah and the Sutleje, and forms the most fertile portion of the Seik territory; the third, the Doabeh Rechtna, comprehends the tract between the Ravey and the Chinaub; the principal towns contained in it are Bissolee, Emenabad, and Vizierabad.

DOBOKA (or Doboka-Varmegye), a large county of Transylvania, situated in the north-western part of that principality, and containing an area of about 1138 square miles. The eastern as well as the western parts are very mountainous, and the highest elevations are from 1800 to 2000 feet: the central districts are level, and form a continuation of the great Clausenburg Heide or heath, called by the natives the Mezoeseg. Doboka is traversed by the Little Szamos or Samosch, the Bisztritz, and Schayo. The climate in the higher regions is fresh and salubrious, but heavy and less healthy in the lower. The soil, though sandy and stony, is not unproductive: agriculture is confined chiefly to the midland districts. In the uplands there are excellent pastures, and the mountains are covered with forests, from which much timber is obtained. Some wine is produced, and the stock of horses, horned cattle, sheep, goats, and swine, is considerable. Honey and wax are made in large quantities. In 1778 this county contained 13,478 families, and 45,891 inhabitants; the present population is estimated at about 87,000. There are gold and silver mines, but they are not worked, nor is any advantage taken of the resources Doboka possesses in salt. There are 163 villages and 1 town in the county; the latter is called Széék, or Seeken, a privileged town with a municipality, and the seat of the Tabula Continua, or administrative board of Doboka.

It lies about twelve miles to the north-east of Clausenburg. The inhabitants derive their subsistence from their corn-lands and vineyards, but the extensive salt mines in its vicinity are no longer turned to account. Doboka, a Wallachian village to the west of Széék, which gives its name to the whole county, is encircled by mountains. Another spot of much note among the Transylvanians is Apafalva, the original seat of the Apasian princes, who governed all Transylvania from 1661 to 1713.

DOBREE, PETER PAUL, was born in the island of Guernsey in the year 1782. At an early age he was sent to Dr. Valpy's school at Reading, and stayed there till he became an undergraduate of Trinity College in the year 1800. He took his B. A. degree in 1804. He was a candidate for the chancellor's medals, but did not obtain either, having been, it is said, prevented by ill health from doing himself justice in the examination. After being elected a fellow of his college, he continued to reside at Cambridge, devoting himself to classical studies, and enjoying the intimacy of Porson, to whom he was devotedly attached, and from whom he derived all the spirit of his scholarship. After Porson's death, the books and MSS. of that great critic were purchased by Trinity College, and the task of editing part of Porson's notes was intrusted to Dobree: he was prevented, however, by illness, a subsequent journey to Spain, and other causes, from publishing the portion of these remains assigned to him till 1820, when he brought out an edition of the Plutus and of all that Porson had left upon Aristophanes, along with some learned notes of his own. In 1822 he published Porson's transcript of the lexicon of Photius. In the following year he was elected Regius professor of Greek. He died on the 24th September, 1825. He was engaged on an edition of Demosthenes at the time of his death: his notes on this and other Greek and Latin authors were collected and published by his successor in 1831. Some of his remarks are very acute, and some of his conjectures most ingenious, but it may be doubted if his friends have consulted his reputation in publishing a number of crude observations, the greater part of which were certainly never intended for the press. As a scholar, Dobree was accurate and fastidious he had some taste, and much common sense, which preserved him from committing blunders. His unwearying industry supplied him with a vast induction of particular observations; but he was unwilling, perhaps unable, to generalise; and on the whole, it must be allowed that he has neither done nor shown a power of doing any thing to justify the extravagant encomiums of some of his friends.

DOCK, the common name of many perennial tap-rooted species of the genus Rumex. They do not multiply by division of the root, but their seeds are dispersed in such abundance that they become a serious nuisance in cultivated land if they are not extirpated. The only two methods of doing this, are either by tearing or digging them up, which is so slow as scarcely to be adopted in practical husbandry, or by constantly hoeing up their young shoots; by the latter means they usually may be destroyed in a single summer.

DOCK, a place artificially formed for the reception of ships, the entrance of which is generally closed by gates. There are two kinds of docks, dry-docks and wet-docks. The former are used for receiving ships in order to their being inspected and repaired. For this purpose the dock must be so contrived that the water may be admitted or excluded at pleasure, so that a vessel can be floated in when the tide is high, and that the water may run out with the fall of the tide, or be pumped out, the closing of the gates preventing its return. Wet-docks are formed for the purpose of keeping vessels always afloat. The name of dock has sometimes been applied to an excavation from which the water, or a considerable part of it, runs in and out with the tide; but such an excavation is more properly an artificial basin or harbour than a dock. One of the chief uses of a dock is to keep a uniform level of water, so that the business of loading and unloading ships can be carried on without any interruption. Dock-yards belonging to the government usually consist of dry-docks for repairing ships, and of *slips* on which new vessels are built; besides which they comprize storehouses, in which various kinds of naval stores are kept, and workshops in which different processes subsidiary to ship-building are carried on. For some account of the great Dock-yards of this kingdom the articles CHATHAM, DEVONPORT, PORTSMOUTH, and PLYMOUTH may be referred to.

The first wet-dock for commercial purposes made in this kingdom was formed in the year 1708 at Liverpool, then a place of no importance. It has been usual to ascribe to the amount of accommodation for shipping which has since been provided at this port a great part of the prosperity which it exhibits at the present day. That the docks at Liverpool have been and are of immense importance to the trade of the town, and extremely profitable to the corporation to which they belong, cannot be disputed, and that the progress of the trade of Liverpool has been accelerated by their means is highly probable; but that progress seems necessarily to have followed from the extraordinary growth of the manufactures in Lancashire; and as Liverpool is the natural outlet for the export trade of that part of the kingdom, we may suppose that the improvements in question have arisen out of the demands and necessities of commerce rather than that they have been the cause in any considerable degree of the trade itself. The Liverpool docks have been exceedingly profitable in proportion to the money expended on their construction. This expense has been much less than such works in general require, the labour of excavating having been in a great measure saved in consequence of their area having been inclosed from the river. For the same reason, the corporation of the town, to whom the docks belong, never had to make any outlay for the purchase of the land; and another great cause of expenditure which has occurred at other places has been avoided at Liverpool, where the docks are simply such, and are not provided with warehouses for storing goods. The dock first constructed, and which went by the name of "The Old Dock," was filled up a few years ago, and the site is now occupied by a very handsome custom-house, which is on the point of being completed (May 1837). Since the Old Dock was first made others have been added at different periods, and at present the margin of the Mersey along the whole extent of the town is occupied by a series of eleven docks, without reckoning one constructed by the late Duke of Bridgewater as an auxiliary to his operations in internal navigation: this work, which is called "*The Duke's Dock,*" is now in possession of the Duke of Bridgewater's executors. The aggregate area of those docks which are the property of the corporation exceeds 100 acres.

The great advantage which the trade of Liverpool has progressively gained from the existence of these docks may be gathered from the following statement of the number of vessels by which they have been frequented in different years, taken at intervals, and by the amount of dues collected upon these vessels and the goods loaded and unloaded in and from the same.

Years.	Vessels.	Amount of Dock Dues.	Years.	Vessels.	Amount of Dock Dues.
1757	1,371	£2,336	1800	4,746	£23,379
1760	1,245	2,330	1805	4,618	33,364
1765	1,930	3,455	1810	6,729	65,782
1770	2,073	1,142	1815	6,440	76,915
1775	2,291	5,384	1820	7,276	94,412
1780	2,261	3,528	1825	10,837	128,691
1785	3,429	8,411	1830	11,214	151,329
1790	4,223	10,037	1835	14,959	244,814
1795	3,948	9,368			

An act of Parliament was passed in 1825 vesting the management of the Docks in a committee of 21 members, of whom 13 are nominated by the corporation of Liverpool, and 8 are elected out of their own body by the merchants who pay each at least 10*l*. a year in rates.

The first commercial wet-dock constructed in the port of London was for the accommodation of vessels employed in the Greenland whale-fishery, and was provided with the necessary apparatus for boiling the blubber. This branch of trade having almost entirely left the port of London, the dock was, about 30 years ago, opened for the reception of vessels employed in the European timber and corn trades; and with a view to the latter, a range of granaries was built. This dock, which is now known as the 'Commercial Dock,' is situated at Rotherhithe; it occupies altogether 49 acres, about four-fifths of which are water. The warehouses are not built so as to entitle them to be considered 'places of special security,' as described in the warehousing act, and many descriptions of goods are consequently not permitted to be deposited in them under bond.

Up to the end of the last century all ships arriving in London, with the exception already mentioned of the Greenland whale-ships, discharged their cargoes into lighters in the river. The continually increasing inconvenience thus caused by the growing trade of the port was much aggravated during a time of war, by the circumstance of the West India ships arriving together in great numbers under convoy. To remedy this inconvenience, a plan was projected in 1793 for constructing wet-docks for the reception of ships employed in the West India trade; but it was not until 1799 that the scheme was sanctioned by Parliament, and that an act was passed incorporating a company for the purpose, with a capital or joint-stock of 1,380,000*l.* The docks constructed under this act of incorporation are known as the West India Docks, and extend across the piece of land called the Isle of Dogs, which lies in a bend of the Thames between Blackwall and Limehouse, at both of which places there are entrances to the docks. Their construction was begun in February 1800, and was prosecuted so vigorously that in two years and a half from that time the works were sufficiently advanced to admit vessels for unloading. These docks consisted at first of two separate basins, one of which was used for discharging, and the other for loading ships. The import dock, which is situated to the north, is 870 yards long and 166 yards wide; the export dock is of the same length and 135 yards wide, so that the area of the two is equal to 54 acres: there are besides two basins, one at each entrance, that at Blackwall being 5 acres, and that at Limehouse 2 acres in extent. These two docks are together capable of accommodating more than 500 sail of merchant vessels of large size, and during the war, when ships arrived from the Colonies in large fleets, the accommodation was at times found to be not greater than was required. The import dock is surrounded by ranges of commodious warehouses. The city canal, which was cut parallel with the West India Docks on the south, was intended to form a short cut for ships, to enable them to avoid the circuit of the Isle of Dogs, but being very little used, was purchased about four years ago by the West India Dock Company, and a communication was made between it and the other basins

The London Docks, which are situated at Wapping, were begun in the year 1801, and opened for business in 1805; they consist of the western dock of 20 acres, the eastern dock of 7 acres, and the tobacco dock, between the other two, of more than one acre. The space included within the dock walls exceeds 71 acres. The warehouses are spacious, and very substantially built. The tobacco warehouse, which is on the south side of the tobacco-dock, covers nearly five acres. The vaults beneath the warehouses contain space enough for stowing 66,000 pipes and puncheons of wine and spirits One of the vaults has an area of 7 acres. A great part of the expense attending upon the construction of these docks was owing to the value of the houses and other property by which the site was previously occupied, and by the compensation which the Dock Company was bound by its act of incorporation to pay to lightermen, owners of warehouses in the City of London, and others whose business would probably suffer from the establishing of the docks. The joint-stock of the company is 3,238,000*l.*, in addition to which 700,000*l.* have been borrowed and expended. The amount of business carried on has been very great from the first opening of these docks, but the proprietors do not receive more than 2½ per cent. per annum on their stock.

The East India Docks, intended for the reception of ships employed by the East India Company, are situated at Blackwall, below the entrance to the West India Docks. There are two docks, one for unloading, the other for loading ships, of the area of 18 and 9 acres respectively; the entrance basin, which is common to both docks, is about 3 acres in extent: the cost of this undertaking was about 500,000*l.*: it has not hitherto proved profitable to the undertakers.

The East Country Dock adjoins the Commercial Dock to the south. It is frequented by vessels employed in the European timber trade. This dock, which was constructed in 1807, has an area of about 6½ acres. The basin at the entrance of the Surrey canal at Rotherhithe is also used as a dock.

The projecting of the St. Katherine's Docks arose out of an alleged want of sufficient accommodation in the London Docks. The act incorporating the St. Katherine's Dock Company was passed in 1826, and the Docks, which are situated between the London Docks and the Tower, were partially opened for business in October 1828. The joint-stock of the company amounts to 1,352,000*l.*, besides which 800,000*l.* of borrowed money have been spent. The outer wall incloses an area of 24 acres, of which 11 acres are water, the remainder being occupied by quays and warehouses. There are two docks, each capable of receiving vessels of 800 tons burthen, and which are frequented by ships in the East India, the North American and South American trades. The warehouses are very commodious, and so contrived that goods are taken into them at once from the ship.

The wet-dock at Bristol, which is of a character different from those of Liverpool and London, has already been described. [BRISTOL.]

At Hull there are three docks, occupying together an area of 26 acres, and capable of affording accommodation to more than 300 ships; but this amount is found to be insufficient for the increasing trade of the port, and a public meeting was lately held in the town to consider of the steps necessary to be taken for providing more dock room. The new port of Goole, situated near the junction of the Ouse with the Humber has two wet-docks, one of which is calculated for the reception of sea-going vessels of considerable burthen, and the other is used for the accommodation of small craft which navigate the rivers and canals.

Leith has two wet-docks, extending together over 10 acres, and capable of accommodating 150 vessels of the size which at the time of the works being performed usually frequented the port. Since then, the introduction of steam navigation has made an entire change in the wants and uses of Leith as a harbour. The entrance to the docks is not sufficiently wide to admit the large steam vessels trading between London and Edinburgh, which must consequently discharge and load in the harbour, where they take the ground every tide, which is very objectionable, or they must lie at anchor in the Frith of Forth, and load and unload by means of boats, which is expensive and sometimes difficult, and even dangerous. The deficient state of accommodation here described was investigated by a committee of the House of Commons in 1835, but the insolvent condition of the corporation of Edinburgh, in which body is vested the property of the harbour and shore of Leith and its neighbourhood, has hitherto prevented the commencement of any improvement.

DOCLEA. [MAIADÆ.]

DOCTOR, one that has taken the highest degree in the faculties of Divinity, Law, Physic, or Music. In its original import it means a person so skilled in his particular art or science as to be qualified to teach it.

There is much difference of opinion as to the time when the title of Doctor was first created. It seems to have been established for the professors of the Roman law in the University of Bologna, about the middle of the twelfth century. Antony à Wood says, that the title of Doctor in Divinity began at Paris, after Peter Lombard had compiled his Sentences, about the year 1151. (*Hist. and Antiq. Univ. of Oxford*, 4to. Oxf. 1792, vol. i. p. 62.) Previously, those who had proceeded in the faculties had been termed Masters only. The title of Doctor was not adopted in the English Universities earlier than the time of John or Henry the Third.

Wood cites several instances of the expense and magnificence which attended the early granting of the higher degrees in England in the reigns of Henry III. and Edward I. About the year 1268, he says, when Alphonsus de Senis, or Siena, an Italian, studied at Oxford, one Bonifacius de Saluciis proceeded in the civil law, at whose inception there were such ceremonies and feasting, that the like for that faculty was scarce before known here. The abbot and convent of Oseney gave him the free use of their monastery on that occasion. He adds, that a still greater solemnity was performed some years after, at Gloucester College, by the Benedictines, for one William de Brooke, a monk of St. Peter's Monastery at Gloucester, who took the degree of D.D in 1298, being the first of his Order who had attained that dignity. He was accompanied by the abbot and whole convent of his own monastery, the abbots of Westminster, Reading, Abingdon, Evesham, and Malmesbury, numerous other priors and monks, and by a hundred noblemen and esquires on horses richly caparisoned. (Wood, ut supr. pp. 65, 66.)

In Oxford the time requisite for the Doctor of Divinity's degree, subsequent to that of M.A., is eleven years: for a Doctor's of Civil Law, five years from the time at which the Bachelor of Laws' degree was conferred. Those who take this degree professionally, in order to practise in Doctors' Commons, are indulged with a shorter period, and permitted to obtain it at four instead of five years, upon making oath in convocation of their intentions so to practise. For the de gree of M.D., three years must intervene from the time of the candidate's having taken his Bachelor of Medicine's degree. For a Doctor's degree in Divinity or Law three distinct lectures are to be read in the schools, upon three different days: but by a dispensation, first obtained in convocation or congregation, all three are permitted to be read upon the same day; so that by dispensation a single day is sufficient in point of time for these exercises. For a Doctor's degree in Medicine, a dissertation upon some subject, to be approved by the Professor of Medicine, must be publicly recited in the schools, and a copy of it afterwards delivered to the Professor.

In Cambridge a Doctor of Divinity must be a Bachelor of Divinity of five, or a M.A. of twelve years' standing. The requisite exercises are one act, two opponencies, a Latin sermon, and an English sermon. A Doctor of Laws must be a Bachelor of Laws of five years' standing. His exercises are one act and one opponency. Doctors of Physic proceed in the same manner as Doctors of Laws. For a Doctor's degree in music, in both Universities, the exercise required is the composition and performance of a solemn piece of music, to be approved by the Professor of the Faculty. (See the *Oxf. and Camb. Calendars for* 1837.)

Coloured engravings of the dresses worn by the doctors of the several faculties of Oxford and Cambridge will be found in Ackermann's *History of the Univ. of Oxford*, 4to., 1814, vol. ii. p. 259, *et seq.*; and in his *History of the Univ. of Cambridge*, 4to., 1815, vol. ii. p. 312, *et seq.*

DOCTORS' COMMONS, the College of Civilians in London, near St. Paul's Churchyard, founded by Dr. Harvey, Dean of the Arches, for the professors of the civil law. The official residences of the judges of the Arches' Court of Canterbury, of the judge of the Admiralty, and the judge of the Prerogative Court of Canterbury, are situated there. It is also the residence of the doctors of the civil law practising in London, who live there (for diet and lodging) in a collegiate manner, and common together, and hence the place is known by the name of Doctors' Commons. It was burnt down in the fire of London, and rebuilt at the charge of the profession. (*Chambral Mag. Brit. Notitia.*) To the college belong a certain number of proctors, who manage causes for their clients, &c.

In the Common Hall are held all the principal spiritual courts, and the High Court of Admiralty.

DODDER. [CUSCUTACEÆ.]

DODDRIDGE, PHILIP, D.D. (birth in 1702, and death in 1751), a dissenting divine, who, on account of his singularly amiable disposition and manners, his ministerial assiduity, piety, and learning, is regarded as one of the ornaments of the religious community to which he belonged.

The community of which we speak is that of the Old Dissenters of England; those who adhered to the clergy who left the church when the Act of Uniformity, passed in 1662, soon after the return of Charles II. from exile, prescribed the terms of ministerial conformity. These persons formed a numerous and powerful party during the whole of that reign, and at length succeeded, though after much suffering, in enforcing their right to have their meeting-houses protected by law, and themselves allowed to assemble under the same protection which was extended to ministers and people who were willing to conform under that act. This right however was not recognised till after the revolution. The act of parliament which gave it is called the Act of Toleration, and was one of the first legislative measures of the new government, being passed in 1689.

The effect of it was, that the non-conforming or dissenting body became cast into societies, each with its own place of worship, where the usual ordinances of Christianity were administered; each having also its own pastor, who was either a minister who had been silenced by the act of 1662, or a minister who had been trained under those ministers and ordained by them.

Doddridge was born in one of these families living in London, where he had the early part of his education. He was then for a time at St. Albans, where lived a minister, Mr. Clarke, who was his great friend, and indeed patron, for the father of Doddridge had died while he was young, and had left little for the expense of his education. It was early perceived that his turn of mind peculiarly pointed to the profession of a minister, and he was entered at a dissenting academy over which Mr. John Jennings presided, the son of one of the ministers silenced in 1662. This academy was kept at the village of Kibworth in Leicestershire. Dr. Doddridge entered it in 1718 or 1719, and in 1722 commenced his ministry at Kibworth, his late tutor Mr. Jennings removing in that year to Hinckley, where he died in the succeeding year.

The death of Mr. Jennings was an important event in the history of Dr. Doddridge. Great expectations had been formed among the Dissenters of the success of Mr. Jennings in the education of ministers, and it was thought a point of importance to maintain an academy of that kind in one of the central counties. Mr. Jennings had mentioned his pupil Doddridge as being a person whom he thought eminently qualified to carry on the work, and the eyes of the Dissenters were generally directed to him as the person best qualified to do so.

However, several years passed, during which Doddridge was leading the life of a non-conformist minister, his services being divided between the people who attended the chapel at Kibworth, and the congregation at the neighbouring town of Market Harborough. He was diligent in his ministry both in public and private, but he found time also for much theological reading, by which means he qualified himself the better for the office which he and his friends had ever kept in view.

In 1729 he began his academy, which soon attained a high reputation. It was the institution in which most of the more distinguished ministers of the Old Dissenters in the middle of the eighteenth century were educated. It was first established at Market Harborough, where he at the time resided; but before the end of the year he removed to Northampton, having been invited to become the minister of the Dissenting congregation in that town; and at Northampton he continued both as pastor of the Dissenting congregation, and head of the Dissenting academy, till his death. He died at Lisbon thirteen days after his arrival. He had gone thither with little hope of recovery.

Doddridge lived at a time when the zeal of the class of persons to whom he belonged had lost some part of its antient fervour. This he saw with regret, and was very desirous to revive it. This appears to have been a principal object, and one kept steadily in view both in his ministerial labours and his published writings. His printed sermons are remarkable for the earnestness with which he presses the great importance of a religious life, the evil of spiritual indifference or carelessness, and the indispensable necessity of uniting with the practice of the moral duties the cultivation of the spirit of piety, and a deep and serious regard to the momentous truths of religion. This appears particularly in a book of his which has been popular both at home and abroad, entitled 'The Rise and Progress of Religion in the Soul.' There is the same spirit of animated piety, and occasionally touches of genuine eloquence, in the practical part of another publication of his entitled 'The Family Expositor,' in which we have the whole Scriptures of the New Testament, (the gospels being in a harmony,) with a paraphrase, a series of critical notes, and reflections, or, as he calls them, improvements of each section into which the whole is divided. This work has also been often printed, and it may be regarded as an evidence of his learning, as well as of his piety; the notes abound with critical remarks, gathered out of numerous authors, or suggestions of his own mind, full of that knowledge which fits a man to illustrate those difficult writings. The course of metaphysical, ethical, and theological lectures, through which he conducted the young men who were trained by him for the christian ministry was published after his death, and forms an excellent text-book of systematic divinity, and (especially in the later edition by Dr. Kippis, in 2 vols. 8vo.) a very useful body of references to writers on almost every topic under the heads of metaphysics, ethics, or divinity. Nor must it be omitted that to him the Dissenters owe some of the best hymns which are sung by them in their public services.

Thus living a life of activity and usefulness, practising the virtues which he taught to others, and exhibiting a fine spirit of an unaustere piety, he lived greatly respected by many eminent persons beyond the pale of his own religious community, and in that community his death at so early an age was felt to be a great and general misfortune. His name is still never mentioned among them but with honour.

Two large accounts of his life have been published. The first by Job Orton, another divine of a kindred spirit, who belonged to the same community. the second by Dr. Kippis, a pupil of Dr. Doddridge, and also a minister, who has introduced it in the 'Biographia Britannica,' of which he was the editor. The reader may see in these works all the detail of his public labours, his principles, and plan of lecturing, and will easily understand from them the influence of his character on the body to which he belonged. One of his descendants has within the last ten years given to the world a very large collection of his correspondence and private papers. In them we see his inmost mind

DODE'CAGON, a figure of twelve sides; a term generally applied to an equiangular and equilateral (or regular) dodecagon.

The side of a regular dodecagon inscribed in a circle is ·5176380 of the radius; and of that about a circle ·5358984 of the radius. Similarly the radii of the circles inscribed in and circumscribed about a dodecagon are 1·8660254 and 1·9318517 of the side. The area of a dodecagon is three times the square of the radius of the circumscribed circle, or 11·1961524 of the square on the side.

DODECAGY'NIA, the name of any order in the Linnean classification of plants wherein the number of styles is twelve.

DODECAHE'DRON. [SOLIDS, REGULAR.]

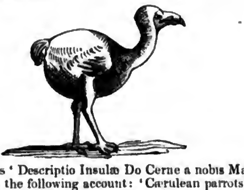
DODECA'NDRIA, the twelfth class in the Linnean classification of plants. It contains species having twelve or about twelve stamens, provided they do not adhere by their filaments.

DODO, DIDUS, a genus of birds generally supposed to be extinct, and whose very existence has been doubted. We have taken some pains to collect the evidence on this subject, and we here present it to our readers.

WRITTEN AND PICTORIAL EVIDENCE.

It appears that Vasco de Gama, after having doubled the Cape of Good Hope (Cabo Tormentoso, or Cape of Storms) in 1497, discovered, at sixty leagues beyond it, a bay, Angra de San Blaz, near an isle, where he saw a very great number of birds of the form of a goose, but with wings like those of the bats, which the sailors called solitaries. On their return, in 1499, the Portuguese touched again at San Blaz, where they took a great number of these birds, and comparing them to swans, called the island 'Ilha des Cisnes,' Isle of Swans.[*] In the voyage to the East Indies, in 1598, by Jacob Van Neck and Wybrand van Warwijk (small 4to., Amsterdam, 1648,) there is a description of the *Walgh-vogels* in the island of Cerne, now called Mauritius, as being as large as our swans, with large heads, and a kind of hood thereon; no wings, but, in place of them, three or four black little pens (pennekens), and their tails consisting of four or five curled plumelets (pluymkens) of a greyish colour. The breast is spoken of as very good, but it is stated that the voyagers preferred some turtle-doves that they found there. The bird appears with a tortoise near it, in a small engraving, one of six which form the prefixed plate.

In the frontispiece to De Bry (Quinta Pars Indiæ Orientalis, &c., M.DCI), surmounting the architectural design of the title-page, will be found, we believe, the earliest engravings of the Dodo. A pair of these birds stand on the cornice on each side, and the following cut is taken from the figure on the left hand.



In De Bry's 'Descriptio Insulæ Do Cerne a nobis Mauritius dictæ' is the following account: 'Cærulean parrots also are there in great numbers, as well as other birds; besides which there is another larger kind, greater than our swans, with vast heads, and one half covered with a skin, as it were, hooded. These birds are without wings, in the place of which are three or four rather black feathers (quarum loco tres quatuorve pennæ nigriores prodeunt). A few curved delicate ash-coloured feathers constitute the tail. These birds we called *Walck-Vögel*, because the longer they were cooked the more unfit for food they became (quod quo longius seu diutius elixarentur, plus lentescerent et esui ineptiores fierent). Their bellies and breasts were nevertheless of a pleasant flavour (saporis jucundi) and easy of mastication. Another cause for the appellation we gave them was the preferable abundance of turtle-doves which were of a far sweeter and more grateful flavour.' It will be observed that the bill in De Bry's figure is comparatively small.

Clusius, in his 'Exotica' (1605), gives a figure, here copied, which, he says, he takes from a rough sketch in a journal of a Dutch voyager who had seen the bird in a voyage to the Moluccas in the year 1598.

The following is Willughby's translation of Clusius, and the section is thus headed: 'The Dodo, called by Clusius *Gallus gallinaceus peregrinus*, by Nieremberg *Cygnus cucullatus*, by Bontius *Dronte*.' 'This exotic bird, found by the *Hollanders* in the island called Cygnæa or Cerne, (that is the Swan Island) by the Portuguese, Mauritius Island by the Low Dutch, of thirty miles' compass, famous especially for black ebony, did equal or exceed a swan in bigness, but was of a far different shape; for its head was great, covered as it were with a certain membrane resembling a hood: beside, its bill was not flat and broad, but thick and long; of a yellowish colour next the head, the point being black. The upper chap was hooked; in the nether had a bluish spot in the middle between the yellow and black part. They reported that it is covered with thin and short feathers, and wants wings, instead whereof it hath only four or five long black feathers; that the hinder part of the body is very fat and fleshy, wherein for the tail were four or five small curled feathers, twirled up together, of an ash-colour. Its legs are thick rather than long, whose upper part, as far as the knee, is covered with black feathers; the lower part, together with the feet, of a yellowish colour: its feet divided into four toes, three (and those the longer) standing forward, the fourth and shortest backward: all furnished with black claws. After I had composed and writ down the history of this bird with as much diligence and faithfulness as I could, I happened to see in the house of Peter Pauwius, primary professor of physic in the university of Leyden, a leg thereof cut off at the knee, lately brought over out of Mauritius his island. It was not very long, from the knee to the bending of the foot being but little more than four inches, but of a great thickness, so that it was almost four inches in compass, and covered with thick-set scales, on the upper side broader, and of a yellowish colour, on the under (or backside of the leg) lesser and dusky. The upper side of the toes was also covered with broad scales, the under side wholly callous. The toes were short for so thick a leg: for the length of the greatest or middlemost toe to the nail did not much exceed two inches, that of the other toe next to it scarce came up to two inches: the back-toe fell something short of an inch and a half; but the claws of all were thick, hard, black, less than an inch long; but that of the back-toe longer than the rest, exceeding an inch.[*] The mariners, in their dialect, gave this bird the name *Walgh-Vögel*, that is, a nauseous or yellowish[†] bird; partly because after long boiling its flesh became not tender, but continued hard and of a difficult concoction, excepting the breast and gizzard, which they found to be of no bad relish, partly because they could easily get many *turtle-doves*, which were much more delicate and pleasant to the palate. Wherefore it was no wonder that in comparison of those they despised this, and said they could be well content without it. Moreover they said that they found certain stones in its gizzard, *and no wonder, for all other birds, as well as these, swallow stones, to assist them in grinding their meat.*' Thus far Clusius.'

In the voyage of Jacob Heemskerk and Wolfert Harmansz to the East Indies, in 1601, 1602, 1603 (small 4to., Amsterdam, 1648), folio 19, the Dod-aarsen (Dodos) are enumerated among the birds of the island of 'Cerne, now Mauritius;' and in the 'Journal of the East Indian Voyage of Willem Ysbrantsz Bontekoe van Hoorn, comprising many wonderful and perilous things that happened to him'—from 1618 to 1625 (small 4to., Utrecht, 1649)—under the head of the 'Island of Mauritius or Maskarinas,' mention is made (page 6) of the *Dod-eersen*, which had small wings, but could not fly, and were so fat that they scarcely could go.

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[*] It is stated (Bouxbon, vol. v., p. 277) that the island of Bourbon was discovered by the Portuguese navigator, Mascarénhas in 1542, and at that time was not inhabited, and that it received the name of Mascarenhas or Mascarigue.

[*] We are indebted to Mr. Gray for the following measurement of the foot in the British Museum:—' Knee to ancle 4¼ inches; circumference 4 inches; middle toe 3 inches; back toe 1¼ inch; front claws, which are much worn, 8 lines; back claw, also much worn, shorter. Mr. Gray observes that the leg mentioned by Clusius is probably, from the similarity of the measurement, the specimen which was afterwards noticed by Grew, and finally came to the British Museum.

[†] So in Willughby, but the print is somewhat indistinct, and there may be error. In the original the words are '*Walgh-Vogel*, hoc est, nauseam movens avis, partim quod, &c.,' the word therefore is an interpolation.

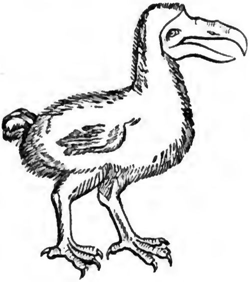
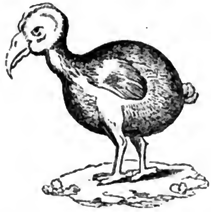


Figure from Clusius.

Herbert, in his Travels (1634), gives a figure or rather figures of a bird that he calls 'Dodo,' and the following account:—'The Dodo comes first to our description, here, and in Dygarrois (and no where else, that ever I could see or heare of, is generated the Dodo). (A Portuguize name it is, and has reference to her simplenes), a bird which for shape and rarenesse might be called a Phœnix (wer't in Arabia); her body is round and extreame fat, her slow pace begets that corpulencie; few of them weigh lesse than fifty pound: better to the eye than the stomack: greasie appetites may perhaps commend them, but to the indifferently curious nourishment, but prove offensive. Let's take her picture: her visage darts forth melancholy, as sensible of nature's injurie in framing so great and massie a body to be directed by such small and complementall wings, as are unable to hoise her from the ground, serving only to prove her a bird; which otherwise might be doubted of: her head is variously drest, the one halfe hooded with downy blackish feathers; the other perfectly naked; of a whitish hue, as if a transparent lawne had covered it: her bill is very howked and bends downwards, the thrill or breathing place is in the midst of it; from which part to the end, the colour is a light greene mixt with a pale yellow; her eyes be round and small, and bright as diamonds; her cloathing is of finest downe, such as you see in goslins; her trayne is (like a China beard) of three or foure short feathers; her legs thick, and black, and strong; her tallons or pounces sharp; her stomack fiery hot, so as stones and iron are easily digested in it; in that and shape, not a little resembling the Africk oestriches· but so much, as for their more certain difference I dare to give thee (with two others) her representation.'—(4th ed., 1677.)



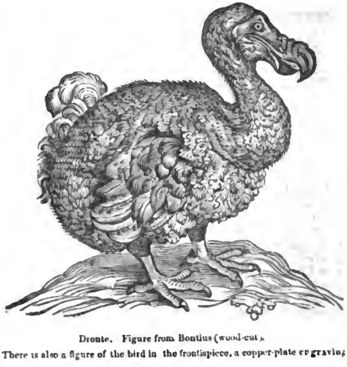
Herbert's figure.

Nieremberg's description (1655) may be considered a copy of that of Clusius, and indeed his whole work is a mere compilation. As we have seen above, he names the bird *Cygnus cucullatus*.

In Tradescant's catalogue ('*Musæum Tradescantianum*; or, a Collection of Rarities preserved at South Lambeth, near London, by John Tradescant,' London, 1656, 12mo.), we find among the 'Whole Birds'—'Dodar, from the island Mauritius; it is not able to flie being so big.' That this was a Dodo there can be no doubt; for we have the testimony of an eye-witness, whose ornithological competency cannot be doubted, in the affirmative. Willughby at the end of his section on 'The Dodo,' and immediately beneath his translation of Bontius, has the following words: 'We have seen this bird dried, or its skin stuft in Tradescant's cabinet.' We shall, hereafter, trace this specimen to Oxford.

Jonston (1657) repeats the figure of Clusius, and refers to his description and that of Herbert.

Bontius, edited by Piso (1658), writes as follows: '*De Dronte*, aliis *Dod-aers*.' After stating that among the islands of the East Indies is that which is called *Cerne* by some, but Mauritius 'a nostratibus,' especially celebrated for its ebony, and that in the said island a bird 'miræ conformationis' called *Dronte* abounds, he proceeds to tell us—we take Willughby's translation—that it is 'for bigness of mean size between an ostrich and a turkey, from which it partly differs in shape, and partly agrees with them, especially with the African ostriches, if you consider the rump, quills, and feathers: so that it was like a pigmy among them, if you regard the shortness of its legs. It hath a great, ill-favoured head, covered with a kind of membrane resembling a hood; great black eyes; a bending, prominent fat neck; an extraordinary long, strong, bluish-white bill, only the ends of each mandible are of a different colour, that of the upper black, that of the nether yellowish, both sharp-pointed and crooked. It gapes huge wide as being naturally very voracious. Its body is fat, round, covered with soft grey feathers, after the manner of an *ostriches*: in each side instead of hard wing-feathers or quills, it is furnished with small, soft-feathered wings, of a yellowish ash-colour; and behind, the rump, instead of a tail, is adorned with five small curled feathers of the same colour. It hath yellow legs, thick, but very short; four toes in each foot, solid, long, as it were scaly, armed with strong, black claws. It is a slow-paced and stupid bird, and which easily becomes a prey to the fowlers. The flesh, especially of the breast, is fat, esculent, and so copious, that three or four *Dodos* will sometimes suffice to fill an hundred seamens' bellies. If they be old, or not well boiled, they are of difficult concoction, and are salted and stored up for provision of victual. There are found in their stomachs stones of an ash colour, of divers figures and magnitudes; yet not bred there, as the common people and seamen fancy, but swallowed by the bird; as though by this mark also nature would manifest that these fowl are of the *ostrich* kind, in that they swallow any hard things, though they do not digest them.'



Dronte. Figure from Bontius (wood-cut).

There is also a figure of the bird in the frontispiece, a copper-plate engraving

It appears from Adam Olearius (Die Gottorfische Kunst Kammer, 1666), that there was a head to be seen in the Gottorf Museum; but the figure (Tab. xiii. f. 5) is very like that of Clusius. It is mentioned as the head of the *Walch-Vogel* and Clusius is referred to. In the plate the head is shaded, and has a more finished appearance: the rest of the bird is in outline.

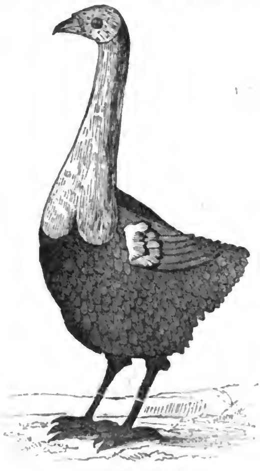
Grew ('Musæum Regalis Societatis; or a catalogue and description of the natural and artificial rarities belonging to the Royal Society,' London, folio, 1681), at p. 68, thus describes the bird which is the subject of our inquiry. '*The leg of a Dodo;* called *Cygnus cucullatus* by Nierembergius; by Clusius, *Gallus gallinaceus peregrinus;* by Bontius called *Dronte*, who saith that by some it is called (in Dutch) *Dod-aers*, largely described in Mr. Willughby's Ornithol. out of Clusius and others. He is more especially distinguished from other birds by the membranous hood on his head, the greatness and strength of his bill, the littleness of his wings, his bunchy tail, and the shortness of his legs. Abating his head and legs, he seems to be much like an ostrich, to which also he comes near as to the bigness of his body. He breeds in Mauris's Island. The leg here preserved is covered with a reddish-yellow scale. Not much above four inches long, yet above five in thickness, or round about the joints, wherein, though it be inferior to that of an *Ostrich* or *Cassowary*, yet, joined with its shortness, may render it of almost equal strength.' At p. 73, there is the following notice:—'The head of the *Man of War*, called also *Albitrosse;* supposed by some to be the head of a *Dodo*, but it seems doubtful. That there is a bird called *the Man of War* is commonly known to our seamen; and several of them who have seen the head here preserved, do affirm it to be the head of that bird, which they describe to be a very great one, the wings whereof are eight feet over. And Ligon (*Hist. of Barbad.*, p. 61), speaking of him, saith, that he will commonly fly out to sea to see what ships are coming to land, and so return. Whereas the *Dodo* is hardly a volatile bird, having little or no wings, except such as those of the *Cassowary* and the *Ostrich*. Besides, although the upper beak of this bill doth much resemble that of the *Dodo*, yet the nether is of a quite different shape; so that this either is not the head of a *Dodo*, or else we have nowhere a true figure of it.' Grew then gives a very lengthened description of the skull which is figured by him (Tab. 6), and intituled '*Head of the Albitros*,' as it doubtless was. The leg above mentioned is that now preserved in the British Museum, where it was deposited with the other specimens described by Grew, when the Royal Society gave their 'rarities' to that national establishment. Grew was a well qualified observer, and much of this description implies observation and comparison; indeed, though he does not refer to it, there is no reason for supposing that Grew was not familiar with Tralescant's specimen.

Charleton also (Onomasticon, 1688) speaks of the *Dodo Lusitanorum, Cygnus cucullatus*, Willughby and Ray, and asserts that the Museum of the Royal Society of London contained a leg of the *Dodo*. This was evidently the leg above alluded to.

Leguat, in his description[*] of the Isle, 'which is called either Diego-Rodrigo, or Diego-Ruys, or Rodrigo,' gives the following account. 'We had also another creek on the other side of our cabbins, and full of oysters sticking to the rock. We went often to breakfast there, and brought some home, with which we made an excellent ragout with palm-tree-cabbages and turtle's fat. Of all the birds in the island, the most remarkable is that which goes by the name of the *Solitary* (*le Solitaire*), because it is very seldom seen in company, though there are abundance of them. The feathers of the males are of a brown-grey colour; the feet and beak are like a turkey's, but a little more crooked. They have scarce any tail, but their hind part covered with feathers is roundish, like the crupper of a horse; they are taller than turkeys. Their neck is straight, and a little longer in proportion than a turkey's when it lifts up its head. Its eye is black and lively, and its head without comb or top. They never fly, their wings are too little to support the weight of their bodies; they serve only to beat themselves and flutter when they call one another. They will whirl about for twenty or thirty times together on the same side during the space of four or five minutes; the motion of their wings makes then a noise very like that of a rattle, and one may hear it two hundred paces off. The bone of their wing grows greater towards the extremity, and forms a little round mass under the feathers as big as a musket-ball: that and its beak are the chief defence of this bird. 'Tis very hard to catch it in the woods, but easy in open places, because we run faster than they, and sometimes we approach them without much trouble. From March to September they are extremely fat, and taste admirably well, especially while they are young; some of the males weigh forty-five pound.

'The females are wonderfully beautiful, some fair, some brown; I call them fair because they are of the colour of fair hair: they have a sort of peak, like a widow's, upon their breasts, which is of a dun colour. No one feather is straggling from the other all over their bodies, being very careful to adjust themselves and make them all even with their beaks. The feathers on their thighs are round like shells at the end, and being there very thick, have an agreeable effect: they have two risings on their *craws*, and the feathers are whiter there than the rest, which livelily represent the fine neck of a beautiful woman. They walk with so much stateliness and good grace, that one cannot help admiring them and loving them, by which means their fine mien often saves their lives.

'Though these birds will sometimes very familiarly come up near enough to one when we do not run after them, yet they will never grow tame: as soon as they are caught they shed tears without crying, and refuse all manner of sustenance till they die. We find in the gizzards of both male and female a brown stone, of the bigness of a hen's egg; it is somewhat rough, flat on one side, and round on the other, heavy and hard. We believe this stone was there when they were hatched, for let them be never so young, you meet with it always. They have never but one of them; and besides, the passage from the craw to the gizzard is so narrow, that a like mass of half the bigness could not pass. It served to whet our knives better than any other stone whatsoever. When these birds build their nests they choose a clean place, gather together some palm-leaves for that purpose, and heap them up a foot and a half high from the ground, on which they sit. They never lay but one egg, which is much bigger than that of a goose. The male and female both cover it in their turns, and the young is not hatched till at seven weeks' end: all the while they are sitting upon it, or are bringing up their young one,



Solitary Bird of Leguat.

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[*] 'A new voyage to the East Indies by Francis Leguat and his companions, containing their adventures in two Desert Islands, &c.,' 8vo., London, 1708.

which is not able to provide for itself in several months, they will not suffer any other bird of their species to come within two hundred yards round of the place; but what is very singular is, the males will never drive away the females, only when he perceives one he makes a noise with his wings to call the female, and she drives the unwelcome stranger away, not leaving it till it is without her bounds. The female does the same as to the males, whom she leaves to the male, and he drives them away. We have observed this several times, and I affirm it to be true. The combats between them on this occasion last sometimes pretty long, because the stranger only turns about, and does not fly directly from the nest: however, the others do not forsake it till they have quite driven it out of their limits. After these birds have raised their young one, and left it to itself, they are always together, which the other birds are not; and though they happen to mingle with other birds of the same species, these two companions never disunite. We have often remarked, that some days after the young one leaves the nest, a company of thirty or forty brings another young one to it, and the new-fledged bird, with its father and mother joining with the band, march to some bye place. We frequently followed them, and found that afterwards the old ones went each their way alone, or in couples, and left the two young ones together, which we called a *marriage*. This particularity has something in it which looks a little fabulous; nevertheless, what I say is sincere truth, and what I have more than once observed with care and pleasure.' The worthy narrator then indulges in some reflections on marriages in general, and early marriages in particular. It is worthy of note, with reference to the alleged juxtaposition of the bones of a large land-turtle and those of the dodo, to which we shall have occasion to allude, that the same author, in the description of the same island, speaks of the multitude of land-turtles; of which he says, 'I have seen one that weighed one hundred pound, and had flesh enough about it to feed a good number of men.'

The preceding cut is copied from Leguat's figure of 'the Solitary Bird.'

In the frontispiece is represented one in a sort of landscape, and also land-turtles; and in 'a plan of the settlement' in the Island of Rodrigo, many, some in pairs, are placed about. This plan shows the situation of the houses, &c., of Leguat and his companions: there are also land-turtles and other animals.*

We now proceed to trace the specimen which was in the Musæum Tradescantianum. There were, it seems, three Tradescants, grandfather, father, and son. The two former are said to have been gardeners to Queen Elizabeth, and the latter to Charles I. There are two portraits to the 'Musæum,' one of 'Joannes Tradescantus pater' and the other of 'Joannes Tradescantus filius,' by Hollar. These two appear to have been the collectors: for John Tradescant, the son, writes in his address 'to the ingenious reader' that he 'was resolved to take a catalogue of those varieties and curiosities which my father had sedulously collected and my selfe with continued diligence have augmented, and hitherto preserved together.' This John Tradescant, the son, must have been the Tradescant with whom Elias Ashmole boarded for a summer when Ashmole agreed to purchase the collection, which was said to have been conveyed to Ashmole by deed of gift from Tradescant and his wife. Tradescant died soon after and Ashmole, in 1662, filed a bill in Chancery for a delivery of the curiosities. The cause is stated to have come to a hearing in 1664; and, in 1674, Mrs. Tradescant delivered up the collection pursuant to a decree in Chancery, and afterwards (April, 1678, some say) was found drowned in her own pond. Ashmole added to the collection, and presented it to the University of Oxford, where it became the foundation of the Ashmolean Museum. That the entire 'Dodar' went to Oxford with the rest of Tradescant's curiosities there can be no doubt. Hyde (Religionis Veterum Persarum, &c., Historia, 1700) makes particular mention of it as existing in the Museum at Oxford. There, according to Mr Duncan, it was destroyed in 1755 by order of the visitors, and he thus gives the evidence of its destruction:—

'In the Ashmolean Catalogue, made by Ed. Llhwyd, Musæi Procustos, 1684 (Plott being the keeper), the entry of the bird is "No. 29. Gallus gallinaceus peregrinus Clusii, &c." In a Catalogue made subsequently to 1755, it is stated "That the numbers from 5 to 46, being decayed, were ordered to be removed at a meeting of the majority of the visitors, Jan. 8, 1755." Among these of course was included the Dodo, its number being 29. This is further shown by a new Catalogue, completed in 1756, in which the order of the visitors is recorded as follows: "Illa quibus nullus in margine assignatur numerus a Musæo subducta sunt cimelia, annuentibus Vice-Cancellario aliisque Curatoribus ad ea lustranda convocatis, die Januarii 8vo., A.D. 1755." The Dodo is one of those which are here without the number.' (Duncan *On the Dodo; Zool. Journ.*, vol. iii., p. 559.)

Upon this solemn sentence, which left to the Museum nothing but a foot and a head, Lyell makes the following observation: 'Some have complained that inscriptions on tomb-stones convey no general information, except that individuals were born and died, accidents which must happen alike to all men. But the death of a *species* is so remarkable an event in natural history that it deserves commemoration; and it is with no small interest that we learn from the archives of the University of Oxford, the exact day and year, when the remains of the last specimen of the Dodo, which had been permitted to rot in the Ashmolean Museum, were cast away:' and the author concludes by giving the fatal record at length with becoming gravity.

We now come to the celebrated painting in the British Museum, a copy of which, by the kind assistance of the officers of the zoological department, who have given us every assistance in prosecuting this inquiry, and who had it taken down for the purpose, we present to our readers.

It has been stated that the painting came into the possession of Sir Hans Sloane, president of the Royal Society, and that it was bought at his sale by Edwards, who, after publishing a plate from it in his Gleanings, presented it to the Royal Society, whence it passed, as well as the foot, into the British Museum. But Mr. Gray informs us that the foot only came with the museum of the Royal Society described by Grew; and that the picture was an especial gift from Edwards. Edwards's copy seems to have been made in 1760, and he himself says—'The original picture was drawn in Holland from the living bird brought from St. Maurice's Island in the East Indies in the early times of the discovery of the Indies by the way of the Cape of Good Hope. It was the property of the late Sir Hans Sloane to the time of his death; and afterwards becoming my property I deposited it in the British Museum as a great curiosity. The above history of the picture I had from Sir Hans Sloane and the late Dr. Mortimer, secretary to the Royal Society.'

M. Morel, Ecrivain Principal des Hôpitaux au Port-Louis de l'Isle de France, writes as follows in his paper 'Sur les oiseaux monstrueux nommés Dronte, Dodo, Cygne Capuchonné, Solitaire, et Oiseau de Nazare, et sur la petite Isle de Sable à 50 lieues environ de Madagascar.' 'These birds, so well described in the second volume of the 'History of Birds', by M. le Comte de Buffon, and of which M. de Borame has also spoken in his 'Dictionary of Natural History,' under the names of Dronte, Dodo, Hooded Swan (Cygne Capuchonné), Solitary or Wild Turkey (Dinde sauvage) of Madagascar, have never been seen in the isles of France, Bourbon, Rodriguez, or even the Seychelles lately discovered, during more than 60 years since when these places have been inhabited and visited by French colonists. The oldest inhabitants assure every one that these monstrous birds have been always unknown to them.' After some remarks that the Portuguese and Dutch who first overran these islands may have seen some very large birds, such as Emeus or Cassowaries, &c., and described them each after his own manner of observing, M. Morel thus proceeds: 'However this may be, it is certain that for nearly an age (depuis près un siècle) no one has here seen an animal of this species. But it is very probable that before the islands were inhabited, people might have been able to find some species of very large birds, heavy and incapable of flight, and that the first mariners who sojourned there soon destroyed them from the facility with which they were caught. This was what made the Dutch sailors call the

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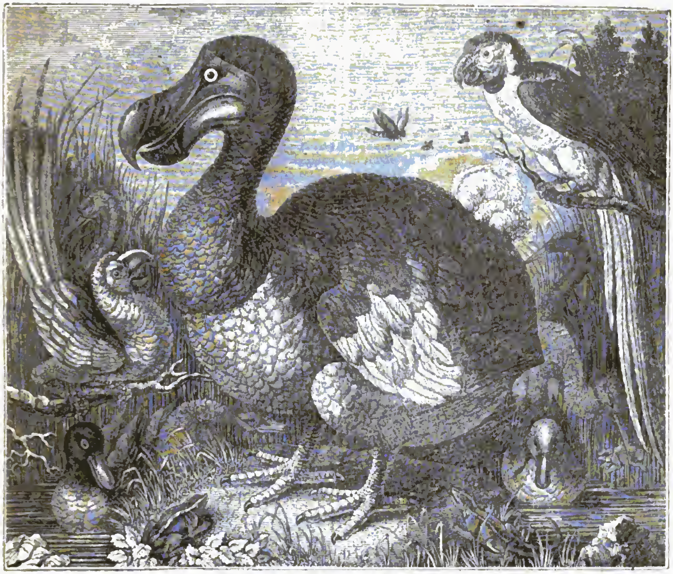
* Le premier auteur qui ait parlé du Solitaire paroît être Castelaton, dans le récit d'un voyage fait en 1614 et publié seulement en 1690. Il toucha à l'île de Bourbon, alors nommée Mascaraigne par les Portugais, et encore inhabitée, quoique visitée depuis long-temps par les navigateurs. Parmi les oiseaux qu'il y remarqua, il en particularise une espèce de la grosseur d'une oie, tres grande, avec des ailes courtes qui ne lui permettoient pas de voler. Cet oiseau avoit été, dit-il, nommé jusque là le géant, et l'île de France en produit beaucoup; il est blanc, et naturellement si doux, qu'on peut le prendre à la main; du moins ils étoient si peu effrayés à la vue des matelots, qu'il leur étoit aisé d'en tuer un tres grand nombre avec des bâtons et des pierres. (De Blainville.)



Dodo, from the picture in the British Museum.

bird 'Oiseaude dégoût' (Walck-Voegel), because they were surfeited with the flesh of it. * * * But among all the species of birds which are found on this isle of sand and on all the other islets and rocks which are in the neighbourhood of the Isle of France, modern navigators have never found anything approaching to the birds above named, and which may be referred to the number of species which may have existed, but which have been destroyed by the too great facility with which they are taken, and which are no longer found excepting upon islands or coasts entirely uninhabited. At Madagascar, where there are many species of birds unknown in these islands, none have been met with resembling the description above alluded to.' (*Observations sur la Physique pour l'an* 1778, tom. xii., p. 154. Notes.)

Mr. Duncan thus concludes his paper above alluded to: 'Having applied, through the medium of a friend, to C. Telfair, Esq. of Port Louis, in the Mauritius, a naturalist of great research, for any information he could furnish or procure relating to the former existence of the Dodo in that island, I obtained only the following partly negative statement:—

'That there is a very general impression among the inhabitants that the Dodo did exist at Rodriguez, as well as in the Mauritius itself; but that the oldest inhabitants have never seen it, nor has the bird or any part of it been preserved in any museum or collection formed in those islands, although some distinguished amateurs in natural history have passed their lives on them, and formed extensive collections. And with regard to the supposed existence of the Dodo in Madagascar, although Mr. Telfair had not received, at the time of his writing to Europe, a reply to a letter on the subject which he had addressed to a gentleman resident on that island, yet he stated that he had not any great expectations from that quarter; as the Dodo was not mentioned in any of his voluminous manuscripts respecting that island, which contained the travels of persons who had traversed Madagascar in all directions, many of them having no other object in view than that of extending the bounds of natural

We close this part of the case with the evidence of one evidently well qualified to judge, and whose veracity there is no reason to doubt. If this evidence be, as we believe it to be, unimpeachable, it is clear not only that the Dodo existed, but that it was publicly exhibited in London. The lacunæ in the print represent the spaces occasioned by a hole burnt in the manuscript.

In Sloane MSS. (No. 1839, 5, p. 108, Brit. Mus.) is the following interesting account by L'Estrange in his observations on Sir Thomas Browne's 'Vulgar Errors.' It is worthy of note that the paragraph immediately follows one on the 'Estridge' (Ostrich).

'About 1638, as I walked London streets I *saw the* picture   of a strange fowl hong out upon a cloth   vas and myselfe with one or two more Gen. in company went in to see it. It was kept in a chamber, and was a great fowle somewhat bigger than the largest Turkey Cock and so legged and footed but stouter and thicker and of a more erect shape, coloured before like the breast of a yong Cock Fesan (pheasant), and on the back of dunn or deare coulour The keeper called it a Dodo and in the ende of a chimney in the chamber there lay an heap of large pebble stones whereof hee gave it many in our sight, some as bigg as nutmegs, and the keeper told us shee eats them conducing to digestion and though I remember not how farre the keeper was questioned therein yet I am confident that afterwards she cast them all agayne.'*

EVIDENCE ARISING FROM REMAINS.

The only existing recent remains attributed to the Dodo are, a leg in the British Museum, and a head (a cast of which is in Brit. Mus.), and a leg in the Ashmolean Museum at Oxford, the relics most probably of Tradescant's bird. Whether the leg formerly in the museum of Pauw or that at present in the British Museum may be, perhaps, doubtful, though we think with Mr. Gray that they are probably identical, but that the specimen in the British Museum did not belong to Tradescant's specimen is clear, for it existed in the collection belonging to the Royal Society when Tradescant's 'Dodar' was complete. In the 'Annales des Sciences' (tome xxi. p. 103, Sept. 1830) will be found an account of an assemblage of fossil bones, then recently discovered, under a bed of lava, in the Isle of France, and sent to the Paris Museum. They almost all belonged to a large living species of land-tortoise, called *Testudo Indica*, but amongst them were the head, sternum, and humerus of the dodo. 'M. Cuvier,' adds Mr. Lyell in his "Principles of Geology," 'showed me these valuable remains at Paris, and assured me that they left no doubt in his mind that the huge bird was one of the gallinaceous tribe'

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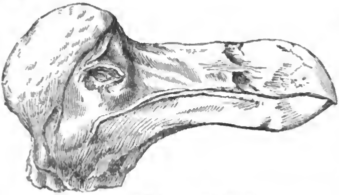
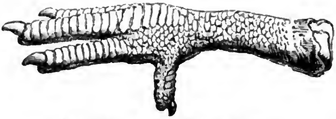
* This curious statement is extracted in the recent edition of Sir Thomas Brown's works by Wilkins; published by Pickering.



Head of Dodo (from cast of Oxford specimen



Foot of Dodo (specimen in the British Museum.

In a letter addressed to the Secretary of the Zoological Society, by Charles Telfair, Esq., Corr. Memb. Z. S., dated Port Louis (Mauritius), November 8, 1832, and read before a meeting of the society on the 12th March, 1833, it appeared that Mr. Telfair had recently had opportunities of making some researches about the buried bones of the Dronte or Dodo found in the Island of Rodriguez. The result of these researches he communicated, and enclosed letters addressed to him by Col. Dawkins, military secretary to the Governor of the Mauritius, and by M. Eudes, resident at Rodriguez.

Col. Dawkins, it was stated, in a recent visit to Rodriguez, conversed with every person whom he met respecting the *Dodo*, and became convinced that the bird does not exist there. The general statement was that no bird is to be found there except the *Guinea-fowl* and *Parrot*. From one person, however, he learned the existence of another bird, which was called *Oiseau-bœuf*, a name derived from its voice, which resembles that of a cow. From the description given of it by his informant, Col. Dawkins at first believed that this bird was really the *Dodo;* but on obtaining a specimen of it, it proved to be a *Gannet* (apparently referable to the *Lesser Gannet* of Dr. Latham, the *Sula candida* of Brisson, and the *Pelecanus Piscator* of Linnæus). It is found only in the most secluded parts of the Island. Col. Dawkins visited the caverns in which bones have been dug up, and dug in several places, but found only small pieces of bone. A beautiful rich soil forms the ground-work of them, which is from six to eight feet deep, and contains no pebbles. No animal of any description inhabits these caves, not even bats.

M. Eudes succeeded in digging up in the large cavern various bones, including some of a large kind of bird, which no longer exists in the Island: these he forwarded to Mr. Telfair, by whom they were presented to the Zoological Society. The only part of the cavern in which they were found was at the entrance, where the darkness begins; the little attention usually paid to this part by visitors may be the reason why they have not been previously found. Those near the surface were the least injured, and they occur to the depth of three feet, but nowhere in considerable quantity; whence M. Eudes conjectured that the bird was at all times rare, or at least uncommon. A bird of so large a size as that indicated by the bones had never been seen by M. Gory, who had resided forty years on the island. M. Eudes added that the Dutch who first landed at Rodriguez left cats there to destroy the rats which annoyed them: these cats have since become very numerous, and prove highly destructive to poultry; and he suggested the probability that they may have destroyed the large kind of bird to which the bones belonged, by devouring the young ones as soon as they were hatched,—a destruction which may have been completed long before the Island was inhabited.

The bones procured by M. Eudes for Mr. Telfair were presented by that gentleman to the Zoological Society. At the reading of the letter, &c., they were laid on the table, and consisted of numerous bones of the extremities of one or more large species of *Tortoise*, several bones of the hinder extremity of a large bird, and the head of a *humerus*. With reference to the metatarsal bone of the bird, which was long and strong, Dr. Grant pointed out that it possessed articulating surfaces for four toes, three directed forwards and one backwards, as in the foot of the *Dodo* preserved in the British Museum, to which it was also proportioned in its magnitude and form. (Zool. Proc. 1833. Part 1.)

OPINIONS OF ZOOLOGISTS AND SUPPOSED PLACE IN THE ANIMAL SERIES.

Piso, in his edition of Bontius, places the Dodo immediately before the Cassowary; and here we may observe that the figure of Bontius does not appear to be identical with the picture which now hangs in the British Museum. Though there is a general resemblance there are particular differences which go far to show, at all events, that the figure of Bontius and that in the picture are different portraits.

Willughby's eighth chapter treats of 'The greatest land-birds, of a peculiar kind by themselves, which, by reason of the bulk of their bodies, and the smallness of their wings, cannot fly, but only walk. The *Ostrich* occupies the 1st section of this chapter, and the *Dodo* the fourth and last, being immediately preceded by 'the Cassowary or Emeu. Ray's section 'Aves rostris rectioribus minusque hamatis maximæ, singulares et sui generis, ob corporum molem et alarum brevitatem volandi impotes' contains the same birds as Willughby's eighth chapter, viz.: the *Ostrich*, the *American Ostrich*, the *Emeu*, *Eme* or *Cassowary*, and, lastly, the *Dodo*.

Moehring, and after him, Brisson, gives the bird, under the name of *Raphus*, a position next to the *Ostriches* also Buffon places it independently.

Linnæus, in his last edition of the 'Systema Naturæ' (the 12th, 1766), places the bird at the head of his '*Gallinæ*,' the order immediately succeeding the '*Grallæ*,' under the name of *Didus ineptus*, and immediately before the genus *Pavo* (Peacocks). The genus *Struthio* is the last of his *Grallæ*, and *Rhea* (American Ostrich) the last species of *Struthio*, so that *Didus ineptus* stands between *Struthio Rhea*, Linn., and *Pavo cristatus* (the Peacock). In a former edition Linnæus had noticed the bird under the name *Struthio cucullatus*.

Latham in his synopsis (1782) followed Linnæus, but gave three species, viz., the *Hooded Dodo*, the *Solitary Dodo*, and the *Nazarene Dodo*.

Gmelin, in his edition of the 'Systema Naturæ' (1789), makes *Psophia* (Trumpeter) the last genus of the Linnæan *Grallæ*, and *Otis* (Bustard) the first genus of the Linnæan *Gallinæ*, under which last-mentioned order he arranges the genus *Didus*, placing it between the genera *Struthio* and *Pavo*, which are both included by Gmelin in the order *Gallinæ*. He also gives three species:—1st. *Didus ineptus*, which he describes as 'black, clouded with white, with tetradactyle feet.' The following are his synonyms:—*Didus*, Syst. Nat. xii. 1, p. 267, n. 1; *Struthio cucullatus*, Syst. Nat. x. p. 155; *Raphus*, Briss. Av. 5, p. 14, n. 1; *Cygnus cucullatus*, Nieremb. Nat. 251; *Gallus gallinaceus peregrinus*, Clus. Exot. 99, t. 10; Olear. Mus. 23, t. 13, f. 5; *Dronte*, Bont. Jav. 70, Buff. Hist. Nat. des Ois. i. p. 480; *Dod-aersen* or *Valgh-Vogel*, Herbert it. p. 382, t. 383; *Dodo*, Raj. Av. p. 37, n. 8; Will. Orn. p. 153, t. 27; Edw. Glean. t. 294; *Hooded Dodo*, Lath. Syn. iii. 1, p. 1, t. 70. 2nd. *Didus solitarius*: *Solitaire*, Buff. Hist. Nat.

des Ois. i. p. 485; Leguat it. i. p. 98; *Solitary Dodo*, Lath. Syn. iii. 1, p. 3, n. 2. This species is described by Gmelin as 'varied with grey and brown, with tetradactyle feet.' 3rd. *Didus Nazarenus*; *Oiseau de Nazareth, et Oiseau de Nausée*, Buff. Hist. Nat. des Ois. i. p. 485; Cauche, Madag. p. 130; *Nazarene Dodo*, Lath. Syn. iii. 1, p. 4, n. 3. Gmelin describes this species as 'black, with tetradactyle feet.'

Blumenbach followed Linnæus; and Duméril and Vieillot followed Latham.

Temminck instituted in his 'Analyse du Système Général d'Ornithologie,' the order *Inertes*, for the *Dodo* and the *Apteryx*; two birds, as Mr. Yarrell in his paper on the *Apteryx* (*Trans. Zool. Soc.*, vol. i., p. 71) observes, differing decidedly from each other in their beaks; but in reference to their imperfect wings, as also in the nature of their external covering, having obvious relation to the species included in his order *Cursores*. 'But,' adds Mr. Yarrell, 'the situation chosen for this order *Inertes*, at the extreme end of his systematic arrangement, leads me to infer that M. Temminck considered as imaginary the subjects for which it was formed.'

Illiger, in his *Prodromus* (1811), instituted the order Inepti for the reception of the *Dodo* alone, *Apteryx* not being then known, and he placed it immediately preceding his *Cursores*, containing the *Struthious Birds*.

Cuvier, in the first edition of his *Règne Animal* at the end of his notice on his family *Brevipennes* (*Les Autruches*, *Struthio*, Linn.), has the following note appended to his description of the last species, *Rhea*. 'I cannot place in this table species but badly known, or, more, so little authentic as those which compose the genus *Didus*. The first or the *Dronte* (*Didus ineptus*) is only known from a description given by the first Dutch navigators, and preserved by Clusius, *Exot.* p. 99, and by an oil-painting of the same epoch copied by Edwards, pl. 294; for the description of Herbert is puerile, and all the others are copied from Clusius and Edwards. It would seem that the species has entirely disappeared, and we now possess no more of it at the present day than a foot preserved in the British Museum (Shaw, *Nat. Miscell.* pl. 143), and a head in bad condition in the Ashmolean Museum at Oxford. The bill does not seem to be without some relation to that of the *Auks* (*Pingouins*), and the foot would bear considerable resemblance to that of the *Penguins* (*Manchots*), if it were palmated. The second species, or the *Solitaire* (*Didus Solitarius*), rests only on the testimony of Leguat, *Voy.* i. p. 98, a man who has disfigured the best known animals, such as the *Hippopotamus* and *Lamantin*. Finally, the third species, or *L'Oiseau de Nazare* (*Didus Nazarenus*), is only known through François Cauche, who regards it as the same as the *Dronte*, and yet only gives it three toes, while all other authors give four to the Dronte. No one has been able to see any of these birds since these voyagers.' In the second edition (1829), the note is repeated with the addition of a notice of Apteryx. With every reverence for the great zoologist who wrote it, it is impossible to avoid observing the haste and incorrectness which mark it. His opinions certainly underwent considerable modification. When he was in this country at the period of the last French revolution, he had an opportunity of seeing the head preserved in the Ashmolean Museum, and the foot in the British Museum, and he doubted the identity of this species with that of which the painting is preserved in the National collection. Lyell mentions these doubts, and we must here recall to the reader the geologist's statement above alluded to, that Cuvier showed him the valuable remains in Paris, and that he assured him that they left no doubt on his mind that the huge bird was one of the Gallinaceous tribe. (*Sur Quelques Ossemens, &c.*, *Ann. des Sci.*, tome xxi., p. 103, Sept., 1830.)

Shaw, as appears indeed from Cuvier's note, made mention of the Dodo in his Naturalist's Miscellany (plates 142 and 143), giving a figure of the head preserved in the Ashmolean Museum, and in his Zoological Lectures. The continuer of his 'Zoology' has the following sweeping notice of the bird:—'The Dodo of Edwards appears to have existed only in the imagination of that artist, or the species has been utterly extirpated since his time, which is scarcely probable. Its beak is said to be deposited in the Ashmolean Museum at Oxford, and a foot in the collection in the British Museum. The former appears rather to belong to some unknown species of albatross than to a bird of this order, and the latter to another unknown bird; but upon what authority it has been stated to belong to the Dodo, I am at a loss to determine. A painting by Edwards still exists in the British Museum.'

'This hasty judgment,' says Mr. Duncan in his paper in the Zoological Journal, 'is fully refuted, especially by the existing head, and the exact resemblance of the leg at Oxford to that in London.'

Mr. Vigors, in his paper 'On the Natural Affinities that connect the Orders and Families of Birds' (*Linn. Trans.*, vol. xiv., p. 395, read December 3, 1823), thus writes on the subject of the *Dodo*:—'Considerable doubts have arisen as to the present existence of the Linnæan *Didus*; and they have been increased by the consideration of the numberless opportunities that have latterly occurred of ascertaining the existence of these birds in those situations, the isles of Mauritius and Bourbon, where they were originally alleged to have been found. That they once existed I believe cannot be questioned. Besides the descriptions given by voyagers of undoubted authority, the relics of a specimen preserved in the public repository of this country, bear decisive record of the fact. The most probable supposition that we can form on the subject is, that the race has become extinct in the before-mentioned islands, in consequence of the value of the bird as an article of food to the earlier settlers, and its incapability of escaping from pursuit. This conjecture is strengthened by the consideration of the gradual decrease of a nearly conterminous group, the *Otis tarda* of our British ornithology, which, from similar causes, we have every reason to suspect will shortly be lost to this country. We may, however, still entertain some hopes that the *Didus* may be recovered in the south-eastern part of that vast continent, hitherto so little explored, which adjoins those islands, and whence, indeed, it seems to have been originally imported into them. I dwell upon these circumstances with more particularity, as the disappearance of this group gives us some grounds for asserting, that many chasms which occur in the chain of affinities throughout nature may be accounted for on the supposition of a similar extinction of a connecting species. Here we have an instance of the former existence of a species that, as far as we can now conclude, is no longer to be found; while the link which it supplied in nature was of considerable importance. The bird in question, from every account which we have of its economy, and from the appearance of its head and foot, is decidedly Gallinaceous; and, from the insufficiency of its wings for the purposes of flight, it may with equal certainty be pronounced to be of the *Struthious* structure, and referable to the present family. But the foot has a strong hind toe, and, with the exception of its being more robust,—in which character it still adheres to the *Struthionidæ*,—it corresponds exactly with the foot of the Linnæan genus *Crax*, that commences the succeeding family. The bird thus becomes osculant, and forms a strong point of junction between these two conterminous groups; which, though evidently approaching each other in general points of similitude, would not exhibit that intimate bond of connexion which we have seen to prevail almost uniformly throughout the neighbouring subdivisions of nature, were it not for the intervention of this important genus.'

M. Lesson, in his Manual (1828), after giving a description of the Dodo (genus *Dronte*, *Didus*, Linn., *Raphus*, Moehring, Brisson), says that the genus includes but one species which may be considered as at all authenticated, and which exists no longer; this is the *Dronte*, *Didus ineptus*, described by Clusius, ex. p. 99, figured by Edwards, pl. 294. 'They possess,' he adds, 'a foot and head of it at London, figured in Shaw's Miscell., pl. 143 and 166.' Then comes the following statement:—'M. Temminck has adopted, after Shaw, the genus *Apteryx*, which he thus describes.' M. Lesson, after giving the description and noticing the only known species, *Apteryx Australis*, proceeds to make the following queries: 'May not the *Dronte* be the *Cassowary* of the East Indies, to which has been added the bill of an Albatross? It is said that it was once very common in the Islands of France and of Bourbon, and that the former received the name of the Isle of Cerne from these birds. May not the *Apteryx* of M. Temminck be founded on the fragments of the *Dronte* preserved in the Museum of London?' To make the confusion complete, M. Lesson places immediately before the genus Dronte the *Emou Kirikiri*, *Dromiceius Novæ Zelandiæ*, Less., which is no other than the *Apteryx Australis* of Shaw, and which has been so well described and figured by Mr.

Yarrell in the first volume of the Transactions of the Zoological Society of London.

M. de Blainville, in a memoir on the *Didus ineptus*, read before the Academy of Sciences, on the 30th of August, 1830, and published in the 'Nouvelles Annales du Muséum d'Histoire Naturelle' (tome iv., p. 1, 4to., Paris, 1835), enters at large into the history of the bird, and terminates his list of authors thus: 'Finally, not long ago (assez dernièrement) in England, an anonymous author, whom I believe to be Mr. Mac Leay, has returned to the idea that this genus ought to be placed among the Gallinaceous birds. Nevertheless, although he pronounces that the *Dronte* is decidedly a bird of this family, he adds, that it may, with the same certainty, be referred to the *Struthionidæ*, on account of the smallness of its wings; but, adds he, as the foot is provided with a hallux (pouce), it departs (s'eloigne) from this family to approach the genus *Corax*, *qui doit la commencer*, according to him. Thus it is one of those genera which he names osculant, forming the passage from one group to another.' Who this anonymous author may be we do not presume to guess, but we have the best authority for asserting that Mr. W. S. Mac Leay is not the person. From the context, we think it probable that Mr. Vigors's opinions above given are alluded to, *Corax* being a misprint for *Crax*.

M. de Blainville, after giving the different points on which the claim of the *Dodo* to be considered a gallinaceous bird rests, and the reasons for and against it, thus proceeds:—'Among the orders of birds which include the largest species, there only remain the birds of prey with which the *Dodo* can be compared; and it seems to us that it is to them that the bird bears the greatest resemblance.' In proof of this it is necessary to attend to the following observations:—

1. The eyes are situated in the same part of the bill as in *Cathartes*.

2. The nostrils are oval, situated very forward, and without a superior scale, as in those birds.

3. The form of the skull, its great width in the interorbitary space, and its flatness at the sinciput, are also nearly the same as in those vultures.

4. Even the colour of the bill, and the two caruncular folds of the origin of the curved part, are nearly the same as in those birds.

5. The species of hood which the skin forms at the root of the bill, and which have earned for the *Dodo* the name of *Cygnus cucullatus*, has a very similar disposition in *Cathartes*.

6. The almost entire nudity of the neck, as well as its greenish colour seen through the few downy feathers which cover it, are also characteristic of the vulture.

7. The form, the number, and the disposition of the toes, as well as the force and curvature of the claws, indicate a bird of that family at least as much as a gallinaceous bird.

8. The scaly system of the tarsi and of the toes more resembles also what is found in *Cathartes* than what is observed in the *Gallinaceous birds*.

9. The kind of *Jabot* at the root of the neck, and even the muscular stomach, are found in one order as well as in the other.

10. Lastly, M. de Blainville notices the absence of the spur (*Ergot*), which he remarks is nearly characteristic of the *Gallinaceous birds*.

M. de Blainville, after expressing a hope that both the *Aye-Aye* (*Cheiromys*, which has not been seen a second time since the days of Sonnerat) and the *Dodo* may be yet recovered in the interior of Madagascar, thus concludes his memoir:—

'1. There exist in the English collections traces of at least three individuals of a large species of walking bird (*oiseau marcheur*), to which has been given the name of *Dodo, Dronte, Didus ineptus*.

'2. These traces exist in Europe since the epoch when the Dutch began to take part in the discovery of the passage to the East Indies by the Cape of Good Hope, that is to say, about 1594.

'3. The name of *Dodo* is employed for the first time by Herbert; that of *Dronte* by Piso, but without its being possible to arrive at the origin and etymology of these denominations.

'4. The country of this bird is the Isle of France; there being nothing to prove positively that it has been found either at Bourbon or at Fernandez, as has been thought, owing to the confusion, no doubt, between the *Dodo* and *Solitaire* of Leguat.

'5. The *Dronte* should be approximated to or even placed in the order of rapacious birds, near the vultures, rather than in that of the Gallinaceous birds, and, for stronger reasons, rather than among the *Grallatores* (*Echassiers*), or near the *Penguins* (*Manchots*).

'6. It is by no means certain that this bird has disappeared from the number of living animals. If this is possible in the case of the Isle of France, it is not probable in the case of Madagascar, the productions of which are so little known, and which belongs, up to a certain point, to the same archipelago.

'There remains another question to discuss namely, whether the incrusted bones which have been lately sent to M. Cuvier from the Isle of France really belonged to the Dodo, as M. Cuvier was led to believe. It is a question which would be most easily solved by the immediate comparison of these bones with the pieces preserved in England. If this was so, which the difference of height in the tarsal bone does not permit us to believe, it would be at the same time proved that the Dodo existed also at Rodriguez, for these bones have been found in this isle in a cave (grotte), as M. Quoy, who saw them on his passage to the Isle of France, has assured me, and not at the Isle of France, under beds of lava, as M. Cuvier has stated from erroneous information, in his note read lately to the academy. Then there would be nearly a certainty that the Dodo was a Gallinaceous bird; but in making the observation that these bones come from the Isle of Fernandez, and that the description of the Solitaire of Leguat accords sufficiently well with a bird of this order, or at least with a Gallinogralle, it might be that the bones actually in the hands of M. Cuvier were no other than those of the Solitary Bird properly so called, and not those of the true Dronte.'

The memoir is illustrated with four plates: the first is a coloured copy of the head of the Dodo from the Museum portrait, of the size of the original. In the painting the author observes the head is at least a foot long from the occiput to the extremity of the bill; but the head at Oxford is only eight inches and a half, or about two-thirds. The bill, he adds, makes out nearly three-fourths of the whole length. The second plate gives a profile of the Oxford head from a sketch taken from the original, and a view of the same seen from above, and skulls of the *Urubu* and *Vultur Papa*. Plate 3 gives two views of the foot preserved in the British Museum, and the remains of the foot at Oxford; a foot of the *Heath-cock* (*Coq de Bruyère*), a foot of a *Penguin*, and a foot of *Vultur Papa*. Plate 4 gives a profile of the cast of the head at Oxford, and a view of the same seen from below.

In the British Museum (1837) in cases 65—68 (Room XIII.) are the *Ostrich; Bustards* 'which in many respects are allied to the *Gallinaceous Birds;*' the foot and cast of the head of the *Dodo* above alluded to: the *Courser* and *Pratincole;* and at p. 99 of the Synopsis (1832) we have the following observations: 'Over the door adjoining the twelfth room is an original painting of the Dodo, presented to the Museum by George Edwards, Esq., the celebrated ornithological artist, and copied in his works, plate No. 294, who says it was 'drawn in Holland, from a living bird brought from St. Maurice's Island in the East Indies.' The only remains of this bird at present known are a foot (case 65) in this collection (presented by the Royal Society) and a head and foot, said to have belonged to a specimen which was formerly in Tradescant's Museum, but is now in the Ashmolean Museum at Oxford. The cast of the head above mentioned (in the same case) was presented by P. Duncan, Esq. The bird in the shortness of the wings resembles the ostrich, but its foot, in general, rather resembles that of the common fowl, and the beak, from the position of its nostrils, is most nearly allied to the Vultures; so that its true place in the series of birds, if indeed such a bird ever really existed, is not, as yet, satisfactorily determined.'

Mr. Swainson (*Natural History and Classification of Birds*, 1836), speaking of the birds of prey, says (p. 285), 'The third and last type of this family appears to us to be the *Secretary Vulture* of Africa, forming the genus *Gypogeranus*. At least we cannot assign it to any other known division of the *Raptores*, without separating it much more widely from its congeners than our present state of knowledge will sanction. It has been thought, indeed, that this remarkable bird represented one of the primary divisions of the whole order; in which case it would stand between the owls and the *Dodo:* but its similarity to the vultures and the falcons, in our opinion, is too great to favour this supposition; while, on the other hand, it will subsequently appear that the circle of the *Falconidæ* is sufficiently complete to show that it does not enter into that family.' After some other observations, Mr. Swainson concludes his observations on the *Secretary* thus: 'It must be remembered, also, that the very same objections occur against placing this bird (the *Secretary*) between the *Strigidæ* (owls) and the *Dididæ* (Dodos), as those we have intimated against considering it as the grallatorial type of the *Vulturidæ*.'

That a bird or birds called by the name of *Dodo* and the other appellations which we need not here repeat once existed, we think the evidence above given sufficiently proves. We have, indeed, heard doubts expressed whether the Museum portrait was taken 'from a living bird,' and have also heard it suggested that the picture may represent a specimen made up of the body of an ostrich to which the bill and legs of other birds have been attached. And here it is that the destruction of Tradescant's specimen becomes a source of the greatest regret. Whatever was the condition of that specimen, as long as the skin was preserved there existed the means of ascertaining whether it was real or a made-up monster; and when the Vice-Chancellor and the other curators in making their lustration gave the fatal nod of approbation they destroyed that evidence. With regard to the picture we have endeavoured to place it before the reader as well as our limited means will permit, in order that he may have an opportunity of judging from the internal evidence as to the probability of the portrait being taken from a living bird, and with this view we have given the accessories as they appear in the painting as well as the principal figure.

Mr. Gray, among others, still inclines, we believe, to the opinion that the bird represented was made up by joining the head of a bird of prey approaching the Vultures, if not belonging to that family,[*] to the legs of a Gallinaceous bird, and his opinion, from his attainments and experience, is worthy of all respect. But, if this be granted, see what we have to deal with. We have then two species, which are either extinct or have escaped the researches of all zoologists to account for, one, a bird of prey, to judge from its bill, larger than the Condor; the other a Gallinaceous bird, whose pillar-like legs must have supported an enormous body. As to the stories of the disgusting quality of the flesh of the bird found and eaten by the Dutch, that will weigh but little in the scale when we take the expression to be, what it really was, indicative of a comparative preference for the turtle-doves there found, after feeding on Dodos *usque ad nauseam.* 'Always Partridges' has become almost proverbial, and we find from Lawson how a repetition of the most delicious food palls. 'We cooked our supper,' says that traveller, 'but having neither bread nor salt, our fat turkeys began to be loathsome to us, although we were never wanting of a good appetite, yet a continuance of one diet made us weary;' and again, 'By the way our guide killed more turkeys, and two polcats, which he eat, esteeming them before fat turkeys.'

With regard to the form of the bill, we must be careful how we lay too much stress on that. Who would have expected to find a bill 'long, slender, smooth, and polished, in form resembling that of an *Ibis*, but rather more straight and depressed at the base[*],' on an Emeu-like body with rasorial legs and feet? Yet such is the form of *Apteryx*. As to the argument arising from the absence of the spur it is worth but little at best; and it may be said in favour of those who would place the Dodo between the Struthious and Gallinaceous birds, that its absence in such an osculant bird would be expected.

If the picture in the British Museum, and the cut in Bontius be faithful representations of a creature then living, to make such a bird a bird of prey—a Vulture, in the ordinary acceptation of the term—would be to set all the usual laws of adaptation at defiance. A Vulture without wings! How was it to be fed? And not only without wings, but necessarily slow and heavy in progression on its clumsy feet. The *Vulturidæ* are, as we know, among the most active agents for removing the rapidly decomposing animal remains in tropical and intertropical climates, and they are provided with a prodigal development of wing to waft them speedily to the spot tainted by the corrupt incumbrance. But no such powers of wing would be required by a bird appointed to clear away the decaying and decomposing masses of a luxuriant tropical vegetation,—a kind of Vulture for vegetable impurities, so to speak,—and such an office would not be by any means inconsistent with comparative slowness of pedestrian motion.

DODO'NA, the most antient oracle of Greece, was probably situated in the valley of Joannina in Epirus, but its exact position has never been ascertained. Dionysius of Halicarnassus places it four days' journey from Buthrotum, and two from Ambracia. (*Antiqu. Rom.* i. 5.) Colonel Leake places it at the south-east extremity of the lake of Joannina, near Kastritza (*Travels in Northern Greece*, vol. iv., p. 168, and following), and there are many reasons for believing that the Dodonæan territory corresponded to the valley at the south of that sheet of water. It is true that there is no mention of a lake in the neighbourhood of the antient Dodona; but it is described as surrounded by marshes, and it is not unlikely that the lake of Joannina may have been increased in later times from the catavothra in the country. (Leake, iv. p. 189.) The temple at Dodona was dedicated to Jupiter, and was of Pelasgian origin. (Hom. *Iliad*, xvi. 233; Herod. ii. 52.) Strabo is of opinion (vii. p. 328), that the priests at this temple were originally men, but that the duties of the office were afterwards performed by three old women. The people who had the management of the temple are called Selli or Helli. (Creuzer, *Symbol.* i., p. 193, note 359.) The oracles were delivered from an oak (Sophocles, *Trachin.* 1171) or beech (Hesiod. *ap. Strabon.*, p. 327; Sophocl. *Trach.* 173). The temple at Dodona was entirely destroyed by Dosimachus, the Ætolian prætor, B.C. 219 (Polyb. iv. 67), and probably was never restored, for it did not exist in the time of Strabo (p. 327); but there was a town of the name in the seventh century A.D., and a bishop of Dodona is mentioned in the council of Ephesus. (Wesseling on Hierocle 'Synecdochæ, p. 651.)

There is a long article on Dodona in the Fragment of Stephanus Byzantinus, which is printed at the end of his work.

DODSLEY, ROBERT, was born in 1703, at Mansfield, in Nottinghamshire, where his father is said to have kept the free school. Robert and several brothers, however, appear to have all commenced life as working artisans, or servants. Robert is said to have been put apprentice to a stocking-weaver, from whom, finding himself in danger of being starved, he ran away, and took the place of a footman. After living in that capacity with one or two persons, he entered the service of the Honourable Mrs. Lowther, and while with that lady he published by subscription in 1732 an octavo volume of poetical pieces, under the title of 'The Muse in Livery, or the Footman's Miscellany.' The situation of the author naturally drew considerable attention to this work at the moment of its appearance; but the poetry was of no remarkable merit. His next production was a dramatic piece, called 'The Toyshop;' he sent it in manuscript to Pope, by whom it was much relished, and who recommended it to Rich, the manager of Covent Garden theatre, where it was acted in 1735 with great success. With the profits of his play Dodsley the same year set up as a bookseller; and, under the patronage which Pope's friendship and his own reputation and talents procured him, his shop in Pall Mall soon became a distinguished resort of the literary loungers about town. His business, which he conducted with great spirit and ability, prospered accordingly; and in his latter days he might be considered as standing at the head of the bookselling trade. He continued also throughout his life to keep himself before the public in his first profession of an author, and produced a considerable number of works of varying degrees of merit, both in prose and verse. In 1737 his farce of 'The King and the Miller of Mansfield' was acted at Drury Lane with great applause. It was followed the same year by a sequel, under the title of 'Sir John Cockle at Court,' which however was not so successful. Nor was he more fortunate with his ballad farce of 'The Blind Beggar of Bethnall Green,' which was brought out at Drury Lane in 1741. This year also he set up a weekly magazine, under the title of 'The Public Register,' to which he was himself a principal contributor; but it was discontinued after the publication of the twenty-fourth number. It is curious to note that, in his farewell address to his readers, he complains that certain rival magazine publishers (understood to mean the proprietors of the Gentleman's Magazine) had exerted their influence with success to prevent the newspapers from advertising his work. In 1745 he published another short dramatic piece, entitled 'Rex et Pontifex, being an attempt to introduce upon the stage a new species of pantomime;' but this never was acted. A collected edition of all these dramas was published in 1748, in a volume, to which he gave the title of 'Trifles.'

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[*] Mr. Gray's reasons for considering the Dodo as belonging to the *Raptores* chiefly rest on the following facts, premising, as he does, that it is to be borne in mind that in the Raptorial birds the form of the bill is their chief ordinal character, which is not the case with the *Grallatores* or the *Natatores*, where the form of the feet and legs are the chief character of the order.

'1. The base of the bill is enveloped in a *Cere*, as may be seen in the cast where the folds of the Cere are distinctly exhibited, especially over the back of the nostrils. The *Cere* is only found in the Raptorial birds.

'2. The nostrils are placed exactly in front of the *Cere*, as they are in the other *Raptores*: they are oval, and nearly erect, as they are in the *true Vultures*, and in that genus alone, and not longitudinal as they are in the *Cathartes*, all the *Gallinaceous birds*, *Grallatores* and *Natatores*, and they are naked and covered with an arched scale, as is the case in all the *Gallinaceæ*.

'3. In Edwards's picture the bill is represented as much hooked (like the *Raptores*) at the tip; a character which unfortunately cannot be verified on the Oxford head, as that specimen is destitute of the horny sheath of the bill, and only shows the form of the bony core.

'With regard to the size of the bill, it is to be observed, that this part varies greatly in the different species of vultures, indeed so much so, that there is no reason to believe that the bird of the Oxford head was much larger than some of the known vultures.

'With regard to the foot,' adds Mr. Gray, 'it has all the characters of that of the *Gallinaceous birds*, and differs from all the vultures in the shortness of the middle toe, the form of the scales on the leg, and the bluntness of the claws.

[*] Yarrell's 'Description of Apteryx Australis,' *Trans. Zool. Soc.*, vol. i.

The following year he produced a masque on the subject of the peace of Aix-la-Chapelle, under the title of 'The Triumphs of Peace,' which was set to music by Dr. Arne, and performed at Drury Lane. In 1750 appeared anonymously his ingenious and well known little work, 'The Economy of Human Life,' which was long attributed to Lord Chesterfield, and was from the first extremely popular. The first part, entitled 'Agriculture,' of a poem in blank verse, on the subject of public virtue, which he published in 1754, was so coldly received that the second and third parts which he originally contemplated were never produced. In 1758 he closed his career of dramatic authorship with a tragedy entitled 'Cleone,' which was acted at Covent Garden with extraordinary applause, and drew crowded audiences during a long run. When it was published, 2000 copies were sold the first day, and it reached a fourth edition within the year. 'Cleone,' however, is now nearly forgotten; although Dr. Johnson declared that if Otway had written it he would have been remembered for nothing else,—a compliment which the modest author, when it was reported to him, observed with some displeasure was 'too much.' Dodsley died at Durham, while on a visit to a friend, on the 25th of September, 1764. He had retired from business some years before, having made a good fortune. Dodsley's name is associated with several works of which he was only the projector and the publisher, but from his connexion with which he is now more generally remembered than for his own productions. Among them may be mentioned the two periodical works, 'The Museum,' begun in 1746 and extended to three volumes, in which there are many able essays by Horace Walpole, the two Wartons, Akenside, &c. (of this Dodsley was only one of the shareholders), and 'The World,' 1754-57, conducted by Edward Moore, and contributed to by Lords Lyttelton, Chesterfield, Bath, and Cork, Horace Walpole, Soame Jenyns, &c.; 'The Preceptor,' 2 vols., 1748, to which Johnson wrote a preface; and especially the 'Annual Register,' begun in 1758, and still carried on and known by his name. [ANNUAL REGISTER.] These and the other works in which he was engaged brought him into intimate connexion with most of the eminent men belonging to the world of letters during the period of his able and honourable career. He has also the credit of having first encouraged the talents of Dr. Johnson, by purchasing his poem of London in 1738, for the sum of ten guineas, and of having many years afterwards been the projector of the English Dictionary. A second volume of Dodsley's collected works, forming a continuation of the 'Trifles,' was published under the title of 'Miscellanies,' in 1772. (Besides the articles in the second edition of the 'Biographia Britannica,' in Chalmers, and in the 'Biographia Dramatica,' there are many notices respecting Dodsley in Nichols's 'Literary Anecdotes of the Eighteenth Century.')

DODSWORTH, ROGER, an eminent antiquary, was the son of Matthew Dodsworth, registrar of York Cathedral, and chancellor to Archbishop Matthews. He was born July 24, 1585, at Newton Grange in the parish of St. Oswald, in Rydale, Yorkshire. He died in the month of August, 1654, and was buried at Rufford in Lancashire. His manuscript collections, partly relating to Yorkshire, in a hundred and sixty-two volumes folio and quarto, a hundred and twenty-two of them in his own hand-writing, were bequeathed to the Bodleian Library at Oxford, in 1671, by General Fairfax, who had been Dodsworth's patron. Chalmers says that Fairfax allowed Dodsworth a yearly salary to preserve the inscriptions in churches.

Dodsworth was the projector, and collected many of the materials for the early part of the work now known as 'Dugdale's Monasticon,' in the title page of the first volume of which his name appears as one of the compilers.

There is a detailed catalogue of the contents of Dodsworth's collections, now in the Bodleian, in the great catalogue of the Manuscripts of England and Ireland. fol. Oxon. 1697. (Gough's *Brit. Top.* vol. i. pp. 123-4; Chalmers's *Biogr. Dict.* vol. xii., p. 180; and the pref. to the last edition of the *Monasticon*.)

DODWELL, HENRY, was born in Dublin in 1642. His father, who had been in the army, possessed some property in Ireland, but having lost it in the rebellion, he brought over his family to England, and settled at York, in 1648. Young Dodwell was here sent to the free school, where he remained for five years. In the meantime both his father and mother had died, and he was reduced for a season to great difficulties and distress from the want of all pecuniary means, till, in 1654, he was taken under the protection of a brother of his mother's, at whose expense he was sent, in 1656, to Trinity College, Dublin. Here he eventually obtained a fellowship, which however he relinquished in 1666, owing to certain conscientious scruples against taking holy orders. In 1672, on his return to Ireland, after having resided some years at Oxford, he made his first appearance as an author by a learned preface, with which he introduced to the public a theological tract of the late Dr. Stearn, who had been his college tutor: it was entitled 'De Obstinatione,' and published at Dublin. Dodwell's next publication was a volume entitled 'Two Letters of Advice: 1. For the Susception of Holy Orders: 2. For Studies Theological, especially such as are rational.' It appeared in a second edition in 1681, accompanied with a 'Discourse on the Phœnician History of Sanchoniathon,' the fragments of which, found in Porphyry and Eusebius, he contends to be spurious. Meanwhile, in 1674, Dodwell had settled in London, and from this time to his death he led a life of busy authorship. Many of his publications were on the popish and nonconformist controversies; they have the reputation of shewing, like everything else he wrote, extensive and minute learning, and great skill in the application of his scholarship, but little judgment of a larger kind. Few, if any, of the champions of the church of England have strained the pretensions of that establishment so far as Dodwell seems to have done; but his whole life attested the perfect conscientiousness and disregard of personal consequences under which he wrote and acted. In 1688 he was elected Camden Professor of History by the University of Oxford, but was deprived of his office, after he had held it about three years, for refusing to take the oath of allegiance to William and Mary. He now retired to the village of Cookham in Berkshire, and soon after to Shottesbrooke in the same neighbourhood, where he spent the rest of his days. He possessed, it appears, an estate in Ireland, but he allowed a relation to enjoy the principal part of the rent, only reserving such a moderate maintenance for himself as sufficed for his simple and unexpensive habits of life. It is said however that his relation at length began to grumble at the subtraction even of this pittance; and on that Dodwell resumed his property, and married. He took this step in 1694, in his 53rd year, and he lived to see himself the father of ten children. The works for which he is now chiefly remembered were also all produced in the latter part of his life. Among these are his Dissertations and Annotations on the Greek Geographers, published in Hudson's 'Geographiæ Veteris Scriptores Græci Minores,' Oxon. 1698, 1703, and 1712; his 'Annales Thucydidei et Xenophontei,' 1696; his 'Chronologia Græco-Romana pro Hypothesibus Dion. Halicarnassei,' 1692; and his 'Annales Velleiani, Quintiliani, Statiani,' 1698. These several chronological essays, which are drawn up with great ability, have all been repeatedly reprinted. Dodwell's principal work is considered to be his 'De Veteribus Græcorum Romanorumque Cyclis, Obiterque de Cyclo Judæorum ac Ætate Christi, Dissertationes,' 4to., Oxon., 1701. He also published in 8vo., in 1706, 'An Epistolary Discourse, proving from the Scriptures and the first Fathers, that the Soul is a principle naturally mortal, but immortalized actually by the pleasure of God, to punishment or to reward, by its union with the divine baptismal spirit; where it is proved that none have the power of giving this divine immortalizing spirit since the Apostles, but only the Bishops.' This attempt to make out for the bishops the new power of conferring immortality raised no small outcry against the writer, and staggered many even of those who had not seen any extravagance in his former polemical lucubrations. Of course it gave great offence to the Dissenters, all of whose souls it unceremoniously shut out from a future existence on any terms. Dodwell died at Shottesbrooke on the 7th of June, 1711. Of his sons, the eldest, Henry, who was a barrister, published anonymously in 1742, a tract, which has been generally, but perhaps erroneously, looked upon as a covert attack upon revealed religion, under the title of 'Christianity not founded on Argument;' and another, William, who was in the church, distinguished himself by some pamphlets in the controversy with Dr. Conyers Middleton about miracles; and also wrote an answer to his brother's anonymous tract just mentioned.

DOG, the English name for the digitigrade quadruped which is so faithfully attached to man.

Under the Linnæan genus *Canis* are to be found the dogs (*Canis familiaris*); the wolves (*Canis Lupus*); the hyænas (*Canis Hyæna*); the foxes (*Canis Vulpes*, &c.); the jackals (*Canis aureus*); the Mexican wolf (*Canis Mexicanus*), *Xoloitzcuintli* of Hernandez: and *Canis Thous* of Surinam.

Cuvier arranges under the genus *Canis* '*les Chiens*,' the dogs properly so called (*Canis familiaris* and its varieties); the wolves (*Canis Lupus*, *C. Mexicanus*, *C. jubatus*): and the jackals (*Chacal* ou *Loup doré*, *Canis aureus*); and he observes, that the foxes (which Brisson and others have separated under the name of *Vulpes*) may be distinguished from the wolves and the dogs by their longer and more tufted tail; by a more pointed muzzle; by the pupils of their eyes, which by day present a kind of longitudinal slit instead of the round form; and by the superior incisors being less lobated (echancrées); and he observes on their fetid odour, their disposition to dig for themselves earths, and to prey upon the weaker animals. These he places in a subgenus, including the *Zerda* (*Megalotis* of Illiger, *Canis Megalotis* of Lalande, *Canis Zerda* of Gmelin); at least he terms the Zerdas *espèces de renards*, though he seems to consider them as a section, and notices them as the *Megalotis* of Illiger: the *Hyæna venatica* of Burchell, *Hyæna picta* of Temminck (wild dog of the Cape), terminates Cuvier's *Canidæ*, and he then passes on to the civets (*Viverra*).

M. Lesson, in his Manual, begins the second section of the Digitigrades with the genus *Canis*, and he adopts the following subdivisions:—

1st. Those genera which have the pupil of the eye round, including the dogs properly so called, the wolves, and the jackals.

2d. Those genera in which the pupil of the eye contracts vertically, the foxes and the zerdas.

3d. The dogs with hyæna-like feet; the hyæna-dog, *Canis pictus*, Desm., *Hyæna picta*, Temm., *Lycaon*, Brookes.

This article will be confined to a consideration of the dog, *Canis familiaris*, and its varieties: the other subfamilies will be treated of under their respective titles.

The specific description given by Linnæus of *Canis familiaris* is simply 'Canis caudâ (sinistrosum) recurvatâ'—'dog with tail curled towards the left'—and his lengthened description, after enumerating the varieties, of which he gives eleven, though it may appear to some almost ridiculously minute and not very delicate, is eminently characteristic. Cuvier observes that the domestic dog, *Canis familiaris*, Linn., is distinguished by its recurved tail, and that it varies infinitely besides, in stature, form, colour, and the quality of the hair. It exhibits, he adds, 'the most singular, the most complete, and the most useful conquest that man has made. The whole species is become our property; each individual is entirely devoted to his master, adopts his manners, distinguishes and defends his property, and remains attached to him even unto death; and all this springs not from mere necessity, nor from constraint, but simply from *reconnaissance* and a true friendship. The swiftness, the strength, and the highly developed power of smelling of the dog, have made him a powerful ally of man against the other animals, and were perhaps necessary to the establishment of society. It is the only animal that has followed man all over the earth.'

Now comes the question—What was the parent-stock of this faithful friend of man? Some zoologists are of opinion that the breed is derived from the wolf; others that it is a familiarized jackal; all agree that no trace of it is to be found in a primitive state of nature. That there were dogs, or rather animals of the canine form, in Europe long ago, we have evidence from their remains, which we shall presently notice; and that there are wild dogs we know. India, for example, affords many of them, living in a state of complete independence, and without any indication of a wish to approach the dwellings of man. These dogs, though they have been accurately noticed by competent observers, do not throw much light on the question. They may have escaped from the dominion or half dominion of man, and have betaken themselves to a vagabond life. It becomes necessary however to examine into the state of these dogs, some of which are entirely wild, and keep to the mountain and forest, whilst others hang about the villages, and though without owners, give tokens of a more social disposition, and are tolerated as the scavengers of the place, which they clear of disgusting incumbrances, somewhat after the Portuguese fashion.

Col. Sykes thus describes the Dukhun (Deccan) dog, *Canis Dukhunensis*, Sykes, *Kolsun* of the Mahrattas. 'Red, paler underneath; tail bushy, pendulous; pupil rounded.' 'This is the *Wild Dog* of Dukhun. Its head is compressed and elongated; its nose not very sharp, the eyes are oblique: the pupils round, *irides* light brown. The expression of the countenance that of a coarse ill-natured *Persian Greyhound*, without any resemblance to the *Jackal*, the *Fox*, or the *Wolf*, and in consequence essentially distinct from the *Canis Quao*, or *Sumatrensis* of General Hardwicke. Ears long, erect, somewhat rounded at the top, without any replication of the *tragus*. Limbs remarkably large and strong in relation to the bulk of the animal; its size being intermediate between the *Wolf* and the *Jackal*. Neck long. Body elongated. Between the eyes and nose red brown: end of the tail blackish. From the tip of the nose to the insertion of the tail 33 inches in length: tail 8½ inches. Height of the shoulders, 16½ inches.' Colonel Sykes adds that none of the *domesticated dogs* of Dukhun are common to Europe. The first in strength and size is the *Brinjaree Dog*, somewhat resembling the *Persian Greyhound*, then (1831) in the possession of the Zoological Society, but much more powerful. The *Pariah Dog*, he states, is referable to M. Cuvier's second section. This is very numerous, not individual property, but breeds in the towns and villages unmolested. The Colonel remarks that the *Turnspit Dog*, long backed, with short crooked legs, is frequently found among the Pariahs. There is also a petted minute variety of the *Pariah Dog*, usually of a white colour, and with long silky hair, corresponding to a common *Lapdog* of Europe; this is taught to carry flambeaux and lanterns. The last variety noticed is the *Dog* with hair so short as to appear naked like the *Canis Ægyptius*. It is known to Europeans by the name of the *Polygar Dog*. (*Zool. Proc.*, part i., 1831.) In 1832 the skin of the *Wild Dog* of Nepâl was compared by Colonel Sykes with a specimen of the *Kolsun* of the Mahrattas above described, and he stated his impression to be that the animals are identical, differing only by the denser coat and more woolly feet of the Nepâl race, a difference readily accounted for by the greater cold of the elevated regions inhabited by it. He declined however pronouncing a decided opinion, which, he thought, could only be arrived at by more extensive comparison and a full acquaintance with the habits of the *Wild Dog* of Nepâl. (*Zool. Proc.*, part ii.) In 1833, Colonel Sykes placed on the table of the Zoological Society his specimen of the *Wild Dog* of Dukhun (*Canis Dukhunensis*, Sykes), for the purpose of comparing it with a skin of the *Wild Dog* of Nepâl, (*Canis primævus*, Hodgson), then recently presented to the Society by the last-named gentleman. He showed that the two dogs are perfectly similar in their general form, and in the form of the *cranium*; and that in his specimen, equally with that of Mr. Hodgson, the hinder tubercular tooth of the lower jaw is wanting. The only difference remarkable between the two specimens was in the quality and colour of the fur, that of the *Dukhun Dog* being paler and less dense than that of the individual from Nepâl. These differences, depending probably on climate and individual peculiarity, cannot be regarded as sufficient to indicate a distinction between the two races. Identical as they are in form and habits, Colonel Sykes considered them as belonging to one species. (*Zool. Proc.*, part i., 1833, and see a more detailed account in the 'Transactions of the Royal Asiatic Society.')

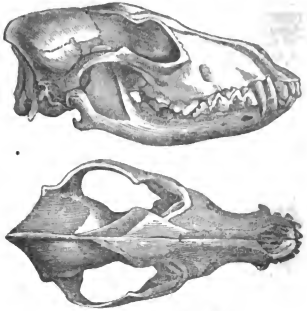
Mr. Hodgson, in a paper 'On the *Mammalia* of Nepâl, published in the 'Journal of the Asiatic Society of Calcutta,' mentions, *inter alia*, under the title of *Canis familiaris*, Linn., the *Pariah* as the only *Dog* of the lower and central regions. The *Thibetan Mastiff*, he states, is limited to Kachâr (Cachar), into which it was introduced from its native country, but in which it degenerates rapidly; there are, he observes, several varieties of it; he also notices his *Canis primævus*. (*Zool. Proc.*, part ii., 1834.)

These contributions we consider very interesting; but we must be on our guard against the begging of the question, which lurks under the specific name *primævus*, given by a gentleman to whom Indian zoology owes so much, and it is for this reason that we have laid before the reader the comparative views of Colonel Sykes, who has so widely extended our knowledge of the Oriental Fauna.

Mr. Bell in his 'History of British Quadrupeds,' approaches this difficult question more boldly than most zoologists. 'In order,' says Mr. Bell, 'to come to any rational conclusion on this head, it will be necessary to ascertain to what type the animal approaches most nearly, after having for many successive generations existed in a wild state, removed from the influence of domestication and of association with mankind. Now we find that there are several different instances of the existence of dogs in such a state of wildness as to have lost even that common character of domestication, variety of colour and marking. Of these two very remarkable ones are the Dhole of India, and the Dingo of Australia: there is besides a half-reclaimed race amongst the Indians of North America; and another, also partially tamed, in South America, which deserve attention; and it is found that these races, in different degrees, and in a greater degree as they are more wild, exhibit the lank and gaunt form, the lengthened limbs, the long and slender muzzle, and the great comparative strength which characterize the wolf; and that the tail of the Australian dog, which may be considered as the most remote from a state of domestication, assumes the slightly bushy form of that animal. We have here then a considerable approximation to a well-known wild animal of the same genus, in races which, though doubtless descended from domesticated ancestors, have gradually assumed the wild condition; and it is worthy of especial remark, that the anatomy of the wolf, and its osteology in particular, does not differ from that of the dogs in general, more than the different kinds of dogs do from each other. The cranium is absolutely similar, and so are all, or nearly all, the other essential parts; and to strengthen still further the probability of their identity, the dog and wolf will readily breed together, and their progeny is fertile. The obliquity of the position of the eyes in the wolf is one of the characters in which it differs from the dogs; and although it is very desirable not to rest too much upon the effects of habit or structure, it is not perhaps straining the point to attribute the forward direction of the eyes in the dogs to the constant habit, for many successive generations, of looking forwards to their master and obeying his voice.'

Another criterion, and a sound one is, the identity of gestation. Sixty-three days form the period during which the bitch goes with young. Precisely the same time elapses before the she-wolf gives birth to her offspring. Upon Buffon's instance of seventy-three days, or rather the possibility of such a duration in the gestation of a particular she-wolf, we do not lay much stress when opposed by such strong evidence of the usual period being sixty three days. The young of both wolf and dog are born blind, and see at the same or about the same time, viz., at the expiration of the tenth or twelfth day.

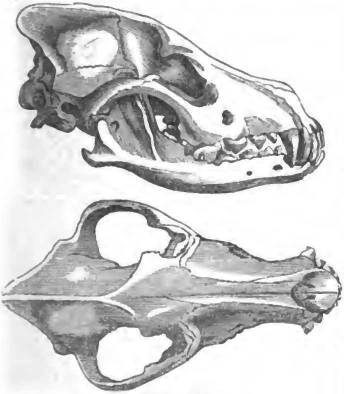
Hunter's important experiments proved without doubt that the wolf and the jackal would breed with the dog; but he had not sufficient data for coming to the conclusion that all three were identical as species. In the course of those experiments he ascertained that the jackal went fifty-nine days with young, whilst the wolf went sixty-three, nor does he record that the progeny of the dog and jackal would breed together: and he knew too well the value of the argument to be drawn from a fertile progeny not to have dwelt upon the fact if he had proved it; not to have mentioned it, at least, if he had ever heard of it.



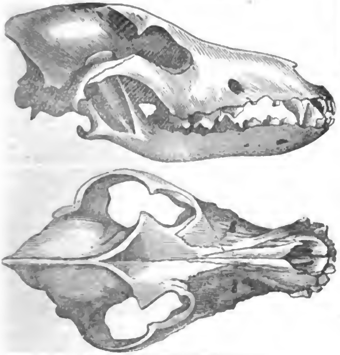
Skull of Jackal; from F. Cuvier.

Mr. Bell disposes of the objection arising from the alleged untameably savage disposition of the wolf by relating two anecdotes, one on his own authority, and the other on that of M. F. Cuvier, in proof of the susceptibility of attachment to man, and the appetite—for it is an appetite—for his caresses on the part of the wolf. The first occurred in the Gardens of the Zoological Society in the Regent's Park, London, and was exhibited in the person of a she-wolf, who came forward to be caressed, and even brought her pups to be caressed also, whenever Mr. Bell or any one whom she knew approached her den. Indeed she killed all her unfortunate young ones in succession, by rubbing them against the bars of her cage in her zeal to have them fondled by her friends. The second happened in the Ménagerie du Roi at Paris, and no faithful dog could show more affecting instances of attachment to his master or distress on account of his absence than did the male wolf which is the subject of M. F Cuvier's touching account. 'With all these analogous properties of form and structure'—we quote Mr. Bell—'as well as of disposition, I cannot but incline at least to the opinion that the wolf is the original source from which all our domestic dogs have sprung: nor do I see in the great variety which exists in the different races sufficient ground for concluding that they may not, all of them, have descended from one common stock. The turnspit and the mastiff, the pug and the greyhound, are perhaps more unlike each other than any of the varieties of other domestic animals; but if it be true that variation depends upon habit and education, the very different employments to which dogs have in all ages been trained, and the various climates to which they have been naturalized, must not be lost sight of as collateral agents in producing these different forms. The care, too, with which dogs of particular breeds are matched with similar ones, for the purpose of keeping the progeny as pure as possible, has doubtless its effect in promoting such distinctions.' The same author thus sums up his opinion. 'Upon the whole, the argument in favour of the view which I have taken, that the wolf is probably the original of all the canine races, may be thus stated: the structure of the animal is identical, or so nearly so as to afford the strongest *à priori* evidence in its favour. The dog must have been derived from an animal susceptible of the highest degree of domestication, and capable of great affection for mankind; which has been abundantly proved of the wolf. Dogs having returned to a wild state, and continued in that condition through many generations, exhibit characters which approximate more and more to those of the wolf, in proportion as the influence of domestication ceases to act. The two animals will breed together, and produce fertile young. The period of gestation is the same.

We now lay before our readers the skull of a wolf, that they may compare it with those of the different varieties of dogs.



Skull of Wolf; from F. Cuvier.

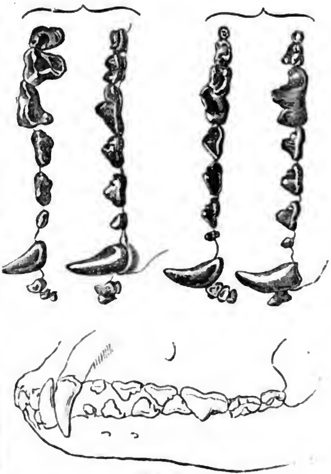


Skull of Canada Wolf; from F. Cuvier.

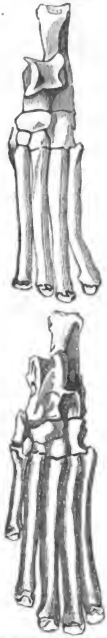
Dog.

Dental formula: incisors, $\frac{6}{6}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{7-7}$ = 42. Such is M. Lesson's statement of the dentition of the great genus *Canis* of Linnæus. M. F. Cuvier says, that dogs in general have forty-nine teeth, viz. six incisors, two canines, three false molars, one carnassier, and two tubercular teeth in the upper jaw; and six incisors, two canines, three false molars, one carnassier, and two tubercular teeth in the lower jaw. Of all these teeth, he observes, none change their shape in any appreciable degree in any race whatever. Only there is sometimes found an additional false molar or tubercular tooth.*

Fore feet with five toes; hind feet with four toes; claws not retractile.



Teeth of Dog.



Feet of Dogs; from F. Cuvier.

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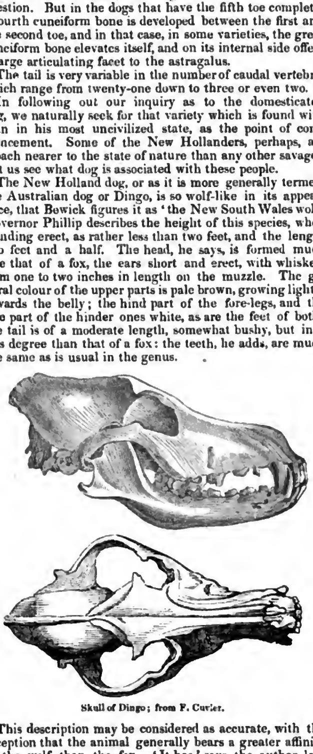
* M. F. Cuvier observes that these supernumerary teeth are developed in each jaw, but that he never saw them developed on each side in the same individual. When, for example, the left intermaxillary bone has a fifth false molar. the right intermaxillary bone has only the usual number; and it is the same with regard to the supernumerary tubercular tooth which is sometimes found in the upper jaw. As these modifications are not perpetuated, M. F. Cuvier places them among those casualties which give no foundation for the establishment of any rule.

Generally speaking, all dogs have five toes on the fore feet, and four on the hind feet, with the rudiment of a fifth metatarsal bone, which does not show itself externally. Nevertheless some dogs have this fifth toe very long and well proportioned, and advancing as far as the origin of the first phalanx of the neighbouring toe; and in those dogs which have only a rudimentary fifth bone of the tarsus, this bone articulates itself to the lower facet of the great cuneiform bone, which is itself placed in relation with the scaphöid bone, the second cuneiform bone, and the second bone of the metatarsus, counting as one the rudiment in question. But in the dogs that have the fifth toe complete, a fourth cuneiform bone is developed between the first and the second toe, and in that case, in some varieties, the great cuneiform bone elevates itself, and on its internal side offers a large articulating facet to the astragalus.

The tail is very variable in the number of caudal vertebræ which range from twenty-one down to three or even two.

In following out our inquiry as to the domesticated dog, we naturally seek for that variety which is found with man in his most uncivilized state, as the point of commencement. Some of the New Hollanders, perhaps, approach nearer to the state of nature than any other savages. Let us see what dog is associated with these people.

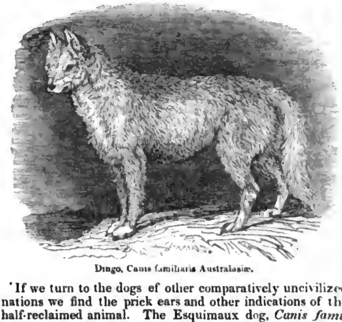
The New Holland dog, or as it is more generally termed, the Australian dog or Dingo, is so wolf-like in its appearance, that Bewick figures it as 'the New South Wales wolf.' Governor Phillip describes the height of this species, when standing erect, as rather less than two feet, and the length two feet and a half. The head, he says, is formed much like that of a fox, the ears short and erect, with whiskers from one to two inches in length on the muzzle. The general colour of the upper parts is pale brown, growing lighter towards the belly; the hind part of the fore-legs, and the fore part of the hinder ones white, as are the feet of both the tail is of a moderate length, somewhat bushy, but in a less degree than that of a fox: the teeth, he adds, are much the same as is usual in the genus.



Skull of Dingo; from F. Cuvier.

This description may be considered as accurate, with the exception that the animal generally bears a greater affinity to the wolf than the fox. 'It has,' says the author last quoted, describing a female, 'much of the manners of the dog, but is of a very savage nature, and not likely to change in this particular. It laps like other dogs, but neither barks nor growls if vexed and teased; instead of which, it erects the hairs of the whole body like bristles, and seems furious: it is very eager after its prey, and is fond of rabbits or chickens raw, but will not touch dressed meat. From its fierceness and agility it has greatly the advantage of other animals much superior in size; for a very fine French fox-dog being put to it, in a moment it seized him by the loins and would have soon put an end to his existence had not help been at hand. With the utmost ease it is able to leap over the back of an ass, and was very near worrying one to death, having fastened on it so that the creature was not able to disengage himself without assistance; it has also been known to run down both deer and sheep. A second of these is in the possession of Mr. Lascelles, of which we have received much the same account in respect of its ferocity; whence it is scarcely to be expected that this elegant animal will ever become familiar.'

Dampier, in his voyage to New Holland (1699), well describes the Dingos, where he says that his men saw two or three 'beasts like hungry wolves, lean like so many skeletons, being nothing but skin and bones.' Indeed ill-treatment of the dog seems to be the characteristic of savage or semi-barbarous nations. Thus Lawson, in his *History of Carolina*, 'When all the viands were brought in, the first figure began with kicking out the dogs, which are seemingly wolves, made tame with starving and beating, they being the worst dog-masters in the world; so that it is an infallible cure for sore eyes ever to see an Indian's dog fat.' Among the oriental nations the natives of Java seem to treat their dogs almost as scurvily as the wild American Indians did in Lawson's time. (DEER, vol. viii., p 362-3.) To return to the Dingo. Mr. Bennett, in his *Gardens and Menagerie of the Zoological Society*, vol. i. (1830), thus writes:—'The specimens in the Garden appear to have shaken off some of their original wildness, and to have begun to accustom themselves in some degree to the circumstances in which they are placed. One of them has been for nearly two years in the Society's possession: the second is a much later acquisition.' This is remarkable as indicative of an approach to greater domestication, but the following statement by Mr. Bell, in his work above quoted (1836), carries this much farther, and enables us to trace the first effect of the more mild dominion of man upon this wolf-like dog. 'The effect of domestication in producing variation in colour, to which allusion has already been made, has lately been exhibited in a very striking and interesting manner in the menagerie of the Zoological Society. An Australian bitch, or *Dingo*, had a litter of puppies, the father of which was also of that breed: both of them had been taken in the wild state, but were of the uniform reddish brown colour which belongs to the race, and the mother had never bred before; but the young, bred in confinement, and in a half domesticated state, were all of them more or less spotted.



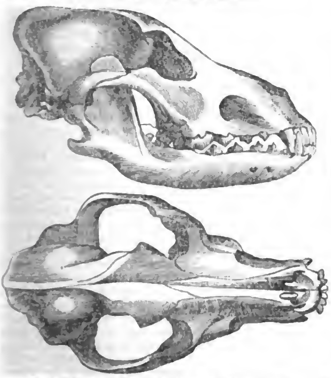
Dingo, Canis familiaris Australasiæ.

'If we turn to the dogs of other comparatively uncivilized nations we find the prick ears and other indications of the half-reclaimed animal. The Esquimaux dog, *Canis familiaris Borealis*, and the Hare-Indian, or Mackenzie River dog, *Canis familiaris Lagopus*, will occur as instances to those who have been familiar—and who are not?—with the histories of our northern expeditions, and the garden of the Zoological Society of London in the Regent's Park. In that menagerie the three dogs last named might at one time be seen side by side, affording the best opportunities for comparison. Peter, the Esquimaux dog, kept in the garden, was of a dingy white with a tinge of yellow on the upper parts, gradually fading away upon the sides; in short, of nearly a uniform colour, but in general this race exhibits a predominance of black markings. Thus Akshelli brought from the Polar sea by Mr. Richards in Captain Parry's first voyage, and described by Mr. Children in the Zoological Journal, was almost entirely blackish, or of a colour nearly approaching to black on the upper parts, and white underneath, tail included. Akshelli seldom barked, but, if displeased, uttered a low wolfish growl, and was a very powerful dog. Peter was brought to this country by Lieut. Henderson, one of the companions of Captain Ross, in his first voyage, and lived long at the Regent's Park. He was very good tempered and familiar. The Hare-Indian dogs, it is said, are never known to bark in their own country, and it is worthy of note that those which were brought from thence to the Regent's Park never barked at all, but the younger one which was born here barked like the other dogs. It is curious to observe these steps. 'The period,' says Mr. Bell, 'at which the domestication of the dog first took place is wholly lost in the mist of antiquity. The earliest mention of it in the sacred Scripture occurs during the sojourn of the Israelites in Egypt.—"But against Israel shall not a dog move his tongue." It is again mentioned in the Mosaic law in a manner which would seem to show that they were the common scavengers of the Israelitish camp, as they are still in many of the cities of the East:—"Neither shall ye eat any flesh that is torn of beasts in the field: ye shall cast it to the dogs." A similar office seems to be repeatedly alluded to in the course of the Jewish history:—"Him that dieth in the city shall the dogs eat, and him that dieth in the fields shall the fowls of the air eat:" a common curse, as it would appear, as it occurs verbatim on no less than three separate occasions in the First Book of Kings; and evidently intimates a violent and disgraceful death, without the honour of sepulture. The dog was considered by the Jews as eminently an unclean animal, and was the figure selected for the most contemptuous insults. It is impossible not to be struck with the striking similarity which exists in the feelings of many oriental nations at the present day, among whom the very phraseology of the Scriptures is, with little modification, applied to a similar purpose.

Before we proceed to give a sketch—and our limits will allow us to give no more—of the varieties of the dog as fostered by man, we must say another word as to its origin. The student should be on his guard against being led to a conclusion as to that origin by any particular developments of parts. No animal seems to be more susceptible of modification than the dog, and man has succeeded in producing almost every degree of change in the form of its cranium, its stature, its aspect, and its fur. With regard to the latter it is, in some varieties, almost entirely absent, and we have seen, on the other hand, good close *wool* from a curious variety of the poodle.

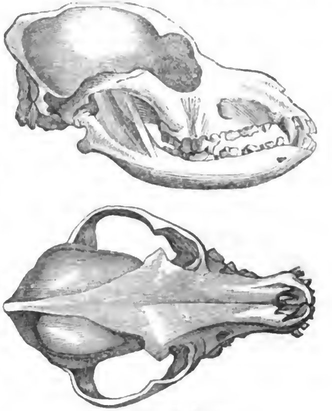
One circumstance should be borne in mind throughout an inquiry into the origin of the dog. None of the wild dogs, however, apparently living in a state of nature, have ever been found to return to the true form of wolf.

The shepherd's dog, a variety which was most probably one of the first that civilized and settled man called in aid to preserve his flocks from beasts and birds of prey and the depredations of roving human tribes, is remarkable for the capacity of its cranium and its great sagacity.

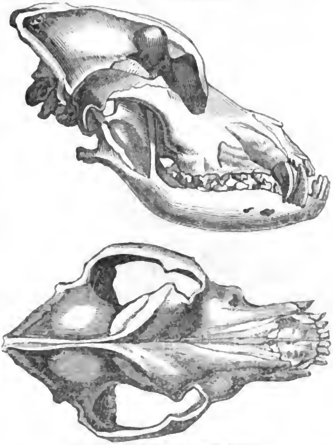


Skull of Shepherd's Dog, Chien de Berger; from F. Cuvier.

It is indeed distinguished by this cranial development even above the spaniels and their varieties, and the hounds which comprise the most useful and intelligent dogs. In the bull-dogs and mastiffs, 'dogues de forte race,' of the French, though the head is one-third larger than those of the shepherd's dog and of the spaniels, 'Barbets,' the cranial *capacity* is not by any means so great.



Skull of Spaniel; from F. Cuvier.

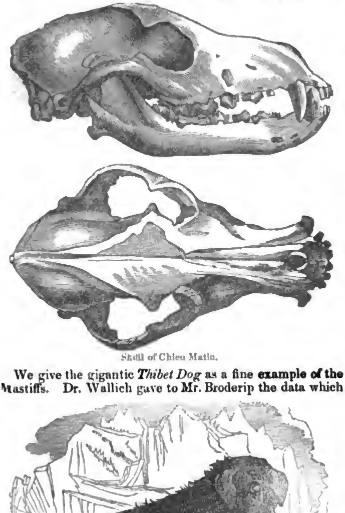


Skull of Dogue de forte race; from F. Cuvier.

Dr. Caius, the physician of queen Elizabeth's time, wrote several papers on Natural History for the use of Gesner his correspondent and friend. In one of these treatises he divides the British dogs into—1st. *The most generous kinds*, which he subdivides into the *dogs of chace*, including the *Hounds*, viz., the *Terrier*, *Harrier*, and *Bloodhound*; and the *Gazehound*, *Greyhound*, *Leviner*, or *Lyemmer*, and *Tumbler*:—*The Fowlers*, viz. the *Spaniel*, *Setter*, *Water-spaniel*, or *Finder*—and the *Lap Dogs*, viz. the *Spaniel Gentle*, or *Comforter*. 2nd. The *Farm-Dogs*, viz. the

Shepherd's Dog, and the *Mastiff*, or *Ban-dog*. 3rd. *Mongrels*, viz. *Wappe*, *Turnspit*, and *Dancer*.

Bewick enumerates the following :—The *Shepherd's Dog*, the *Cur Dog*, the *Greenland Dog*, the *Bull-dog*, tho *Mastiff*, the *Ban-dog*, the *Dalmatian*, or *Coach-dog*, the *Irish Greyhound*, the *Highland Greyhound*, the *Gazehound*, the *Greyhound*, the *Italian Greyhound*, the *Lyemmer*, the *Lurcher*, the *Tumbler*, the *Terrier*, the *Beagle*, the *Harrier*, the *Foxhound*, the *Old English Hound*, the *Kibble Hound*, the *Blood Hound*, the *Spanish Pointer*, the *English Setter*, the *Newfoundland Dog*, the *Rough Water Dog*, the *Large Water Spaniel*, the *Small Water Spaniel*, the *Springer*, or *Cocker*, *King Charles's Dog*, the *Pyrame Dog*, the *Shock Dog*, the *Lion Dog* (a small and rare variety), the *Comforter* (a small spaniel), tho *Turnspit*, and the *Pug*. We could add many more to this list, which is long enough. The French divide the dogs into three groups, viz., tho *Mâtins*, the *Spaniels* (including the *Hounds* and *Pointer*), and the *Dogues* (the last containing tho *Mastiff*, *Bull-dog*, &c.)



Skull of Chien Matin.

We give the gigantic *Thibet Dog* as a fine **example of the Mastiffs.** Dr. Wallich gave to Mr. Broderip the data which enabled the latter to write the following account for tho lato lamented Mr. Bennett. 'These noble animals are the watch-dogs of tho table-land of the Himalaya mountains, about Thibet. Their masters, the Bhoteas, to whom they are most strongly attached, are a singular race, of a ruddy copper colour, indicating the bracing air which they breathe, rather short, but of an excellent disposition. Their clothing is adapted to the cold climate they inhabit, and consists of fur and woollen cloth. The men till the ground and keep sheep, and at certain seasons come down to trade, bringing borax, tincal, and musk, for sale. They sometimes penetrate as far as Calcutta. On these occasions the women remain at home with the dogs, and the encampment is watched by the latter, which have an almost irreconcileable aversion to Europeans, and in general fly ferociously at a white face. A warmer climate relaxes all their energies, and they dwindle even in the valley of Nepaul.' Those which were in the Zoological Society's Garden in the Regent's Park died soon after thoir arrival. They were considered very great rarities, and were brought over to this country by Dr. Wallich. The Hon. Edward Gardner, British resident at the court of the Rajah of Nepâl, never heard of any other instance of this variety being domesticated by Europeans.

The Thibet Dog. Canis familiaris, var. Molossus Thibetanus.

In all the varieties the period of gestation is sixty-three days. The litter is generally numerous, often as many as eight or nine. The whelps are born blind, and do not see till nine days are fully expired: they sometimes see on the tenth, and sometimes not till the twelfth day. At tho fourth month the teeth begin to change, and at two years the growth of the animal is considered complete. A dog is considered old at the expiration of five years, and the limits of his existence rarely exceed twenty years.

It is confidently stated that in all the varieties, if a dog has any white on any part of his tail, that colour will invariably be found at the tip.

Those who would pursue their inquiries as to the varieties of breeds of dogs, should refer to *The Sportsman's Cabinet* (two quarto volumes entirely devoted to tho subject, and beautifully illustrated); *Daniel's Rural Sports*; the chapter on 'Dogs' in *The Menageries* (*Library of Entertaining Knowledge*); and Sir John Sebright's interesting and well-digested little book, in addition to the works referred to in this article.

FOSSIL DOGS.

It may be doubted whether any fossil remains of the *Dog*, properly so called, have ever been found. The occurrence of the bones of the wolf and the fox in the ossiferous caverns, &c., is well known; but in pursuing this part of the inquiry it should be remembered how difficult it is to distinguish the bones of the wolf from those of the *mâtin*, as Cuvier observes, and the Shepherd's Dog. The *Canis Spelæus* of Goldfuss, the remains of which were found at Gailenreuth, bears the strongest resemblance in the form of the cranium generally to the wolf, but the muzzle is shorter and the palate is wider. The *Agnotherium* of Kaup is described by him to havo been as large as a lion, and to be allied to the dog.

DOGE was the title of the first magistrate of the republic of Venice. The first settlers on the islands of the lagune were governed by magistrates sent from Padua. After Padua was devastated by the Huns and other barbarians, A.D. 452-60, the colonists of the lagune being left to themselves, each island elected a magistrate called tribune. An annual selection was made of seven from among these tribunes, who constituted the government of the whole community. A council of forty persons chosen by the general assembly of the people had the legislative and judicial powers. As population and wealth increased, and the community was threatened by hostile neighbours, it was found necessary to concentrate and strengthen the executivo, and a chief magistrate for life was elected by the assembly of the people, and was called doge, a corruption of dux, as he was also general of the armed force. The first doge, Paolo Luca Anafesto, was elected in 697. The third doge in succession, Orso Ippato, elected in 724, made war against the Longobards, and took Ravenna, which he rostored to the Byzantine emperor, who, as a reward for this service, granted to the republic a tract on the coast of the mainland as far south as the Adige. This first continental possession of Venice, being afterwards enlarged, was called Dogado. Tho successes of Orso inspired the people with jealousy, and he was assassinated in 737. The office of doge was at tho same time abrogated, and an annual magistrate was substituted, but the fifth of these was imprisoned on some charge, and his eyes were put out, after which the people again elected a doge for life in 742. From that time till 1172 about forty doges ruled in succession, nearly one half of whom died a violent death or were deposed, exiled, or had their eyes put out, sometimes by regular trial before the council of forty, and sometimes by popular insurrection. The Quarantia, or Council of Forty, which exercised the government during the interregna, assumed by degrees the power of electing a doge in order to put a stop to the frequently recurring tumult and anarchy, the choice however was subject to confirmation by the assembly of the people. The first doge thus elected was Sebastiano Ziani in 1172, and the Forty made him swear to a new constitution, or fundamental law, by which, instead of the general assembly of the people, the sovereign power was vested in a great council of 470 citizens, elected for one year, but capable of indefinite re-election. These were chosen by twelve electors, two for each sestiere, or district, of the city of Venice alone, who were themselves appointed by the inhabitants of their respective districts, the other islands and territories of the republic having no part in the elections. The Great Council was to appoint six individuals who were to be the doge's counsellors, without whose concurrence no act of the doge should be valid. This council was afterwards called 'la Signoria.' In important cases the doge was to consult with another council of sixty members, called Pregadi, or 'requested,' taken also from the Great Council. This is the body which in course of time became invested with all the powers of the state, and is generally known by the name of the Venetian Senate. The citizens of Venice, weary of tumult, and being secured in the exclusive right of furnishing the members of the Great or Sovereign Council, seem to have willingly acquiesced in these constitutional changes, and a distribution of golden pieces made by the new doge served to gratify the populace. About a century after, another organic change took place. Pietro Gradenigo being elected doge in 1289, by the influence of the old or aristocratic families, proposed a law which passed the Great Council in 1298 after much opposition and delays, that no one should in future be eligible to sit in that assembly except those who then had a seat in it, or whose fathers, grandfathers, and great-grandfathers, had been members of it. The number of the members of the Great Council was no longer limited to 470. Lastly, in 1319 a new law passed the Great Council, by which that assembly declared itself permanent and hereditary, all the members who were then sitting in it (about 600 in number) remaining for life in possession of their seats, their sons who were above twenty-five years of age being likewise admitted, and their descendants after them, to the exclusion of all other families. This decree, known in history as 'la serrata del maggior consiglio,' established an hereditary and exclusive aristocracy at Venice, which lasted till the end of that republic. The confirmation of the doge by the people was henceforth dispensed with. The doge himself became merely a state pageant, the servant of the councils, which had the power of trying and deposing him, and even sentencing him to death. They took away from him the command of the military and naval forces, his children were excluded from every office of state, and he had no patronage except the prebendal stalls of the cathedral of St. Mark. The doge was president by right of all the councils, with a double, or casting vote. He was simply addressed by the title of Messer Doge. (*Memori Venete* di Giovanni Gallicioli, Venice, 1826; Daru, *Histoire de Venise*, books 6 and 39; and an article in the *Edinburgh Review*, No. 91, June, 1827.)

The doges at Genoa were at first magistrates for life [Boccanera], as at Venice, but the frequent contentions and civil factions among the aspirants to that dignity induced Andrea Doria, in his reform of 1528, to make the office of doge to last only two years. [Doria.]

DOGGERBANK, a very extensive sand-bank in the North Sea, lying between the east coast of England and the west coast of Holland, and situated between the Well-bank and the Broad-fourteen. The western part of the Doggerbank is about twelve leagues east from Flamborough head, in the east riding of Yorkshire, whence the bank extends in a direction nearly E.N.E. to within twenty leagues of Jutland. In some places this bank is twenty leagues broad, but it is contracted towards the east, and terminates nearly in a point. The shoalest part is that nearest the English coast, where it has nine fathoms water, so that it presents no dangers or difficulties to navigators; in other parts the surface rises generally towards the centre: in some places the depth of water is as great as twenty-seven fathoms.

The Doggerbank is a noted station for the cod-fishery, and is much frequented by both English and Dutch fishermen. It is also known in history as the scene of an obstinate naval engagement which took place in the summer of 1781 between the English and Dutch fleets under the respective commands of Admirals Parker and Zoutman. The disabled condition of the ships on both sides put an end to the battle, in which neither side could claim a victory.

DOGMA (δόγμα), a word borrowed from the Greek, means an established principle, a fundamental article of belief derived from undisputed authority, and is generally applied to the essential doctrines of Christianity which are drawn from the Scriptures, or from the authority of the Fathers. Hence that branch of divinity called dogmatic theology is an exposition and assertion of the various articles of the Christian faith as founded upon authority acknowledged by Christians in general, and is distinguished from scholastic theology, which assumes to establish the truth of the Christian doctrines by argument. John Damascenus was one of the first who wrote an exposition of Christian dogmatics. [Damascenus.] But although the authority of the Scriptures and of the early fathers is acknowledged by all Christians, there are other authorities which are acknowledged only by one communion, and not by others. Thus the Greek church acknowledges the authority of the earlier councils only, while the Roman Catholics look upon the later councils and the bulls and decretals of the Popes as equally positive authority in matters of faith; and the Protestant and reformed churches, rejecting the latter, recur to their respective Synods and confessions of faith. Melancthon wrote a concise exposition of the dogmas of the Protestant or Lutheran church. Among the numerous Roman Catholic writers on dogmatic theology, Bellarmine is one of the most distinguished. Dogmatic theology, as distinct from scholastic as well as from moral theology and Biblical divinity, constitutes a separate chair in several Roman Catholic universities in continental Europe.

In the Protestant Universities of Germany there is a chair for the history of dogmas. The business of the professor is to examine the doctrines of the various sects which have divided Christianity, their sources, and the arguments by which they are supported. Such a course of lectures forms an important addition to the study of Ecclesiastical History.

DOG'S-BANE, the English name of the poisonous plant called by botanists Apocynum.

DOG'S-TAIL GRASS. [Cynosurus.]

DOGWOOD, the English name of various deciduous-leaved shrubs belonging to the genus Cornus. [Cornaceæ.] They are cultivated as ornamental plants, for the sake of their bright red shoots, which are an embellishment of plantations in the winter; and also for the sake of the charcoal obtained from them, which is one of the best sorts for the manufacture of gunpowder.

DOIT or **DUYT**, a small Dutch copper coin, being the eighth part of a stiver, in value half a farthing. Doit is also a division of the English grain Troy. See Snelling's 'View of the Coins of Europe,' 8vo. London: 1766. Kelly's 'Complete Cambist,' i. 219; ii. 278. The word is used by Shakspeare, *Coriolanus*, act. i., sc. 5.

DOL. [Ille et Vilaine.]

DOLABELLA. (Malacology.) [Tectibranchiata.]

DOLABRIFORM, a term applied in botany to certain fleshy leaves, which are straight at the front, taper at the base, compressed, dilated, rounded, and thinned away at the upper end at the back, so as to bear some resemblance to an old fashioned axe-head.

DOLCI, CARLO, an excellent painter, was born at Florence, on Thursday, May 25, 1616. His father Andrew, and his mother's father and brother, Pietro and Bartolomeo Marinari, were all painters, and much esteemed and respected in their native city. At the age of four years Carlo had the misfortune to lose his father, and his mother was obliged to maintain a numerous family by her industry. At the age of nine she placed him with Jacopo Vignali, a pupil of Roselli, who was famous for his powers of teaching. In four years Carlo could paint. His first efforts attracted the notice of Piero de' Medici, an amateur who procured him the notice of the court, and he soon became very busily and profitably employed. In 1654, by the advice of his friends, he married Theresa Bucherelli, by whom he had a numerous family. About 1670 he was invited to paint the likeness of Claudia, the daughter of Ferdinand of Austria, at Innspruck, which place he visited for a short time. After his return he was afflicted with melancholy, and he died on Friday, January 17, 1686, leaving one son in holy orders, and seven daughters, of whom

Agnese, married to Carlo Baci, a silk merchant, painted in the manner of her father.

Dolci's biographer, Baldinucci, attributes his excellence in painting to the goodness of Heaven, as a just reward for his singular piety, in illustration of which numerous anecdotes are told. When invited to take Claudia's portrait, he declined for fear of the length of the journey, never having lost sight of the cathedral dome and campanile of his favourite city since his birth; and his assent was only procured by obtaining the commands of his confessor, which he obeyed at once. In like manner he was recovered from his first fit of melancholy by the command of his confessor to proceed with a picture of the Virgin. He appears to have been extremely good and amiable, but singularly timid. His last illness was brought on by a remark which Luca Giordano uttered in joke, according to his intimate friend Baldinucci, that his slowness would never allow him to amass 150,000 dollars as the expeditious Giordano had done, but that he must starve. Upon this, poor Carlo seems to have grown bewildered; he decried the works of the other, whom he thought to be taking the bread out of his mouth, and refused food for some time. In the midst of his troubles, his excellent and beloved wife died, and death soon released him from his grief. In all his insanity he was never violent, but dejected and helpless, and as obedient as a child to his ghostly adviser.

From his first attempts at painting, Carlo determined to paint none but sacred subjects, and he almost literally observed this rule. His style is pleasing, and full of gentle and tender expressions; his drawing for the most part, but not always, correct; his colouring varied, soft, bright, and harmonious; sometimes too pearly in its tint. Lanzi traces in his painting something of the manner of Rosselli, who was, as it were, his grandfather in art. He elaborated all he did with the most consummate patience and delicacy. His pictures are numerous, and found in many collections, for he painted many duplicates, and many copies were made by his pupils Alessandro Lomi and Bartolomeo Mancini, and Agnese, his daughter. Onorio Marinari, his cousin and scholar, gave great promise, but died young. (Baldinucci.)

DOLCIGNO, or **DULCIGNO**, in the Albanian tongue **DULTZUNE**, and in the Turkish **OLGUN**, a town in Upper Albania, near Scutari. [ALBANIA.] This town is on the coast, and has a good harbour. The inhabitants, who amount to about 6000, are engaged partly in commerce, but chiefly in piracy. They were regarded till of late as the most formidable pirates of the Gulf of Venice. Some of their seamen enter into the service of the Barbary States. This town, or perhaps Dulcigno Vecchie, which Mr. Hobhouse (in the map prefixed to his Travels) places on the coast, five or six miles more to the north, was antiently called Olcinium, a name containing the same elements as the modern Albanian and Turkish names; the Illyrians of Olcinium followed the same piratical course as the modern Dulcignotes. (Hobhouse, *Travels in Albania*.)

DOLE, a town in France, in the department of Jura, on the north-west bank of the Doubs, a feeder of the Saône, and on the road from Paris to Geneva. It is about 190 miles in a straight line south-east of Paris, in 47° 7′ N. lat. and 5° 28′ E. long.

Dole is not clearly identified with any Roman site; but in the town and its environs vestiges of the Romans have been traced. In the middle ages, while Besançon was yet a municipal republic, Dole was considered as the capital of La Comté de Bourgogne, or La Franche Comté. It was taken and almost destroyed by the French in 1479. It was again attacked by the French, under the Prince of Condé, in 1536. In 1668, La Franche Comté having been conquered by the French, the ramparts of Dole were rased, but repaired by the Spaniards, to whom the town was restored by a treaty of peace the same year. At a subsequent period, after La Franche Comté had come finally into the hands of the French, they were finally demolished.

The town is pleasantly situated, but its streets are steep, and the houses poor and irregularly built. The church of Nôtre Dame is worthy of notice, and there is a pleasant promenade. The population, in 1832, was 7304 for the town, or 9927 for the whole commune. The inhabitants carry on a trade in corn, wood, and iron; they manufacture hosiery and glass. There are iron-works and coal-mines in or near the town. There are a library, a high school, an agricultural society, and a theatre. There is also a prison at Dole.

Dole is the capital of an arrondissement, which had in 1832 a population of 72,992.

DOLGELLY. [MERIONETHSHIRE.]

DO'LICHONYX. [BOB-O-LINK; EMBERIZIDÆ.]

DO'LICHOS. Under this name Linnæus included the greater part of those tropical twining leguminous plants which bear eatable fruit like the kidney-beans cultivated in Europe. A large number of species, ill distinguished from each other, and differing materially in the structure of their fructification, were for so long a time collected under this name that, although they are now broken up into several genera, we shall briefly notice the more remarkable in this place.

Dolichos itself is confined to the species with a compressed linear pod, having incomplete cellular dissepiments and ovate seeds with a small oval hilum. Of these *D. Catjang*, the pulse of which is called Boberloo in India, is an annual, and has somewhat deltoid leaves angular at the back, few-flowered peduncles, and erect pods; it is cultivated in the fields in many parts of India during the dry season, and its seeds are extensively consumed by the poorer natives. *D. lignosus*, a perennial, with long racemes of flowers, broad heart-shaped leaflets, and linear sharp-pointed pods, is extremely common all over India, where it is cultivated 'during the cold season in gardens and about the doors of the natives, forming not only cool shady arbours, but furnishing them with an excellent pulse for their curries,' &c. There are several varieties of it constituting the commonest kidney-beans of India. *D. biflorus*, an annual, with oblong pointed leaflets and scimitar-shaped hairy pods, furnishes the pulse called in India horse-gram; and *D. sphærospermus* produces the Calavana or black-eyed peas of Jamaica.

Lablab has a compressed scimitar-shaped pod, rough with tubercles at the sutures, and furnished with transverse imperfect cellular partitions, and ovate seeds with a fungous callous linear scar. *Lablab vulgaris*, the old *Dolichos Lablab*, is a common plant in the hedges in many parts of India, whence it has travelled into the tropical parts of America. It is a smooth perennial with showy white or purple flowers, and large horizontal pods, containing from three to four seeds. It has a heavy disagreeable bug-like smell, prefers a rich black soil that cannot be flooded by rains, and produces a coarse but wholesome pulse, much eaten by the lower classes in India.

Pachyrhizus has a long compressed pod, with kidney-shaped seeds and no dissepiments, and is remarkable for its principal species, *P. angulatus* (formerly *Dolichos bulbosus*), producing a root of the size and substance of a turnip. It is reported to have been carried to the Philippines from South America, and thence to have been introduced into the west of Asia. The side leaflets are nearly triangular, that in the middle lozenge-shaped, slightly toothed, and shaggy on both sides. The flowers are very beautiful, of a violet blue colour, and arranged in axillary nearly erect racemes, from one to two feet long. Its root is a common article of food in the Malay archipelago, but no other part of the plant is eaten.

In *Psophocarpus* the pods are oblong, and have four longitudinal wings; the seeds are roundish. It comprehends the *Dolichos tetragonolobus*, a twining annual, the pods or tuberous roots of which are a common Indian esculent.

Canavalia, with long straightish compressed pods, having three short wings at the lower suture, cellular dissepiments, and oblong seeds with a narrow hilum, comprehends the South American Lima beans and the Sword beans of India. The species have a handsomer and firmer foliage than the other genera, and the flowers are usually large and showy. *C. gladiata*, the common cultivated species, has often pods as much as two feet long, and varies with red, grey, and white seeds.

Finally, the genus *Mucuna*, known by its oblong puckered compressed hispid pods, includes all the species from which Cowhage is obtained. [COWHAGE or COWITCH.]

DOLI'OLUM. [DIPHYDES, vol. ix., p. 11.]

DO'LIUM. [ENTOMOSTOMATA.]

DOLLAR. [MONEY.]

DOLLOND, JOHN, an eminent optician, was descended from a French refugee family, settled in Spitalfields, and born on the 10th of June, 1706.

His parents were in humble circumstances, his father being an operative silk weaver; and the man who was des tined to add so important a discovery to our knowledge of the laws of light was compelled to spend his boyhood in the drudgery of a manufactory, and in a capacity which had nothing congenial to his tastes. The little leisure however which he had was spent in the acquisition of a varied circle of knowledge. Besides the study of mathematics and physics, to the latter of which his reputation is chiefly due, he studied anatomy and natural history in general, on one hand, and theology and ecclesiastical history on the other. In furtherance of this diversified class of subjects, which, considering the toil to which the day was devoted, was sufficiently extensive, he undertook the Greek and Roman classics; he was partially acquainted with several of the modern languages, but with French, German, and Italian, he was intimately conversant. It is very rare to see the happy union of great powers of reasoning, of memory, and of observation, that was displayed by this eminent man.

Notwithstanding the cares of a family and the duties which it imposed upon him, Dollond still found means to cultivate the sciences; and having apprenticed his eldest son, Peter, to an optical instrument maker, he was in due time able to establish him in business in Vine Court, Spitalfields. In this business he finally joined his son, for the especial purpose, it would seem, of being able to unite his tastes with his business more perfectly than silk weaving enabled him to do.

Immediately on this arrangement being completed, Dollond commenced a series of experiments on the dispersion of light, and other subjects connected with the improvement of optical instruments, and especially of telescopes and microscopes, the results of which were communicated to the Royal Society in a series of papers. Three of them were printed in the Philosophical Transactions for 1753, one in 1754, and the last in 1758, the titles of which are given below. It was about 1755 that he entered upon a systematic course of experiments on dispersion, and after, to use his own words, 'a resolute perseverance' for more than a year and a half, he made the decisive experiment which showed the error of Newton's conclusions on this subject. [LIGHT.]

The memoir in which the series of investigations was detailed appeared in the Philosophical Transactions, and was the last which he gave to the world. It was rewarded by the council of the Royal Society with the Copley medal

It was the lot of Dollond to undergo considerable annoyance on account of the claims set up for this discovery in favour of others, especially of Euler; but there is not a shadow of a doubt of Dollond's priority as well as originality, in this very important discovery, left on the minds of the scientific world. The discrepancies which followed the application of Newton's doctrine to the varied cases that presented themselves in the course of different experiments might, in speculative minds, have created a *suspicion* of the accuracy of that doctrine; yet there does not appear to have been the least hesitation among scientific men in attributing these discrepancies to *errors of observation exclusively*, and consequently not the least ground for honestly attempting to deprive Dollond of the honour of the discovery.

In the beginning of the year 1761 Dollond was elected a Fellow of the Royal Society, and appointed optician to the king. He did not long survive to enjoy the honour or advantages of his discoveries; as, on the 30th of September of that year, he was attacked by a fit of apoplexy, brought on by a too close and long continued application to a paper which he was studying. This attack immediately deprived him of speech, and in a few hours of life itself.

Besides his eldest son Peter, already mentioned, he left another son and three daughters The two sons carried on the business jointly with great reputation and success; and upon the death of the younger, it went into the hands of a nephew, who took the family name, and who still carries it on without diminution of the high character attached to the name of Dollond.

Mr. Dollond's appearance was somewhat stern, and his address and language impressive; but his manners were cheerful, kind, and affable. He adhered to the religious doctrines of his father, and regularly attended the French Protestant Church, of which his life and conversation rendered him a bright ornament.

The following is the list of Dollond's published papers:—

1. A letter to Mr. James Short, F. R. S., concerning an Improvement in Reflecting Telescopes; *Phil. Trans.*, 1753, p. 103
2. Letter to James Short, A.M., F.R.S., concerning a mistake in Mr. Euler's Theorem for correcting the Aberration in the Object Glasses of Refracting Telescopes; *Phil. Trans.*, 1753, p. 287.
3. A description of a Contrivance for measuring Small Angles; *Phil. Trans.*, 1753, p. 178.
4. An Explanation of an Instrument for measuring Small Angles; *Phil. Trans.*, 1754, p. 551.
5. An account of some experiments concerning the different Refrangibility of Light; *Phil. Trans.*, 1758, p. 733.

DOLOMIEU, DEODAT-GUY-SILVAIN TANCREDE DE, was born at Grenoble on the 24th of June, 1750. In early youth he was admitted a member of the religious order of Malta, but in consequence of a quarrel with one of his companions, which ended in a duel fatal to his adversary, he received sentence of death, but, after imprisonment, he was pardoned, and went to France. After some hesitation whether he should devote himself to classical literature or to natural history, he decided in favour of the latter. While at Metz with the regiment of carbineers, in which he had obtained a commission, he formed an acquaintance with the celebrated and unfortunate La Rochefoucault, which ceased but with his existence; and the attachment for science, by which this nobleman was distinguished probably contributed to confirm Dolomieu in the choice of the pursuit which he had previously made. He was soon afterwards elected a corresponding member of the Academy of Sciences, and quitted the military profession.

At the age of twenty-six he went to Sicily, and his first labour was an examination of the environs and strata of Ætna. He next visited Vesuvius, the Appenines, and the Alps, and in 1783 published an account of his visit to the Lipari islands.

He returned to France at the commencement of the Revolution, and early ranged himself on the side of liberty. He had however no public employment until the third year of the republic, when he was included in the *Ecole de Mines*, then established; and he was one of the original members of the National Institute, founded about the same time. He was indefatigable in the pursuit of geological and mineralogical science, and in less than three years he published twenty-seven original memoirs; among which were those on the nature of *leucite*, *peridot*, *anthracite*, *pyroxene*, &c

When Bonaparte undertook the conquest of Egypt, Dolomieu accompanied the expedition; on the arrival of which he visited Alexandria, the Delta, Cairo, the Pyramids, and a part of the mountains which bound the valley of the Nile He proposed also to explore the more interesting parts of the country; but before he could carry his plan into execution his health became so deranged that he was compelled to return to Europe. On his passage home he was, with his friend Cordier, the mineralogist, and many others of his countrymen, made prisoner after being driven into the Gulf of Tarentum, and confined in a miserable dungeon. His companions were soon set at liberty, but the remembrance of the disputes which had existed between him and the members of the Order of Malta led to his removal and subsequent imprisonment at Messina, where he was confined in a dungeon lighted only by one small opening, which, with barbarous precaution, was closely shut every night. The heat, and the small quantity of fresh air admitted by the window of his prison, compelled him to spend nearly the whole of his time in fanning himself with the few tattered remnants of his clothes, in order to increase the circulation of the air.

Great exertion and urgent demands were made by the scientific men of various countries to obtain his enlargement; and when, after the battle of Marengo, peace was made with Naples, the first article of the treaty was a stipulation for the immediate release of Dolomieu. On the death of Daubenton he was appointed professor of mineralogy, and soon after his return to France he delivered a course of lectures on the philosophy of mineralogy at the Museum of Natural History.

In a short time he again quitted Paris, visited the Alps, and returned to Lyon by Lucerne, the glaciers of Grindelwald and Geneva, and from thence to Châteauneuf, to visit his sister and his brother-in-law De Drée: here he was unfortunately attacked by a disorder which proved fatal in the 53rd year of his age.

He had projected two journeys for adding to his vast store of geological knowledge, the first through Germany, and the second through Norway, Denmark, and Sweden. He also proposed to publish a work which he had planned in his prison at Messina; of this he printed a fragment on *Mineral Species*, which is a monument at once of his misfortunes and his genius, being written in his dungeon in Sicily, on the margin of a few books with a bone sharpened against his prison walls for a pen, and the black of his lamp smoke mixed with water for ink. In this work the author proposes that the integral molecule shall be regarded as the principle by which the species is to be determined, and that no other specific characters should be admitted than those which result from the composition or form of the integral molecule. It must however be admitted as an objection to this proposal that the integral molecule is not always easily ascertained or characterized.

'From a careful perusal of the works of Dolomieu,' observes Dr. Thomson, *Annals of Philosophy*, vol. xii., p. 166, 'especially his later ones, the following appear to be the results of his observations and the bases of his geological system:

'It appears highly probable, from geometrical considerations and from the theory of central forces, that the earth at the time when it received its spheroidal shape was in a state of fluidity. This fluidity was probably neither the result of igneous fusion nor of aqueous solution, but of the intermixture of a substance or substances with the earthy particles fusible, like sulphur, at a moderate heat, capable of entering into more rapid combustion when exposed to the air, decomposing water, and involving the gas thus produced so as to enter into strong effervescence when the superincumbent pressure does not exceed a given quantity.

'The surface of this fluid, by the action of the air on the combustible ingredient which occasioned its fluidity, would at length become consolidated, and would envelop the whole spheroid with a shell of less specific gravity than the fluid part, and therefore floating securely on its surface; this latter essential condition being rendered extremely probable from the well-known fact, that the mean specific gravity of the globe is considerably greater than that of any natural rock hitherto known.

'The interposition of this solid shell of stony matter, a bad conductor of heat, between the liquid and gaseous portions of the globe, would enable the aqueous and other easily-condensible vapours to separate themselves from the permanently-elastic gases, and thus the matter of the globe would be arranged in four concentric spheroids according to their respective gravities: namely, the liquid central portion, the solid stony, the liquid aqueous, and the permanently elastic. As the water penetrated through the stony portion to the nearest fluid part, it would be gradually decomposed, the consolidation would proceed downwards, the newly consolidated part would enlarge in bulk, and thus, aided by the elastic expansion of the hydrogenous base of the decomposed water, would occasion rifts of greater or less magnitude in the superincumbent mass. Some of the larger of these rifts would open a free communication between the ocean and the fluid central mass, a torrent of water would rush down, and the effervescence occasioned by its decomposition would produce the first submarine volcanos. The lava thus ejected would in time raise the mouth of the volcano above the surface of the water, when it would either become quiescent, or, if supplied laterally with a sufficient quantity of water, would assume the character of a proper volcano, or burning mountain. The secondary rocks, *i. e.* all those which either themselves contain organic remains or are associated with those which do, were deposited from solution or suspension in water. By the deposition of these, and the increase by consolidation of the primitive rocks, the thickness of the mass incumbent above the central fluid is continually increasing; and those causes which antiently broke through the solid crust of the globe are now rarely able to produce the same effect; hence the greater magnitude and frequency of volcanic eruptions in the earliest ages of the earth; for the same reason the elevation of large mountainous or continental tracts above the general level no longer takes place; and thus the surface of the globe has become a safe and proper habitation for man and other animals. If the land animals were created as early as possible, that is, while the great changes of the earth's surface abovementioned were still in process, many of the most antient traditions of deluges and other catastrophes may be founded on fact.

'The fluidity of the central part of the globe, and its connection with the active volcanos, affords a plausible theory of earthquakes, and particularly accounts for the propagation of the shock, with diminishing intensity, to great distances.

'The crystals of hornblende, of felspar, &c., which occur so abundantly in most lavas, are, according to this theory, not those component ingredients of rocks which have resisted the heat while the other substances associated with them have been melted; nor are they the result of the slow cooling of a vitreous mass, but are produced by crystallization in the central fluid, and are accumulated, on account of their inferior specific gravity, about its surface, together with the peculiar inflammable matter in which they float, whence they are disengaged during volcanic eruptions.'

DOLOMITE, a variety of magnesian limestone first noticed by Dolomieu. It occurs mostly massive, and in mountain masses; it is usually white, sometimes greyish or yellowish; its structure is sometimes slaty; it is frequently translucent on the edges. It is softer than common limestone.

The Apennines are partly composed of dolomite, and it occurs at Iona. Sometimes it is met with in veins accompanied by quartz, carbonate of lime, &c. The dolomite of the Apennines consists of 59 carbonate of lime and 40 carbonate of magnesia: it contains a variable quantity of oxide of iron.

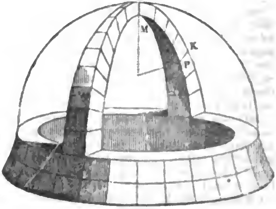
Compact Dolomite or ***Gurhoffian*** is snow white, and very compact. The surface, when newly broken, is scarcely shining, and the fragments, which are sharp, are translucent on the edges; the fracture is flat conchoidal, and its hardness is considerable. It occurs in veins traversing serpentine between Gurhoff (whence its name) and Aggsbach, in Lower Austria. According to Klaproth, it consists of carbonate of lime 70.50, and carbonate of magnesia 29.50.

DOLPHIN. [WHALES.]

DOMBES, a principality in France, to the east of the river Saône; one of the divisions existing before the Revolution. It consisted of two portions separated from each other by an intervening part of the district of Bresse by which the eastern portion was entirely surrounded. The western portion was bounded on the west by Lyonnois, Beaujolais, and Maconnois, from which it was separated by the river Saône; on the south, by the districts of Franc-Lyonnois and Bresse; and on the north and east by Bresse. It is now comprehended in the department of the Ain. It contained seven towns, among which were Trévoux, the capital, and Thoissey. Dombes was governed by sovereign princes of its own, who derived a considerable revenue from it, until the year 1762, when the reigning prince exchanged his principality for the duchy of Gisors in Normandy, and other lands. Dombes was united to the crown; but retained its 'parlement,' or local civil court.

DO'MBEYA, a name given by botanists to a Sterculiaceous genus of shrubs or trees inhabiting the East Indies and the Isles of France, Bourbon, and Madagascar. They have a five-parted persistent calyx, surrounded by a three-leaved unilateral involucel. The petals are five. The stamens are from fifteen to twenty, scarcely monadelphous, five of them being sterile, with from two to three fertile ones between each sterile stamen. The name Dombeya was also applied to the plant now called *Araucaria excelsa.*

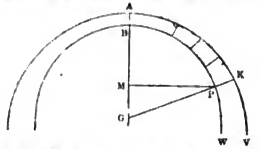
DOME. The mathematical theory of a dome, so far as considerations requisite for security are concerned, is more



simple than that of an arch. Imagine two vertical planes passing through the axis of a dome, and making a small angle with each other. These planes intercept (as in the cut) two symmetrically opposite slices of the dome, which tend to support each other at the crown. This support might be made complete and effectual upon principles explained in the article ARCH; so that in fact each small slice of the dome, with its opposite, might compose a balanced arch. Any slice of such a dome is supported by the opposite one only, so that all the rest might be taken away. Now suppose such a dome to be constructed upon an interior centering, of which however the arches are not separately balanced, in consequence of the weight of A P K being so great that the resultant of this weight and the horizontal thrust at A falls obliquely, not being, as in a balanced arch, perpendicular to P K, but cutting the line K P produced towards the axis. Still this dome cannot fall: for since every part of the horizontal course of stones has the same tendency to fall inwards, these pressures inwards cannot produce any effect, except a lateral pressure of each slice upon the two which are vertically contiguous. Hence the condition of equilibrium of a dome is simply this, that the weight of any portion A M P K must be too great for a balanced arch. Upon this same principle a dome may even be constructed with a concave exterior: and in a dome of convex exterior a portion of the crown may be removed, as is the case when the building is surmounted by a lantern. The tendency of the upper part to fall inwards being equal all round, each stone is supported by those adjacent.

From the preceding it appears that it would be (in comparison with an arch) easy to construct a dome with perfectly polished stones, and without cement. The friction of the stones and the tenacity of the cements are of course additional securities. The part in which the construction is weakest will be near the base, more particularly if the joints become nearly horizontal at the base, or if the circumference at the base be very considerable. This weak point is generally secured in practice by bringing strong chains or hoops round the horizontal courses at the interior of the base. Dr. Robison says 'The immense addition of strength which may be derived from hooping largely compensates for all defects; and there are hardly any bounds to the extent to which a very thin dome vaulting may be carried when it is hooped or framed in the direction of the horizontal courses.' This system of internal hooping is every way preferable to reliance upon cements, and may, without interference with the ornamental part of the design, be carried to any length. Among other advantages, a dome may be made by means of it to rise vertically from the base, which cannot be the case in an arch.

The thickness of a dome should increase towards the base. A perfectly spherical dome, that is, a segment of a hollow shell cut off by a plane, and therefore of uniform thickness, will stand securely if the arch of the generating circle subtend at the centre less than 51° 49′. The law of the thickness necessary to secure equilibrium is as follows:



Let the dome be formed by the revolution of A V and B W, and let P K, the joint of one of the stones, be always perpendicular to the interior curve; which is usually the case in practice. Let A M = x, M P = y, P K = z, arc B P = s; and let p be any constant *greater than unity*, and A any constant whatever. Then there will be equilibrium, the equation of B P W being given, if

$$z = \frac{Ap}{y}\left(\frac{dx}{dy}\right)^{p-1} \cdot \quad \frac{d}{ds}\cdot\frac{dx}{dy}$$

or e being the angle K G B, and ρ the radius of curvature at P

$$z = \frac{Ap\,(\tan e)^{p-1}}{\rho y \cos^2 e}$$

For the demonstration of this formula, see Venturoli's *Mechanics* (Creswell's translation), or Robison's *Mechanical Philosophy*. It is not necessary that p should be a constant: a reference to the work first cited will show how to proceed on the supposition that it is a function of x greater than unity.

DOME, a term applied to a covering of the whole or part of a building. The Germans call it *Dom*, and the Italians *Duomo*, and apply the term to the principal church of a city, although the building may not have any spherical or polygonal dome. From this and other circumstances we may infer the term to be derived from the Latin *Domus*, house.

The remains of antient domes are generally spherical in their form, and built of stone or tufo.

The word dome is applied to the external part of the spherical or polygonal roof, and cupola to the internal part. Cupola is derived from the Italian *cupo*, deep, whence also our word cup. But cupola and dome are often used synonymously, although perhaps incorrectly.

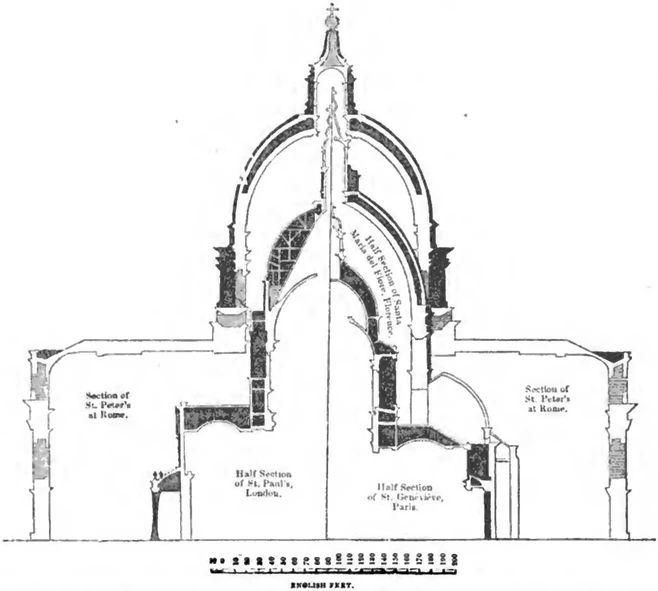
Ruins of numerous domes still exist in the neighbourhood of Rome and Naples. The principal in and near Rome are the Pantheon and the temples of Bacchus, Vesta, Romulus, Hercules, Cybele, Neptune, and Venus, and also some of the Chambers of the Thermæ.

The most magnificent dome of antiquity is that of the Pantheon, supposed to be a chamber of the great baths of Agrippa. The diameter of the dome internally is 142 ft. 8½ in., with a circular opening at the top in the centre 28 ft. 6 in. in diameter. The height of the dome from the top of the attic is 70 ft. 8 in. Internally it is decorated with five rows of square compartments. Each row is considerably larger than that immediately above it, as they converge towards the top. The large squares, all of which are rather more than 12 feet each way, contain four smaller squares sunk one within the other. It is supposed that these squares were decorated with plates of silver, from some fragments of that metal having been found on them. The opening at the top of the dome was decorated with an ornamented bronze moulding, gilt. The external part of the dome appears also to have been decorated with bands of bronze. Constantius II. removed the silver and bronze with which the building was decorated. The base of the dome externally consists of a large plinth with six smaller plinths or steps above it; and in the curve of the dome a flight of steps is formed which leads to the opening at the top of the dome. From the drawings of the architect Serlio it appears that flights of steps were formed at intervals all round the dome, which are now covered with the lead placed there by order of Urban VIII. The dome is constructed of bricks and rubble. Sunk bands round the hollow squares or caissons appear to be formed in brick, and the other parts in tufo and pumice stone. The thickness of the dome of the Pantheon is about 17 ft. at the base, 5 ft. 1½ in. at the top of the highest step, and 4 ft. 7 in. at the top of the dome. The circular wall which supports the dome is 20 ft. thick. This wall is however divided by several large openings, and is furnished with discharging arches of brick. It is most probable that the dome of the Pantheon was executed by means of a centering of wood with the hollow squares formed in relief upon it, as was afterwards done in constructing the great vaulting of St. Peter's.

The dome of one of the chambers of the Thermæ of Caracalla was 111 feet in diameter. In the Thermæ of Titus there are two domes each 84 feet in diameter, and in the baths of Constantine there was one of 76 feet. There were three domes in the baths of Diocletian, of which two still remain; one is 73 feet 6 inches in diameter, and the other 62 feet 3 inches. Judging from those that remain, there is every reason to believe that in the Thermæ they were all lighted from above, like the dome of the Pantheon. Near Pozzuoli there is a very perfect circular building, with a dome 96 feet in diameter, built of volcanic tufo and pumice stone. The temple of Minerva Medica, without the walls of Rome, was on the plan a polygonal dome of ten sides built of brick and pumice stone. This building does not appear to have had any opening at the top.

The antients appear to have constructed domes on corbels. At Catania there is a spherical dome which covers a square vestibule; and in one of the octagonal rooms of the enclosure surrounding the baths of Caracalla the corbels still remain which most probably supported the dome of the chamber.

The dome of Santa Sophia, at Constantinople, built in the



Parallel Section of the four principal Domes of Europe, to the same scale; by Joseph Gwilt; published by Priestley and Weale, High Street, Bloomsbury. (With the permission of the Publishers.)

reign of Justinian, is the most remarkable and the earliest constructed after those of the Romans. Anthemius of Tralles and Isidorus of Miletus were the architects. The present dome, however, was reconstructed by the nephew of Isidorus. It rests on the square formed at the intersection of the arms of the Greek cross: the diameter is about 111 feet, and the dome 40 feet high. The dome is supported by four corbellings placed in the angles of the square. The corbels are surmounted by a kind of cornice which supports a circular gallery. The lower part of the dome is pierced with a row of small windows adorned with columns on the exterior. Externally the dome is divided by projecting ribs, rounded and covered with lead. The top is surmounted by a lantern or finishing like a baluster, on which is a cross. The dome of Anthemius and Isidorus was not so high, and was partly destroyed twenty-one years after its construction by an earthquake during the lifetime of Justinian. In the reconstruction the nephew of Anthemius used very light white bricks, only one fifth the weight of common bricks, which are said to have been made in Rhodes. It appears from the history and description of the building of Santa Sophia, by Procopius, that the architects encountered many difficulties, which arose probably from not being thoroughly acquainted with the principles on which domes should be constructed. (Procopius, *περὶ κτισμάτων*, lib. i. cap. 1.)

The dome of San. Vitale, at Ravenna, which is considered to be more antient than that of Santa Sophia, is curiously constructed. The lower part of the plan of the dome is a regular octagon, which is supported by eight piers placed at the angles of the dome. Between these angles are seven tall niches divided into two stories. The lower part of these niches is open, and ornamented with columns, like Santa Sophia. The eighth side of the dome is pierced with a great arch forming an entrance. This arch is of the same diameter and the same elevation as the niches. The wall above the niches and arch, which is without openings, sustains a hemispherical dome, the plan being a circle described within a regular octagon. Corbels are not employed as at Santa Sophia, but the arches support the gathering over, or corbelling, which forms the circular base of the dome. The base of the dome is pierced with eight windows, each divided in the middle by a column which supports two small arches. The dome itself is built with a double row of pipes, hollow at one end and pointed at the other, the point of one being placed in the hollow of the preceding. They are thus continued in a gentle spiral line until they finish at the top. Between the top of the small arched windows and the pipes there is a construction formed with vases, not unlike the system adopted in the circus of Caracalla. [CIRCUS, vol. vii., p. 197.] The dome itself is covered with mortar both within and without.

The church of San Marco at Venice, built in the tenth century, by order of Pietro Orseolo, the then doge, is decorated with five domes. One of these, placed in the centre of the church, is much larger than the others. Each dome is enclosed within four pieces of semi-cylindrical vaulting, together forming a square, in the angles of which are four corbels, which gather in the circular base of each dome. The lower part of the dome is pierced with small windows. The interior is covered with mosaic, and the top of the dome is terminated with a finishing on which is a cross. In 1523 the doge, Andrea Gritti, caused the domes to be repaired, and Sansovinus, the architect, restored in a great measure the supports, and placed (at about one third of its height a great circle of iron round the large dome to prevent its falling; a precaution which has been completely successful. The other domes are not so well preserved. In 1729 one of the smaller domes was in danger of falling, from the decay which had taken place in a circular bond placed at the base of the dome. Stone was however substituted for the wooden bond, and a circle of iron placed without the dome near its base. In 1735 Andrew Tirali, the architect to the church, placed an iron circle round the dome which is near the great gate, on account of some small fractures which were then perceived. If, however, the other domes are constructed with a wooden bond, it is very probable that they will eventually fall unless steps be taken in time to remove the timber. By the use however of corrosive sublimate, now used in Kyan's patent for preserving wood from the dry rot, wood may be used in the construction of domes with much more security as regards durability.

The celebrated dome of Santa Maria del Fiore, built by Bruneleschi, is far superior in construction to the domes of Santa Sophia and San Marco. Bruneleschi first constructed the octagon tower which supports the dome. Each face of the tower is pierced with a circular window; the walls are 17 feet thick, and the cornice which terminates the tower is 175 feet from the ground. From this cornice rises the double dome.

The external dome is 7 ft. 10 in. thick at the base. The internal dome, which is connected at the angles with the external dome, is 139 ft. in diameter and 133 ft. high from the top of the internal cornice of the tower to the eye of the lantern. This dome has eight angles, forming a species of Gothic vault, and was the first double dome with which we are acquainted. Some time after the dome was finished, several fractures were perceived in it, which were owing to settlements in the masonry; but the fractures were filled up, and no new signs of settlement have showed themselves since.

The first modern dome constructed in Rome was that of the Church of Our Lady of Loretto. It was commenced in 1507 by Antonio Sangallo. The dome, which is double, is circular on the plan. The internal dome is constructed on double consoles, instead of corbellings. The double consoles are crowned with a small cornice, forming an impost for eight arches, from the upper part of which springs the dome. On the top is a lantern light, which is not apparent externally. Up to this time domes had been constructed on walls and corbellings; but in St. Peter's at Rome a new plan was adopted. The dome of St. Peter's stands upon four piers, 61 ft. 11 in. high, and 30 ft. 10 in. thick, measured in a straight line with the arches. From the arches spring the corbellings, which are finished by an entablature. Upon this entablature is a plinth. The plinth is externally an octagon, and internally a circle. The external diameter of the octagon is 192 ft. 9 in., and the internal circle 134 ft. 8½ in.; the thinnest part of the wall, between the octagon and the circle, is 29 ft. 3 in. On the plinth is a circular stylobate, 28 ft. 6½ in. thick. This thickness is divided into three parts by a circular passage, 5 ft. 10 in. wide: the two walls on each side of this passage are, respectively, the internal wall 14 ft. 7¼ in. thick, and the external 8 ft. In the internal wall are other smaller passages, 2 ft. 10 in. wide, forming flights of steps communicating with the four spiral staircases formed in the thickness of the wall of the drum of the dome. Above the circular stylobate, which is 12 ft. 4¼ in. high, is placed the drum of the dome, which is 10 ft. 1½ in. thick, measured to the inside line of the pilasters, which decorate the interior of the dome. The pilasters themselves are 1·78 ft. thick in addition. The construction is formed of rubble and fragments of brick. The interior is lined with bricks stuccoed. Externally the work is faced with thin slabs of travertine stone. The drum is pierced with 16 windows, 9 ft. 3¾ in. wide and 17 ft. high. The walls are strengthened on the outside, between the windows, with 16 buttresses, constructed with solid masonry. These buttresses are 13 ft. 3 in. wide and 51 ft. 6 in. in height from the base to the top of the entablature. Each buttress is decorated and strengthened with half pilasters, and terminates with two coupled columns engaged, the diameter of which is 4 ft.: the order is Corinthian. When the base of the dome had been built to the height of the entablature of the drum, Michel Angelo died; but some time before his death he had caused a wooden model to be made, with ample details, to which he added drawings and instructions. After his death Pirro Ligorio and Vignola were appointed the architects. Giacomo della Porta, the pupil of Vignola, followed his master as architect to the cathedral; but though the designs of Michel Angelo were strictly followed, the dome itself was constructed under the pontificate of Sixtus V. Sixtus gave Giacomo della Porta as a colleague Domenico Fontana, by whom the dome was constructed.

On the constructions of Michel Angelo a circular attic was first formed, 19 ft. 2¼ in. high and 9 ft. 7 in. thick. This attic is strengthened externally by 16 projections, 2 ft. 11 in. deep and 6 ft. 4¼ in. wide, placed over the buttresses of the dome. On the attic rises the double dome, the internal diameter of which, at the base, is 138 ft. 5 in. The curve externally is an arc of a circle whose radius is 84 ft. 1·62 in. To the height of 27 ft. 8 in. from the attic the dome is solid. At the base the thickness is 9 ft. 7 in.; and as the external dome is raised higher than the internal dome, the thickness is increased as the curve ascends, so that where the dome is divided the thickness is 11 ft. 4 in. The circular space which divides the two domes is 3 ft. 2¼ in. wide; the internal dome is 6 ft. 4 in. thick; and the height from the attic to the opening of the lantern is 83 ft. 10 in. The diameter of the lantern is 24 ft. 10 in. The external dome is 2 ft. 10½ in. thick where it separates itself from the internal dome; and it is strengthened externally by 16 projecting bands of the same thickness. The dome is pierced with three rows of small windows. As the curves of the dome are not concentric, the space between them becomes wider as it rises; so that at the opening of the lantern the space is 10 feet wide. These domes are joined together by 16 walls or spurs, diminishing in thickness as they ascend to the lantern; at the base they are 8 ft. thick, and at the summit 3 ft. The base of the lantern is arched, and pierced with small windows. Above the two domes is a circular platform, surrounded with an iron gallery. In the centre rises the lantern, on a stylobate broken into 16 parts, forming projecting pedestals, above which are buttresses similar to the buttresses of the drum, decorated externally with coupled Ionic columns, 17½ in. in diameter. The space between the buttresses is filled with arched openings, which give light to the lantern. The external diameter of the lantern is 39 ft.; the internal diameter 25 ft. 16¾ in.; and the height from the platform to the top of the cross is 89 ft. 7½ in. The whole height, from the external plinth of the dome to the cross, is 263 ft. The total height from the pavement is 437 ft. 5 in. The total height internally, to the top of the dome of the lantern, is 387 ft.

Sixtus V. covered the external dome with lead, and the bands with bronze gilt. One hundred thousand large pieces of wood were used in making the centering of the domes, which was so admirably constructed, that it appeared suspended in the air. (See the drawings in the work by Fontana, on the construction of this dome.) This centering was more for the purpose of a scaffolding for the materials and workmen, than to sustain the weight of the double dome. During the construction of the dome it is believed that only two circles of iron were placed round the masonry, one of which was placed on the outside of the internal dome, at about 36 feet from its springing, and one foot above the division of the domes. The bands of iron of which this circle is composed are 3 in. wide by 1¾ in. thick. A similar circle is placed about the middle of the solid part of the dome, at about 17 feet 6 inches above the springing of the internal dome. Near the top of the internal dome there are several holes, at the bottom of which upright iron bars appear. These bars are said to be the connecting rods which keep together other circles of iron placed at different heights within the masonry, which are finally terminated by a circle round the eye of the dome.

The domes were constructed with such haste, that sufficient time was not allowed to the work to form solid beds as it was carried up, in consequence of which a great number of vertical settlements took place, and the circle of iron round the internal dome was fractured. To obviate the danger arising from these settlements, six circles of iron were placed round the external dome at different heights, and the broken circle of the internal dome was repaired. The first circle was placed above the cornice of the external stylobate, or continuous plinth, on which the buttresses stand; the second circle was placed above the cornice of the buttresses, the third above the attic at the springing of the external dome, the fourth half way up the external dome, and the fifth under the base of the lantern. A sixth was shortly after placed at one foot below where the dome divides itself. The iron bands are flat, from 16 to 17 feet long, 3¼ inches wide, and 2⅞ in. thick. At one end of the pieces of iron a hole is made; the other end is turned up and passed through the eye of the next band. The whole of these bands are fixed with iron wedges, driven into the rubble with maliets. Sheets of lead are placed under the iron circles. In the 'Encyclopédie Méthodique' there is a detailed account of the various fractures of the dome, and the means employed to repair them. ('Coupole,' *Encyclopédie Méthodique*, 'Architecture.')

The dome of St. Paul's cathedral, London, is placed over the intersection of the four naves. The ground plan is a regular octagon, each face of which is 44 feet 8¾ inches wide: four of these sides are formed by the four great arches of the naves; the other four sides are formed by false arches of the same size; in each of these arches there is a great niche, the base of which is pierced with two arches. By this means eight supports are obtained instead of four, and the corbellings do not project too much, as in other similar constructions. The corbellings gather in a circle, the diameter of which is 104 feet 4 inches, the octagon base being 107 feet. The corbellings are surmounted by a complete entablature 8 feet 3 inches high, decorated with consoles. The drum is set back 3 feet 2¼ inches from the face of the frieze, and this intermediate space is occupied by two steps and a seat. The cornice is 98 feet 9¾ inches from the pavement. The height of the drum from the top of the seat is 62 feet 6¼ inches to the springing of the internal dome. The wall forming the drum is inclined internally 4 feet 11½ inches, or about the 12th part of its height. This was designed by the architect to increase the resistance of the walls to the united pressure of the large internal vault and the conical dome which carries the lantern.

The interior of the drum is decorated with a continuous stylobate, on which is an order of Corinthian pilasters. The 32 spaces between the pilasters are filled with 24 windows and eight large niches. Externally the drum is decorated with an order of 32 Corinthian columns engaged, which are united to the wall of the drum by eight solid constructions in masonry. In each space between the constructions there are three intercolumnations, the columns being joined at their bases by walls pierced with arches. The external colonnade is surmounted by an entablature, with a mutuled cornice, on which is a balustrade; behind this is a terrace, formed by the recessing back. The attic is 22 feet 4½ inches high from the top of the balustrade to the under side of the cornice of the attic. Above the internal order of the drum rises the interior dome, the diameter of which at the springing is 102 feet 2¾ inches by 51 feet in height. The top of the dome has a circular opening 14 feet 10¾ inches in diameter.

Above the attic are two steps, from which the external dome springs. The external dome is constructed of wood, covered with lead, and decorated with projecting ribs forming pannels, curved at the ends. This dome terminates with a finishing which joins the base of the lantern: the circular gallery formed on the finishing is 274 feet 9 inches above the pavement of the nave. The lantern is supported on a conical tower, terminated by a spherical dome. This tower, which is joined to the internal dome at its base, disengages itself from it at the height of 8 feet 6 inches above the springing of the same. The perpendicular height of this tower is 86 feet 9 inches, and the walls are inclined 24 degrees from the perpendicular: the diameter of the base is 100 feet 1 inch measured externally, and 34 feet 1 inch at the springing of the spherical dome which finishes it. The wall of this tower is built of brick, and is 1 foot 7 inches thick, with circular rings of masonry, fastened with iron bands. The spherical dome at the top of the tower has an opening 8 feet in diameter at the summit. Between the attic and the wall of the tower are 32 walls or buttresses, which also serve to bear the ribs of the wooden external dome.

About the same time that Wren built the dome of St. Paul's, Hardouin Mansard, a French architect, constructed the dome of the Invalides at Paris. The plan of this dome is a square, in which is inscribed a Greek cross; in the angles of the square there are four chapels. The dome is raised in the centre of the Greek cross; the base supporting it is an octagonal figure, with four large and four small sides. The four small sides form the faces of the piers of the dome; the large sides are the arched openings of the nave and transverse aisles. A circular entablature is placed over the corbellings, and on the entablature is raised the drum of the dome, the diameter of which is 79 feet 9½ inches. The interior of the drum is decorated with a continuous stylobate, above which are coupled pilasters of the composite order, and the wall is pierced with 12 windows. The dome, which is double, rises from a springing common to both. The lower or internal dome, constructed with masonry, is spherical, and is 83 feet in diameter, with an opening or eye at the top 53 feet 3 inches in diameter, through which part of the outer dome can be seen. The outer dome is of a spheroidal form, and constructed of stone at the base, and of brick above. Externally the dome is formed with a stylobate, on which is a Corinthian order of columns, over which is an attic with pilasters, and buttresses in the form of consoles. The drum is fortified externally by eight projections, placed two and two above each pier of the dome. The external dome is framed of wood, and covered with lead, like St. Paul's, London, but the construction is much heavier. The external diameter of the dome is 85 feet 4 inches, and its height is 57 feet 2½ inches. The finishing of the dome is decorated with consoles, on which is formed a circular balcony round the base of the lantern, constructed of wood, which is 39 feet 4¾ inches high; the lantern above it, with the cross, is 35 feet 4¾ inches high. The total height from the ground is 330 feet.

The dome of the Pantheon at Paris is constructed entirely of stone, and is placed in the centre of a Greek cross. It is supported by four triangular piers strengthened by engaged columns of the Corinthian order. The four piers with the lines of the intermediate arches form externally a large square, each side of which is 74 feet 9 inches.

These four piers are pierced above with arched openings, and between the piers with the openings are large arches, the diameter of which is 44 feet 11½ inches, and the height 85 feet 5 inches. Between these arches rise the corbellings, which are gathered in to form the circular plan of the drum. The arches and the corbellings are crowned with a large entablature 13 feet 4 inches high. The upper part of the cornice of the entablature is raised 101 feet above the pavement of the nave. The diameter taken at the frieze is 66 feet. The internal drum which is constructed on this entablature is 55 feet 7½ inches in height to the springing of the internal dome. The interior of this drum is decorated with a continuous stylobate, which is the basement of a colonnade of 16 Corinthian columns almost isolated from the wall. These columns are 35 feet 2¾ inches in height. Between the columns are 16 windows; four of which are false, and placed above the four piers of the dome. The colonnade is crowned with an entablature, above which is a large plinth which rises to the springing of the internal dome. The internal dome is 66 feet 8¼ inches in diameter at the springing, and is decorated with octagonal caissons or sinkings with a rose in the centre of each. The eye at the top of the dome is 31 feet 3¼ inches in diameter. Through this eye is seen the upper part of another or intermediate dome. The external dome is placed on a circular base 108 feet 7½ inches in diameter and square at the bottom. The angles are strengthened by flying buttresses. Above the corbellings a circular wall is constructed, forming an external continuous stylobate which supports an external colonnade. The external colonnade constructed on the stylobate forms a peristyle round the dome, and is composed of 32 isolated columns of the Corinthian order 36 feet 5¾ inches high. This colonnade is divided into four parts by the solid constructions in masonry raised over the four piers. The external colonnade is surmounted with an entablature and balustrade above it. There is an attic constructed above the circular wall of the drum, set back 13 feet 10 inches, and pierced with 16 windows, twelve of which light the space between the internal dome and the intermediate dome which bears the lantern. This attic is terminated with a cornice with a step or plinth above. The external dome 77 feet 8¼ in diameter, measured on the outside, is constructed with masonry; the height is 45 feet 9½ inches from the top of the attic to the underside of the finishing against which the curve terminates. The outside of the dome is covered with lead, and is equally divided vertically by 16 projecting ribs. The intermediate dome, built for the purpose of carrying the lantern, was intended to be decorated with subjects by the painter, and we believe it has since been decorated. The form of this dome resembles the small end of an egg: its springing commences at the base of the attic at the point where the internal dome begins to disengage itself. This dome is 50 feet ¾ inch high, and 70 feet 3½ inches in diameter, and is pierced with four great openings at the lower part 37 feet 3 inches high, and 30 feet 10½ inches wide at the base. On a circular platform above the summit of the dome are eight piers with arches, which support the finishing against which the external dome terminates. Above this is the lantern of the dome.

Very full details of the most remarkable domes in Europe are given in the 'Encylopédie Méthodique' *(Architecture)*, from which this brief notice is in a great measure taken. For an account of the construction of wooden-ribbed domes, see Nicholson's Architectural Dictionary; also the section of the Pantheon dome by Taylor and Cressy; and the work on St. Peter's, by Fontana.

The following admeasurements of most of the principal domes of Europe are from Mr. Ware's 'Tracts on Vaults and Bridges.'

Domes of Antiquity.

	Feet in diameter, taken externally.	High from the ground line.
Dome of the Pantheon	142	143
„ Minerva Medica at Rome	78	97
„ Baths of Caracalla	112	116
„ Baths of Diocletian	74	83
Temple of Mercury	68	
„ Diana	98	78
„ Apollo	120	
„ Proserpine and Venus	87	77
Domes of comparatively modern Times.		
Santa Sophia at Constantinople	115	201
Mosque of Achmet, ditto	92	120
San. Vitale at Ravenna	55	91
San Marco at Venice	44	
From the time of Brunelleschi to the present period.		
Santa Maria del Fiore at Florence	139	310
The Chapel of the Medici	91	199
Baptistry at Florence	86	110
Cathedral of St. Peter at Rome	139	330
Ch. of the Madonna della Salute at Venice	70	133
„ Superga at Turin	64	128
„ Invalides at Paris	80	173
„ Val de Grace, Paris	55	133
„ Sorbonne, Paris	40	110
Pantheon, or St. Généviève, Paris	67	190
Cathedral of St. Paul's, London	112	215

DOMENICHI'NO, DOMENI'CO ZAMPIERI, called DOMENICHINO, was born at Bologna, in 1581, of poor parents. According to some authorities, his first master was Denis Calvart; but Bellori gives him Fiammingo for his first teacher. The latter, entertaining a jealous dislike (says the biographer) to the Caracci, beat his pupil, and turned him out of doors, because he found the boy copying a design by Annibale. On the occasion of his dismissal being made known to Agostino Caracci, he was admitted to the study of the Caracci, and he soon gained one of the prizes which Lodovico customarily distributed, to the surprise of his fellow-students, who had expected little from a youth of his bashful, retiring, awkward manners. After visiting Parma, Domenichino went to Rome, where he studied and worked for some time under Annibale Caracci. He afterwards obtained the patronage of Cardinal Gieronimo Aguechi, and while he lived in his house painted many pictures for him. Besides painting, he studied architecture, and was appointed architect to the apostolic palace by Gregory XV. After the death of that pontiff, finding himself somewhat reduced in circumstances, and receiving an invitation to Naples, he removed thither with his wife and children. He died in 1641. During his life he was much respected. He formed a particularly strict friendship with Albano, in whose house he lived for two years when he first arrived in Rome.

Domenichino was so slow in his early progress as to disappoint many of his friends, and he had the appellation of Bue (ox) among his fellow-students; but Annibale Caracci, who perceived in him the marks of that genius which he afterwards developed, told the jeerers that their nickname was only applicable to the patience and fruitful industry of the laborious student. He retained the utmost deliberation in his mode of working to the last; and it was his custom, if he had anything to design, not to proceed at once to work with his pencil, but to reflect some time upon his subject: when, however, he once took it in hand, slow as he was, he did not leave it until he had completed it. It is said that he had many maxims which justified his slowness: such as, that no line was worthy of an artist which was not in his mind before it was traced by his hand. He entered so fully into his subject, that he was once surprised acting the scene which he had to paint, in person, by Annibale Caracci, who burst into raptures at so instructive a lesson. Annibale ever sympathized with enthusiasm and activity of will in painting. Domenichino only left his retired study to make sketches and observations upon expression in active life, and spent much of his time in reading history and poetry.

Domenichino was profoundly studied in his drawing, rich and natural in his colouring, and, above all, correct and lifesome in his expression. Annibale is said to have been decided in his judgment between two pictures of the Scourging of St. Andrew, painted in competition by Domenichino and Agostino Caracci, by hearing an old woman point out with much earnestness the beauties of Domenichino's to a little child, describing every part as if it were a living scene, while she passed the other over in silence. To the graver design of the Bolognese school Domenichino added something of the ornamental manner of the Venetian, his pictures being rich in the accessaries of architecture and costume. His genius, however, is not characterized by great invention, and he has been accused of borrowing too directly from the works of others; and his draperies have been confessed by his admirers to be harsh and too scanty in the folds. Nevertheless, he has been esteemed by the best judges (and among them are the Caracci and Nicholas Poussin) as one of the first of painters, and by some second only to Raphael. Such, however, he will never be thought by the world at large.

Domenichino excelled also in landscape, and was famous for his admirable execution of the figures with which he enlivened them. His principal works are at Rome and Naples; among them the Communion of St. Jerome and the Martyrdom of St. Agnes are the most celebrated. (Bellori.)

DOMESDAY BOOK, the register of the lands of England, framed by order of King William the Conqueror. It was sometimes termed *Rotulus Wintoniæ*, and was the book from which judgment was to be given upon the value, tenures, and services of the lands therein described. The original is comprised in two volumes, one a large folio, the other a quarto. The first begins with Kent, and ends with Lincolnshire; is written on three hundred and eighty-two double pages of vellum, in one and the same hand, in a small but plain character, each page having a double column; it contains thirty-one counties. After Lincolnshire (fol. 373), the claims arising in the three ridings in Yorkshire are taken notice of, and settled; then follow the claims in Lincolnshire, and the determinations of the Jury upon them (fol. 375); lastly, from fol. 379 to the end there is a recapitulation of every wapentake or hundred in the three ridings of Yorkshire; of the towns in each hundred, what number of carucates and ox-gangs are in every town, and the names of the owners placed in a very small character above them. The second volume, in quarto, is written upon four hundred and fifty double pages of vellum, but in a single column, and in a large fair character, and contains the counties of Essex, Norfolk, and Suffolk. In these counties the 'liberi homines' are ranked separate; and there is also a title of 'Invasiones super Regem.'

These two volumes are preserved, among other records of the Exchequer, in the Chapter House at Westminster: and, at the end of the second, is the following memorial in capital letters of the time of its completion: 'Anno Millesimo Octogesimo Sexto ab Incarnatione Domini, vigesimo vero regni Willielmi, facta est ista Descriptio, non solum per hos tres Comitatus, sed etiam per alios.' From internal evidence there can be no doubt but that the same year, 1086, is assignable as the date of the first volume.

In 1767, in consequence of an address of the House of Lords, George III. gave directions for the publication of this Survey. It was not, however, till after 1770 that the work was actually commenced. Its publication was entrusted to Mr. Abraham Farley, a gentleman of learning as well as of great experience in records, who had almost daily recourse to the book for more than forty years. It was completed early in 1783, having been ten years in passing through the press, and thus became generally ac-possible to the antiquary and topographer. It was printed in fac-simile, as far as regular types, assisted by the representation of particular contractions, could imitate the original.

In 1816 the commissioners upon the Public Records published two volumes supplementary to Domesday, which now form one set with the volumes of the Record: one of these contains a general introduction, accompanied with two different indexes of the names of places, an alphabetical index of the tenants in capite, and an 'Index Rerum.' The other contains four records; three of them, namely, the Exon Domesday, the Inquisitio Eliensis, and the Liber Winton., contemporary with the Survey; the other record, called 'Boldon Book,' is the Survey of Durham, made in 1183, by bishop Hugh Pudsey. These supplementary volumes were published under the superintendence of Sir Henry Ellis.

Northumberland, Cumberland, Westmorland, and Durham were not included in the counties described in the Great Domesday; nor does Lancashire appear under its proper name; but Furness, and the northern part of that county, as well as the south of Westmorland and part of Cumberland are included within the West Riding of Yorkshire: that part of Lancashire which lies between the rivers Ribble and Mersey, and which at the time of the Survey comprehended six hundreds and 188 manors, is subjoined to Cheshire. Part of Rutlandshire is described in the counties of Northampton and Lincoln; and the two antient hundreds of Atiscross and Existan, deemed a part of Cheshire in the Survey, have been since transferred to the counties of Flint and Denbigh. In the account of Gloucestershire we find a considerable portion of Monmouthshire included, seemingly all between the rivers Wye and Usk. Kelham thinks it probable that the king's commissioners might find it impossible to take any exact survey of the three counties northernmost of all, as they had suffered so much from the Conqueror's vengeance. As to Durham, he adds, all the country between the Tees and Tyne had been conferred by Alfred on the bishop of this see; and at the coming in of the Conqueror he was reputed a count-palatine.

The order generally observed in writing the Survey was to set down in the first place at the head of every county (except Chester and Rutland) the king's name, *Rex Willielmus*, and then a list of the bishops, religious houses, churches, any great men, according to their rank, who held of the king in capite in that county, likewise of his thains, ministers, and servants; with a numerical figure in red ink before them, for the better finding them in the book. In some counties the cities and capital boroughs are taken notice of before the list of the great tenants is entered, with the particular laws or customs which prevailed in each of them; and in others they are inserted promiscuously. After the list of the tenants, the manors and possessions themselves which belong to the king, and also to each owner throughout the whole county, whether they lie in the same or different hundreds, are collected together and minutely noted, with their under-tenants. The king's demesnes, under the title of *Terra Regis*, always stand first.

For the adjustment of this Survey certain commissioners, called the king's justiciaries, were appointed. In folios 164 and 181 of the first volume we find them designated as 'Legati Regis.' Those, for the midland counties at least, if not for all the districts, were Remigius, bishop of Lincoln, Walter Giffard, earl of Buckingham, Henry de Ferrers, and Adam, the brother of Eudo Dapifer, who probably associated with them some principal person in each shire. These inquisitors, upon the oaths of the sheriffs, the lords of each manor, the presbyters of every church, the reves of every hundred, the bailiffs and six villains of every village, were to enquire into the name of the place, who held it in the time of king Edward, who was the present possessor, how many hides in the manor, how many carucates in demesne, how many homagers, how many villains, how many cotarii, how many servi, what free-men, how many tenants in socage, what quantity of wood, how much meadow and pasture, what mills and fish-ponds, how much added or taken away, what the gross value in king Edward's time, what the present value, and how much each free-man, or soc-man had or has. All this was to be triply estimated: first, as the estate was held in the time of the Confessor; then as it was bestowed by king William; and thirdly, as its value stood at the formation of the Survey. The jurors were, moreover, to state whether any advance could be made in the value. Such are the exact terms of one of the inquisitions for the formation of this Survey, still preserved in a register of the monastery of Ely.

The writer of that part of the Saxon Chronicle which relates to the Conqueror's time, informs us with some degree of asperity, that not a hide or yardland, not an ox, cow, or hog, was omitted in the census. It should seem, however, that the jurors, in numerous instances, framed returns of a more extensive nature than were absolutely required by the king's precept, and it is perhaps on this account that we have different kinds of descriptions in different counties.

From the space to which we are necessarily limited, it is impossible to go more minutely into the contents of this extraordinary record, to enlarge upon the classes of tenantry enumerated in it, the descriptions of land and other property therewith connected, the computations of money, the territorial jurisdictions and franchises, the tenures and services, the criminal and civil jurisdictions, the ecclesiastical matters, the historical and other particular events alluded to, or the illustrations of antient manners, with information relating to all of which it abounds, exclusive of its particular and more immediate interest in the localities of the country for the county historian.

As an abstract of population it fails. The tenants in capite, including ecclesiastical corporations, amounted scarcely to 1400; the under-tenants to somewhat less than 8000. The total population, as far as it is given in the record itself, amounts to no more than 282,242 persons. In Middlesex, pannage (payment for feeding) is returned for 16,535, in Hertfordshire for 30,705, and in Essex for 92,991 hogs; yet not a single swine-herd (a character so well known in the Saxon times) is entered in these counties. In the Norman period, as can be proved from records, the whole of Essex was, in a manner, one continued forest; yet once only in that county is a forester mentioned, in the entry concerning Writtle. Salt-works, works for the production of lead and iron, mills, vineyards, fisheries, trade, and the manual arts, must have given occupation to thousands who are unrecorded in the survey; to say nothing of those who tended the flocks and herds, the returns of which so greatly enlarge the pages of the second volume. In some counties we have no mention of a single priest, even where churches are found; and scarcely any inmate of a monastery is recorded beyond the abbot or abbess, who stands as a tenant in capite. These remarks might be extended, but they are sufficient for their purpose. They show that, in this point of view, the Domesday Survey is but a partial register. It was not intended to be a record of population further than was required for ascertaining the geld.

There is one important fact, however, to be gathered from its entries. It shows in detail how long a time elapsed before England recovered from the violence attendant on the Norman Conquest. The annual value of property, it will be found, was much lessened as compared with the produce of estates in the time of Edward the Confessor. In general, at the Survey, the king's lands were more highly rated than before the Conquest; and his rent from the burghs was greatly increased; a few also of the larger tenants in capite had improved their estates; but, on the whole, the rental of the kingdom was reduced, and twenty years after the Conquest the estates were, on an average, valued at little more than three fourths of the former estimate. An instance appears in the county of Middlesex, where no Terra Regis however occurs. The first column, headed T. R. E., shows the value of the estates in the time of king Edward the Confessor; the second, the sums at which they were rated at the time of the Survey, *tempore Regis Willielmi*:—

	T. R. E.			T. R. W.		
	£	s.	d.	£	s.	d.
Terra Archiep. Cant.	100	14	0	86	12	0
Terra Episc. Lond. .	190	11	10	157	19	6
Eccl. S. Pet. West. .	114	0	0	86	16	6
Eccl. Trin. Rouen .	25	10	0	20	10	0
Geoff. de Mandeville	121	13	0	112	5	0
Ernald de Hesding .	56	0	0	24	0	0
Walter de St. Waleri	120	0	0	111	0	0
Terr. alior. Tenent .	204	0	0	147	8	0
	932	8	10	746	11	0

We shall now say a few words on the uses and consequences of the Survey. By its completion the king acquired an exact knowledge of the possessions of the crown. It afforded him the names of the landholders. It furnished him with the means of ascertaining the military strength of the country; and it pointed out the possibility of increasing the revenue in some cases, and of lessening the demands of the tax-collectors in others. It was moreover a register of appeal for those whose titles to their property might be disputed.

Appeals to the decision of this Survey occur at a very early period. Peter of Blois notices an appeal of the monks of Croyland to it in the reign of Henry I. Others occur in the Abbreviatio Placitorum from the time of John downward. In later reigns the pleadings upon antient demesne are extremely numerous: and the proof of antient demesne still rests with the Domesday Survey. Other cases in which its evidence is yet appealed to in our courts of law, are in proving the antiquity of mills, and in setting up prescriptions *in non decimando*. By stat. 9 Edw. II., called Articuli Cleri, it was determined that prohibition should not lie upon demand of tithe for a *new* mill. The mill, therefore, which is found in Domesday must be presumed older than the 9th Edw. II., and is, of course, discharged, by its evidence, from tithe.

On the discharge of abbey-lands from tithes, as proved by Domesday, it may be proper to state that pope Paschal II. at an early period, exempted generally all the religious from paying tithes of lands in their own hands. This privilege was afterwards restrained to the four favoured Orders, the Cistercians, the Templars, the Hospitallers, and the Premonstratensians. So it continued till the fourth Council of Lateran in 1215, when the privilege was again restrained to such lands as the abbeys had at that time, and was declared not to extend to any after-purchased lands. And it extends only to lands *dum propriis manibus coluntur*. From the paucity of dates in early documents, the Domesday Survey is very frequently the only evidence which can be adduced that the lands claiming a discharge were vested in the monastery previous to the year expressed in the Lateran Council.

Although in early times, Domesday, precious as it was always deemed, occasionally travelled, like other records, to distant parts, till 1696 it was usually kept with the king's seal, at Westminster, by the side of the Tally Court in the exchequer, under three locks and keys, in the charge of the auditor, the chamberlains, and deputy chamberlains of the exchequer. In the last-mentioned year it was deposited among other valuable records in the Chapter House, where it still remains.

The two most important works for the student of the Domesday Survey are Kelham's *Domesday Book illustrated*, 8vo., Lond., 1788, and the *General Introduction* to the survey, reprinted by command of His Majesty under the direction of the commissioners on the Public Records, 2 vols., 8vo., 1833, accompanied by fresh indices. A translation of the whole, under the title of 'Dom-Boc,' was undertaken early in the present century by the Rev. William Bawdwen, vicar of Hooton Pagnell, in Yorkshire, who published Yorkshire, with the counties of Derby, Nottingham, Rutland, and Lincoln, in 4to., Doncaster, 1809, followed by the counties of Middlesex, Hertford, Buckingham, Oxford, and Gloucester, 4to., Doncaster, 1812; but the work went no further. County portions of this record will be found translated in most of our provincial histories; the best are undoubtedly those in Dugdale's Warwickshire, Nichols's Leicestershire, Hutchins's Dorsetshire, Nash's Worcestershire, Bray and Manning's Survey, and Clutterbuck's Hertfordshire. Mr. Henry Penruddocke Wyndham published Wiltshire, extracted from Domesday Book, 8vo. Salisb. 1788, and the Rev. Richard Warner, Hampshire, 4to Lond., 1789. Warwickshire has been published recently by Mr. Reader. There are numerous other publications incidentally illustrative of Domesday topography, which the reader must seek for according to the county as to which he may desire information.

DOMINANT, in music, the fifth of the key. Thus, if the key be C, the dominant is G.

DOMINGO, ST. [HISPANIOLA.]

DOMINI'CA, one of the Antilles, belonging to the English, and lying between the French islands of Martinique and Guadaloupe: the parallel of 15° 18′ N. lat. and the meridian of 61° 28′ W. long. pass through the island. Dominica was discovered by Columbus in 1493, and received its name in consequence of its being first seen on a Sunday. The right of occupancy was long claimed equally by England, Spain, and France, without any active measures being taken on the part of any of those powers for its exclusive possession; so that it became virtually a kind of neutral ground until the year 1759, when its possession was assumed by the English, and their right to hold it was formally recognized, in 1763, by the treaty of Paris. On this occasion commissioners were sent out by the English government, who sold the unsettled lands by auction to the highest bidders. In this way nearly half the island was disposed of in small lots, at prices amounting on the average to 65*s*. per acre. The occupiers of lands already settled were confirmed in their possession by leases granted for forty years, and renewable, at the annual rent of 2*s*. per acre. In 1778 Dominica was taken by a French squadron under the Marquis de Bouillé, but was restored to England at the peace in 1783. In 1805 the island was again attacked by the French fleet under Admiral Villeneuve, but was successfully defended by the garrison under Sir George Prevost.

Dominica is 28 miles long and 16 miles broad in the broadest part; but its mean breadth is not more than 9 miles. No regular survey has ever been made; but the area is computed at 260 square miles. The origin of the island is volcanic. Pumice-stone, sulphur, and other volcanic productions are found. An attempt was recently made to trade in sulphur with the United States, but the speculation proved unsuccessful. There are numerous quarries of a volcanic lava, sufficiently durable for the purpose of ordinary buildings, which are worked for the use of the colony. The surface of the island is rugged, and its mountains are among the highest in the Antilles. Morne Diablotin is 5300 feet above the sea. The valleys are very fertile, and watered by numerous streams, of which there are thirty in different parts. About the centre of the island, and about six miles from the town of Roseau, on the top of a high mountain, is a fresh-water lake, with an area of several acres, and in some parts unfathomable. The soil in the valleys having been washed down from the hills by the periodical rains and mixed with decayed vegetable matter, has formed a light brown coloured mould, which is highly productive; towards the coast the soil is a fine deep black mould on a subsoil of yellow brick clay. The island contains an abundance of large timber-trees of the kinds commonly found in the West India Islands; among these the trunks of the gum-trees are hollowed out to form canoes. The streams abound with excellent fish, among which are mullets, pike, eels, and crayfish; the fishery on the coast also yields abundantly for the supply of the inhabitants.

The principal produce of Dominica consists of sugar (and of course rum) and coffee; the quality of the latter has a higher repute than that of any other of the West India Islands. The island is unequally divided into ten parishes. The town Roseau is in St. George's parish, on the south-west side of the island, and on a tongue of land, having Woodbridge Bay on the north and Charlotteville Bay on the south. The town is regularly built, with long and wide paved streets, which intersect each other at right angles. The roadstead is safe, although the anchorage is far from good, from October to August; but during the hurricane months a heavy sea frequently rolls in from the south. Prince Rupert's Bay, on the north-west side of the island, is at all times safe and commodious.

The population, according to a census taken in 1833, consisted of—

	Males.	Females.	Total.
Whites	382	338	720
Free coloured people	1,673	2,141	3,814
Slaves	6,802	7,324	14,126
Total,	8,857	9,803	18,660

The population of the town consisted of 244 whites, 1289 free coloured people, and 739 slaves; altogether, 2272 persons. There were in 1835, in Roseau, 3 schools, in which there were 245 children, taught according to the Madras system; there was one other school, in the parish of St. Joseph, wherein 40 children were instructed. The greater part of the inhabitants profess the Roman Catholic faith.

The shipping that arrived and sailed from the island in 1835 were as follows:—

	Arrived. Ships.	Arrived. Tons.	Arrived. Men.	Sailed. Ships.	Sailed. Tons.	Sailed. Men.
Great Britain	7	1,783		6	1,515	
British colonies	100	4,340		112	5,585	
United States	36	4,682		18	2,206	
Foreign parts	79	1,846		87	3,615	
Total,	222	12,651	1,154	223	12,921	1,172

The imports consist principally of plantation stores, cotton, linen, and woollen manufactures from England; corn, fish, and lumber from the British North American colonies and the United States, and live stock from the neighbouring continent of America. The exports are principally coffee, sugar, and rum. The quantities shipped in 1832, 1833, and 1834, were as follows:—

	1832.	1832. Value.	1833.	1833. Value.	1834.	1834. Value.
Coffee	1,365,392 lbs.	45,146*l.*	897,555 lbs.	30,701*l.*	898,891 lbs.	26,272*l.*
Sugar	6,256,992	84,792	5,356,512	78,953	5,996 928	77,228
Rum	51,100 gals.	4,607	44,097	3,238	46,090	2,575

DOMINICAL LETTER (*dies domi'nica*, Sunday). To every day in the year is attached one of the first seven letters, A, B, C, D, E, F, G; namely, A to the first of January, B to the second, &c.; A again to the eighth of January, and so on. The consequence is, that all days which have the same letter fall on the same day of the week. The *dominical letter* for any year is the letter on which all the Sundays fall. Thus, the first of January, 1837, being Sunday, the dominical letter for 1837 is A. In a common year, the first and last days have the same letters, whence the dominical letter of the succeeding year is one earlier in the list: that is, the dominical letter for 1838 is G. But in leap-year, it is to be remembered that the 29th of February has no letter attached to it: whence every leap-year has two dominical letters, the first for January and February, the second for all the rest of the year, the second being one earlier than the first. The following will now be easily understood; each year is followed by its dominical letter; 1837, A; 1838, G; 1839, F; 1840, E, D; 1841, C; 1842, B; 1843, A; 1844, G, F, &c.

As it is convenient in historical reading to be able to find the day of the week on which a given day in a distant year fell, we subjoin the following tables. The middle column of figures contains the tens and units of the year in question, while the figures at the head contain the hundreds and tens of hundreds. Thus for the years 536 and 1772, look for 36 and 72 in the middle column, and for 5 and 17 at the head. On the right of the middle column is all that relates to the *old style;* on the left all that relates to the *new style.* The large letters on the left refer to years after Christ, the small letters to years before Christ.

OLD STYLE. The large letters refer to years *after* the Christian Era, and the small letters to years *before* it.								NEW STYLE.			
0 7 14 21 28 35	1 8 15 22 29 36	2 9 16 23 30 37	3 10 17 24 31 38	4 11 18 25 32 39	5 12 19 26 33 40	6 13 20 27 34 41		1 5 9 13 17 21 25 29 33 37	2 6 10 14 18 22 26 30 34 38	3 7 11 15 19 23 27 31 35 39	4 8 12 16 20 24 28 32 36 40
B *e* A *f* G *g* F E *b a*	C *d* B *e* A *f* G F *a g*	D *c* C *d* B *e* A G *g f*	E *b* D *c* C *d* B A *f e*	F *a* E *b* D *c* C B *e d*	G *g* F *a* E *b* D C *d c*	A *f* G *g* F *a* E D *c b*	1 29 57 85 2 30 58 86 3 31 59 87 4 32 60 88	B A G F E	D C B A G	F E D C B	G F E D C
D *c* C *d* B *e* A G *g f*	E *b* D *c* C *d* B A *f e*	F *a* E *b* D *c* C B *e d*	G *g* F *a* E *b* D C *d c*	A *f* G *g* F *a* E D *c b*	B *e* A *f* G *g* F E *b a*	C *d* B *e* A *f* G F *a g*	5 33 61 89 6 34 62 90 7 35 63 91 8 36 64 92	D C B A G	F E D C B	A G F E D	B A G F E
F *a* E *b* D *c* C B *e d*	G *g* F *a* E *b* D C *d c*	A *f* G *g* F *a* E D *c b*	B *e* A *f* G *g* F E *b a*	C *d* B *e* A *f* G F *a g*	D *c* C *d* B *e* A G *g f*	E *b* D *c* C *d* B A *f e*	9 37 65 93 10 38 66 94 11 39 67 95 12 40 68 96	F E D C B	A G F E D	C B A G F	D C B A G
A *f* G *g* F *a* E D *c b*	B *e* A *f* G *g* F E *b a*	C *d* B *e* A *f* G F *a g*	D *c* C *d* B *e* A G *g f*	E *b* D *c* C *d* B A *f e*	F *a* E *b* D *c* C B *e d*	G *g* F *a* E *b* D C *d c*	13 41 69 97 14 42 70 98 15 43 71 99 16 44 72	A G F E D	C B A G F	E D C B A	F E D C B
C *d* B *e* A *f* G F *a g*	D *c* C *d* B *e* A G *g f*	E *b* D *c* C *d* B A *f e*	F *a* E *b* D *c* C B *e d*	G *g* F *a* E *b* D C *d c*	A *f* G *g* F *a* E D *c b*	B *e* A *f* G *g* F E *b a*	17 45 73 18 46 74 19 47 75 20 48 76	C B A G F	E D C B A	G F E D C	A G F E D
E *b* D *c* C *d* B A *f e*	F *a* E *b* D *c* C B *e d*	G *g* F *a* E *b* D C *d c*	A *f* G *g* F *a* E D *c b*	B *e* A *f* G *g* F E *b a*	C *d* B *e* A *f* G F *a g*	D *c* C *d* B *e* A G *g f*	21 49 77 22 50 78 23 51 79 24 52 80	E D C B A	G F E D C	B A G F E	C B A G F
G *g* F *a* E *b* D C *d c*	A *f* G *g* F *a* E D *c b*	B *e* A *f* G *g* F E *b a*	C *d* B *e* A *f* G F *a g*	D *c* C *d* B *e* A G *g f*	E *b* D *c* C *d* B A *f e*	F *a* E *b* D *c* C B *e d*	25 53 81 26 54 82 27 55 83 28 56 84	G F E D C	B A G F E	D C B A G	E D C B A
D C *d c*	E D *c b*	F E *b a*	G F *a g*	A G *g f*	B A *f e*	C B *e d*	Years ending with 00.	C	E	G	B A

Example 1. What was the dominical letter of the year 763, *before Christ*, old style? Look on the left, opposite to 63, in the column which has 7 among the headings, and the *small letter* there found is *e*. Hence E was the dominical letter of 763 B.C., or the fifth of January was a Sunday.

Example 2. What is the dominical letter of 1819, *after Christ*, old style? Look on the left, opposite to 19, in the column which has 18 among its headings, and the large letter there found is E. Hence E is the dominical letter of 1819 (old style), or the fifth of January was a Sunday.

Example 3. What will be the dominical letters of the year 1896, new style? Look on the right, opposite to 96, in the column which has 18 among the headings, and E D is found. Hence in this leap-year E is the dominical letter the opening of the year, or the fifth of January will be a Sunday.

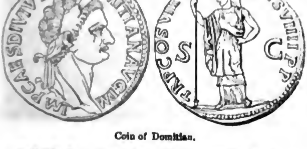
Having found the dominical letter for a given year, the following table will assist in finding the day of the week upon which a given day of the month falls. It is the list of days which have A for their letter.

January . . .	1	8	15	22	29
February. . .	5	12	19	26	..
March	5	12	19	26	..
April	2	9	16	23	30
May	7	14	21	28	..
June	4	11	18	25	..
July.	2	9	16	23	30
August . . .	6	13	20	27	..
September . .	3	10	17	24	31
October . . .	1	8	15	22	29
November . .	5	12	19	26	..
December . .	3	10	17	24	31

Thus the dominical letter being E, we ask on what day the 20th of July falls. The E being Sunday, the A is Wednesday, and July 16 is Wednesday, whence July 20 is Sunday.

DOMINICANS. [Black Friars.]

DOMITIA'NUS, TITUS FLAVIUS, younger son of the Emperor Vespasianus, succeeded his brother Titus as emperor, A.D. 81. Tacitus (*Histor.*, iv., 51, 68) gives an unfavourable account of his previous youth. The beginning of his reign was marked by moderation and a display of justice bordering upon severity. He affected great zeal for the reformation of public morals, and punished with death several persons guilty of adultery, as well as some vestals who had broken their vows. He also forbade under severe penalties the practice of emasculation. He completed several splendid buildings begun by Titus; among others, an Odeum, or theatre for musical performances. The most important event of his reign was the conquest of Britain by Agricola; but Domitian grew jealous of that great commander's reputation, and recalled him to Rome. His suspicious temper and his pusillanimity made him afraid of every man who was distinguished either by birth and connexions or by merit and popularity, and he mercilessly sacrificed many to his fears, while his avarice led him to put to death a number of wealthy persons for the sake of their property. The usual pretext for these murders was the charge of conspiracy or treason; and thus a numerous race of informers was created and maintained by this system of spoliation. His cruelty was united to a deep dissimulation, and in this particular he resembled Tiberius rather than Caligula or Nero. He either put to death or drove away from Rome the philosophers and men of letters; Epictetus was one of the exiled. He found, however, some flatterers among the poets, such as Martial, Silius Italicus, and Statius. The latter dedicated to him his *Thebais* and *Achilleis*, and commemorated the events of his reign in his *Silvæ*. But in reality the reign of Domitian was anything but favourable to the Roman arms, except in Britain. In Mæsia and Dacia, in Germany and Pannonia, the armies were defeated, and whole provinces lost. (Tacitus, *Agricola*, 41.) Domitian himself went twice into Mæsia to oppose the Dacians, but after several defeats he concluded a disgraceful peace with their chief Decebalus, whom he acknowledged as king, and agreed to pay him a tribute, which was afterwards discontinued by Trajan; and yet Domitian made a pompous report of his victories to the senate, and assumed the honour of a triumph. In the same manner he triumphed over the Catti and the Sarmatians, which made Pliny the Younger say that the triumphs of Domitian were always evidence of some advantages gained by the enemies of Rome. In 95 A.D. Domitian assumed the consulship for the seventeenth time, together with Flavius Clemens, who had married Domitilla, a relative of the emperor. In that year a persecution of the Christians is recorded in the history of the church, but it seems that it was not directed particularly against them, but against the Jews, with whom the Christians were then confounded by the Romans. Suetonius ascribes the proscriptions of the Jews, or those who lived after the manner of the Jews, and whom he styles as 'improfessi,' to the rapacity of Domitian. Flavius Clemens and his wife were among the victims. [Clemens Romanus.] In the following year, A. D. 96, under the consulship of Fabius Valens and C. Antistius Vetus, a conspiracy was formed against Domitian among the officers of his guards and several of his intimate friends, and his wife herself is said to have participated in it. The immediate cause of it was his increasing suspicions, which threatened the life of every one around him, and which are said to have been stimulated by the predictions of astrologers and soothsayers, whom he was very ready to consult. He was killed in his apartments by several of the conspirators, after struggling with them for some time, in his forty-fifth year, after a reign of fifteen years. On the news of his death, the senate assembled and elected M. Cocceius Nerva emperor.


IMP CAES DIVI VESP F DOMITIAN AVG GM
TR P COS VIII DES VIIII P P
S C

Coin of Domitian.

British Museum. Actual size. Copper. Weight, 432¼ grains.

The character of Domitian is represented by all antient historians in the darkest colours, as being a compound of timidity and cruelty, of dissimulation and arrogance, of self-indulgence and stern severity towards others. He punished satirists, but encouraged secret informers. He took a delight in inspiring others with terror, and Dion relates a singular banquet, to which he invited the senators, with all the apparatus of a funeral and an execution. He is also said to have spent whole hours in hunting after and killing flies. At one time, before his becoming emperor, he had applied himself to literature and poetry, and he is said to have composed several poems and other works. (Tacitus, Suetonius, Dion, and Pliny the Younger.)

DON, the (Douna or Tuna in Tartar, and Tongoul in Calmuck), a considerable river of European Russia, and in the latter part of its course the boundary between Europe and Asia. It rises about 54° N. lat. in the small lake Ivanofskoe, in the government of Tula, close to the borders of the government of Ryazan, and thence flows in a general S. S. E. direction until it has passed Paulofsk, after skirting the southern extremity of the government of Ryazan and north-western parts of that of Tambof, and traversing the greater part of the government of Voronesh. Within these limits the Don receives the Sosva, Voronesh near Tavtof, and Sosna near Korotoszak. From Paulofsk it inclines more to the east, and quitting the government of Voronesh, enters the western districts of the territory of the Don Cossacks: soon afterwards it turns due east, and after having been joined by the Khoper at Khopeiskaya, the Medveditsa near Ostrofskaya, and the Ilawla above Katchokinskaya, flows with numerous bendings until it approaches the mountains of the Volga, through which it forces a passage about forty-five miles from that river. The Don now proceeds in a south-western and then a W. S. W. direction towards its mouth, near which it receives on its right bank, above New Tsherkask, the Donecz, or Little Don, the most considerable of its tributaries, which rises above Belgorod, in the government of Kursk, and is upwards of four hundred miles in length. On its left bank the Don is joined by the Manitsh, which rises on the southern termination of the Irgeni mountains, crosses the great Caucasian steppe, flows through lake Bolshoü, and falls into the Don at Tsherkask. The Don discharges its waters by three branches into the sea of Azof, not far from Nachikgefan, Asof, and Tsherkask, about 46° 40′ N. lat. The length of its course is estimated at about 900 miles, but the distance from its source to its mouth would not exceed 490. It has a very slow current, and abounds in shallows and sand-banks, but has neither falls nor whirlpools. In spring it overflows its banks, and forms broad and unwholesome swamps; it is navigable as high as Zadonsk, and has depth of water enough from the middle of April to the end of June for the larger description of vessels, but is so shallow during the remainder of the year, that there is scarcely two feet of water above the sand-banks. Its mouths are so much choked with sand as to be unnavigable for any but flat boats. The current of its tributaries is also sluggish, and none but the Donecz are navigable. As far as Voronesh, near the junction of the Voronesh and Don, the river flows between fertile hills; but from that point until its passage through the chain of the Volga, its left bank is skirted by lowlands, and its right by a range of uplands; thence to its confluence with the Donecz, its high bank is skirted by chalk hills, and its left is bounded by a continued steppe. The waters of the Don are impregnated with chalk, and are muddy, and prejudicial to the health of those who are unused to them: they however abound in fish, though in this respect the Don is much inferior to the Volga. The Don is the Tanais of Herodotus (iv., 57) and other Greek and Roman writers. Herodotus states that the river rises in a large lake and flows into one still larger, the Maietis, or sea of Azof. The Hyrgis, which he mentions as a tributary of the Don, appears to be the Donecz.

DON-COSSACKS, the Territory of the (or, in Russian, Donskich Kosak of Zembla), so called from the river Don, is a free country which acknowledges the Russian sovereign as its chief, but is not reduced to the condition of a province, or organized as a government, like other parts of the empire. It lies between 47° and 54° N. lat., and 55° and

67° E. long.; and is bounded on the north by the governments of Voronesh and Saratof, on the east by Astrachan, on the south-east by the government of Caucasia, on the south-west by the sea of Azof and the Nogay Steppes in Taurida, and on the west by the governments of Ekaterinoslaf and the Ukraine. It occupies an area of about 76,000 square miles.

The general character of the country is that of a plain, in many parts consisting entirely of steppes, especially in the south-eastern districts bordering on the Sal and Manitsh. The interior is a complete flat, but in the north and along the banks of the Don there are slight elevations, and the south-eastern parts bordering on lake Bolskoi are traversed by low offsets of the Caucasian mountains. The rest of the country, with the exception of the parts immediately adjacent to the banks of the larger rivers, is a broad steppe, which contains abundance of luxuriant pasturage intermixed with tracts of sand and sluggish streams. The whole territory does not contain a single forest, and even brushwood is only occasionally found. The northern districts are far the best adapted for agriculture; the southern, where the soil is saline and sandy, for grazing. The steppes are full of low artificial mounds and antient tumuli, which are so numerous in some places as to give rise to the conjecture that they are the vestiges of some great and extinct race, probably of Mongolian origin, as the rude images in stone erected over some of them bear, in their features and peculiar style of head-dress, traces of that origin. Many of these tombs have been opened, and found to contain gold and silver urns, rings, buckles, &c.

The chief river is the Don, which enters the territory in the west, winds across it to the east, and then turning suddenly round, flows through the eastern and southern districts to the sea of Azof. In its course through this country it is joined by the Khoper, Medwedicsa, Ilawla, Sal, Donecz, and several minor streams. Besides these there are several other rivers which discharge their waters into the sea of Azof, such as the Krinka, Kagalnik, Yega, &c.; and there are numerous streams in the steppes, of which the greater part terminate in marshes, and are dry in summer. The principal lake is the Bolskoi, an enlarged bed of the Manitsh, about 70 miles long and 9 broad, the length of which forms for that distance the boundary between the territory of the Don-Cossacks and Caucasia. Next to this the most considerable lakes are those of Nowoe and Staroe-Osero, which are covered in summer with an incrustation of salt from one to two inches in thickness, of which they furnish an abundant supply. No mineral springs have yet been discovered.

The country enjoys a mild and not unhealthy climate. The spring sets in early, and in the summer, which is of long continuance, the land is refreshed by frequent showers; the autumn is at times damp and foggy, and the winter, though clear and not accompanied with much snow, is severe and attended by much stormy weather. The rivers are closed by ice from the end of November to the month of February. Failures of the harvest are rare, but the inhabitants often suffer severely from the ravages of the locust, which is the scourge of the country.

Agriculture, cattle-breeding, the fisheries, and the cultivation of the vine, constitute the principal occupations of the Don-Cossacks; but, according to the most recent writer on this country, Schnitzler, agriculture, not the rearing of cattle, as most authors have affirmed, forms the chief employment of the people. In the low-lands of the north, which lie along the banks of rivers, the soil is very fertile, and produces grain of various kinds, such as rye, barley, wheat, oats, maize, and buckwheat; also peas, flax, and hemp. But even in the south, fields are found in the heart of the steppes at a distance of thirty and even forty miles from the Don, with rich crops of grain upon them; these fields are cultivated by the richer class of proprietors. In 1832, 91,486 tshetworts of winter-corn (about 68,370 quarters), and 359,643 (about 260,230 qrs.) of spring-corn were sown; the former yielded two, and the latter three grains for one, without the use of manure or much cost of labour. The average crops of wheat are estimated at about two millions of tshotwerts (1,447,180 quarters) annually. None of the Cossack families are without gardens, in which they raise vegetables of the ordinary descriptions, melons, cucumbers, and fruit; the last is not however an object of much attention. The culture of the vine was introduced by Peter the Great, and has been followed up with spirit, especially along the banks of the Don, where a very pleasant wine, not unlike Champaign, is made, and has become a favourite beverage in Russia. There are superior kinds, the Stanitze and Zimlyanskoye, which resemble Burgundy in colour and flavour; but the favourite species is the Vinomarozka, or frozen wine, which is made from a mixture of wine with brandy and the juice of various berries. In what is called the 'First Natshalstoe (district) of the Don,' which lies east of Tsherkask, there are at present 9710 vineyards, and in the 'Second,' north-east of Tsherkask, 2590; these vineyards contain from 200 to 800, and even as many as 1000 vines, and about fifteen different kinds of grasses. The inferior descriptions of wine are red ones, of which about 70,000 vedros (about 225,800 gallons) are annually sent to Moscow, and 30,000 (about 96,770 gallons) to Kharkof, beside considerable quantities to Kursk and other parts. The yearly sale of these wines produces about two millions of roubles, or 92,000*l.* sterling. The vines also yield about 10,000 vedros (32,250 gallons) of brandy spirit annually.

The rearing of cattle is pursued with great industry both by the Cossacks and Calmucks; the wealth of the more affluent among them consists, in fact, of their numerous herds and flocks, and they have large Khutors, or cattle-farms, for breeding them in the steppes. The native Cossack horse is small and spare in flesh, with a thin neck and narrow croup; he is, on the whole, an ill-looking animal, but strong, fleet, and hardy. The common Cossack is rarely owner of less than three or four horses, but many of the Tabunes or herds, of the wealthier breeders, contain 1000 or more. All, with the exception of the saddle-horses, are kept on the pasture-grounds throughout the year, and in winter are forced to seek for their food either beneath the snow or from the high reeds on the banks of rivers. The Cossack himself does not keep either camels or dromedaries, but they are reared by their Calmuck fellow-countrymen and thrive well on the saline plants of the steppes. Next to the horse the sheep is the most common domestic animal; the ox is used for draught; goats are bred principally by the Calmucks; but swine and buffaloes are rare. The stock of the Cossack population in 1832 was composed of 257,211 horses, of which 123,328 were mares, 2,110,539 sheep, from which 217,775 poods (about 7,839,900 pounds) of wool were obtained; and 840,683 heads of horned cattle. The Calmucks at that time possessed 33,747 horses, 55,574 heads of cattle, 28,574 sheep, and 1365 camels and dromedaries.

The chase is unproductive, as the steppes are not the usual resort of wild animals or of much game; wolves, foxes, marsh-cats, dwarf otters, martens, marmots, jerboas, a species of gazelle, and hares are occasionally met with. Of wildfowl there are the steppic-fowl (Otis tetrax), water-starling, Muscovy duck, swan, snipe, pelican, and falcon. The principal amphibious animals are tortoises. The steppes also breed the Polish cochineal insect, of which however no use is made, the silkworm, and the cantharides.

Next to agriculture the people derive their chief subsistence from their fisheries. Fish indeed is their ordinary food, and consists of the sturgeon, trout, pike, tench, perch, salmon, carp, &c., for which the richest fishing grounds are the Don and the shores of the sea of Azof. The produce of 1832 was 1,033,935 poods (about 37,221,660 pounds weight), of which 496,512 poods were appropriated to internal consumption, and the remainder was exported. Caviar and isinglass are sent abroad in large quantities. Turtles and crabs in immense numbers, and of large size, are taken in the Don and its tributary streams.

The Cossacks rear little poultry, but they keep large stocks of bees; the number of apiaries a few years ago was 1044, which contained 30,201 hives, and produced annually 8299 poods (about 298,764 pounds weight) of honey and wax.

Trades and mechanical pursuits are carried on only in the two chief towns, New and Old Tsherkask, and the larger stanitzes, or villages; for as the Cossack depends upon himself for the supply of his daily wants, there is consequently little encouragement for the manufacturer and mechanic. The only large manufactures are caviar, wax, and isinglass. The exports are inconsiderable, and consist principally of horses, cattle, tallow, skins, glue, fish, and their products, wine, and a little grain; the greater part of these exports are sent to Taganrog, which is the chief mart for the sale of what the country produces, or find a vent at the periodical fairs of Tsherkask, &c. They amounted in 1832 to 4,943,930 rubles (about 226,600*l.*), while the imports in that year were to the extent of 13,886,133 rubles (about 666,450*l.*)

The territory of the Cossacks is divided into seven Notchalstoe, or provinces, namely, 1. Aksai, on the Don, in which are Old Tsherkask, and New Tsherkask (14,000 inhabitants), the only towns in the country; 2. The First District of the Don, containing the large villages of Troilinskaya, Bistrianskaya, Tsiemlianskaya, &c.; 3. The Second District of the Don, with the large villages of Tsherskaya, and Gelubinskaya; 4. Medwediesza, with the large villages of Ust-Mestwedicsza, Beresofska, and Ostiofskaya; 5. Koperskye, with the large villages of Urupinskaya (1200), Kototskaya and Dobrinskaya; 6. Donecszkaya, with the large villages of Kasanskaya, Luganskaya, and Mikitenska: and 7. Minsk, with the large villages of Grabova and Alexiefkaya.

The great mass of the population are Cossacks and Little Russians, among whom a number of Great Russians, Nogay-Tartars, Gypsies, Armenians, and Greeks are intermixed. The Calmuck part of the population are a nomadic people: in 1832 their numbers were 16,413, of whom 7889 were males and 8524 females. The following is given as the official return of the remaining inhabitants of the territory:—

Bondsmen in the service of Cossack proprietors .	389,371
Free labourers, &c.	123,299
	512,670

This return does not comprise the chiefs or great landowners, or the ecclesiastics, nor probably the principal starchines or nobility; it may be concluded, therefore, that Arsenief's calculation, that the population amounts to 600,000 of all classes, is not above the mark. The census of 1796 gave 366,274, but there are reasonable grounds for questioning its correctness.

The territory of the Don Cossacks, which is more extensive than the whole area of the Austrian States in Germany, contains but two towns, and 120 stanitzes. The villages, many of which have markets, are always placed on the banks of rivers and composed of from fifty to three hundred houses, well built, clean, and conveniently arranged, with one or more churches of stone or wood. Some of these stanitzes are large, and resemble towns, and are surrounded by a wall and narrow ditch; the khutors, or stables, stalls, &c., lie outside of them. The Cossacks, who have been settled in the country since 1569, are genuine Little Russians, and speak pure Russian mixed with occasional provincialisms. They are proverbially hospitable and cheerful, but violent when excited; and although they consider the plunder of their enemy lawful in war, theft is almost unknown among them. Their mode of life is in general very simple and frugal, and the enjoyment of civil freedom has given them an independence of mind, which places them far higher in the social scale than the abject Russian. Their starchines, or nobles, are in general well educated. With regard to public instruction, their establishments are within the jurisdiction of the University of Kharkof. The state of those establishments was in 1825, 12 schools with 46 teachers and 937 pupils, and in 1832, the same number with 45 teachers and 1031 pupils, all males. Besides these, there are 5 ecclesiastical seminaries in the Eparchy of New Tsherkask, with 10 teachers and 274 students. The entire number of scholars, therefore, was 1035, which averages very nearly 1 scholar in every 580 inhabitants. But, as the Raskolniks, a sect of the Græco-Russian church, have doubtless schools of their own, this proportion can be approximative only.

In respect of church matters, this territory was formerly dependent upon the diocese of Voronesh, but the eparchate of New Tsherkask was established expressly for it by the ukase of May, 1829: it contained in 1830 369 churches, of which 5 are cathedrals, beside three monasteries and one convent. The majority of the people are of the Russo-Greek church. The Calmucks are Lamaists, and the Nogay and other Tartars are Mohammedans.

The Cossacks are exempt from taxes, but are liable to do military duty, and are bound to dress, arm, and equip themselves entirely at their own expense, in return for which the government provides for their maintenance while in the field, allows them pay, and supplies them with field equipage. Few Cossacks are unskilled in the use of the bow and arrow, although they do not use them in war. Their principal weapon in battle is the lance. They live under a military government wholly distinct from the government of every other Russian province, at the head of which is a Voiskovoi-Attaman, or Captain-general; but as the present emperor has vested this office in the heir-apparent, his powers are delegated to a Nakazmi or Vice-Attaman; and on this model every stanitze has its local attaman, who is elected by the inhabitants. The Cossacks have a supreme council of state, called the Chancery of the Voiskofnya, or Captaincy, which controls both the civil as well as the military affairs of the territory. The attaman or his deputy is its president, and he is assisted by two perpetual members and four other members, who are elected by the people every three years. The expenses of the administration, including the allowances to the vice-attaman, the attorney-general, and the officers attached to the attaman, amounted in 1832 to upwards of 150,000 silver rubles (about 26,000*l.*)

The Cossacks are divided into Polks, or regiments, and Sotnyes, or companies; which last are again divided into sections: each polk has a standard-bearer and a major. In return for the exemption from taxes, crown monopolies, and other privileges, they are bound to keep in a constant state of readiness for the Imperial service about 25,000 cavalry, who are reckoned among the regular Cossacks. From the age of 15 to 50 every Cossack is a soldier, and in case of pressing emergency, all males capable of service are bound to take up arms. The Calmucks are governed by the same laws, and subject to the authority of the Voiskovoi-Attaman. They are equally bound to serve with their Cossack fellow-countrymen, by whom, however, they are held in great contempt. They dwell in tents of skin, lead a wandering life, and are exclusively occupied in rearing cattle, sheep, camels, and especially horses, with which they supply the Russian light cavalry.

The Cossacks pay much attention to their dress; which consists of a blue jacket, frequently laced with gold and lined with silk, a silk vest and girdle, full white trowsers, and black woollen cap, with a large red bag dangling behind. The females, who are inferior in symmetry of form to the males, have agreeable features, a florid complexion, and fine black eyes. They wear a long falling tunic of cotton or silk, partly open in front, and confined by an ornamental waistband. Beneath this upper garment appear broad trowsers, with which yellow boots are usually worn. The hair of the unmarried female floats in long braided tresses over the shoulder, but when married she conceals it under a cap richly embroidered with gold and pearls. Their dances resemble those of the Russian gipsies, and are performed by two persons only, who accompany their movements with loud cries.

DONAGHADEE, a mail-packet station, in the barony of Ards and county of Down, in Ireland: distant 94 Irish or 119 English miles from Dublin, seventeen English miles from Belfast; and twenty-one English miles from Portpatrick, on the opposite coast of Great Britain.

Donaghadee owes its rise to being the most convenient point of communication between the latest colonists of Ards, and their countrymen in Scotland, with whom they carried on a sufficient traffic to induce the proprietor, the Lord Montgomery, about A. D. 1650, to erect a quay 128 yards in length, and from 21 to 22 feet broad, which continued during the last century to afford pretty good shelter to all the craft employed. The Scottish mails have landed here since before 1744, at which time Donaghadee enjoyed a large share of the imports and exports of this part of the country. The accommodation of the old quay being latterly found insufficient for the better class of steam-packets, as well as for merchantmen, which frequently experienced the want of an asylum harbour on this coast, a new pier was commenced at the expense of government, which is now completed, enclosing a basin of seven acres, and calculated to hold sixty vessels of the larger class. The expense has been upwards of 150,000*l.*, and the work is executed in the best manner; but the benefits so far derived from it are not considered commensurate with so great a cost. The town, which consists of two principal streets, is well built and airy: it has at present a considerable export trade in cattle and grain, and a large import of coal. There are a handsome church, two Presbyterian meeting-houses, two Seceders' meeting-houses, and one Wesleyan Methodist meeting-house.

On the north-east side of the town stands a remarkable artificial mount or rath, surrounded by a dry fosse from 27 to 32 feet broad. The circumference of the mount at the bottom is 480 feet, at the top 219 feet, and its greatest conical height 140 feet. A powder magazine has been built on the summit, from which Scotland and the Isle of Man are visible in fair weather.

In 1834 there were in the parish 15 schools, educating 703 young persons: of these schools three were in connexion with the Board of National Education. Population of town in 1821, 2,795: in 1831, 2,986. (Harris's *History of the County of Down; Northern Tourist; Reports, &c.*)

DONATELLO. Donato di Belto di Bardo, called Donatello, was born at Florence in the year 1383. He was brought up in the house of a Florentine gentleman named Ruberto Martelli, a liberal patron of the arts, and received his first instructions from Lorenzo Bicci, from whom he learned painting in fresco; but he afterwards became more famous as a sculptor. He also practised architecture. In the course of his life he visited many towns of Italy, among which were Venice and Padua, where the people wanted to detain and naturalize him, and Rome. Donatello was much esteemed by his contemporaries, and executed a great number of works, both in private and public buildings, and for the grand-duke Cosmo I. He was the first to employ bas-relief in telling stories, according to the more elaborate style of Italian sculpture. He died paralytic, December 13, 1466.

When he first became so infirm as to be unable to work, the grand-duke Piero I. gave him a small estate: but he was so much annoyed by the troublesome references of his labourers, that he insisted on relinquishing it; and Piero gave him a pension instead, in daily payments, which perfectly contented him. Some relations visited him one day, for the purpose of persuading him to leave them at his death a vineyard which he owned; but he answered, that it seemed more reasonable to leave it to the peasant who had always worked upon it than to those who had done no labours for him, except paying him that visit: and he did so.

His principal works are at Florence; but some have decayed, or been removed from their original station. One, a figure of St. Mark, which was nicknamed (according to the common propensity of the Florentines) Lo Zuccone (the Gourd) on account of its bald head, is much commended. A St. George is also much esteemed; and Vasari, speaking of a Judith bearing the head of Holofernes, in bronze, calls it, with all the strength he gathered from his intense love of his art, 'A work of great excellence and mastery, which, to him who considers the simplicity of the outside, in the drapery and in the aspect of Judith, sees manifested from within it the great heart (animo) of that woman and the aid of God; as in the air of that Holofernes, wine and sleep, and death in his members, which, having lost their spirit, show themselves cold and falling.'

Donatello left several pupils, to whom he bequeathed his tools. The most noted are Bertoldo, Nanni d'Anton di Bianco, Rossellino, Disederio, and Vellano di Padova. To the last he left all the works which he retained at his death. (Vasari; Baldinucci.)

DONA'TIO MORTIS CAUSA (Law), a gift made in prospect of death. The doctrine is derived from the civil law, and a donation of this kind is defined in the Institutes (lib ii., tit. 7) as 'a gift which is made under an apprehension of death, as when a thing is given upon condition that, if the donor die, the donee shall have it, or that the thing given shall be returned if the donor shall survive the danger which he apprehends, or shall repent that he has made the gift; or if the donee shall die before the donor.' In the English law it is necessary to the validity of this gift that it be made by the donor with relation to his dying by the illness which affects him at the time of the gift, but it takes effect only in case he die of that illness. There must be a delivery of the thing itself to the donee; but in cases where actual transfer is impossible, as, for instance, goods of bulk deposited in a warehouse, the delivery of the key of the warehouse is effectual. A donatio mortis causâ partakes of the nature of a legacy so far as to be liable to the debts of the donor, and, by 36 Geo. III., c. 52, § 7, to the legacy duty; but as it takes effect from the delivery, and not by a testamentary act, it is not within the jurisdiction of the ecclesiastical court, and neither probate or administration is necessary, nor the assent of the executors, as in the case of a legacy.

On the Roman donatio mortis causâ the reader may consult Heineccius, *Op.*, tom. vi., p. 581, and the references there given; and the Pandect, xxxix., tit. 6. The Constitution of Justinian put donations mortis causâ very nearly on the footing of legacies in the Roman law.

As to the English law, see Roper *on Legacies*, vol. i.

DONATISTS, Christian schismatics of Africa, of the fourth century, originally partisans of Donatus, bishop of Casa Nigra in Numidia, the great opponent to the election of Cecilianus into the bishopric of Carthage. Donatus accused Cecilianus of having delivered up the sacred books to the Pagans, and pretended that his election was thereby void, and all those who adhered to him heretics. Under this false pretext of zeal he set up for the head of a party, and, about the year 312, taught that baptism administered by heretics was ineffectual; that the church was not infallible; that it had erred in his time; and that he was to be the restorer of it. But a council held at Arles, in 314, acquitted Cecilianus, and declared his election valid. The schismatics, irritated at the decision, refused to acquiesce in the sentence of the council; and the better to support their cause, they thought it proper to subscribe to the opinions of Donatus, and openly to declaim against the Catholics. They gave out that the church was become prostituted; they re-baptized the Catholics; trod under foot the hosts consecrated by priests attached to the Holy See; burned their churches; and committed various other acts of violence. They had chosen into the place of Cecilianus one Majorinus, but he dying soon after, they brought in another Donatus, different from him of Casa Nigra, as bishop of Carthage.

It was from this new head of the cabal, who used so much violence against the Catholics, that the Donatists are believed to have received their name. As they could not prove, however, that they composed a true church, they bethought themselves of sending one of their bishops to Rome. They attempted likewise to send some bishops into Spain, that they might say their church began to spread itself everywhere.

After many ineffectual efforts to crush this schism, the emperor Honorius ordered a council of bishops to assemble at Carthage in the year 410, where a disputation was held between seven of each party, when it was decided that the laws enacted against heretics had force against the Donatists. The glory of their defeat was due to St. Augustine, bishop of Hippo, who bore the principal part in this controversy. The Donatists, however, continued as a separate body, and attempted to multiply their sect even in the sixth century; but the Catholic bishops used so much wisdom and prudence that they insensibly brought over most of those who had strayed from the bosom of the church. The church of the Donatists gradually dwindled to nothing, and became quite extinct in the seventh century. (Broughton's *Dict. of all Religions*, fol. Lond., 1756, pp. 340, 341; Mosheim's *Eccl. History*, 4to. Lond., 1765, vol. i., pp. 211, 214, 259, 305; Moreri, *Dict. Historique*, fol., Paris, 1759, tom. iv. p. 214.)

DONATIVE. [Benefice, vol. iv., p. 220.]

DONA'TUS, ÆLIUS, a celebrated grammarian, who lived in the middle of the fourth century. He wrote a Grammar, which long continued in the schools; and also Notes upon Terence and Virgil. He was most eminent in the time of Constantius, and taught rhetoric and polite literature at Rome in the year 356, about which time St. Jerom studied grammar under him. Donatus has given ample employment to the bibliographers, who all speak of an 'Editio Tabellaris sine ulla nota' of his Grammar, as one of the first efforts at printing by means of letters cut on wooden blocks. (See Meerman, *Origines Typograph.* of this and other editions, 4to., Hag. Com. 1765, tom. i. pp. 126, 132; ii. pp. 107, 215, 218.) This Grammar has been printed with several titles, as 'Donatus,' 'Donatus Minor,' 'Donatus Ethimolvzatus,' 'Donatus pro puerulis,' &c., but the work is the same, namely, 'Elements of the Latin Language for the use of Children.' In the volume of the Grammatici Veteres, printed by Nic. Jenson, without date, it is entitled 'Donatus de Barbarismo et de octo partibus Orationis.' Dr. Clarke, in his 'Bibliographical Dictionary,' vol. iii. p. 144-148, has given a long list of editions of Donatus, to which the more inquisitive reader is referred. Donatus's 'Commentarii in quinque Comœdias Terentii,' were first printed without date, probably before 1460, and reprinted in 1471 and 1476. The 'Commentarius in Virgilium,' fol., Ven., 1529, though ascribed to him, is thought by many not to be his.

Donat, in the middle ages, both in English and French, became a synonym for any system of grammar: as in Piers Plowman—

> 'Then drave I me among drapers my Donet to lerne.'

In the statutes of Winchester College, written about 1386, grammar is called 'Antiquus Donatus,' the old Donat. Cotgrave quotes an old French proverb, 'Les Diables estoient encores en leur Donat,' the devils were but yet in their grammar. (See Harles, *Introd. in Hist. Ling. Latinæ*, 8vo., Bremæ, 1773, pp. 202, 203; Clarke, *Bibliogr. Dict.*, ut supra; Warton's *Hist. Eng. Poet.*, 4to., vol. i. p. 281; Chalmer's *Biogr. Dict.*, vol. xii. p. 241.)

DONAX. [CONCHACEA, vol. viii., p. 428.]

DONCASTER, a market-town, borough, and parish in the West Riding of the county of York, in the wapentake of Strafforth and Tickhill. It is situated on the river Don, on the great north road, which passes through the whole length of the town; it is 162 miles north-north-west of London, and 37 miles south-by-west of York. Doncaster was the *Danum* of Antoninus, and was called *Dona Ceastre* by the Saxons, from which its present name is derived. Doncaster is one of the cleanest, most airy, and most beautiful towns in the kingdom. The approach from London, by a wide and nearly level road, ornamented with antient elm-trees, is magnificent. The town stands on the Watling-street of the Romans. Coins, urns, and other Roman remains are occasionally dug up in various parts of the town and neighbourhood.

Under the Municipal Reform Act the borough is divided into three wards, with six aldermen and eighteen councillors; it has also a commission of the peace. The clear income of the corporation is about 8000*l.* per annum, of which large sums are expended in lighting, paving, cleaning, and watching the town, in repair of roads, improvement of the estates, police expenses, and in contributions to various charities. The air is considered remarkably pure and salubrious, and this circumstance, combined with its advantageous situation and its comparative freedom from local assessments, renders it a desirable residence for persons of limited income. The population of the borough was, in 1801, 5697; in 1811, 6935; in 1821, 8544; in 1831, 10,030. The population of the townships in the soke of Doncaster, including Hexthorpe-with-Balby, Loversal, Rossington, Aukley, Blaxton, and Wheatley-with-Sandall, was, in 1831, 1700.

Doncaster has a few iron foundries, a sacking and a linen manufactory on a small scale. In 1787, Dr. Cartwright introduced the manufacture of muslins by power-looms, of which he was the inventor, into the town; but the attempt to make Doncaster a manufacturing town was unsuccessful. As the centre of a large agricultural district, the markets and fairs are attended by a large rural population, who contribute greatly to its support. Although it is one of the largest corn-markets in the kingdom, there is no corn-exchange; a spacious area between the shambles and the cattle-market is used for the sale of corn. The town also derives support from the numerous opulent families residing in its vicinity, and from the continual intercourse on the north road. Though the navigation of the Don renders it an eligible situation for general traffic between the manufacturing districts and the eastern coast, no advantage has yet been taken of the facilities thus afforded for making it a place of trade.

The public buildings in Doncaster are the mansion-house, a handsome structure, which has cost about 10,000*l.*, and which is used for the meetings of the corporation, for concerts, assemblies, and occasionally for public meetings; the town-hall, in which the quarterly sessions for the borough and the annual sessions for the wapentake are held: the gaol, which is built on the improved principle for the classification of prisoners, a betting-room, and a theatre. The stand, on the race-ground, may also be considered as one of the public buildings; it was erected at the expense of the corporation, and is both elegant and commodious. The stand tickets sold during the race week produce an income of about 1700*l.* a year. The churches of Doncaster are, the parish church, dedicated to St. George, and Christ Church. The former is a spacious and elegant cruciform structure, with a fine square tower, 141 feet high. The various details of the exterior and interior are particularly fine, and well deserving of the attention of the antiquary. Christ Church was erected a few years ago, from a fund left for that purpose by the late John Jarratt, Esq. The spire was 160 feet high; in November, 1836, it was struck by lightning, the tower was much injured, and that part of the edifice is at present (May, 1837) a mass of ruins. The interior is uninjured, and the service has not been interrupted by the accident. The living of the parish church is a vicarage, in the archdeaconry and diocese of York, and in the patronage of the archbishop of York. Christ Church is a perpetual curacy, in the gift of the trustees of the late Mr. Jarratt. The dissenting places of worship are for Friends, Methodists, Independents, Catholics, and Presbyterians.

The educational establishments are numerous. There are many boarding-schools for both sexes, a grammar-school, a national-school, a British-school, and six Sunday-schools. All these schools are well supported. The number of pupils instructed in Sunday-schools exceeds 1000; they are taught by 150 teachers and superintendents. The Yorkshire institution for the Deaf and Dumb is situated near the race-course: it is a school of instruction and industry. (DEAF and DUMB.) Other institutions are the Subscription Library, the Mechanics' and Apprentices' Library, and the Lyceum Literary and Scientific Society. A valuable library also belongs to the church, which is accessible to all the inhabitants. The public charities which belong to the town are numerous. St. Thomas's Hospital, endowed in 1588 by Thomas Ellis, is an asylum for six "poore and decayed housekeepers of good name and fame." Its present income is 335*l.* 3*s.* 6*d.* a year. Quintin Kay's charity of 300*l.* per annum, is chiefly devoted to the relief of poor and reduced persons, and to the apprenticing of six poor children to mechanical or handicraft trades. Jarratt's charity is for the relief of six reduced housekeepers. There are several other bequests for purposes similar to those enumerated. The other charities in Doncaster are the dispensary, the lying-in, clothing, sick, and soup charities. The total number of accounts kept at the Doncaster savings' bank to November 1836 was 2050, amounting to 81,711*l.* 9*s.* 6*d.*

The races at Doncaster are held in the third week of September, and continue for five days. It is said that they are a source of great emolument to the town, but this is very doubtful. It is certain that they are productive of great immorality, not only among the casual visiters, but also among the permanent residents. The race-ground, which is about a mile from the town, is perhaps unrivalled. The St. Leger stakes excite great interest not only throughout the kingdom, but in all parts of the world. The municipal body subscribes largely to the maintenance of the races, under the idea that they tend to the prosperity of the town. Potteric Car, on the south of Doncaster, was a morass of many miles in extent, till the year 1766. It is now completely drained, and yields luxuriant crops.

DONEGAL, a maritime county of the province of Ulster in Ireland; bounded east and south on the inland side by parts of the counties of Londonderry, Tyrone, Fermanagh, and Leitrim; and on the south-west, west, and north, by the Atlantic Ocean. Greatest length from Inishowen head on the north-east, to Malin Beg head (sometimes called Teelin head,) on the south-west, 85 statute miles; greatest breadth from Fearn-hill on the south-east to Horn Head on the north-west, 41 statute miles. Area according to Ordnance survey of Ireland, consists of—

	a.	r.	p.	
Land	1,170,335	2	31	
Water	23,107	0	11	
Total	1,193,442	3	2	Statute measure.

Or, about 1865 square miles.

Gross population in 1831, 289,149.

Donegal forms the north-western extremity of Ireland. The inland boundary preserves a general direction of south-west by north-east, and from Lifford northward is formed by the navigable river and harbour of Loch Foyle. The maritime boundary is extremely irregular, being deeply indented on the north by the æstuaries of Loch Swilly, Mulroy, and Sheephaven, and on the south by Donegal bay. The whole county is uneven and mountainous, with the exception of the midland district extending from the liberties of Londonderry westward to Letterkenny and Rathmelton, on Loch Swilly, and southward along the Foyle to Lifford and Castle Finn; and some other inconsiderable tracts around Ballyshannon and Donegal on the south, and Dunfanaghy and Buncrana on the north. The mountain groups of Donegal together with the highlands of Tyrono and Derry present a deeply withdrawn amphitheatre to the north-east, enclosing the basin of the Foyle. That portion of the mountainous circuit which lies within this county is broken only in the north by the openings of Loch Swilly and Mulroy Bay; and on the south (where the connecting highlands of Donegal and Tyrone are narrowed between the valley of the Finn and the Bay of Donegal) by the gap of Barnesmore. Slieve Snaght, which rises to a height of 2019 feet in the centre of the peninsula of Inishowen, forms the extremity of this chain on tho north. Westward from Slieve Snaght and similarly situated in the centre of the peninsula of Fanad between Loch Swilly and Mulroy Bay, is Knockalla (1196 feet); backed in like manner by Loch Salt mountain (1541 feet), between the head of Mulroy Bay and the low country stretching inland from Sheep Haven. Westward again from the Sheep Haven is Muckish, 2190 feet in height, which slopes down on the north to the promontory of Horn Head; and Carntreena, (1396 feet), which extends to the sea at Bloody Foreland. Southward from Muckish stretches a vast region of highlands, which expands towards the west in wide-extended tracts of bog, interspersed with small lakes and covered with black heaths down to the sandy beach of the Atlantic: on the east it presents a series of bold continuous eminences overhanging the basin of the Foyle. The chief eminences of the chain are Erigal and Dooish on the north, the first 2462 feet in height (the highest ground in the county), the second 2143 feet; and Bluestack and Silverhill on tho south, 2213 and 1967 feet respectively. From Bluestack extends a series of considerable elevations westward, along the northern boundary of the bay of Donegal, which terminate in tho precipices of Slieve League, and the promontory of Malin Beg; the Barnesmore mountains sweeping eastward continue the chain into Tyrone. This mountainous tract covers upwards of 700 squaro miles, or more than twice the area of the county of Carlo. It contains several spots of great interest to the tourist; such as Loch Salt, the prospect from which over Horn Head and Tory Island has been justly celebrated, and Glen Veagh, under the eastern declivity of Dooish, where cliffs of 1000 feet hang for upwards of two miles over a glen and lake; the opposite bank being clothed with a natural forest which is still the retreat of the red deer.

From the liberties of Londonderry northward, the coast of Loch Foyle between the mountains of Inishowen and the sea, is well inhabited and improved. Muff, close to the county boundary, and Moville, near the mouth of the Loch, are much frequented, the latter especially by the citizens of Derry during the bathing season. From Inishowen Head at the entrance of Loch Foyle, the coast, which from this point is very rocky and precipitous, bends north-west to Malin Head, the most northern point of this county and of Ireland. The cliffs at Inishowen Head are 313 feet in height: at Bin Head, about half-way between Culdaff and Malin, they rise to the altitude of 814 feet above the sea. On the Loch Swilly side of the peninsula the coast is low, and in many places covered with sand, which the north-westerly gales heap up in immense quantities on all the exposed beaches of this coast. Loch Swilly extends inland upwards of twenty miles, and forms a spacious and secure harbour: the average breadth is about one mile and a half, and the inner basin is completely land-locked; but the vicinity of Loch Foyle, which floats vessels of 900 tons up to the bridge of Derry, renders Loch Swilly of less importance as a harbour. On the river Swilly, a little above its entrance into the Loch, stands Letterkenny, a thriving town, which supplies most of the country to the westward with articles of import. Rathmelton, and Rathmullen are situated on the western shore of the Loch, the latter nearly opposite Buncrana, and all in the midst of well improved vicinities. The rise of spring tides opposite Buncrana is 18 feet. Westward from Loch Swilly, the coast of Fanad, which is peninsulated by the Bay of Mulroy, is very rugged, and in many parts overspread with sand blown in between the higher points of rock. The Bay of Mulroy is encumbered with sand-banks and intricate windings: it extends inland upwards of ten miles, and is completely land-locked, being scarcely half a quarter of a mile wide at the entrance. The small peninsula of Rosguill intercepted between this bay and Sheep Haven, has been almost obliterated by the sands which have been blown in here within the last century. Rosapenna-house, built by Lord Boyne, on the neck of the isthmus, with all its demesne, gardens, and offices, has been buried to such a depth, that the chimneys of the mansion-house some years since were all that was visible. On the opposite shore of Sheep Haven stand Doe Castle, and the house and demesne of Ardes, the most remote, and at the same time the most splendid seat in this quarter of Ulster. On a creek of Sheep Haven is the little port-town of Dunfanaghy, immediately under Horn Head, which rises north of it to the height of 833 feet, with a cliff to the ocean of 626 feet. On the western side of Horn Head is a perforation of the rock, known as Mc Swine's Gun: when the wind sets in from the north-west, the sea is driven into this cavern with such violence as to rise through an opening of the rock above in lofty jets, with a report which, it is said, may be heard at a distance of many miles. In the sound between Horn Head and Bloody Foreland are the islands of Innisboffin, Innishdoony, and Tory Island, which last is at a distance of eight miles from the shore. Tory Island is three miles and a half in length, by half a mile to three quarters in breadth, and is inhabited by perhaps the most primitive race of people in the United Kingdom. In 1821 the island contained 59 houses and 296 inhabitants, few of whom had ever been on the main land. It is stated by the only tourist who has given an account of his travels through this remote district, that seven or eight of the inhabitants of Tory having been driven by stress of weather into Ardes Bay about the year 1825. 'Mr. Stewart of Ardes, gave these poor people shelter in a large barn, and supplied them with plenty of food and fresh straw to lie on;—not one of these people was ever in Ireland before; the trees of Ardes actually astonished them—they were seen putting leaves and small branches in their pockets to show on their return. Mr. Stewart had the good nature to procure a piper for their amusement, and all the time the wind was contrary those harmless people continued dancing, singing, eating, and sleeping—a picture of savage life in every age and clime.' (*Sketches in Ireland* by the Rev. Cæsar Otway, p. 13.) The average elevation of the western part of the island is no more than from 50 to 60 feet above the level of the sea, and the want of shelter is felt very severely in those north-westerly gales which set in with such violence on this coast. In the summer of 1826, it is said, a gale from this quarter drove the sea in immense waves over the whole flat part of the island, destroying the corn and washing the potatoes out of the furrows.

From Bloody Foreland south to Malin Beg Head, a distance of 40 miles in a straight line, nothing can be more desolate than the aspect of the western coast of Donegal. Vast moors studded with pools of bog water descend to the Atlantic between barren deltas of sand, through which each river and rivulet of the coast winds its way to the sea. In winter when these sandy channels are overflowed, it is impossible to proceed by the coast line, as there are no bridges over any of the larger streams north of the village of Glanties. The wildest part of this district is called the Rosses, in which the village of Dunglo or Cloghanlea containing, in 1821, 253 inhabitants, is the principal place. A great number of islands lie off this coast separated from the main-land, and from one another by narrow sounds and sand-banks. Of these, eleven are inhabited; of which the principal are Aranmore, or the north Island of Aran, containing in 1821, 132 houses, and 788 inhabitants; Rutland or Innismacdurn, containing 29 houses, and 173 inhabitants; Innisfree, containing 25 houses, and 171 inhabitants: and Owney, containing 12 houses and 76 inhabitants. The cause of so dense a population in this desolate country is the success of the herring fishing here in 1784 and 1785, when each winter's fishing was calculated to have produced to the inhabitants of the Rosses a sum of 40,000*l.*, who loaded with herrings upwards of 300 vessels in each of these years. These successes induced the government, in conjunction with the Marquis of Conyngham the proprietor, to expend, it is said, 50,000*l.* in the improvements necessary to erect a permanent fishing station on the island of Innismacdurn. A small town was built and called Rutland, but it was scarcely completed when the herrings began to desert the coast; at the same time the sands began to blow, and have since continued to accumulate to such a degree that at present the island is nearly half covered, and the fishing station quite obliterated. Below high water mark on the coast of Innisfree, grows a marine grass peculiarly sweet and nutritive for cattle, which watch the ebb of the tide and feed upon it at every low water.

The district of the Rosses is separated from the more reclaimed country about Glanties and Ardara, on the south by the river Gweebarra, the sandy channel of which is from a mile and a half to a quarter of a mile in breadth throughout the last eight miles of its course, and can only be passed by fording in dry weather. On the whole line of coast from Bloody Foreland to Malin Beg Head there is but one gentleman's seat: this is at Ardara, a village at the head of Loughrosmore Bay, from which there is a pretty good communication over the heights that stretch from Bluestack to Malin Beg, with Killybeggs and Donegal. Westward from Ardara, the coast again becomes precipitous, being lined with cliffs from 500 to 600 feet in height on the northern side of the great promontory terminated by Malin Beg Head. The loftiest cliffs, however, on the whole line of coast are those of Slieve League immediately east of Malin Beg, where the height from the sea to the summit of the shelving rock above is at one point 1964 feet. Eastward from Slieve League to the town of Donegal, the northern shore of Donegal Bay affords excellent shelter from the north-west gales in the successive creeks of Teelin Bay, Fintragh Bay, Killybeggs Bay, Mc Swine's Bay, and Inver Bay. Of these the harbour of Killybeggs is by much the most sheltered and commodious, being the only one secure from a gale from the west or south-west. The harbour of Donegal itself at the head of the bay is sufficiently good for a much more trading place; and ten miles south from it is the embouchure of the navigable river Erne, which flows from Loch Erne through Ballyshannon. [BALLYSHANNON.] Four miles from Ballyshannon on the coast, at the junction of the counties of Donegal and Leitrim, is Bundoran, a fashionable watering-place, much frequented by the gentry of the neighbouring counties. Round the head of Donegal Bay from Killybeggs to Bundoran, cultivation extends more or less up all the seaward declivities: the neighbourhood of Ballyshannon is well improved; and north-east from the town of Donegal a good tract of arable land stretches inland to the picturesque lake of Loch Eask, and the Gap of Barnesmore, where a mountain defile about seven miles in length connects it with the south-western extremity of the district of the Foyle at Ballybofey and Stranorlar, two thriving villages on the Finn.

The Finn, which is the chief feeder of the Foyle on this side, issues from a lake 438 feet above the level of the sea, situated in the centre of the mountain chain extending south from Erigal, and after a course of about thirty miles eastward, joins the Foyle at Lifford bridge, eight miles below Castlefinn, where it is navigable for boats of 14 tons. Other feeders of the Foyle, out of Donegal, are the Derg, which comes from Loch Derg in the south-east extremity of the county of Donegal and joins the main stream in Tyrone; the Deele, which has a course nearly parallel to the Finn, and descends upwards of 800 feet in its course from Loch Deele to the Foyle, which it joins a mile below Lifford; and the Swilly burn or brook, which passes by Raphoe, and is navigable for a few miles above its junction. Loch Derg is about 2¼ miles wide each way, and surrounded on all sides except the south by steep and barren mountains: it is 467 feet above the level of the sea, and its greatest depth is 75 feet. This lake is subject to violent gusts of wind. It abounds in excellent trout. The Swilly river, although it has a course of little more than fifteen miles, brings down a good body of water through Letterkenny to Loch Swilly. The Leannan river, which likewise flows into Loch Swilly by Rathmelton, is a considerable stream, as is also the Lackagh, which discharges the waters of the lakes of Gartan, Loch Veagh, Loch Salt, and Glen Loch into Sheep Haven. The waters of Loch Salt, which is perhaps the deepest pool in Ireland, descend 731 feet in a course of little more than three miles to Glen Loch. Of the rivers of the western coast the chief is the Gweebarra already mentioned: of a similar character is the Gweedore, which separates the Rosses on the north from the district of Cloghanealy. The Owenea, which flows through Ardara, is the only other considerable river on this coast; the minor streams issuing from small lakes, and the torrents which descend from the moors in winter, are almost innumerable.

The general direction of all the valleys which intersect the highlands of Donegal is north-east and south-west, and this natural disposition marks out the three chief lines of mountain road; viz., from Ballyshannon and Donegal to Lifford and Londonderry, through the gap of Barnesmore; from Ardara to Lifford and Letterkenny, by the head of the Finn; and from Dunfanaghy and the cultivated country about Sheep Haven into the Rosses, by the passes between Dooish and Erigal. These latter roads are little frequented, so that west of Enniskillen the gap of Barnesmore is the only ordinary communication between Connaught and Ulster. The district along the Foyle and round the head of Loch Swilly is as well supplied with means of communication by land and water as any other part of Ireland. Throughout the county the roads are good.

The climate of Donegal is raw and boisterous, except in the sheltered country along the Foyle. The prevalent winds are from the west and north-west, and the violence with which they blow may be estimated from the effects of the storm of December 4, 1811, in which His Majesty's ship *Salhander* was lost in Loch Swilly. The maws and gills of all the fish cast on shore—eels, cod, haddock, lobsters, &c.—were filled with sand; from which it would appear, that by the furious agitation of the sea, the sand became so blended with it, that the fish were suffocated. Eels are fished in fifteen fathoms, and cod in twenty to thirty; hence making allowance for their approach nearer shore before the storm, we may judge of the depth to which the agitation of the water descended: the ordinary depth in a gale of wind is seven feet below the surface, and in a heavy storm twelve to fourteen feet. (*Geological Transactions*, iii. c. 13.) From the remains of natural forests in many situations where no timber will at present rise against the north-west blast, it has been inferred that the climate is now more severe than it formerly was, a conjecture which would seem to be corroborated by numerous ruins of churches and houses, overwhelmed by sand blown in on situations where, had such events been common at the time of their foundation, no one would have ventured on building. The deposit of sand at the bottom of the sea is daily increased by the detritus of loose primitive rock brought down by every river of the coast; so that with each succeeding storm a greater quantity may be expected to be blown in, until the whole coast becomes one sandy desert, unless the danger be obviated by timely plantations of bent grass and the extirpation of those multitudes of rabbits whose burrows now extend, in many places, for several miles along the shore, and prevent the natural grasses from binding down the loose matter.

The Floetz limestone-field, which occupies the central plain of Ireland, extends over the borders of this county from Bundoran, where the limestone cliff rises to the height of 100 feet over the Atlantic, ten miles north-east to Ballintra, where the extreme edge of the stratum is perforated by a subterraneous river. Limestone gravel is also found along the flanks of the primitive district as far as some miles north of Donegal town, and to the presence of this valuable substance may be chiefly attributed the cultivation which distinguishes this part of the county from the steril tract that separates it from the basin of the Foyle. From the mountains of Barnesmore, north, the whole formation of this county, with the exception of the transition tract along the basin of the Foyle, is primitive.

The prevalent rocks are granite and mica slate, passing into gneiss, quartz slate, and clay slate. The granite is a coarse granular syenite, the detritus of which gives a strong reddish tinge to the sands washed down by the streams that traverse it. It occurs supporting flanks of mica-slate along the whole line of mountains from Loch Salt to Barnesmore. On the eastern flanks of this range the mica slate passes into greywacke, which forms the substratum of the valley of the Foyle: the same rock occurs over the lower parts of Inishowen, and also appears on the southern side of the range near Donegal town. Granular limestone is found in beds throughout the whole mountain district in great quantity and variety of colour, as among various other indications, grey at Malin Head; greyish-blue at Loch Salt; fine granular, pearl-white, pearl-grey, flesh-red, and bright bluish-grey, at the marble hill near Muckish; yellowish-white, greyish-white, and rose-red, at Ballymore, pearl-white and pale rose colour at Dunlewy, under Erigal; pearl-grey in extensive beds at the head of the river Finn; and greyish fine blue at Killybeggs. Siliciferous, magnesian, and marly limestone also occur in various parts of the baronies of Inishowen and Raphoe, with a remarkable steatite near Convoy, on the Deele, which cuts under the knife like wood, and is used by the country people for the bowls of tobacco-pipes. Beds of greenstone and greenstone porphyry are sometimes found resting on the deposits of granular limestone, and occasionally on the mica slate and granite, and the dikes from which these originate may be seen traversing the primitive rock at Horn Head and Bloody Foreland. Among the rarer minerals occurring in this remarkable region are columnar idocrase, malacolithe, epidote, and essonite (cinnamon stone), from a bed of mica slate in the Rosses, and from the bar of the Gweebarra river; garnet in hornblende slate over the marble of Dunlewy; and cherry-red garnet from Glanties: also plumbago from the shore of Ardes; copper pyrites from Horn Head; lead earth and iron ochre from Kildrum, in Cloghanealy; pearl-grey and yellowish-white porcelain clay from Aranmore Island; potter's clay from Drumardagh, on Loch Swilly; iron pyrites from Barnesmore; lead ore from Finntown, Letterkenny, Glentogher, and various other places; and pipe-clay from Drumboe, near Stranorlar. The white marble of Dunlewy, near the mountain Erigal, is stated to be of an excellent quality, and its bed very extensive; it has been traced over a space of half a mile square, and is so finely granular, that it may be employed in the nicest works of sculpture. 'Its texture and whiteness,' says Mr. Griffith, 'approach more to those of the Parian than of the Carrara marble. It is very well known that perfect blocks of the Carrara marble are procured with great difficulty, and I firmly believe that the marble of Dunlewy is free from mica, quartz grains, and other substances interfering with the chisel, which so frequently disappoint the artists who work upon the marble from Carrara.' A large supply of fine siliceous sand was formerly drawn from the mountain of Muckish by the glass-houses of Belfast, and considerable quantities have been of late exported to Dunbarton for the manufacture of plate and crown glass: the sand is rolled down the hill in canvas bags.

The soil of the primitive district is generally cold, moory, and thin. The limestone tract from Ballyshannon to Donegal is covered with a warm friable soil, varying from a deep rich mould to a light-brown gravelly earth. The soil of the transition district, arising chiefly from the decomposition of slaty rock, is a light but manageable clay, which is very well adapted for crops of potatoes, flax, oats, and barley, and in some situations, as along the rivers Finn and Foyle, bears wheat abundantly. The ordinary rotation of crops in the limestone district is potatoes, oats, or on the sea-coast, barley, and flax: on the cold lands of the western coast potatoes and barley, and among the mountains, potatoes and oats. Alternate green crops and house-feeding have been practised by some of the leading gentlemen farmers since before 1802, but the practice is not general. The loy, or one-sided spade, and old wooden plough, are still in common use in the highland districts. Donegal is not a grazing country; the good land is almost all under tillage; and the grasses of the remainder are generally too sour for feeding. Cattle grazing on the mountain districts are liable to two diseases, the *cruppan* or crippling, and *galar* or bloody urine, which are said to alternate as the cattle are removed from the higher to the lower pastures: horses are not subject to these diseases. The Raphoe and Tyrhugh farming societies originated about A. D. 1800, and have been of some service in the encouragement of green crops and nurseries. The principal plantations are at Ardes and Tyrcallan, a fine seat near Stranorlar, where Mr. Stewart, the proprietor, has a nursery of sixteen acres. Two thousand larch-trees, each measuring at nine feet from the butt, from two feet to two feet ten inches in girth, are at present (April, 1837) for sale in the latter neighbourhood. This is the first home growth of timber offered for sale in Donegal. The trees have been grown on steep and poor land, and are good evidences of the capabilities of the waste lands of this county.

The linen manufacture is carried on to a very considerable extent, and is still increasing in the cultivated country about Raphoe and Lifford, and also in the neighbourhood of Ballyshannon. Bleachgreens are numerous in the neighbourhood of Stranorlar, but spinning by machinery has not yet been introduced. Strabane, in the county of Tyrone, within two miles of Lifford, is the principal linen market for the southern district: the sale here averages 500 pieces weekly. Londonderry and Letterkenny are the markets for the district to the north: the weekly sale in the former place is about 400, and in the latter about 120 pieces. The manufacture of stockings by hand formerly employed many females on the western coast, a pair of Boylagh knit woollen stockings selling for seven shillings, but the common wear of trousers has now taken away the demand. Burning kelp continues to be a profitable occupation along the coast. About the beginning of the present century private distillation was carried on to an immense extent all over this county, particularly in the baronies of Inishowen and Kilmacrenan: repeated baronial fines and the vigilance of the authorities have latterly checked the practice, but it still exists to some extent in the mountain districts. Considerable numbers of whales have from time to time been taken off this coast; but this, as well as the herring fishery, is now neglected. In 1802 there were but two flour mills in this county. There is an export of three to four thousand tons of corn annually from Letterkenny, and the remaining export of the county is from Londonderry. The condition of the peasantry in the south and west is not much better than that of the wretched inhabitants of northern Connaught: land is let exorbitantly high; 3*l.* 5*s.* per acre is paid in the neighbourhood of Donegal town, and 1*l.* and 18*s.* on the declivities of the mountain district. All the butter and eggs of the poorer farmers go to market to make up the rent, and buttermilk and potatoes constitute their diet. The traveller is much struck with the improved appearance of the peasantry north of the gap of Barnesmore; 'a ragged, rather than a whole coat,' says Mr. Inglis, vol. ii., p. 109, 'was now a rarity, and the clean and tidy appearance of the women and girls was equally a novel as it was an agreeable sight. The farm-houses too were of a superior order: most of the houses had inclosures and clumps of sheltering trees.' The majority of the population in this district is Protestant.

Donegal is divided into six baronies; Tyrhugh on the south, Bannagh and Boylagh on the west, Kilmacrenan on the north-west, Inishowen on the north-east, and Raphoe on the east and centre. Ballyshannon (pop. 3775), Killybeggs (pop. 724), and Donegal (pop. 830), were erected into corporations in the reign of James I.: these corporations are now extinct. Lifford, which is the assize town of the county, is governed by a charter of the 27th February, 10th James I. This corporation still possesses some property, and has a court of record with jurisdiction to the amount of five marks, but no criminal jurisdiction. The vicinity of Strabane has prevented Lifford from increasing: the court-house and county gaol constitute the greater part of the town: pop. 1096. The other towns are Letterkenny, pop. 2168; Rathmelton, pop. 1783; Buncrana, pop. 1059; Ballybofey, pop. 874; and Stranorlar, pop. 641. Donegal is represented in the imperial parliament by two county members.

Table of Population.

Date.	How ascertained.	No. of Houses.	No. of Families.	Families chiefly employed in Agriculture.	Families chiefly employed in Trade, Manufactures, and Handicraft.	Families not included in preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort.	23,521	..	..	..	..	..	..	140,000
1821	Under Act 55 Geo. III. c. 120.	44,800	48,030	..	..	..	120,559	127,711	248,270
1831	Under Act 1 Wm. IV. c. 19.	50,171	52,739	38,178	7,204	7,357	141,845	147,304	289,149

The southern part of Donegal, down to the plantation of Ulster, was known as Tyrconnell, and was the patrimony of the O'Donnells, whose chief tributaries were the O'Boyles in Boylagh and the Rosses; the Mac Swines (Mac Suibhne) in Bannagh, Rossguill, and Fanad; and the O'Doghertys in Inishowen. Prior to the fifteenth century, Inishowen had been in the possession of the Mac Loughlins, a family of the Kinel Owen or O'Neills. The most distinguished of the chieftains of Tyrconnell was Hugh O'Donnell, surnamed the Red, whose entrapment by Sir John Perrot, and subsequent imprisonment at Dublin as a hostage for the good conduct of his clan, caused much hostility against the government of Queen Elizabeth in this part of Ulster. O'Donnell, after more than three years' confinement, escaped, and with much risk made his way through the English pale and reached Dungannon, the residence of the disaffected earl of Tyrone. Here, it is supposed, the plan of the great rebellion, commencing with the attack on the fort of the Blackwater [Blackwater], was originally formed. From Dungannon he proceeded to Ballyshannon, the residence of his father, who immediately resigned the chieftainship into his hands. A council of the tribe was then held on Barnesmore mountain, the result of which was a sanguinary irruption into Connaught, which they wasted as far as Galway and Limerick. O'Donnell next turned his arms to the assistance of Tyrone, who had risen in rebellion, and was present at the battle of the Blackwater. His confederates, Maguire and O'Rourke, soon after obtained an equally signal victory over Sir Conyers Clifford, the governor of Connaught, whom they met in a pass of the Carlow mountains on his way to lay siege to Belleek.

O'Donnell next invaded Thomond, which he laid waste; but he soon after returned to oppose Sir Henry Dockwra, governor of Loch Foyle [Londonderry], who had seized on his castle of Donegal in his absence, and had set up his cousin Neal Garv O'Donnell, who was in the queen's interest, as chieftain in his place. But the Spanish troops who had been sent by Philip II. to the assistance of the rebels, having landed at Kinsale [Kinsale] in the mean time (23rd of September, 1601), he was obliged to raise the siege of Donegal and march into Munster. Here having formed a junction with Tyrone (23rd of December), they attempted the relief of Kinsale, in which the Spanish auxiliaries were besieged by the lord deputy, but owing, it is said, to a dispute about precedence, their armies did not act in concert, and a total defeat was the consequence. O'Donnell then sailed for Spain, to solicit in person new succours from Philip. After spending a year and a half in fruitless negotiation, he was seized with fever and died at Valladolid, where he was interred with royal honours in the church of St. Francis. On the death of Hugh, Neal Garv having proved refractory, his cousin Rory O'Donnell was promoted to the chieftainship, and afterwards to the earldom of Tyrconnell, which produced an ineffectual rebellion on the part of Neal and his allies the Mac Swines; but on the 7th of May, 1607, a letter accusing Rory of having entered into a conspiracy with Tyrone, Maguire, O'Cahan, and other Irish lords, was dropped in the council-chamber at Dublin Castle, in consequence of which it was judged expedient for him to accompany the flight of his alleged associates, who immediately went beyond seas. In the mean time a town had been walled in at Derry by Sir Henry Dockwra, who had also built a castle at Lifford for the control of Tyrconnell. The vicinity of an English garrison proved so unsatisfactory to the proprietor of Inishowen, Sir Cahir O'Dogherty, that on some vague assurances of aid from Spain, communicated by the exiled earls, he broke into open revolt May 1st, 1608, and having surprised Culmore and put the garrison to the sword, advanced on Derry next day, which he carried with little resistance and burned to the ground. He then fell back on Kilmacrenan, and took up a strong position on the rock of Doune, where he held out for five months until he was killed by a Scotch settler, who shot him as he leaned over the edge of the rock. O'Dogherty being thus slain in rebellion and the exiled earls attainted of high treason, Donegal, along with five other counties of Ulster, escheated to the crown. On the plantation, the district about Lifford was allotted to English undertakers, of whom the chief were Sir Ralph Bingley and Sir John Kingsmill; the whole of Boylagh and Bannagh was allotted to John Murray, Esq., and his sub-patentees; the district of Portlough to Scottish undertakers, of whom the chief were Sir John Stewart and Sir James Cunningham; the district of Kilmacrenan to servitors and natives, of whom the chief were Sir William Stewart, Sir John Kingsmill, Sir George Marburie, Captain Henry Hart, Sir Mulmory Mac Swine, Mac Swine Banagh, Mac Swine Fanad, and Tirlagh Roe O'Boyle. In Inishowen Muff was granted to the Grocers' Hall. Letterkenny owes its origin to Sir George Marburie, and Rathmelton to Sir William Stewart. At the time of the plantation the old Irish were in a very uncivilized state: in many of the precincts those who were permitted to remain, still practised their barbarous method of ploughing by the tail at the time of Pynnar's survey. During the wars that succeeded the rebellion of 1641, the British of the district along the Foyle, called the Laggan forces, did excellent service in this and the adjoining counties. There were some few forfeitures among the proprietors of Irish descent at the time of the Act of Settlement. The forfeitures consequent on the war of the revolution of 1688 did not extend into Donegal. The last historical event connected with this county was the capture of the French fleet off Tory Island by Sir John B. Warren in 1798.

The most remarkable piece of antiquity in Donegal is the Grianan of Aileach, the palace of the northern Irish kings from the most remote antiquity down to the twelfth century. It stands on a small mountain 802 feet in height, near the head of Loch Swilly. The summit of the mountain, which commands a noble prospect, is surrounded by three concentric ramparts of earth intermixed with uncemented stones. The approach by an antient paved road leads through these by a hollow way to a dun or stone fortress in the centre. This part of the work consists of a circular wall of Cyclopean architecture varying in breadth from 15 feet to 11 feet 6 inches, and at present about 6 feet high, enclosing an area of 77 feet 6 inches in diameter. The thickness of this wall is diminished at about 5 feet from the base by a terrace extending round the interior, from which there are flights of steps somewhat similar to those at Steague Fort, another remarkable Cyclopean erection in the county of Kerry. There was probably a succession of several such terraces before the upper part of the wall was demolished. Within the thickness of this wall, opening off the interior, are two galleries, 2 feet 2 inches wide at bottom and 1 foot 11 inches at top by 5 feet in height, which extend round one-half of the circumference on each side of the entrance doorway, with which however they do not communicate: their use has not been determined. The remains of a small oblong building of more recent date but of uncertain origin, occupy the centre. The space contained within the outer enclosure is about 5¼ acres, within the the second, about 4; within the third, about 1; and within the central building, or cashel, ½. The stones of the wall are generally of about 2 feet in length, polygonal, not laid in courses, nor chiselled, and without cement of any kind.

The description is thus minute, as, from an antient Irish poem published in the first part of the 'Memoir of the Ordnance Survey of Ireland,' and which bears conclusive internal evidence of having been written before A.D. 1101, the building of Aileach ('the stone fortress') is attributed, with every appearance of accuracy, to Eochy Ollahir, whose reign is one of the very earliest historical epochs in Irish history. In this poem are preserved the names of the architects, the number of the ramparts, and the occasion of the undertaking. Until the publication of the Memoir, the uses and history of this remarkable edifice were totally unknown. It was reduced to its present state of ruin A.D. 1101, by Murtagh O'Brien, king of Munster, who, in revenge of the destruction of Kincora [Clare] by Donnell Mac Loughlin, king of Ulster, A.D. 1088, invaded this district and caused a stone of the demolished fortress of Aileach to be brought to Limerick for every sack of plunder carried home by his soldiery. This event was remembered as late as 1599, when the plunder of Thomond by Hugh O'Donnell was looked on as a just retaliation. On Tory Island also are some Cyclopean remains, not improbably connected with the very antient tradition of the glass tower mentioned by Nennius. Tory signifies the island of the tower. On the same island are also a round tower and the remains of seven churches and two stone crosses. Throughout the county are numerous memorials of St. Columba, or as he is more usually known in Ireland, St. Columbkille. This distinguished saint, the apostle of the Picts and founder of the church of Iona, was born at Gartan, a small village south of Kilmacrenan, where he founded an abbey which was afterwards richly endowed by the O'Donnells. Near Kilmacrenan is the rock of Doune, on which the O'Donnell was always inaugurated. The remains of the abbey of Donegal still possess interest for the antiquarian, and on the north of Glen Veagh are some very antient remains of churches. But by much the most celebrated ecclesiastical locality in this county is the Purgatory of St. Patrick, situated on an island in Loch Derg. The antient purgatory was in high repute during the middle ages: the penitent was supposed to pass through ordeals and undergo temptations similar to those ascribed to the Egyptian mysteries. (See O'Sullivan, *Hist. Cathol. Hib.*) In Rymer's 'Fœdera,' are extant several safe conducts granted by the kings of England to foreigners desirous of visiting Loch Derg during the fourteenth century. On Patrick's day, A. D. 1497, the cave and buildings on the island were demolished by order of Pope Alexander VI., but were soon after repaired: they were again razed by Sir James Balfour and Sir William Stewart, who were commissioned for that purpose by the Irish government A. D. 1632. At this time the establishment consisted of an abbot and forty friars, and the daily resort of pilgrims averaged four hundred and fifty. The cave was again opened in the time of James II., and again closed in 1780. At present the Purgatory, which has been a fourth time set up, but on an island at a greater distance from the shore than the two former, draws an immense concourse of the lower orders of Roman Catholics from all parts of Ireland, and many from Great Britain and America every year. The establishment consists, during the time of the station from the 1st of June to the 15th of August, of twenty-four priests: the pilgrims remain there six or nine days; the penances consist of prayer, maceration, fasting, and a vigil of twenty-four hours in a sort of vault called the 'prison.' The fees are 1*s.* 4½*d.* each, of which 6½*d.* is paid for the ferry. During the time the pilgrims remain on the island they are not permitted to eat anything but oaten bread and water. Water warmed in a large boiler on the island is given to those who are faint; this hot water is called 'wine,' and is supposed to possess many virtues. One of the pilgrims whom Mr. Inglis saw here, had her lips covered with blisters from the heat of the 'wine' she had drank. The number of pilgrims is variously estimated from 10,000 to 13,000 and 19,000 annually, and is at present on the increase. A station was advertised here in the year 1830 by a Roman Catholic bishop.

For the state of education in this county, see RAPHOE, with which diocese the county of Donegal is nearly coextensive.

The only newspaper published in this county is the Ballyshannon Herald; number of stamps used in 1835, 7185.

The county expenses are defrayed by Grand Jury presentments. The amount of direct taxation averages about 24,000*l.* per annum. Assizes are held twice a year at Lifford, where there is a county gaol: there are bridewells at Donegal and Letterkenny. The district lunatic asylum is at Londonderry. The share of the expense of erecting this establishment, which falls on Donegal, is 9055*l.* 10*s.* 1*d.*

(*Statistical Survey of Donegal*, 1802; *Sketches in Ireland*, by the Rev. C. Otway; *Northern Tourist;* Inglis's *Ireland in* 1834; *Memoirs of Ordnance Survey of Ireland*, Hodges and Smith, *Dublin*, 1837; *Parliamentary Papers*, *&c.*)

DO'NGOLA, a province of Upper Nubia, extending southwards from the borders of Mahass about 19° 30′ N. lat., along the banks of the Nile as far as Korti, about 18° N. lat., where it borders on the country of the Sheygia Arabs. The Nile coming from Sennaar flows in a northern direction through Halfay, Shendy, and the Barabra country to about 19° N. lat. and 33° E. long., when it suddenly turns to the south or south-south-west, passing through the Sheygia country. [BARKAL.] After passing below the rock of Barkal, as it reaches the town or village of Korti, its course assumes a direction nearly due west, which it continues for about 20 or 30 miles, and then resumes its north direction towards Egypt. The province called Dongola stretches along the banks of the river from Korti first to the westward, and then northwards, following the bend of the stream to below the island of Argo, where it borders on Dar-Mahass, which last is a distinct province of Nubia. The whole length of Dongola is about 150 miles, and its breadth may be considered as extending no further than the strip of cultivable land on each bank, which varies from one to three miles in breadth, beyond which is the desert. The left or west bank is the more fertile, the eastern being in most places barren, and the sands of the desert stretching close to the water's edge. (Waddington and Hanbury's *Travels.*) The fine and fertile island of Argo is included within the limits of Dongola. The principal place in Dongola is Maragga or New Dongola, on the left or west bank, in 19° 9′ N. lat., which was in great measure built by the Mamelukes during their possession of the country from 1812 to 1820, when they were driven away by Ismail, son of the pasha of Egypt. (Caillaud's *Travels.*) Further south and on the right bank of the Nile, is Dongola Agous or Old Dongola, formerly a considerable town, but now reduced to about 300 inhabitants. At one end of it is a large square building, two stories high, which was formerly a convent of Coptic monks, and the chapel of which has been turned into a mosque. There are also other remains of Christian monuments, for Dongola was a Christian country till the fourteenth century, and Ibn Batuta speaks of it as such. Makrizi in the fifteenth century describes Dongola as a fertile and rich country with many towns; and Poncet, who in 1698 visited Old Dongola and its king and court, speaks of it as a considerable place. The king was hereditary, and paid tribute to the king of Sennaar. After Poncet's time, however, the Sheygia Arabs desolated Dongola, and reduced it to subjection during a great part of the last century, a circumstance which accounts for the present depopulated and poor state of the country. When the Mamelukes who had escaped from Egypt came to Dongola in 1812, the country was under several Meleks or petty native chiefs, subject however to the Sheygia Arabs. It is now a Beylik dependent on the pasha of Egypt; and the bey of Dongola, who resides at Maragga, extends his jurisdiction also over the country of the Sheygia Arabs. The natives of Dongola resemble those of Lower Nubia in appearance, they are black, but not negroes; they produce dourra, barley, beans, and have sheep, goats, and some large cattle. The fine horses which in Egypt are known by the name of Dongola come chiefly from the Sheygia or Barabra countries. The houses are built of unbaked bricks, made of clay and chopped straw. The country of Dongola is more fertile than Lower Nubia, but the people are few and indolent or dispirited by long calamities. Rüppel, in his 'Travels to Nubia and Kordofan,' gives particulars of the manners and habits of the people of Dongola.

DONNE, JOHN, was born at London in the year 1573 of respectable parents. At the early age of eleven, being esteemed a good Latin and French scholar, he was sent to the University of Oxford, and after remaining there a few years was removed to Cambridge. Although he greatly distinguished himself in his studies he took no degree, as his family being Catholic had conscientious objections to his making the requisite oath. At the age of seventeen he went to Lincoln's Inn to study the law; and while here, in order to satisfy certain religious doubts, he read the controversies between the Roman Catholics and Protestants, and decided in favour of the latter. After travelling for about a year in Spain and Italy, he became on his return secretary to Lord Elsinore, and fell in love with that nobleman's niece, the daughter of Sir George More. The lady returned his affection, and they were privately married. When this union was discovered by Sir George he was so indignant, that he induced Lord Elsinore to dismiss Donne from his service. The unfortunate secretary was afterwards imprisoned by his father-in-law, and his wife was taken from him; but by an expensive law-proceeding, which consumed nearly all his property, he was enabled to recover her. Sir George forgave him shortly afterwards, but absolutely refused to contribute anything towards his support, and he was forced to live with his kinsman, Sir Francis Whalley. Dr. Morton, afterwards bishop of Gloucester, advised Donne to enter into the Church, and offered him a benefice; but although in great poverty he refused the offer, thinking himself not holy enough for the priesthood. Sir Francis Whalley at last effected a complete reconciliation between Donne and Sir George, who allowed his son-in-law 800*l.*, in quarterly sums of 20*l.* each, till the whole should be paid. Still he continued to be in embarrassed circumstances, and after residing some time at Mitcham, whither he had removed for the sake of his wife's health, he lived in the house of Sir Robert Drury, at Drury Lane. He accompanied that gentleman to Paris, contrary to the solicitations of his wife, who could not bear to be parted from him, and who, as she said, felt a foreboding of some evil. While Donne was in Paris, there is a story that he saw the apparition of his wife enter his apartment bearing a dead child, and shortly afterwards received the intelligence that his wife had actually been delivered of a dead child at that very moment. The honest angler, Isaac Walton, who writes Donne's Biography, seems inclined to believe this story. On Donne's return to England he was introduced to James I., and delighted the king by a polemic treatise against Catholicism, entitled 'Pseudo-Martyr.' James was so anxious that he should take holy orders, that Donne at length complied, and became the king's chaplain-in-ordinary. His style of preaching is thus described by Walton: 'always preaching as an angel *from* a cloud, but not *in* a cloud.' The University of Cambridge made him doctor of divinity; and now, just as he was rising from his misfortunes, his happiness was embittered by the death of his beloved wife. The benchers of Lincoln's Inn presented him with their lectureship; and after accompanying an embassy to the queen of Bohemia, James's daughter, he became dean of St. Paul's and vicar of St. Dunstan's, being then in the fifty-fourth year of his age. Falling into a consumption, he was unable to perform his clerical duties; but some enemy having hinted that he merely feigned illness because he was too idle to preach, he mounted his pulpit, and almost in a dying state, preached what Walton has called his 'own funeral sermon.' This discourse was afterwards printed under the quaint title of 'Death's Duel.' From this time he abandoned all thoughts of life, and even had a portrait painted of himself, enveloped in a shroud, which he kept in his bed-room. Shortly afterwards he died, having exalted himself (according to Walton), almost to a state of angelic beatitude.

Of the real goodness and piety of Donne there can be no doubt. But while we admire these genuine qualities, we must not be blind to the superstitions and puerilities which were blended with Donne's religion, though these might be attributed partially (but not wholly) to the age. There was evidently a great deal of simplicity about him, as well as about his biographer Walton, who, enthusiastic in his admiration, exalts a weakness as much as his hero's most brilliant qualities. However, to those who wish to see characters like Donne treated in the spirit of their own time, we cannot recommend a more delightful book than Walton's Life of Donne.

As a poet, Donne was one of those writers whom Johnson has (to use Wordsworth's expression) 'strangely' designated metaphysical poets: a more infelicitous expression could not well have been devised.

In the biography of Cowley, Johnson has committed an unintentional injustice towards Donne. By representing Cowley's faults as the faults of a school, he brings forward parallel passages from other authors containing like faults, and Donne is one of them. He has previously described the school as a set of cold unfeeling pedants, and hence the reader finding Donne's worst lines cited in illustration of that remark, may easily imagine that he never did anything better, and set him down as a mere pedantic rhymer.

The fact is, that 'quaint conceits' are only the deformities of Donne's poetical spirit: the man himself had a rich vein of poetry, which was rarely concealed even when most laboriously encumbered, while some of his pieces, both for thought and even melody, are absolute gems. His fault, far from being coldness, is too much erotic fervour: he allows his imagination to run loose into the most prurient expressions; and in some of his amatory pieces, the conceits stand as a corrective to their excessive warmth. His satires, though written in a measure inconceivably harsh, are models of strength and energy. Their merits were discovered by Pope, who (to use his own odd phrase) translated them into English.

Donne's principal theological works, besides sermons, are the 'Pseudo-Martyr,' and a treatise against suicide, called 'Bia-thanatos.'

We beg leave to call the attention of those readers who study the progress of their own language to one fact, and that is, that whilst many of the pieces of Donne, written in lyric measures, are absolute music, what he has composed in the heroic measure is painfully uncouth and barbarous. Thus, though the invention of heroic verse took place at an early period (it is attributed to Chaucer), we find that a language must be in a highly cultivated state before this kind of verse can be written in perfection.

DOOM or DOUM, a remarkable palm-tree exclusively inhabiting Upper Egypt, especially the neighbourhood of Thebes, whence it is named Cucifera Thebaica. Its stem, instead of growing without branches like other palms, forks two or three times, thus assuming the appearance of a Pandanus. Clumps of it occur near Thebes; the fruit is about the size of an orange, angular, irregularly formed, of a reddish colour, and has a spongy, tasteless, but nutritious rind. The albumen of the seed is hard and semitransparent, and is turned into beads and other little ornaments. Gærtner described it under the name of Hyphæne coriacea.

DOOMS, FALSING OF, a term of the old Scots law somewhat similar in import with appeal of false doom in the law of England. A doom or judgment thus falsed or charged with injustice, was of old taken from the bailies of burghs to the court of Four-boroughs, and from the court baron or freeholder's court to the court of the sheriff, thence to the justice ayre, and thence to the parliament. But on the institution of the court of session, in 1532, a new method of review was established, the proceedings of the inferior courts being thenceforward carried into the court of session by advocation, suspension, and reduction, a form of process derived from the tribunals of modern Rome, and from the court of session to parliament by protest for remeid of law, and now to the House of Lords by appeal.

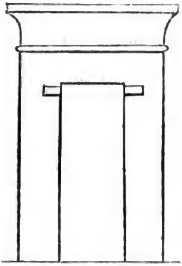
The civil jurisdiction of the court of justiciary declined immediately on the institution of the court of session. By the Jurisdiction Act, however, 20 Geo. II., a power of appeal to a limited extent was again bestowed on the circuit court of justiciary, and a process of appeal laid down entirely in the spirit of the antient falsing of dooms. This method of appeal has, with some slight alterations, been continued to the present time.

For the old falsing of dooms, see *Stat. Will.* c. 10; 1429, c. 116; 1471, c. 41; 1503, c. 95, 99.

DOONGURPORE, a small principality, situated in the district of Bagur and province of Gujerat, in a hilly tract, as to which but few particulars are known. This principality was formerly united to Odeypore, in Rajpootana, and the rajah of Doongurpore still claims seniority over the reigning sovereign of Odeypore, but this distinction is merely nominal, and there is in fact no political connexion between the two rajahs. The greater part of the inhabitants of Doongurpore are Bheels, who are considered to be the Aborigines of the country. Some years ago the rajah to preserve his authority, which was threatened by the more powerful among his subjects, took some bands of Sindes into his pay, but they soon usurped all power, and were proving destructive to the country, when the rajah sought and obtained the protection of the English under whose intervention the country has recovered from the desolate condition to which it had been reduced. The town of Doongurpore, the capital, is situated in 23° 54′ N. lat. and 73° 50′ E. long.: about 95 miles north-east from Ahmedabad. A lake near this town is said to have its mounds constructed with solid blocks of marble.

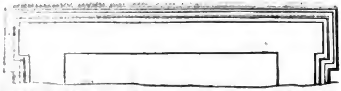
DOOR and DOORWAY, the entrance leading into a public or private edifice, and the opening or entrance way into an apartment or from one apartment to another. This way is closed with the door, which is generally made of wood, and hung to one of the sides or jambs of the doorway. The name door is from the Saxon part of our language, but it is one of those roots which occur also in the cognate languages as the Greek and Latin. The doorway consists of a sill, or horizontal piece laid on the ground, the perpendicular pieces, architraves or jambs, called also by Vitruvius the antepagmenta, and the lintel, or piece laid on the top of the jambs. According to Vitruvius (iv. 4), who gives general rules for the proportions of the portals of temples, the hypothyron, or aperture for doors, should be as follows:—The height from the pavement to the ceiling of the temple being divided into three parts and a half, two of the whole parts were allowed for the height of the door. These two parts were subdivided into twelve smaller parts, of which five and a half were allowed as the width of the door at the base; and the upper part was contracted according to the following rules: if not more than 16 feet high, the contraction was one-third of the width of the jamb on the face; if the height was more than 16, and not exceeding 25 feet, a fourth part of the width of the jamb only was employed; and from beyond 25 feet, and not exceeding 30 feet one-eighth only. Doors higher in proportion were made perpendicular.

The Egyptian doorway is perpendicular, and consists of two flat architraves of stone, with a flat lintel surmounted by an astragal moulding, above which is a frieze terminated with a bold cavetto and fillet. The doorway inclosed between the architraves and lintel is narrow in its proportions. The form of the door itself (if there ever was one used) is unknown.



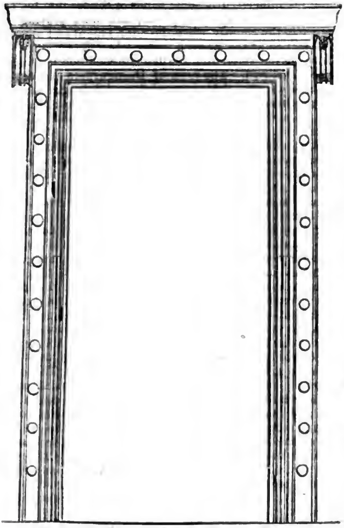
Egyptian Door from Denderah.

The Greek doorway is often inclined inwards, or contracted at the top; it has also a peculiar lintel or top-stone, with mouldings running round it and meeting the ends of the architraves, and forming two elbows, thus:



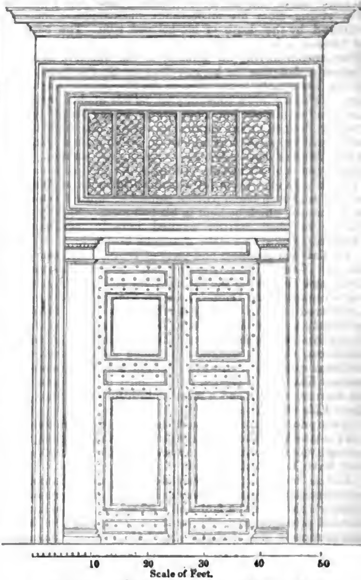
Greek lintel head, showing the manner in which the architrave moulding is formed round it.

The mouldings of the architraves are delicately formed, and decorated with ornaments, and a frieze and cornice supported on consoles are sometimes added. The decorations of the Erectheium doorway are very rich, but the size of our cut precludes the possibility of giving them. We have no example of the form and construction of a Greek door.



Greek Doorway of the Erectheium; from Donaldson's work on Doors.

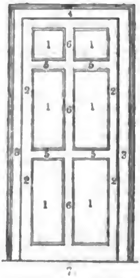
The Roman doorway is formed on the model of the Greek, except that the elbows or projections of the architrave mouldings over the lintels are of rare occurrence, as we as the inclination of the jambs or their contraction at th tops: they occur however in the temple of Vesta at Tivol and of Hercules at Cora. The bronze door of the Par theon at Rome, of which we have given a cut, is not w believe altogether an antique model. The bronze door the temple of Romulus at Rome is however an antiqu door. (Donaldson on *Doors*, plates.) Some notion of th



Pantheon Door and Doorway; from Donaldson's work on Doors.

construction and panelling of antient doors may be derive from the above work. Many beautiful models of moder doorways exist at Rome, and in various cities of Italy. careful study of them cannot fail to improve the taste of th architect. The modern bronze doors of the Baptistery a Florence and St. Peter's at Rome are unrivalled for thei size, design, and beauty of workmanship.

Wooden-framed doors, either single or double, consist styles or upright side pieces, rails or horizontal piece tenoned into the styles, and panels or thinner pieces



Common framed Door. 1, 1, 1, 1, panels; 2, 2, styles; 3, 3, architrave, jambs; 4, lintel; 5, 5, rails; 6, 6, 6, munnions; 7, sill.

wood let into grooves in the compartments formed by the joining the rails and styles together. Munnions, a corruption of mullions, are short upright pieces let into the rails. The panels have often a moulding running round their edges, either on one or both sides. For the technical terms of framed doors, the reader may consult Nicholson's Dictionary; and for the best general information on doors, the recent work of T. L. Donaldson on Doors.

DOOR, GOTHIC. [GOTHIC ARCHITECTURE.]

DOORNIK. [TOURNAY.]

DORA'DO (constellation), the sword-fish, a constellation of Bayer, situated in the southern hemisphere, and out nearly in half by a line joining *α* Argûs and *α* Eridani. The principal stars are as follows.

Character.	No. in Catalogue of		Magnitude.
	La Caille.	Astron. Society.	
γ	327	483	4
α	356	538	3
ζ	392	610	5
β	436	697	4
δ	455	730	5
ε	468	741	5

DORAT, CLAUDE JOSEPH, was born at Paris in the year 1734. Having a considerable fortune he devoted himself entirely to poetry, and produced a number of tragedies, which, though some were successful, drew on him torrents of ridicule from contemporary wits. He seems however to have attained some reputation as a writer of the lighter class of poems. He had a great passion for bringing out splendid editions of his own works, and the cost of vignettes and tail pieces consumed his fortune. He died in the year 1780.

The works of Dorat fill twenty volumes, but they are not highly estimated. La Harpe will scarcely allow him mediocrity. *La Déclamation Théâtrale*, a work on the proper department of actors, is considered his chef d'œuvre; but, though it is replete with wholesome advice to performers, it is deficient in everything that can be called poetry. His lighter tales in verse are told with naïveté and humour; of these *Alphonse* enjoys the best reputation, but they are terribly indecent. His dramas are entirely forgotten.

It should be observed that the edition of the works of Dorat in twenty volumes is adorned with engravings superior to most works of the time; and though we may blame the author for his prodigality in lavishing his fortune on such ornaments, we must not refuse the praise which is due to his taste, considering that these choice engravings were made at his own suggestion.

DORCHESTER, a borough and market-town, having separate jurisdiction, in the division of Dorchester and county of Dorset, 120 miles south-west by west from London.

Dorchester was called by the Romans 'Durnovaria,' and 'Durinum.' Hutchins, in his history of Dorsetshire, says that the first part of the name Dorchester is from Dur, or Dwr, in antient British, *water*, which seems the best opinion. By the Saxons it was called 'Dorneceaster,' from whence we have the modern name Dorchester. It has also been called 'Villa Regalis,' to distinguish it from Dorchester in Oxfordshire, called 'Villa Episcopalis.'

Placed on the 'Via Icenia' (the Icknield street), it must have been a place of some importance in the time of the Saxons, as two mints were established here by King Athelstan. The town was nearly destroyed by fire in 1613: 300 houses, and the churches of the Holy Trinity and All Saints, were totally consumed; and the loss is estimated by Hutchins at the enormous sum of 200,000*l*.

Many severe battles were fought in the vicinity of Dorchester between the king's and the parliamentary forces during the civil war. At the assizes held here on the 3rd of September, 1685, by Judge Jefferies and four other judges, out of 30 persons tried on a charge of being implicated in Monmouth's rebellion, 29 were found guilty and sentenced to death. The following day 292 persons pleaded guilty, and 80 were ordered for execution. John Tutchin, who wrote the 'Observator' in Queen Anne's time, was sentenced to be whipped in every town in the county once a year, but on his petitioning to be hanged as a *mitigation* of his punishment, he was reprieved, and subsequently pardoned.

The manor of Dorchester has passed through the hands of a great many families, and in the 11th year of the reign of King Henry IV. appears to have been the king's demesne borough. In the 1st of Henry V. the profits of the borough were confirmed to the burgesses at a fee-farm rent of 20*l*. The rent was subsequently granted, and is now paid, to the Hardwicke family.

The corporation claim a prescriptive right, but they have charters of Edward III., Charles I., and of other reigns: the governing charter is that of the 5th Charles I. The assizes and courts of quarter-sessions for the county and for the borough are held here; as well as a court of record and a court leet. A high steward is appointed for life.

The borough has returned two members to parliament since the 23rd year of the reign of King Edward I., but, by the Boundary Act, the boundaries are considerably extended, and include Fordington, Colleton Row, and part of Trinity parish, and include a population of 4940 inhabitants. The population of the town itself is 3033, of whom 1552 are females.

The town of Dorchester is pleasantly situated on a slight elevation near the river Frome, and consists principally of three spacious streets, which are well paved and lighted. A delightful walk, well shaded, surrounds two-thirds of the town. Races are annually held here in September; and a theatre was erected in 1828. The shire hall is a plain building of Portland stone, and is commodiously fitted up. The gaol, built in 1795, contains the county gaol, the house of correction, and the penitentiary: the interior is divided into four wings, communicating by cast-iron bridges.

The trade is now very trifling, but in the reigns of King Charles I. and James I. the manufacturing of cloth was carried on to some extent: the market-days are Saturday and Wednesday. There are fairs on Trinity Monday, St. John the Baptist's, and on St. James's days; the three last are principally for sheep and lambs, for which Dorchester is celebrated. A tract of land, called Fordington Field, partly meadow, partly arable, surrounds a portion of the town: its soil is particularly adapted for the feeding of cattle, and it extends over a surface seven miles in circumference, without any inclosures.

The town is divided into three parishes, All Saints (commonly called All Hallows), St. Peters, and the Holy Trinity, and is in the archdeaconry of Dorset and diocese of Bristol. St. Peter's church contains some curious monuments, is spacious, well built, and consists of a chancel, nave, aisles, and an embattled tower, 90 feet in height. The living of Trinity is by far the best, being now worth 439*l*. a year. There are also places of worship for Baptists, Independents, Wesleyan Methodists, and Unitarians.

A free grammar-school was founded and endowed by Mr. Thomas Hardy in the year 1579, the government of which is vested in trustees. It has two exhibitions, of 10*l*. per annum, to St. John's College, Cambridge, and one of 5*l*. per annum to any college of either University. A second school, founded prior to the grammar-school, was refounded in 1623 by the corporation, the master of which instructs five boys gratuitously in reading, writing, and arithmetic. There are almshouses, founded by Sir Robert Napier in 1615, by Matthew Chubb in 1619; and the Whetstone almshouses, for the support of four couples, or four single persons.

The town was strongly fortified and entirely surrounded by a wall, when in possession of the Romans; and the site where an antient castle stood is still called Castle Green. The building itself was totally demolished, and a priory for Franciscan monks was constructed out of the materials by one of the Chidiock family, in the reign of Edward III., near the site of the old castle. The church of the priory was pulled down at the Reformation, and the house became the residence of Sir Francis Ashley, and was subsequently converted into a Presbyterian meeting-house.

Tesselated pavements, Roman urns, and a quantity of coins of Antoninus Pius, Vespasian, Constantine, and other Roman emperors, have been dug up in the vicinity of Dorchester.

DORDOGNE, a river in the south of France, rises in the department of Puy de Dôme, on the slope of Mont

Dor, the summit of which (Puy de Sancy, 6224 feet high) is the highest point of central France. The Dordogne flows past the towns of Bort, Argentat, and Beaulieu, all in the department of Corrèze, to the junction of the Cére.

From the junction of the Cére the course of the Dordogne is westward: at Mayronne, 14 miles below the junction, the navigation commences; and at Limeuil, about 40 miles below Mayronne, the Dordogne receives the Vezère, a navigable tributary, which rises in the department of Corrèze, and has a south-western course of about 100 miles. [Correze.] At Libourne, 70 miles below the junction of the Vezère, the Dordogne receives the Isle, its largest tributary, which rises in the department of Vienne, and has a south-west course of nearly 120 miles. About 22 miles below the junction of the Isle, the Dordogne unites with the Garonne, and forms the æstuary of the Gironde. Its whole length is about 240 to 250 miles, for more than 130 of which it is navigable. The tide flows up to Castillon, nearly 50 miles above its junction with the Garonne: and sometimes at spring tides, when the water in the river is low, sets in with a violence which overwhelms everything. The anchors of the boats and vessels moored in the stream are carried away, the cables broken, and the vessels wrecked, unless the owners have taken the precaution to place them in the middle of the channel, where the depth of the water diminishes the violence of the stream. This violent flow of the tide is called *Le Mascaret;* the noise which it makes may be heard as far off as seven or eight miles. [Bore.]

The Dordogne is noticed in the writings of Ausonius and Sidonius Apollinaris, in the 4th and 5th centuries under the name of Duranius. Gregory of Tours, in the 6th century, calls it Dorononia; and Eginhard (9th century) Dornonia. Dordonia, the Latinized form of Dordogne, first appears in the writings of Aymoin or Aimoin in the end of the 10th or beginning of the 11th century.

DORDOGNE, a department in the south of France, taking its name from the river just described. Its figure approximates to that of an equilateral triangle, having its sides respectively facing the S., N.E. and N.W. It is bounded on the N. and N.E. by the department of Haute Vienne; on the E. by that of Corrèze; on the S.E. by that of Lot; on the S. by that of Lot and Garonne; on the S.W. by that of Gironde; on the W. (for a very short distance) by that of Charente Inférieure; and on the N.W. by that of Charente. Its greatest length from N. to S. is about 80 miles, and its greatest breadth from E. to W. about 72 miles. The area of the department, according to M. Malte Brun, is 3640 square miles; rather more than the joint area of the English counties of Norfolk and Suffolk; the population in 1832 was 482,750 (not more than 12-17ths of the population of the two English counties just mentioned), giving 133 inhabitants to a square mile. Perigueux, the capital, on the Isle, (population in 1832, 8700 for the town, or 8956 for the whole commune,) is about 264 miles in a straight line S.S.W. of Paris, or 294 miles by the road through Orléans, Vierzon, Châteauroux, and Limoges.

There are no very lofty hills in this department. The hills which run N.W. from the mountains of Auvergne send off a subordinate chain which just crosses the northern part of the department near Nontron. Other hills of lower elevation traverse the department, and form, except in the instance of the two great rivers, the Dordogne and the Isle, narrow valleys, which are liable to be inundated and damaged by the floods. The department is watered by the Dordogne, which passes through it from E. to W.; and is navigable throughout this part of its course. The Vezère enters this department from that of Corrèze, and flows past Montignac, where it becomes navigable into the Dordogne. The Isle arises in the department of Haute Vienne, and entering that of Dordogne on the N.E., flows through it in a S.W. direction, until it enters the department of Gironde a few miles above its junction with the Dordogne. The Dronne rises in the department of Haute Vienne, and entering that of Dordogne, flows through it or along the border until it enters the department of Gironde, and unites with the Isle. These are the principal rivers. Of the smaller ones, the Nizonne, which receives the Belle and the Pude, falls into the Dronne; as do also the Boulou and the Colle: the Loue, the Haute Vezère (which rises in the department of Corrèze), the Vern, the Salambre, and tho Grande Durche, fall into the Isle: the Beune falls into the Vezère; and the Melve, the Ceou, the Couze, the Coudou united with the Louire, into the Dordogne; the Bandiat, in the northern part of the department, belongs to the basin of the Charente, and the Dropt and the Allemance, in the southern part, to that of the Garonne.

'The soil is far from productive: the calcareous rock often presents its bare surface, or is covered only with heath, broom, and chestnut-trees, which occupy immense tracts. Sometimes the continuity of these arid lands is broken only by the intervention of marshes. Rich and fertile spots occur, as it were, accidentally in the midst of this district. The grain harvests would be insufficient for the support of the inhabitants, were they not eked out by the use of chestnuts as food: but of the produce of the vineyards more than half is sold as wine or converted into brandy for exportation. The mineral wealth of the department is considerable: it consists of pit coal, manganese, and several other articles, especially iron. But that which entitles this department to the consideration of epicures is the white wine of Bergerac, the delicacy of the pork, the abundance of red partridges, the excellent pike which are found in the ponds, the liqueurs, the fine confectionary of Perigueux, and, above all, the truffles which the district round that town affords.' (Malte Brun.)

The department contains 635 communes, and is divided into five arrondissements or sub-prefectures, viz., Perigueux, central (101,527 inhabitants); Nontron, in the north (82,122 inhabitants); Bergerac, in the south (116,897 inhabitants); Sarlat, in the east (109,430 inhabitants); and Riberac, in the west (72,774 inhabitants). Of the towns, Perigueux and Bergerac on the Dordogne (population, 5966 for the town, 8557 for the whole commune,) are described in their respective articles.

Sarlat is between the Dordogne and the Vezère, on a brook which flows into the former and in a deep valley. The neighbourhood abounds with copper and iron mines, coal-pits, and mill-stone quarries. The population of Sarlat in 1832 was 3917 for the town, or 6056 for the whole commune. The inhabitants are engaged in making paper. Though it is so small a place, Sarlat was before the Revolution a bishop's see. The bishop was a suffragan of the archbishop of Bordeaux. Sarlat was one of the strongholds of the Huguenots, and was twice besieged in the religious wars of the sixteenth century.

Riberac is on the left or south bank of the Dronne in a fertile plain, in which corn and hemp are grown, and sent to Bordeaux. There are at Riberac the remains of a strong castle, once belonging to the viscounts of Turenne. The population of the whole commune in 1832 was 3954; that of the town is not distinguished. Riberac is not on or near any main road.

Nontron is on the Bandiat, in the northern part of the department. The inhabitants amounted in 1832 to 2132 for the town, or 3246 for the whole commune. They manufacture leather and common cutlery, and carry on trade in the iron produced by the mines and wrought in the forges of the surrounding country.

Beside the above, which are the capitals of arrondissements, there are in the north, St. Jean-de-Colle, on the river Colle; Mareuil and Thiviers, on the Belle; and La Roche-Beaucour, on the Nizonne. The last is on the road from Paris to Perigueux, 20 or 21 miles from the latter, and consists of one crooked, steep and ill-paved street, with ill-built houses. The situation however is pleasant. The inhabitants are given by Vaysse de Villiers (A.D. 1818) at 1500. Many sheep, whose flesh is in good esteem, are fed in the neighbourhood. In the eastern part there are Excideuil, near the Loue, Terrasson and Montignac on the Vezère, and St. Cyprien on the Dordogne. Montignac had in 1832 a population of 2629 for the town, and 3922 for the whole commune: the navigation of the Vezère begins here. Terrasson is on the road from Perigueux to Brives and Tulle. St. Cyprien had in 1832 a population of 1541 for the town, or 2375 for the whole commune.

In the western part are St. Aulaye and La Roche-Chalaus or Chalais, on the Dronne, and La Tour Blanche, near the source of the Pude; and Villefranche-de-Louchapt, between the Isle and the Dordogne: these are all very small places. In the south are Eymet, on the Dropt; Beaumont, on the Couze; Issigéac, Belvès, Biron, Monpazier, and another Villefranche. Belvés had, in 1832, a population of 1781 for the town, or 2363 for the whole commune. A considerable quantity of nut-oil is made here. Biron was a barony held by the Maréchal de Biron, one of the chief supporters of Henry IV., and was made a duchy in favour of the son of the Maréchal, who was afterwards beheaded for a conspiracy against Henri.

In the centre of the department are Brantôme and Bourdeilles, on the Dronne; St. Astier, on the Isle; and La Linde on the Dordogne. Brantôme has a population of nearly 3000. According to the 'Dictionnaire Universelle de la France' (A.D. 1804), the manufactures of Brantôme were serges, hosiery, and cotton and woollen yarn. There was at this place a Benedictine abbey, founded by Charlemagne, A.D. 769. This abbey was held in commendam by Pierre de Bourdeilles, author of the well-known 'Mémoires de Brantôme.' The town of Bourdeilles is said by Expilly to have an antient castle. The inhabitants of the town were, according to the 'Dictionnaire Universelle,' engaged in weaving serges and other light woollens, and cotton hose.

Not far from the bourg or small town of Miremont, near the Vezère, is a cavern whose ramifications extend for about five miles. Another cavern, that of Mussidan, in the west of the department, is remarkable for the fountain of Sourzac, which gushes from it and forms a cascade.

For ecclesiastical purposes, the department forms the diocese of Périgueux, the bishop of which is a suffragan of the archbishop of Bordeaux: for the administration of justice, it is included in the jurisdiction of the Cour Royale of Bordeaux; and for military affairs it is comprehended in the eleventh division, of which the head-quarters are at Bordeaux. It sends seven members to the Chamber of Deputies. (Malte Brun; Balbi; Vaysse de Villiers.)

In respect of education, this department is rather behind the average of France. M. Dupin assigns to it, in the chart subjoined to his 'Forces Productives, &c. de la France' (Paris, A.D. 1827), one male child at school to every 104 inhabitants.

DORDRECHT. [Dort.]

DO'RIA, ANDRE'A, was born in 1466 at Oneglia, in the western Riviera of Genoa, of an antient noble family, to which Oneglia belonged as an imperial fief. Having lost his parents at an early age, Doria embraced the profession of arms, served under several princes in various parts of Italy, and lastly entered the service of Francis I., who made him commander of his fleet in the Mediterranean. Genoa had been for a long time distracted by factions, which had brought it under the dominion or protection, as it was styled, of the Visconti and Sforza, dukes of Milan. The French having conquered the duchy of Milan, placed a garrison in Genoa, upon condition of respecting the liberties of the citizens, a promise which they kept with the usual faith of conquerors. The citizens were oppressed in various ways, and Doria having remonstrated with the agents of Francis in behalf of his countrymen, a secret order came for his arrest, just after his nephew and lieutenant, Filippino Doria, had gained an important victory for the French over the imperial fleet near the coast of Naples in 1528. The French were then besieging Naples by land. Barbezieux, a French naval officer, was sent to Genoa with twelve galleys to seize on the person of Andrea Doria, who, having had intimation of this design, retired into the gulf of La Spezia, sent for his nephew to join him with the galleys which he had fitted out at his own expense, and offered his services to Charles V., who received him with open arms. Doria stipulated with Charles that Genoa, as soon as it was freed from the French, should be restored to its independence under the imperial protection, but no foreign garrison or government should be admitted into it. At the same time he engaged to serve the emperor with twelve galleys, fitted out by himself, which number was afterwards raised to fifteen, for which Charles agreed to pay him 90,000 ducats a year. Doria soon after appeared before Genoa with his little squadron, and being favoured by the inhabitants, he obtained possession of the city, and drove the French away. It is said that Charles offered him the sovereignty of Genoa; but Doria preferred a nobler course. He re-organised the government of the republic, and, in order to extinguish the factions, he named a certain number of families of nobles and citizens, out of which the legislative council was to be chosen annually. New families might be added to the number from time to time. A Signoria, or Council of Sixteen, with a Doge, renewed every two years, composed the executive, and five censors were appointed for five years as guardians of the laws. Doria was appointed censor for life, with the title of 'Father and Liberator of his country.' He now resumed his naval career as admiral of Charles V., and distinguished himself against the Turks and the Barbary pirates. He escorted Charles V. to the expedition of Tunis in 1535, and contributed greatly to the taking of the place. In 1538 he joined the Venetian fleet off Corfu, when he lost the opportunity of attacking, with every chance of success, the Turkish armament commanded by the famous Barbarossa. [Barbarossa; Khair Eddin.] His conduct on the occasion was attributed to secret instructions from the emperor. In 1541 Doria commanded the fleet in the expedition of Charles V. against Algiers, from which he is said to have tried in vain to dissuade the emperor. It turned out as he had foreseen, and he could only save the emperor with a small part of the army. In his old age, Doria retired to Genoa, where he lived in great splendour and reputation, the first among his fellow-citizens, respected by all, and consulted upon all matters of importance. Charles V. created him Prince of Melfi and Tarsi in the kingdom of Naples. At the beginning of 1547 his life was threatened by the conspiracy of Fieschi: his nephew Giannettino was murdered, but Andrea escaped, and Fieschi perished in the attempt. A few months after a fresh conspiracy was formed against him by Giulio Cibo, a Genoese emigrant, who however was discovered and executed. In 1548 some of the ministers of the emperor proposed to build a fortress, and introduce a Spanish garrison, in Genoa, under the pretence of preventing any new conspiracies, but the Genoese appealed to Doria, who interposed and prevented the execution of the project. In 1552 Doria, then eighty-five years old, went to sea again, to attack his old enemies the Turks, who, under Dragut Reis, were ravaging the coast of Naples. Doria lost some of his galleys, which were surprised by the Turks, but Dragut sailed away for the Levant. In 1556 he resigned his command to his nephew, Gian Andrea Doria, who was confirmed as admiral by Philip II. Andrea Doria died in his palace at Genoa in November, 1560, being then ninety-four years of age. He left no issue, and no very large fortune, owing to his splendid way of living and generous disposition. The Genoese paid great honours to his memory, and lamented his death as a public calamity. Doria was one of the greatest characters that Italy produced during the middle ages, and one of the few that were fortunate to the last. Several individuals of his family have distinguished themselves at various times in the service of the republic of Genoa. A branch of the Doria family are settled at Rome, with the title of princes. (Casoni, *Annali di Genova;* Botta, *Storia d' Italia.*)

DORIANS, the most powerful of the Hellenic tribes, derive their origin from a mythical personage named Dorus, who is generally made the son of Hellen, though he is described as the son of Xuthus by Euripides (Ion., 1590). Herodotus mentions (I. 52) five successive migrations of this race. Their first settlement was in Phthiotis, in the time of Deucalion; the next, under Dorus, in Hestiæotis, at the foot of Ossa and Olympus; the third on Mount Pindus, after they had been expelled by the Cadmæans from Hestiæotis. In this settlement, says Herodotus, they were called the Macedonian people; and he elsewhere (viii. 43) attributes to the Dorians a Macedonian origin; but there does not appear to have been any real connexion between the Dorians and the Macedonians (who, it has been shown, were of Illyrian extraction: Müller, *Dor.*, i., p. 2) beyond this vicinity of abode. The fourth settlement of the Dorians, according to Herodotus, was in Dryopis (afterwards called the Dorian Tetrapolis); and their last migration was to the Peloponnese. Another, and most remarkable expedition, not mentioned by Herodotus, was the voyage of a Dorian colony to Crete, which is stated to have taken place while they were in their second settlement at the foot of Olympus (*Androm. apud Strabon.*, p. 475 D); and Dorians are mentioned among the inhabitants of that island even by Homer (*Od.* xix., 174). The eastern coast was the first part which they occupied. (*Staphylus apud Strabon.*, p. 475 C.) This early settlement in Crete must not be confused with the two subsequent expeditions of the Dorians to that island, which took place after they were well settled in the Peloponnese, the one from Laconia under the guidance of Pollis and Delphus, the other from Argolis under Althæmenes. The migration of the Dorians to the Peloponnese, which is generally called 'the return of the descendants of Hercules,' is expressly stated to have occurred 80 years after the Trojan war, *i.e.* in 1104 B.C. (Thucyd. i., 12.) The origin and nature of the connexion which subsisted between the Heracleidæ and the Dorians are involved in much obscurity. The Dorians were from very early times divided into three tribes, and the epithet *thrice-divided* (τριχάϊκες) is applied to them by Homer in the passage referred to above. These three tribes were called the Hyllæans, the Dymanes, and the Pamphylians. Now the two latter tribes are said to have descended from Dymas and Pamphylus, the two sons of Ægimius, a mythical Doric king, and the first claimed a descent from Hyllus, the son of Hercules.

An attempt has been made to show that the Hyllæans were of Doric origin as well as the other two tribes (Müller *Dor.* i., chap. 3, sec. 2), but we are inclined to infer from the traditions as well as from the duplicate divinities of the Dorians, that the genuine Dorians were included in the two other tribes, and that the Heracleidæ were a powerful Achæan family united with them in a similar manner, but by a stronger tie than the Ætolians under Oxylus, who are also said to have taken part in this expedition. The Heracleidæ, then, with their Ætolian and Dorian allies, crossed the Corinthian gulf from Naupactus, invaded and subdued Elis, which was assigned to the Ætolian chieftain, and bending their steps southward, conquered successively and with greater or less difficulty, Messenia, Laconica, Argolis, Corinth, and Mégaris. In Laconia they were joined by the Cadmæan clan of the Ægidæ, who assisted them in their tedious war with Amyclæ, and afterwards took a part in the colonies to Thera and Cyrene. [Bœotia and Cyrene.] This invasion, which so materially affected the destinies of Greece, was very similar in its character to the return of the Israelites to Palestine. The invaders, who, like the descendants of Abraham, brought their wives and children with them, though they perhaps did not completely abandon their last settlement, which was still called and considered Dorian (Thucyd. i. 107), numbered about 20,000 fighting men on the highest estimate. (Müller, *Dor.* i., chap. 4, sec. 8.) They were, therefore, very inferior in number to the inhabitants of the countries which they conquered; but the superiority of their peculiar tactics ensured them an easy victory in the field, and they appear to have taken all the strong places either by a long blockade or by some lucky surprise; for they were altogether unskilled in the art of taking walled towns.

The governments which the Dorians established in all the countries which they thus invaded and conquered was, as might have been expected, very analogous to that which the Norman invasion introduced into England, namely, an aristocracy of conquest; for while the successful invaders remained on a footing of equality among themselves, all the old inhabitants of the country were reduced to an inferior condition, like the Saxons in England. They were called περίοικοι, or 'dwellers round about the city,' a name corresponding exactly to the Pfahlbürger, or 'citizens of the Palisade,' at Augsburg, who dwelt in the city suburbs without the wall of the city; to the 'pale' in Ireland before the time of James I.; to the people of the contado in Italy; and to the fauxbourgeois in France. (Niebuhr, *Hist. of Rome*, i. p. 398, Eng. tr.; Arnold's *Thucydides*, i. p. 626; and Borghini, *Origine della Città di Firenze*, p. 280, ed. 1584.) All the members of the one class were *gentle*, all those of the other class were *simple*. The constitution of Sparta in particular was an aristocracy of conquest as far as the relations between the Spartans and Lacedemonians were concerned, while the Spartans themselves lived under a democracy with two head magistrates, who were indeed called kings, but possessed very little kingly power. The usual name for a constitution in a Dorian state was an order or regulative principle (κόσμος), and this name appears to have arisen from the circumstance that the attention of the Dorian legislators was principally, if not solely, directed to the establishment of a system of military discipline and to the encouragement of that strict subordination which is the result of it. To bring this about the Dorian population was continually engaged in public choral dances, in which the evolutions of an army were represented, and which served as a rehearsal for actual war. These dances were professedly in honour of the Dorian god, Apollo, who was represented as the inventor of the lyre, their original accompaniment, and also as a god of war, and of civil government, as presiding over the Delphian Oracle, which regulated all the Dorian law systems; but this is merely an expression of the fact that music was an important instrument in the civil and military organization of a Dorian state. Apollo had a duplicate in his sister Artemis, and this, as we have before hinted, points to an antient division of the Dorian race into two distinct tribes. (See Niebuhr, *Hist. of Rome*, i. p. 217, comp. p. 224.) The necessity for such a religion, and such a system of worship depending upon it, is to be explained by the peculiar relation subsisting between the Dorians and their περίοικοι. It was by superior prowess and discipline that they had acquired their rank, and it was only by a continuance of this superiority that they could hope to maintain themselves in the same position. Accordingly, it was important that while the bulk of the population was occupied as much as possible in agricultural employments, the Dorian aristocracy should enjoy sufficient leisure and have every inducement of religion and amusement to practise those martial exercises in which it was so needful for them to excel. The same occasion for strict discipline may also account for the extraordinary austerity which prevailed in most Dorian communities. The Dorian women enjoyed a degree of consideration unusual among the Greeks. The Syssitia, or common tables, which were established in most Dorian states, were designed to admonish those of the privileged class that, living as they did in the midst of a conquered but numerous population, they must not consider themselves to have any individual existence, but must live only for the sake of their order (κόσμος).

In addition to the Dorian settlements which have been already mentioned, this race sent out many colonies: of these the most important were established along the southwest coast of Asia Minor. Rhodes, Cyprus, Corcyra, and Sicily also boasted a Dorian population; Byzantium and Chalcedon were Megarean colonies; and the celebrated cities, Tarentum and Crotona, in Italy, were founded under the authority of Sparta.

The reader will find a full discussion of all questions relating to the history and peculiarities of the Dorian race in Müller's *Dorier*, Breslau, 1824 (translated into English, with additions and improvements by the author, Oxford, 1830; in the second chapter of K. F. Hermann's *Lehrbuch der Griechischen Staatsalterthümer*, Heidelberg, 1836, translated, Oxford, 1836; and in Lachmann's *Spartanische Staatsverfassung*, Breslau, 1836.) Dr. Lachmann adopts the view which we have given of the original two-fold division of the Dorians, but considers the two first tribes to have been the Hyllæans and Dymanes, the Pamphylians being made up of volunteers who joined the expedition to the Peloponnese.

DORIC DIALECT, a variety of the Greek language peculiar to the Dorian race. It was spoken in the Dorian Tetrapolis; in the greater part of the Peloponnese; in the numerous Dorian colonies in Italy, Sicily, and Asia Minor; in Crete, Ægina, Rhodes, Melos, Corcyra, and Cyrene. As a written language it is divided by grammarians into two classes, the old and new Doric. In the former Epicharmus, Sophron, and Alcman wrote; in the latter Theocritus, Bion and Moschus. The lyric poets in general wrote in the Doric dialect; but Pindar, perhaps the greatest of them, at all events the best known to us, wrote a language based upon the epic or Ionic dialect, but with a liberal use of Doric and Æolic forms. (Hermann *de Dialecto Pindari*, Opuscula i. p. 247.) The choruses in the Attic plays are written in a kind of Doric; which circumstance (as well as the use of Doric words by Pindar, a Theban) is to be accounted for by the Dorian origin of lyric poetry; for as Herodotus, although a Dorian, wrote his history, which is a kind of epic, in the Ionic dialect, because that was the prescriptive language for epic poetry, so all writers of odes adopted the Doric more or less, because the oldest lyric poems were written in that dialect. The existing monuments of the pure Doric, in addition to the fragments of the old writers which have been carefully collected, are the specimens in the comedies of Aristophanes, the treaties and decrees quoted by the Athenian historians and orators, and the inscriptions collected by Chandler, Mustoxidi, and Böckh. The peculiarities by which the Dorian dialect was distinguished from the other varieties of the Greek language are to be attributed to the mountain life of the Dorians in their earliest settlements. We always find a tendency to the formation of broad vowel sounds in the language of mountaineers, and this fondness for the α and ω, which the Dorians generally used where η and ου were used in other dialects, and also their aversion to sibilants, is perfectly analogous to what we observe in other languages which are spoken both by highlanders and lowlanders. The use of the article in the Greek language is attributable to the Dorians, the poetry of Alcman having first introduced it into the literature of Greece. The older language, which is called the Æolian or Pelasgian, and to which, according to Strabo, pp. 333 and 679, the Doric bore the same relation as the Attic did to the Ionian, was entirely without the article, as we may see in the Latin branch of it. On the Dorian dialect the reader may consult in addition to Maittaire and Gregory of Corinth, who have written on the Greek dialects in general, the excellent remarks of Müller, *Dorians*, vol. ii., Appendix viii., p. 484, &c., English translation.

DORIC ORDER. [Civil Architecture; Column.]

DORIPPE (Fabricius), a genus of brachyurous decapod crustaceans belonging to the subdivision which have the feet of the fourth and fifth pairs elevated on the back, and not terminated with paddles, and the eyes supported upon simple peduncles (*Notopoda*). The genus is adopted by Latreille, Lamarck, Leach, Bosc, and Risso: it is the *Notogastropus* of Vosmaer, and was comprehended under the general term *Cancer* by Linnæus, Herbst, Aldrovandus, and Plancus.

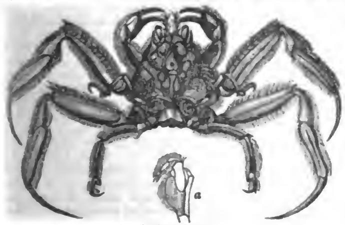
Generic character.—External *antennæ* rather long, setaceous, inserted above the intermediate ones, which are folded (pliées), but not entirely lodged in the cavities where they take their insertion: third joint of the external *jaw-feet* (pieds-mâchoires) straight, elongated, terminated in a point, *buccal opening* triangular: *claws* (chelæ) small, short, equal; the other *feet* very long and compressed, the third pair being the greatest; the two last pair elevated upon the back, and terminated by a small hooked nail, which is folded back upon the next joint: *carapace* slightly depressed (the sides wider posteriorly than they are anteriorly), truncated, and spinous before; truncated, sinuous, and bordered behind; the surface marked with small humps or tubercles, which correspond exactly to the regions proper to the soft parts beneath: two great oblique openings, ciliated on their edges, communicating with the branchial cavity, and situated below the head, one at the right, the other at the left of the mouth: inferior and posterior part of the body truncated into a kind of gutter to receive the reflected abdomen, the pieces of which are nodulous or tuberculous: *eyes* small, lateral, supported on rather long peduncles, placed near the angles of the head, and protected by its angular projections, which form the edges of their orbits. (Desmarest.)

Geographical Distribution.—Probably wide on the sea-coasts of warm climates, where the water is deep. The Mediterranean and Adriatic seas, and Manilla, are among the localities given.

Habits.—Not well known. The species haunt great depths in the sea, nor has it yet been proved whether they make use of the feet elevated on the back to cover themselves like the *Dromiæ* with foreign bodies. It is however very probable that such is their use.

Example, *Dorippe lanata*, Latreille, Lamarck; *Dorippe Facchino*, Risso; *Cancer lanatus*, Linnæus; *Cancer hirsutus alius*, Aldrovandus.

Description.—Four dentations in the front and a very strong lateral point, forming at the same time the angle of the head and the external border of the orbit. A short point on the middle of each side of the carapace. Anterior border of the thighs of the second and third pair of feet without spines. Fingers of the chelæ compressed and arched within, having their internal edge armed with a series of dentilations, which are rather strong, oblique, equal, and white. Body often covered with reddish down.



Dorippe lanata.
a, external left jaw foot.

Locality,—the Mediterranean and the Adriatic. The inhabitants of Rimini call it *Facchino*. (Desmarest.)

Fossil Dorippe?

Desmarest (Histoire Naturelle des Crustacés Fossiles, 1822), describes a species, *Dorippe Rissoana*, which has some resemblance to the species above figured and described, and still more to the crab figured by Herbst under the name of *Cancer Frascone;* and above all, to a species brought from New Holland by Péron, and named *Dorippe nodosa*. Desmarest observes that he is the more inclined to consider it as approaching very near to this last, inasmuch as he had thought that the specimen which he had described might not be in reality fossil. In fact, he adds, that though brown and shining, like the fossil crabs which come from the East Indies, it is much lighter, more friable, and not so much imbedded in the clay as they are. In his 'Considérations Générales sur la Classe des Crustacés,' (1825,) he describes the *Dorippe à quatre dents* with the synonyms *Dorippe quadridens*, Fabr. Latr.; *Dorippe nodosa*, Coll. du Mus.; *Cancer Frascone*, Herbst. 'This *Dorippe* from the East Indies,' he adds, 'has lately been brought from Manilla by M. Marion de Procé. It so much resembles a species which I have described with doubt as fossil, that I know not how precisely to point out the difference. This species belongs to M. Defrance, who has stated its characters in the article 'Dorippe' (fossil) of the Dict. des Sc. Nat.'

DORKING. [Surrey.]

DOROG, a market town of eastern Hungary, in what is called the 'Haydu Varosok,' or privileged district of the Haydukes, lying north-east of Böszörmény, the head town of that district, in 47° 30′ N. lat. and 21° 20′ E. long. (according to the Austrian quartermaster-general's map). It contains about 920 houses and 6650 inhabitants.

DORPAT, or DOERPT, a circle in the north-eastern part of the Russian government of Livonia, bounded on the north by Esthonia, and lying in the large subdivision of the empire, called 'The Provinces of the Eastern Sea,' or Baltic. It has an area of about 4257 square miles, and contained, in 1792, 130,904 inhabitants; in 1816, 140,606; and in 1833, 179,819. There are 2 towns (Dörpt, or Dörpat, and Verroe), 20 parishes, 206 equestrian estates, and 15,331 small farms in the circle. Ridges of low hills and gentle eminences occur alternately with lakes, streams, marshes, forests, and cultivated plains: the largest lake, next to its eastern boundary, lake Peipus, the western side of which, together with a portion of the bay of Pskow, belongs to this circle, is the Vürzyerva, which is navigable, and discharges its waters through the river Embach into the Peipus. Independently of the Little Embach, which enters lake Vürzyerva from the south, and the Great Embach, which flows out of that lake into the Peipus, and is navigable from the town of Dörpat, the circle has no streams of any note: one of them, the Schvarzbach, contains pearls. The forests are of considerable extent, and in conjunction with the cultivation of buckwheat, flax and hemp, and the fisheries, afford employment to the people. A considerable quantity of cattle are reared. The only mechanical occupations are sawing timber, for which there are 18 mills, and making potashes, and a small quantity of paper. Verroe, the second town, which lies on a lake in 57° 46′ N. lat. and 27° 3′ E. long., has a Lutheran and a Greek church, and about 3500 inhabitants.

DORPAT, or DOERPT (in Esthonian, Tart Ling, and in Livonian, Tehrpata), the chief town of the circle, is agreeably situated at the foot and on the declivity of an eminence, part of a range of hills, about 200 feet high, which rise abruptly from the spacious plain below, and is built on each bank of the Great Embach, in 58° 22′ N. lat. and 26° 42′ E. long., 290 versts (about 193 miles) north-east of Riga. The river is crossed by a handsome bridge of granite of three massive arches, and the town, which is embellished with gardens, forms a semicircle, laid out in straight broad streets, which are kept very clean, and adorned with some handsome public buildings of freestone, particularly the government offices and university buildings. The houses, constructed either of bricks or wood, the walls and roofs of which are painted in showy colours, do not in general exceed one story in height. The eminence, at the north-western extremity of the town, is approached from one of the principal squares, and laid out in avenues and walks: the summit is called the 'Place of the Cathedral,' from its having been the site of a cathedral which was burned down in the great fire of 1775, and is at present the site of an observatory, admirably supplied with instruments by the well-known astronomer, Dr. Struve, as well as of the university library and medical school. In the middle of the sixteenth century Dörpat had a cathedral and seven churches within the walls, besides three outside of them, but at present it has only one Lutheran and one Greek church. In 1782 it had 546 houses and 3603 inhabitants; in 1816 the population had increased to 7376; and at present the number of houses is about 1200, and the population is about 11,000. In 1833 it was 10,802; viz., 5011 males and 5791 females; and in 1835 the births were 772 and the deaths 653. Internal trade, the navigation of the Embach, and the wants of those who are connected with the university afford employment to the people of the town. They also hold a large annual fair in January for the sale of Russian and foreign manufactures. The university was founded in 1632 by Gustavus Adolphus, at a time when Livonia, Esthonia, and Ingria, belonged to the Swedish crown, but was suppressed by Alexis Michaelovitsh in 1656. The Swedes having however recovered possession of Livonia, it was re-established in 1690: in 1699 they transferred it to Pernau; and in December, 1802, it was reconstituted by the Emperor Alexander for the benefit of Livonia, Esthonia, and Courland, the nobility of which elect a curator or superintendent, who, conjointly with its heads, administers its revenue, which amounts to about 5800*l.* a year (126,000 roubles). The university, which is open to students of every religious persuasion, consists of the four faculties of theology, law, medicine, and philosophy; has 30 professors, and is attended by about 580 students. It has a library of nearly 60,000 volumes, and suitable collections for natural and experimental philosophy, mineralogy, zoology, anatomy, and pathology, &c.; a botanical garden, clinical institutions, a theological and a philological seminary, an establishment for educating Russian professors, a gymnasium, and a school for educating teachers in the elementary schools. Public education throughout Livonia, Esthonia, and Courland, is under the direction of the University of Dörpat.

DORR-HAWK. [GOATSUCKERS.]

DORSET. [SACKVILLE.]

DORSETSHIRE, an English county, bounded on the east by Hampshire, on the north by Wiltshire, on the northwest by Somersetshire, and on the west by Devonshire: along all its southern borders it is washed by the English Channel. Dorsetshire is for a short distance separated from Hampshire by a rivulet which joins the Avon of Wiltshire and Hampshire above Christchurch: for a short distance it is separated from Somersetshire by the Ivel or Yeo, and the brooks that run into it; and in the west it is separated from Somersetshire and Devonshire by the Axe and some small streams that run into that river.

The form of the county is very irregular, and one small part is entirely detached from the rest and inclosed by Devonshire. Its greatest length is from east to west, from Alderholt, near Fordingbridge, in Hampshire, to the western extremity of the detached part, which is inclosed within the boundary of Devonshire, 57 or 58 miles: but from the irregular course of the boundary, the line joining these two points is not wholly in Dorsetshire. The breadth from north to south varies much; the greatest breadth is from the spot where the river Stour enters Dorsetshire to Portland Bill or Point, 40 miles: at the eastern extremity, along the Hampshire border, the breadth is 16 miles; at the western extremity, near Lyme Regis, only 5 miles. The area, as given in the table in Arrowsmith's large map of England and Wales, and in the population returns, is 1006 square miles, or 643,840 acres: the population in 1831 was 159,252, or about 158 to a square mile. In respect of size, it is below the average of the English counties; and in respect, both of amount and density of population, very much below. Dorchester, the county town, is 115 or 116 miles from St. Paul's, London, in a straight line south-west by west, or 119½ from Hyde Park Corner by the road through Basingstoke, Andover, Salisbury, and Blandford.

Dorsetshire is included between 50° 30′ and 51° 5′ N. lat., and 1° 48′ and 3° 7′ W. long. Dorchester is in 50° 43′ N. lat. and 2° 26′ W. long.

Coast, Bays, and Islands.—At the eastern end of Dorsetshire the coast is precipitous; but the cliffs extend scarcely a mile south-west from the border of Hampshire, and are succeeded by a low sandy tongue of land, running about a mile farther in the same direction to the narrow entrance of Poole harbour. This bay penetrates six miles inland towards the west, and expands to a breadth of four or five. Its outline is very irregular, and it forms several small bays; as Hole's Bay, Lytchet Bay, Arne Bay, &c. It receives the Frome, the Piddle, and other streams: it consists for the most part of banks of mud, which are dry at low water, and covered with sea-weed, and are separated from each other by deeper channels. The town of Poole is on a peninsula at the entrance of Hole's Bay, on the north side of the harbour. There are several islands in Poole harbour; Brownsea or Brownsey, the largest, which lies near the entrance of the harbour, is a mile and a half long from east to west, and nearly a mile broad. It is sandy, partly covered with heath, furze, and fern, and partly cultivated or laid out in a plantation. There are on it an old castle and one or two tenements. The water is so shallow in Poole Harbour, except in the channels, that only small or lightly-laden boats can pass over the banks, even at high water; several of the channels are only sufficient for fishing boats and small craft: the Wareham and Main channels, the south or Wych channel, and that which leads to the town of Poole, are navigable for larger vessels. The shore round Poole harbour is low, and near where the Frome falls into it the land is protected from inundation by an embankment.

From the entrance of Poole harbour a low shore runs southward nearly three miles, and then becomes steep and turns eastward, forming Studland Bay, the southern limit of which is Handfast Point. From Studland Bay, the coast, still for the most part abrupt, runs about 4 miles south by west to Peverel Point and Durlston Head, forming the two small bays, Swanage or Swanwich Bay and Durlston Bay. From Durlston Head a precipitous coast runs west by south 5 miles to St. Aldhelm's or St. Alban's Head (344 feet high B.), and from thence in an irregular line west by north 17 or 18 miles to Weymouth Bay, forming several small bays, such as Chapman's Pool, Kimmeridge Bay, Worbarrow Bay, Lulworth Cove, and Ringstead Bay. The cliffs which extend from Peverel Point to the neighbourhood of Weymouth are a longitudinal section of the high land which forms this part of the coast.

The shore of Weymouth Bay is low, and extends 2 miles south to the towns of Melcomb Regis and Weymouth: here the cliffs recommence, and run 1 mile south-west to Sandsfoot Castle, from whence a low shore extends 2 miles south by east to Portland Castle, on the peninsula or Isle of Portland. The lofty coast of this island takes a circuit of 5 or 6 miles to the Bill of Portland, the southernmost point of the county, and from thence above 3 miles northward to the commencement of the Chesil Bank, which connects the north-west extremity of the Isle of Portland with the main land. The bay between Weymouth and the Isle of Portland is called Portland Road.

The Isle of Portland is about four miles long, and in the widest part nearly one and a half broad. It is one continued bed or rock of freestone. The highest point in the island is 458 feet (B.) above the level of the sea: the cliffs on the western side are very lofty; those at the Bill are not more than 20 or 30 feet. There is sufficient depth of vegetable soil to render the island tolerably productive, but not sufficiently so for the entire sustenance of the population, who get much of their provisions from Weymouth. Water is plentiful and good; one stream has sufficient volume to turn a mill. The herbage is very fine, and affords pasturage to a number of sheep, whose flesh is considered to be excellent mutton. In wet seasons the meadows produce a good crop of grass, but in a dry spring it is so much parched as not to be worth mowing. The arable land is mostly common field; what inclosures there are, are bounded by stone fences: wheat, oats, peas, and a little barley are grown; sainfoin is also cultivated. The grain harvest is small, but the corn is fine, and in request for seed. There are very few trees in the island except a few elms in the southern part: and from the scarcity of other fuel, the islanders are obliged to use dried cow-dung mixed with the stubble of their corn, which they gather for the purpose. (Hutchins's *Dorsetshire*, vol. ii. p. 354, 2nd edit., Lond., 1796-1815.) The whole island is included in one parish, which contained in 1831 a population of 2670. The islanders are a robust race, peculiarly adapted to the hard labour of quarrying stone, in which a considerable number are employed: they are not long-lived, which is ascribed to their free use of ardent spirits. (Hutchins's *Dorsetshire*.) They occasionally engage in fishing, and some few are employed in agriculture, trade, and handicraft. The custom of gavelkind prevails here. The island has one village, Chesilton, at the commencement of the Chesil bank, on the north-west side of Portland: there are several hamlets. There are two castles; one, on the east shore of the isle, is very antient, and built in the form of a pentagon, with a number of small loop-holes, whence it has been vulgarly called 'Bow and Arrow Castle:' it is sometimes called Rufus's Castle. The other is on the northern side of the island, built by Henry VIII., and, in connexion with Sandsfoot Castle, commands Portland Road: a few guns are still mounted. Near the Bill are two lighthouses. The quarries will be noticed hereafter. Masses of rocks extend under water to a considerable distance from the island. A dangerous surf, called 'The Race of Portland,' extends from the west of the island eastward to St. Aldhelm's Head. Portland Road is sheltered from the south-west wind, and affords good holding ground at eight or nine fathoms.

Leland, Hollinshed, and Camden agree in speaking of Portland as having been once separated from the main land; but it has long been united to it by the Chesil Bank, one of the longest and most extraordinary ridges of pebbles in Europe. From its commencement at the Isle of Portland, near the village of Chesilton, to which it gives name, it extends in a remarkably straight line north-west for many miles, not joining the shore at the part nearest to Portland, but running parallel to the coast, from which it is separated by a narrow arm of the sea called 'The Fleet,' as far as Abbotsbury, 10 miles from Portland: here it unites with the main land and runs along the shore nearly six miles further to the commencement of the cliffs at Burton Castle, not far from Bridport. The breadth of the Chesil Bank is in some places near a quarter of a mile, but commonly much less. The base is formed of a mound of blue clay, which is covered to the depth of four, five, or six feet, by a coat of smooth round pebbles, chiefly of white calcareous spar (these are called Portland pebbles), but partly of quartz, chert, jasper, &c., so loose that a horse's legs sink almost knee deep at every step. The bank slopes on the one side toward the open sea, and on the other toward the narrow inlet intercepted by it: it is highest at the Portland end, and is there composed of pebbles as large as a hen's egg; but they diminish in size towards the west so regularly, that it is said the smugglers who land in the night can judge where they are by examining the beach; at Abbotsbury they are little bigger than horse-beans. Marine plants grow in patches along the edge of the bank by the water-side. The pebbly covering is continually shifting: a north-east wind sometimes clears away the pebbles in parts, leaving the blue clay exposed; but the denuded spaces are covered again with pebbles by the heavy sea which the south-west wind brings up. 'The Fleet' receives the water of several rivulets, and runs into the open sea at its south-eastern extremity by a narrow channel called 'Small Mouth:' it is in some places half a mile broad; there are two or three passages or causeways over it. At the north-western extremity it forms a 'swannery,' which once consisted of 7000 swans. The Fleet is much frequented by water-fowl, among which Dr. Maton observed the wild swan. (Hutchins's *Dorsetshire;* Smeaton's *Hist. of the Edystone Lighthouse;* and Maton's *Western Counties.*)

From Burton Castle the coast, generally abrupt and frequently high, runs W.N.W. ten or twelve miles to the border of Devonshire: the cliffs in this part are remarkable for the beauty and variety of the fossils which they contain. The whole extent of the Dorsetshire coast, including the circuit of the Isle of Portland, may be estimated at above 75 miles.

What is sometimes called 'the Isle of Purbeck,' being really a part of the main land, is not noticed here; it comprehends the peninsula formed by the river Frome and Poole Harbour on one side, and the sea on the other.

Surface, Hydrography, Communications.—The surface of this county is for the most part uneven. The principal elevations are the chalk downs, which, entering Dorsetshire from Wiltshire on the northern side of Cranbourne Chase, two or three miles south-east of Shaftesbury, turn to the south, and run to the valley of the Stour, in the neighbourhood of Blandford. In this range of downs, some parts of which are covered with wood, are Melbury Down, Ashmore Down, Fontmell Down, Iwerne Free Down, Bushy Down, Preston Down, Main Down, Gunville Down, Pimperne Down, Stowerpaine Down, Furze Down, Camp Down, and Mill Down, with the outlying eminences Hod Hill and Hamilton Hill. From the valley of the Stour the chalk downs run nearly west to the neighbourhood of Beaminster, and form the northern boundary of the basin whose drainage is received by Poole Harbour. In this part we have Okeford Hill, Bell Hill, White Hill (between the last two is Bulbarrow, 927 ft. high) (A.), Great Ball, Little Ball, Revels Hill, Dogberry Hill, High Stoy, 891 ft. (A.), Highcombe Hill, Row Hill, East Hill, West Hill, Evershot, Rampisham, Corscombe, and Beaminster Downs, Whitesheet Hill, and Horn Hill. The foregoing eminences belong to the range of the 'North Downs,' and lie along the northern escarpment of that range. The hills near Beaminster form, with the exception of some outlying masses, the western extremity of the great chalk formation. The chalk hills from Beaminster run south-east or east, and form 'the South Downs,' the highest points in which are along the southern escarpment. The hills gradually approach the coast a few miles north-east of Melcombe Regis. In this range we have Hackthorn Hill, Chilfrome Down, Eggardon, where is an old entrenchment, Chilcombe Hill, Little Bredy Down, Black Down, 817 ft. (A.), Whaddon Down, Ridgeway Down, and Bincombe Down (if these be not two names for the same), Came Down, Moignes or Maine Down, Holworth Down, and Chaldon Down. From Lulworth the chalk hills run eastward to Handfast Point, the headland which separates Studland and Swanage Bays. In this part of the range are Purbeck Hill, Knowl or Norden Hill, west of Corfe Castle, 369 ft. (B.), Corfe Castle Hill, 207 ft. (B.), Challow Hill, east of Corfe Castle, 390 ft. (B.), Nine Barrow Down, 625 ft. (B.), or 642 ft. (O.), and Ballard Down.

Pillesdon Pen, west of Beaminster, which is 934 ft. high (O.), is the highest point in the county, and belongs to the green sand formation. Swyre Hill, on the coast, near Kimmeridge, in the Isle of Purbeck, is 669 ft. high. (B.) For the above elevations we have given our authorities: O. the Ordnance Survey; A. Arrowsmith's 'Map of England and Wales;' and B. Dr. Berger in 'Geol. Trans.' vol. i. p. 268.

The Stour, the chief river of Dorsetshire, rises in Wiltshire, in Stourhead Park, on the border of Somersetshire, and running south-by-east, enters Dorsetshire between 3 and 4 miles from its source. After flowing about 4 miles farther in the same direction, it receives the Shreen Water from the north, and soon after the Lidden River from the north-east. It then flows in a very winding channel, south-south-east, for 8 miles, to the junction of the Cale, which comes from the neighbourhood of Wincanton, in Somersetshire. From the junction of the Cale the Stour flows south about 3 miles to the junction of the Lidden, and thence winds to the east past the town of Sturminster Newton, and through a depression in the range of the North Downs, and passes in a south-east course to the town of Blandford Forum, after which it flows south-east for 20 miles to the village of Corfe Mullen; and from thence 4 miles east to the junction of the Allen, which flows from the north near Cranbourne. After it receives the Allen the Stour flows east-south-east 6 or 7 miles into Hampshire, after entering which it receives a considerable stream, 16 or 18 miles long, from Cranbourne; and about 4 miles lower it joins the Avon near Christchurch, in Hampshire. The whole course of the Stour is nearly 65 miles, for 40 of which, viz. up to Sturminster Newton, it is navigable.

The river Yeo, Ive or Ivel, is formed by two brooks, one rising in Somersetshire, and one in Dorsetshire, which uniting near Milbourne Port (Somersetshire), and flowing south-west, enter Dorsetshire between Milbourne Port and Sherbourne, about three miles from their respective sources. The Yeo then flows first west-south-west, then west-north-west for about seven miles, when it again touches the border of Somersetshire, along which it winds for about three miles, and then entering Somersetshire flows north-west into the Parret. The Stour and the Yeo carry off the drainage of all that part of the county which lies north of the North Downs.

The North and South Downs inclose the basin of the two rivers Piddle or Trent and Frome, which unite in Poole Harbour below Wareham, and from their situation with respect to that town are respectively called Wareham North and Wareham South river. The Piddle rises in the village of Alton on the southern declivity of the North

Downs, and flows south and south-east past Piddletrenthide and Piddlehinton to Piddletown. From Piddletown it has a general east-south-east course to its entrance into Poole Harbour. Its whole course is about twenty-two miles; or, if we add seven or eight for the length of the low water channel through the æstuary of Poole Harbour, 30 miles.

The Frome rises on the Downs near Corscombe, north-east of Beaminster, and flows south-east. At Maiden Newton it receives a stream from the Downs near Beaminster. From Maiden Newton the Frome flows south-east eight miles to Dorchester. From Dorchester the Frome flows east nearly twenty miles into Poole Harbour, just upon entering which it unites with the Piddle, and has the same low water channel as that river: its whole length is about thirty-five miles, or, including the channel through Poole Harbour, forty-two or forty-three miles. For a considerable part of their course both the Frome and the Piddle flow through low meadows; the channel of each is repeatedly divided and reunited. They are not navigable, at least above Wareham.

The western extremity of the county is watered by the Bredy, the Brit, the Char, and the Axe, which last rather belongs to Devonshire. The Bredy flows westward seven or eight miles from Little Bredy into the sea, near Burton Bradstock, at the north-west extremity of the Chesil Bank. The Brit rises near Beaminster on the southern slope of the chalk hills, near the junction of the North and South Downs, and flows south about nine miles into the sea below Bridport: the mouth of it forms Bridport Harbour. The Char is about as long as the Brit; it rises near Pillesdon Pen, and flows south and south-west into the sea at Charmouth: it receives many brooks. The Axe rises in Dorsetshire, and flows for some miles along the border of the county.

Dorsetshire has no canals. The Dorset and Somerset canal, for which acts were obtained in 1796 and 1803, but which was never executed, was to have entered the county near Stalbridge, and to have followed the valley of the Stour till it opened into that river above Blandford Forum. The intended English and Bristol Channels' ship canal was to cross the western extremity of the county. There is a short railway from the clay pits at Norden, near Corfe Castle, to the Quay on Middlebere Channel, Poole Harbour.

The Penzance, Falmouth, and Exeter mail-road crosses the county in nearly its whole extent. It enters it near Woodyates' Inn, between Salisbury and Blandford, and runs south-west through the latter town, Winterbourne Whitchurch, Milbourne St. Andrew, and Piddletown to Dorchester; and from thence west by Winterbourne Abbas, Bridport, Chidcock, and Charmouth to Axminster in Devonshire. The Exeter mail-road crosses the northern part of the county, entering it near Shaftesbury, and running thence sometimes in Somersetshire and sometimes in Dorsetshire, by Sherbourne to Yeovil in Somersetshire. It just crosses the western extremity, and the detached portion of the county between Chard and Honiton. The Falmouth, Devonport, and Exeter mail-road also just crosses the western part of the county. The Southampton and Poole mail-road enters the county beyond Ringwood, and runs by Wimbourne Minster to Poole. Roads run from Dorchester to Weymouth, to Wareham, Corfe Castle and Swanage, to Beaminster and Crewkerne, and to Sherbourne; from Shaftesbury to Sherbourne, to Sturminster Newton, and to Blandford, and from Blandford to Wimbourne.

Geological character.—The direction of the chalk-hills, which has been already noticed, furnishes the key to the geological structure of Dorsetshire. The North and South Downs, which respectively extend westwards from the neighbourhood of Shaftesbury and the Isle of Purbeck, and unite at their western extremity near Beaminster, inclose a basin, 'the Trough of Poole,' in which we have the formations superior to the chalk; beyond or without this basin we have the formations which underlie the chalk.

The eastern part of the county, as far as Cranbourne, Chalbury and Wimbourne Minster, and the Trough of Poole (bounded on the north by a line drawn from Wimbourne by Bere Regis and Tolpiddle to Stinsford near Dorchester, its western extremity, and on the south by a line drawn from Broad Mayne along the northern slope of the South Downs to Studland bay) are occupied by the plastic clay. The undulations of the surface occupied by this formation are considerable. Potters' clay in beds of various thickness and at different depths alternates with loose sand in this formation in the Trough of Poole. It is sent to Staffordshire, where it is mixed with ground flints and employed in the finer kinds of pottery. Beneath the potters' clay lies a seam of very friable earthy brown coal, which crumbles when put into water, burns with a weak flame, emitting a particular and rather bituminous smell, somewhat like Bovey coal. An extensive horizontal bed of pipeclay skirts the northern declivity of the South Downs, and it contains a bed of coal exactly resembling that of Alum Bay in the Isle of Wight; clay of the same bed, but not of equal quality, may be found in other parts of the Trough of Poole. it is quarried extensively near the town of Poole, where clay for fire-bricks is also dug. Near Handfast Point the sand of this formation passes into sandstone. The plastic clay is found capping one or two hills south-west of Dorchester.

The chalk formation bounds the plastic clay. In the North Downs the chalk occupies a breadth of nearly ten miles, viz., from Shaftesbury to Cranbourne and along the valley of the Stour from above Blandford to Wimbourne Minster: at its western extremity the formation is still broader, extending about eighteen miles from beyond Beaminster to Stinsford near Dorchester. On the southern side of the Trough of Poole it becomes much narrower, scarcely averaging two miles in breadth. The cliffs along the south coast are partly chalk: the strata are in some places curved and occasionally vertical. The valleys, drained by the upper part of the Frome and its tributaries, are occupied by the green sand, so that the mass of the chalk-hills about Beaminster is cut off from the rest of the formation.

The remainder of our geological notice must be arranged in two parts: the first referring to the district south of the chalk range and extending to the coast: the second referring to the district west and north-west of the same range. We shall first speak of the southern districts.

The chalk marle, green sand, weald clay, and iron sand skirt the chalk in the order in which we have named them in the Isle of Purbeck, and extend along the coast between the chalk and the Purbeck and Portland limestone next to be noticed. The iron sand near Lulworth contains imperfect beds of wood-coal. The weald clay is not found along the coast west of the Isle of Purbeck.

The Purbeck strata, belonging to the upper series of the Oolitic formation, consist of argillaceous limestone alternating with schistose marle: they crop out from under the iron sand in the Isle of Purbeck. A variety of the Purbeck stone, known as Purbeck marble, was formerly much used for columns and ornaments in our cathedrals and old churches, but is now out of use. The thickness of the Purbeck beds is estimated at 290 feet. The Portland Oolite, another member of the same series, which succeeds the Purbeck stone, occupies the remainder of the Isle of Purbeck and the whole of that of Portland. It consists of a number of beds of a yellowish white calcareous freestone, generally mixed with a small quantity of siliceous sand. But the different beds of which it is composed often vary in their characters, nor are the same beds of an uniform character in different localities. The varieties of this formation afford the greater part of the stone used for architectural purposes in London.

The Portland stone came into repute in the time of James I., who used it by the advice of his architects in rebuilding the banqueting-house at Whitehall. After the great fire of London, A.D. 1666, vast quantities of this stone were used in rebuilding St. Paul's and other public edifices. A considerable portion of Westminster Bridge and the whole of Blackfriars Bridge are built of it. The quarries are thus described by Mr. Smeaton in his 'Narrative of the Building, &c., of the Edystone Lighthouse:'

'The first thing that excited my curiosity was the very subject I came upon; that is, the quarries from whence the stone sent from Portland is produced. The upper surface of the island I found was totally flat, but elevated above the sea, according to the estimation of my eye, at least 200 feet.* The stratum of stone, that is wrought for sale, lies nearly parallel with the upper surface of the island, and with not much cover of earth or rubbish upon it. There are several beds of stone, lying in contiguity one above another, varying in thickness in general from two to four feet, and upward. Those which are usually called the merchantable beds (on account of the blocks for sale being produced therefrom) are universally covered with a stratum called the cap, which is formed entirely of a congeries of petrified sea shells of a great variety of kinds, but in general so distinct and separate in their forms that to the curious naturalist their species seem very easy to be made out; but as they, in a considerable degree, retain their respective figures (though in some places more, in some less), spaces or cavities are left between them, which consequently very much diminish the coherence of the mass; but yet the cementing principle is so strong that the whole together is considerably harder than the merchantable beds; and indeed so hard that, to get rid of it as easily as possible, it is generally blasted off with gunpowder. Were it not for these cavities the capstone would not readily be worked with tools; or, at least, it would not be worth working at a place where there is so great a plenty of stone of a better quality; but as it is necessary to remove it in the course of working the better kind of stone, though by far the greatest proportion is blasted into fragments, yet for the buildings in the island the capstone is in general use, and also for the piers and quay walls of Weymouth harbour; as also in the pier for shipping stone at Portland blocks are used from the cap; and indeed were it not for the expense of freight (which is the same as upon those of the best quality) for various rough purposes under water, &c., the cap would make quite as good and durable work as the merchantable blocks.

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* The highest point as we have seen is much higher than this.

'When the merchantable beds are thus cleared of the cap, the quarry-men proceed to cross-cut the large flats, which are laid bare with wedges in the way I have described as to the moorstone: only the wedges are not so numerous, nor does Portland stone split so evenly as granite; and frequently in the splitting as well as other working of this stone, oysters and other fossil shells are discovered in the solid substance of the merchantable stone. The beds being thus cut into distinct lumps, the quarry-man, with a tool called a kevel, which is at one end a hammer and at the other an axe, whose edge is so short or narrow that it approaches towards the shape of a pick, by a repetition of sturdy blows soon reduces a piece of stone with his eye to the largest square figure which it will admit, and blocks are thus formed from half a ton to six or eight tons' weight, or upwards, if particularly bespoke.'

The strata of stone of all kinds on the east side of Portland have an aggregate thickness of 93 feet, on the west side of 112 feet. The 'cap' is at present only burnt for lime. The Kimmeridge clay, a blue slaty or greyish yellow clay which also belongs to the upper Oolitic series underlies the Portland stone: it sometimes contains beds of a highly bituminous shale, which from their being found near Kimmeridge in the Isle of Purbeck, have obtained the name of Kimmeridge coal, and have given to the whole formation the name of Kimmeridge clay. The shale burns with a yellowish flame, giving out a sulphureous smell. The thickness of the Kimmeridge clay is estimated at 600 or 700 feet. It forms the base of the Portland Oolite in the Isle of Portland, and the line of junction between the two formations is elevated on the north side of the island far above the level of the sea. The coasts of the island are here formed by a sloping bank of Kimmeridge clay, surmounted by an abrupt escarpment of Oolite. On the south side of the island by the dip of the strata towards the south the line of junction is brought down to the level of the sea.

Towards the south-western shore of the Isle of Purbeck where the chalk downs approach the sea, and are skirted only by a very narrow belt occupied by the iron sand, and beyond that seaward, by the Portland Oolite, the sea has formed several singular coves, at the entrance of which are lofty headlands of Oolite; while the cove or basin is excavated inland as far as the chalk. The precipitous sides of these basins exhibit in a most striking manner the formations between the chalk and the Oolite.

Westward of the coves just described, extending from Weymouth bay towards the river Brit, occurs what is termed by Geologists 'a saddle,' a double series of formations. After the green sand, Purbeck, and Portland beds, and Kimmeridge clay have successively cropped out from beneath the chalk, the coral rag and Oxford clay, members of the middle series of Oolites rise to the surface in succession, and are succeeded by the Forest Marble and the Great Oolite, which belong to the lowest series of the Oolitic formations. To the southward of the Great Oolite and Forest Marble the superior strata re-appear in reverse order of succession; the Oxford clay, then the coral rag, and then the Kimmeridge clay, which runs down to the shore at Weymouth, and rises again from the sea in the Isle of Portland, where it appears capped with the Portland Oolite.

In the north-western and western parts of the county, the chalk formation is succeeded by the green sand, which crops out from beneath it, and skirts the northern side and the western extremity of the North Downs. The green sand forms the outlying masses of Pillesdon and Lewston hills, and of others yet farther west along the border of Dorsetshire and in the county of Devon. [DEVONSHIRE.] Neither the iron sand nor the weald clay, nor so far as we are aware, the chalk marle, appears to be found in this part of the county.

West of Shaftesbury extends a bed of Kimmeridge clay which crops out from under the green sand: west of the Kimmeridge clay is a range of coral rag hills; and still further west occur the Oxford clay, and the Great Oolite. All these formations are overlaid by the westward extension of the chalk and green sand from the valley of the Stour to Beaminster; but some of them re-appear in the cliffs which line the coast westward of the Chesil Bank.

The western extremity of the county is occupied by the lowest members of the Oolitic series and by the Lias. The line of junction of these formations extends nearly north and south from Ilminster in Somersetshire to the sea. Insulated masses of green sand frequently cover both the Oolites and the Lias, and render it difficult to trace the line of junction. The detached part of the county which is enclosed within Devonshire is partly occupied by the red marle foundation.

Agriculture.—The climate of Dorsetshire, though mild and healthy, is not so warm as its geographical situation would lead us to expect; a circumstance owing to the nature of the soil and the bareness of its chalk hills, there being little or nothing to break the force of the winds that sweep over them. The air is keen and bracing, rather than soft and warm. In the valleys, the climate resembles that of the valleys of Devonshire, and the vegetation is very similar. It appears from Domesday Book that there were vineyards at that time in several parts of this county. At present the harvest is not in general earlier than in the midland counties: and although snow seldom lies long on the ground, the land is not fit for sowing in spring sooner than in many parts of England where the winters are more severe.

A considerable portion of the soil in the south-eastern part of this county is similar to that of Bagshot Heath, and not more fertile, being a loose sand and gravel, with a portion of ferruginous loam. The whole surface of the county consists chiefly of this loose sand and gravel, clay and chalk. The most fertile spots are those where all the three have been mixed in the valleys by the rivulets which run down the hills carrying the soil with them. The poor sandy soil occupies that part of the county which joins Hampshire. In the centre and towards Wiltshire lies the chalk; and along the coast, over a more solid chalky rock, is a stratum of clay, which likewise covers the western part towards Devonshire, and the northern towards Somersetshire.

The following division of the soils is given in the 'Agricultural Report of the County,' by Stevenson:—

Chalk	160,759	Acres.
Sand	85,157	,,
Loam	37,746	,,
Gravel	59,894	,,
Miscellaneous	13,427	,,
Stone Brash . . .	29,700	,,
Clay	117,331	,,
Total	504,014	

Exclusive of rivers, towns, roads, &c.

The chalk hills to the west of Dorchester, and along the borders of the vale of Blackmore, are of considerable elevation, and contain several narrow vales and deep hollows. The soil on the most elevated parts of the chalk district is a thin loam over a rubbly chalk mixed with stones which lies on the solid chalk. It is most advantageous to let this soil remain as sheep-walk, the pasture being fine and short as in other downs. In the bottom of the vale of Blackmore are some extremely fertile meadows watered by the river Stour. The hills which look down upon this valley are high and bare; but the lower sides are beautifully varied with woods and fields.

The quantity of arable land throughout the county bears but a small proportion to the pasture; and greater attention is paid to the rearing of sheep and feeding of cattle than to the raising of corn. The implements of husbandry are similar to those in use in Devonshire. The wheel-ploughs are preferred in stiff and stony soils; and it is usual to put three horses before them, two abreast, and the third before the near horse; so that the furrow being turned to the right, two horses walk on the unploughed ground, and one in the furrow; they are driven by a lad. Improved ploughs have been introduced; but the majority of farmers are slow in relinquishing the instruments which they have been early accustomed to. The nine-share plough, or scarifier, has been found very useful in the light soils, and saves much time in preparing the land for the seed, as it goes over a great width and saves a ploughing.

On the larger farms the farm-houses are old buildings of, and covered with stone tiles; in the smaller they are mostly thatched with reed. Many cottages are built with mud walls composed of road scrapings, chalk, and straw. The foundation is of stone or brick, and on this the mud wall is built in regular layers, each of which is allowed to dry and harden before another is put over it. Garden walls are frequently built of these cheap materials, their top being protected from the weather by a small roof of thatch, which extends a few inches over each side. The farms are large, many having been laid together, in prosperous times, at the desire of the richer farmers, and with the concurrence of landlords, who found that the repairs on one large set of buildings are less than on many small ones.

The rent of land varies greatly. In the poor sands it is as low as 10*s.* or 12*s.* per acre; in the richer grass lands it is from 30*s.* to 40*s.*; some water-meadows let as high as 60*s.* or more. On the whole, the average rent of grass land is about 20*s.*, of old meadow about 30*s.*, the tenant paying the tithes, which seldom exceed 5*s.* per acre.

The old method of managing arable land, which is still followed by many farmers, was to fallow every fourth year on the clays, and then take two or even three crops of corn in succession. Where clover or grasses are cultivated, they are put in with the second crop, and consequently the land is not in a clean state. The most common rotation on the rich loams in the vale of Blackmore is: summer fallow—wheat—barley with grass seeds, which continue two or three years, and are then broken up again after the hay has been made, when a kind of bastard fallow succeeds, consisting of three ploughings, and the land is tolerably prepared for wheat; but it is not clean enough to prevent the necessity of a repetition of the summer fallow every sixth year at least. There is a practice with some farmers which deserves notice, as it is a step towards the system of double crops, by which the Flemish culture is rendered so much more productive than most other. It is as follows: the clover or grass of the second year is fed off early by sheep; the land is then ploughed up and sown with rape and spring tares, which give an abundant produce in autumn, on which the sheep are folded, and the land is thus well prepared for wheat. The time of sowing is about the end of May or beginning of June. A bushel of vetches and two quarts of rape-seed are the quantities sown on an acre. The crop is fed off by Michaelmas.

On the light chalky soils turnips have been very generally introduced, although they are not yet every where cultivated in the best manner.

The introduction of sainfoin on the dry chalky soils has been a great advantage, as it produces a rich fodder, requires little manure, and lasts many years. In this soil the wheat is generally sown after clover which has stood one or two years, but sometimes also after turnips or rape fed off. The folding of the land saves manure, and the vicinity of sheep downs gives an opportunity of having large folds and repeating the folding often, both before and after sowing the seed. The tread of the sheep consolidates loose soils better than the heaviest roller. The ploughing in the chalky soils is generally very shallow, because they say that the couch is thus more easily kept down; but those who plough as deep as the subsoil will permit find that their crops are more certain, especially in dry summers; and the couch is best eradicated by careful hand-picking after every ploughing.

Wheat is sown sometimes in the light soils as soon as August, and before the wheat crop of that year is ripe. The quantity sown is usually three bushels, and is increased as it is sown later. In the heavier loams the wheat is sown later, sometimes not much before Christmas; in that case a bushel more is required to allow for the grains that perish, or are eaten by the birds, who are then more alert after their food. The early sown wheat is thought more subject to mildew. The seed is usually steeped and limed. When it is sown very early this precaution is frequently omitted. The average produce of wheat is from 17 to 20 bushels per acre.

Barley is here a more important crop than wheat. It is sown from the middle of March to the middle of May. The earliest sown is generally the best. The produce averages 30 bushels per acre. Oats are sown on the heavier and moister soils, at the rate of six bushels per acre. They think that the straw is better fodder where the oats are sown thick, but they perhaps forget that the heaviest grain is produced by sowing thin or drilling wide. Beans are planted or drilled in rows from 18 to 24 inches distant. In the rich loams of the vale the produce is considerable, from 30 to 40 bushels per acre, and often more. Turnips are generally sown broadcast, at the rate of three pounds of seed per acre; this gives an abundance of plants, which are thinned out by the hoe.

Potatoes are cultivated to a considerable extent in the rich loams about Bridport, Beaminster, Abbotsbury, &c.: they are planted in rows, or the sets are dropped in every third furrow after the plough. They are horse-hoed, and moulded up by a double mould-board plough: 24 bushels planted on an acre often produce 360. The beginning of May is the usual time of planting.

Sainfoin is sown with a spring crop: four bushels of seed are required for an acre. It is cut before the blossom is fully expanded and made into hay, which is excellent fodder for sheep in winter. After several years, when it begins to go off, it is ploughed up, and the land sown with oats. It is often advantageous to pare and burn the land after sainfoin; but as this practice is generally forbidden in leases, however advantageous it may be occasionally, a method is adopted which equally destroys the vegetable matter without burning the soil. This is to rib the land; that is, to plough furrows with intervals, and do this again across the first ribs; the sods are thus cut in squares, and the harrows passing over them leave the roots in the form of matted tufts, which are burnt, and the ashes spread to enrich the ground. A regular paring and burning would be much better, both for the landlord and the tenant. Sainfoin does not produce much the first year after it is sown, and consequently many farmers sow hop-clover with it, which being an annual gives a produce the first year, and fills the intervals of the sainfoin, which is in perfection the second. The land which has borne sainfoin for some years is not sown again with the same crop till after an interval of 10 or 12 years at least.

Hemp is cultivated to some extent in the richest soils, which contain a considerable proportion of sand, and are too light for beans. The land is prepared by ploughing it three times; first, before winter, when it is richly dunged; and next in spring, when it is well harrowed. The direction of this second ploughing is across the former furrows, whenever it can conveniently be done. The third ploughing is in May, when the ground is laid as level and smooth as possible by means of the heavy hoe or hack. Two bushels of seed are then sown evenly over it, and slightly harrowed in. A slight rolling of the ground, if it is very loose, finishes the operation. Hemp completely keeps down weeds by the shade of its leaves; and the land, if very richly manured for this crop, is in good order after it for any other which may suit it. An acre of good hemp produces 800 lbs. of fibre, a middling crop is 600 lbs., and a poor one 450 lbs. The chaff of the hemp makes an excellent manure.

Flax is likewise cultivated in the sound deep loams which have been gradually enriched by manuring the preceding crops. If the dung were not thoroughly incorporated in the soil it would make the flax coarse and uneven. The soil must be pulverized to a considerable depth, and must also be very free from weeds. Two bushels of seed are sown on an acre. The best seed comes from Riga; the time of sowing is the middle of April. Clover seed is sometimes sown among it. It should be most carefully hand-weeded as soon as the plants can be distinguished from weeds: after this the flax and clover will keep them down. The produce is about six to eight bushels of seed, each of which gives a gallon and a half of oil, and from 600 to 900 lbs. of flax fit for spinning.

The grass lands and pastures occupy about three-fifths of the surface of the county, or above 300,000 acres, of which about 6000 are irrigated, chiefly in the sandy and chalky districts. The meadows along the vale of Blackmore are extremely rich and produce much hay, which is used to feed the dairy cows in winter. The upland meadows are well managed and frequently dressed with lime and dung. Many sheep which feed on the downs in summer are wintered in the vales. The pastures on the hills are not sufficiently rich to fatten oxen, but are well adapted to feed dairy cows. The Dorset butter is in good repute in London and Portsmouth for ship provision as well as domestic use: it is not so salt as the Irish, and is therefore preferred, although the Irish is richer when it is of the best quality. Dorset salt butter, when well washed, is very commonly sold in London for fresh butter. The best cow pastures will keep a cow on two acres during the whole summer; of the inferior pastures three or four acres are required for each cow. The cows are frequently let to a dairyman at the rate of 8*l.* or 10*l.* per cow for the season. This is a great convenience to a farmer who has arable land to attend to, and is thus relieved from all care but that of providing pasture for the cows, and cows for the pasture. The cows eat little else but straw in winter, and very little hay is made in proportion to the extent of grass land. The farmer finds a house for the dairyman and his family to live in, allows him to keep as many pigs and poultry as he chooses, and a mare to carry the butter to market. This mare generally produces a foal, which is part of the dairyman's profit. The bargain is from Candlemas to Candlemas. A notice to quit given by either party before All Saints' Day is considered sufficient, and the dairyman quits the premises at Candlemas. The butter is made from the cream, and the skimmed milk is made into cheese. The milk is skimmed only once in twenty-four hours. The Dorsetshire skim-milk cheese is preferred on account of streaks of blue mould which frequently run through it. These streaks are said to be produced by breaking the curd again after the cheese has been pressed, and sprinkling wheat flour over the fragments; it is then replaced in the vat and pressed again.

A few calves are annually reared to keep up the number of the cows: the calves have milk for three months, and the dairyman receives an allowance of a fourth part of the sums which he pays for a cow for each calf so reared. February is the usual time for weaning calves, because in May when the grass is abundant they can be turned out to advantage and get strong before winter.

The cows kept for the dairy in the vales are chiefly of the Devonshire breed, but the pasture on the hills not being sufficiently good for them, another mixed breed is preferred there, which has longer horns, and seems to be a cross between the old long horns and the Gloucestershire, or perhaps the short horn. The colour is generally brindle on the sides with a white stripe down the back and white under the belly. They are hardy, and in general good milkers on moderate pasture. Crosses with Alderney cows are occasionally met with, but chiefly in gentlemen's dairies on account of the rich cream which they give. Dairymen prefer quantity of milk and larger cows.

The Dorset sheep are noted as a profitable breed to those who rear house-lambs for the London market. They are horned and well formed, straight in the carcase, deep in the body, and the rump is larger than in other sheep; the breast points forward, the face is thin, the horns are thin and bend rather backward, the tail is usually left long. They give much milk and fatten their lambs better than any other breed. There is another very small breed in the Isle of Purbeck, and near Weymouth, of which the flesh is in repute with epicures: they weigh about 10 lbs. a quarter, and are generally sold by the quarter like early lamb, and not by the pound. Some consider them as the real and original Dorsetshire breed. They resemble the small forest sheep formerly found on all the commons of the forest of Windsor, and on Bagshot-heath, the mutton of which was in equal repute as Bagshot mutton. The wool is fine, but the fleece does not weigh above 1½ or 2 pounds on an average. The South-down breed is very generally found in Dorsetshire, and suits the pasture and climate better than the Leicester. The management of Dorset ewes, when they are intended for producing early lambs, is as follows:—At four years old when the ewes have had two or three lambs, their lambs are weaned in April, and the ewes are kept on water meadows and the richest pastures, without being ever folded, that they may be in condition to take the ram in May and June, and be forward in lamb by Michaelmas, when they are almost invariably sent to Weyhill fair, and sold to dealers who drive them towards London and sell them to those who fatten early house-lamb, and who make a very considerable profit on them, if they understand how to manage the ewes to the best advantage. The Dorset ewes frequently have twin lambs, but the single are preferred for fattening. When there are twins, one of them is either killed immediately or given away. The average quantity of wool on a Dorset sheep is 3½ pounds.

The following fairs are established in the county; but several of them are no longer cattle fairs, but mere holydays: Abbey Milton, Tuesday after July 25; Abbotsbury, July 10; Allington, July 22; Beaminster, September 19; Blandford, March 7, July 10, and November 8, a large sheep fair; Bridport, April 6, fat beasts, cows, calves, bulls; October 11, cattle and pedlery; Broadway, Wednesday before September 18; Broad Windsor, Trinity Monday; Cerne Abbas, Midlent Monday, for barren cows, and cows with calf, Holy Thursday, October 2; Corfe Castle, May 12, October 29 for hogs and toys; Cranbourne, August 24, December 6, cheese and sheep; Dallwood, first Wednesday before August 24; Dorchester, February 14, cows and calves, barreners, Trinity Monday, cows and horses; July 6, sheep and lambs, August 6, sheep, lamb, wool, leather; Emmergreen, Tuesday before Holy Thursday; Evershot, May 12, cattle and toys; Farnham, August 21, cheese and toys; Frampton, March 4, August 1, September 4; Gillingham, Trinity Monday, cattle, September 12, toys; Hermitage, August 26, horses; Holtwood, August 6, horses, sheep, toys; Lyme Regis, February 13, October 2; Leigh, March 25, May 1, September 3; Lambert Castle, Wednesday before June 24, cattle; Maiden Newtown, March 9, May 4, cows, &c.; Martin Town, November 22, 23, sheep, cows, and horses; Milborne St. Andrews, November 30, sheep, cows, &c.; Melbury, Whitsun Monday; Ower Moigne, October 10, pigs and toys; Poole, May 1, November 2, free mart for toys; Pamphill, July 7, October 29; Piddle Town, Easter Tuesday, October 29, cows and pigs; Portland, November 5, sheep; Shaftesbury, Saturday before Palm Sunday, June 24, November 23, cattle; Sherborne, Wednesday before Holy Thursday, cattle, July 18, wool, cattle, horses, July 26, lambs, October 13, wool and cattle; Shroton, September 25, sheep, cows, horses; Stalbridge, May 6, September 4, beasts; Stockland, July 18, cattle; Sturminster, May 12, October 24, fat cattle; Sydling, December 6, cattle; Toller Down, May 29, sheep, 30, toys; Wareham, April 17, cattle, July 5, September 11; Wimborne, Friday before Good Friday, cattle and horses, September 14, cattle, horses, sheep, cheese; Woodbury Hill, near Bere Regis, September 18, and five following days, cattle, horses, hops, cheese, cloth, &c.; Woodland, July 5, horses and cheese; Woolbridge, May 14, cows, pigs, toys; Yetminster, First Tuesday after April 20, October 4.

Divisions, Towns, &c.—The county of Dorset previous to the year 1740, was thus divided. There were five more considerable parts, or as they were termed, 'divisions,' which took their names from the towns of—I. Blandford, II. Bridport, III. Dorchester, IV. Shaftesbury, and V. Sherbourne. These were further subdivided as follows:—

I. The Blandford division contained the boroughs of (1) Blandford, (2) Corfe Castle, (3) Poole, and (4) Wareham: the hundreds of (1) Bere Regis, (2) Coombsditch, (3) Hasler, (4) Hundreds Barrow, (5) Pimperne, (6) Rowbarrow, (7) Rushmore, and (8) Winfrith: and the liberties of (1) Bindon, (2) Divelish, (3) Overmoigne, and (4) Stowborough.

II. The Bridport division contained the boroughs of (5) Bridport, and (6) Lyme Regis; the hundreds of (9) Beaminster, (10) Beaminster Forum, and Redhove, (11) Eggardon, (12) Godderthorn, and (13) Whitchurch Canonicorum: and the liberties of (5) Broad Windsor, (6) Frampton, (7) Loder and Bothenhampton, and (8) Poorstock.

III. The Dorchester division contained the boroughs of (7) Dorchester, (8) Weymouth, and (9) Melcomb Regis. the hundreds of (14) Cullifordtree, (15) George (St.), (16) Piddletown, (17) Tollerford, and (18) Uggescomb, or Uggscombe: and the liberties of (9) Fordington, (10) Piddlehinton, (11) Portland, (12) Preston and Sutton Poyntz, (13) Waybaionse, and (14) Wyke Regis and Elwell.

IV. The Shaftesbury division contained the borough of (10) Shaftesbury: the hundreds of (19) Badbury, (20) Cogdean, (21) Cranbourne, (22) Knolton, (23) Loosebarrow, (24) Sixpenny Handley, (25) Up Winbourne Monkton, and (26)

Wimbourne St. Giles: and the liberties of (15) Alcester, (16) Gillingham, and (17) Sturminster Marshall.

V. The Sherbourne division contained the hundreds of (27) Brownshal, (28) Buckland Newton, (29) Cerne, (30) Modbury, (31) Redlane, (32) Sherbourne, (33) Sturminster Newton Castle, (34) Totcomb, (35) Whiteway, and (36) Yateminster: and the liberties of (18) Alton Pancras, (19) Halstock, (20) Minterne Magna, (21) Piddletrenthide, (22) Ryme Intrinseca, (23) Sydling St. Nicholas, and (24) Stour Provost, Cerne, Totcomb, and Modbury hundreds are for some purposes united: and the liberty of Minterne Magna is by some given as united with that of Piddletrenthide.

The boroughs in the above list are not all parliamentary.

Since 1740 a new arrangement of the county has been adopted. The five divisions have been increased to nine, as follows:—

I. The Blandford north division (population 9198) contains the borough of (1) Blandford; the hundreds of (1) Coombsditch, (2) Pimperne, (3) Rushmore; and the liberty of (1) Divelish, or Dewlish.

II. The Blandford south division (population 15,139) contains the boroughs of (2) Corfe Castle, and (3) Wareham; the hundreds of (4) Beer, or Bere Regis, (5) Hundredsbarrow, (6) Hasilor or Hasler, (7) Rowbarrow, (8) Winfrith; and the liberties of (2) Bindon, (3) Owermoigne or Overmoygne, and (4) Stoborough, or Stowborough.

III. The Bridport division (population 29,585) contains the boroughs of (4) Bridport, and (5) Lyme Regis: the hundreds of (9) Beaminster, (10) Beaminster Forum and Redhone or Redhove, (11) Eggerton or Eggardon, (12) Godderthorn, and (13) Whitchurch Canonicorum; and the liberties of (5) Broad Windsor, (6) Frampton, (7) Loder, or Lothers, and Bothenhampton, and (8) Poorstock.

IV. The Cerne division (population 8517) contains the hundreds of (14) Buckland Newton, (15) Cerne, (16) Modbury, (17) Totcomb (which three are united), and (18) Whiteway; the liberties of (9) Alton Pancras, (10) Piddletrenthide, and (11) Sydling St. Nicholas.

V. The Dorchester division (population 32,039) contains the boroughs of (6) Dorchester, (7) Melcomb Regis, united with (8) Weymouth; the hundreds of (19) Cullifordtree, (20) George, or St. George, (21) Tollerford, (22) Piddletown, (23) Uggscombe; and the liberties of (12) Fordington, or Forthington, (13) Piddlehinton, (14) Portland, (15) Sutton Points, or Poyntz, (16) Wabyhouse, or Waybaiouse, and (17) Wyke Regis and Elwell.

VI. The Shaftesbury, or Shaston, east division (population 21,012) contains the hundreds of (24) Badbury, (25) Cogdean, (26) Cranbourne (part of), (27) Knolton, or Knowlton, (28) Loosebarrow, (29) Monkton up Wimbourne, (30) Sixpenny Handley (part of), and (31) Wimbourne St. Giles.

VII. The Shaftesbury, or Shaston, west division (population 12,510) contains the borough of (9) Shaftesbury; parts of the hundreds of (26) Cranbourne, and (30) Sixpenny Handley, given above; and the liberties of (18) Alcester, and (19) Gillingham.

VIII. The Sherbourne, or Sherborne, division (population 10,953) contains the hundreds of (32) Sherbourne, and (33) Yateminster, or Yetminster; and the liberties of (20) Halstock, and (21) Ryme Intrinseca.

IX. The Sturminster division (population 11,219) contains the hundreds of (34) Brownshal, (35) Redlane, and (36) Sturminster Newton Castle; and the liberty of (22) Stour or Stower Provost.

The hundreds in the above list, it will be seen, are the same as those in the foregoing: but the borough of Poole is here omitted, being considered as a county of itself (population 6459), and the liberties of Minterne Magna and Sturminster Marshall are respectively included in the liberty of Piddletrenthide and the hundred of Cogdean.

The population given above is from the census of 1831.

The following are market-towns. Dorchester, the county town and a municipal and parliamentary borough, on the river Frome; population, in 1831, 3033; the parliamentary boroughs of Bridport on the Brit, population in 1831, 4242; Lyme Regis on the Sea, population in 1831, 2621; Melcomb Regis on the Sea, population in 1831, united with that of Weymouth, 7655; Poole, on Poole harbour, population in 1831, 6459; Shaftesbury, on the border of the county adjacent to Wiltshire, population in 1831, 3061; and Wareham, between the Piddle and the Frome, population in 1831, 2325; and the municipal borough of Blandford Forum, on the Stour, population in 1831, 3109. Of these places, and of the market-towns of Beaminster on the Brit, near its source, population in 1831, 2968, Sherbourne on the Yeo, population in 1831, 4261, and Wimbourne Minster, on the Allen, population in 1831, 4009, an account is given elsewhere. [Beaminster, Blandford, Bridport, Dorchester, Lyme, Poole, Shaftesbury, Sherbourne, Wareham, Weymouth, Wimbourne Minster.]

Of the other market-towns, Cerne Abbas, Cranbourne, Stalbridge, and Sturminster Newton, as well as of Corfe Castle, a disfranchised borough, and Milton Abbas, the market of which has been discontinued of late years, an account is subjoined.

Cerne Abbas is on the little river Cerne, a feeder of the Frome, and in the combined hundreds of Cerne, Totcomb, and Modbury, 7½ miles from Dorchester. The parish comprehends 3010 acres (a large proportion being downs or sheep-walks), and had in 1831 a population of 1209. Cerne is in a pleasant vale, surrounded by steep chalk hills. It is a very small town, with little trade except what is transacted at its weekly market (held on Wednesday, for corn, butchers' meat, and provisions, and tolerably well frequented), and at its three yearly fairs. The town was formerly notorious for the number of persons engaged in smuggling. Petty sessions for the division are held here. There was formerly at Cerne a Benedictine abbey of great antiquity, rebuilt and endowed in the tenth century by Ailmer, or Ælward, or Ægilward, whom Leland calls earl of Cornwall and Devon. Its revenues were valued, at the dissolution, at 623*l.* 13*s.* 2*d.* gross, or 515*l.* 17*s.* 10*d.* clear yearly value. All that remains of the abbey is a stately, large, square, embattled tower or gate-house, now much dilapidated. There is an antient bridge, once an appendage of the abbey, and a more modern bridge; both are of stone. A mansion-house, called the Abbey House, and chiefly built from the ruins of the abbey, contains incorporated in it some remains of the more antient abbey-house, built by Abbot Vanne in the fifteenth century. Several beautiful overflowing wells still remain, probably the work of the abbots, drawing their sources through subterranean channels from the spring of St. Augustine. The parish church was built by one of the later abbots for the use of the parishioners. It is a handsome building, in the perpendicular style of Gothic architecture, with a fine tower, which has octagonal turrets and pinnacles. The living is a vicarage, of the annual value of 81*l.*, with a glebe-house. There is a meeting-house for Independents. By the education returns of 1833, it appears that there were in Cerne 1 infant and daily school, with about 80 children, partly supported by the clergyman of the parish; 9 day-schools, with nearly 220 children; and 2 Sunday-schools, with nearly 150 children (the larger school connected with the church), supported by voluntary contributions.

On the southern slope of 'Trendle Hill,' a short distance north-west of the town, is the outline of a remarkable figure of a man bearing a club, cut into the chalk; the height of the figure is about 180 ft.; the outlines are about 2 ft. broad. There are various traditional and conjectural statements respecting the origin of this figure. It is repaired by the townspeople about once in seven years. On the south point of the hill, over the giant's head, has been an antient fortification, and on the north point a barrow. There are several barrows on the surrounding hills Cerne was injured by the Irish troops in the king's service in the great civil war A.D. 1644, and by a storm of wind A.D. 1731.

Cranbourne is a small market-town, situated in a fine champaign country, on the little river Allen (a feeder of the Stour) near its head. It is in the hundred of Cranbourne, 93 miles from London. The parish is the largest in the county, comprehending 13,730 acres, and had, in 1831, a population of 2158, chiefly agricultural. No manufactures are carried on. The market, which is small, is on Thursdays; there are two fairs and one great cattle market in the year. The houses are in general neat and well built. About A.D. 980 a monastery for Benedictines was founded here by Ailward de Meau or Snew, of the family of Edward the Elder. This either was originally, or subsequently became, an abbey; but the abbot and most of the monks being removed to Tewkesbury, it was reduced to be a simple priory and a cell of Tewkesbury. Some time after the Dissolution, the present manor-house was built on the site and from the materials of the priory; it is the property of the Marquis of Salisbury, who takes the title of viscount from this town. The parish church, formerly the priory church, which is one of the oldest and largest in the county, will accommodate 1000 persons. The tower is in the perpendicular style: the church has portions of an earlier character, and a door under the north porch is Norman. There is a rich wood pulpit on a stone base. The living is a vicarage, united with the chapelries of Verwood and Boveridge, of the yearly value of 151*l.*, with a glebe-house. There were in the parish, in 1833, 6 infant or dame schools, with 60 children; 4 day-schools, with 206 children; and 4 Sunday-schools, with 402 children.

North-west of the town is a large waste extending into Wiltshire: it was formerly a free warren or chase, once possessed by the house of Gloucester, and till lately by Lord Rivers, who had a right to keep deer all over it. It is covered chiefly with hazels and blackthorns, with a few timber trees. It has lately been disfranchised as a chace by act of parliament. It was very pernicious to the neighbouring farms, and was the occasion that few turnips were sown, as the deer made great depredations on that crop and could not be prevented. The deer are now destroyed.

Stalbridge is in the hundred of Brownshal, about two miles from the Cale (which falls into the Stour), 112 miles from London. The parish contains 4900 acres (including the tithings of Gomershay, Thornhill and Weston), and had in 1831 a population of 1773, of which rather more than a third was agricultural. The market is on Tuesday, and there are two cattle fairs in the year. The cattle market is held in alternate weeks. According to Hutchins's *History of Dorsetshire* (2nd edit. 1813, vol. iii., p. 239), the stocking manufacture is carried on here.

The town is irregularly laid out: in the market-place is an antient cross twenty-two feet high, or, including the base of three steps, thirty feet. There is a dissenting meeting-house. The church is a large antient structure, with a high embattled tower at the west end. The living is a rectory of the yearly value of 888*l.* with a glebe-house. There were in the parish in 1833, one 'national' day-school, supported by subscription, with 115 children, three Sunday-schools, with 308 children, besides several dame schools. Stone is quarried in the parish, and used for building and roofing.

Sturminster or Stourminster Newton Castle is in the hundred of the same name, in a rich vale on the bank of the Stour, 109 miles from London. The town is divided into two parts: Sturminster (by far the largest) lies on the north side, Newton Castle lies on the south side of the river. The two are connected by a bridge. The parish contains 4530 acres, and had in 1831 a population of 1831, of which about two-fifths are agricultural. The market is on Thursday for corn and on Saturday for butchers' meat: the cattle market is once a fortnight: there are two fairs in the year for cattle, &c.

The town is irregularly built; the market-house is a very antient building, near which is the base of a cross, on four steps. The church is a large building with an embattled tower of moderate height. The living is a vicarage of the yearly value of 712*l.* In Newton Castle is an antient fortification, probably of the Saxon time, in the form of a Roman D, surrounded on the south-west side and part of the east side by a vallum and ditch: there are the remains of some antient buildings near it. There were in the parish in 1833, one infant school with nearly 170 children, one day-school with 60 or 70 boys, and one Sunday-school of 140 children, all supported by subscriptions or donations: and five other day-schools with about 50 children.

Corfe Castle, a disfranchised borough, is near the centre of the 'isle' or rather peninsula of Purbeck. It is included in Blandford south division, and is 116 miles from London. The borough and parish boundaries are the same, and include an area of 9860 acres: there were in 1831 1712 inhabitants.

This town, which is near the castle, consists of two streets, of mean looking houses, built of stone and covered with tiles. The inhabitants are partly engaged in the marble and stone quarries, and clay works in the neighbourhood. The church is a large and very antient fabric, with many portions of Norman and early English architecture: it has an embattled and pinnacled tower, a large porch, and two buildings, one on each side of the church, formerly chapels, but now applied to other purposes. The church was much damaged in the great civil war when the castle was attacked A. D. 1646.

The castle was built, probably in the tenth century, by King Edgar. Its stateliness and strength, being situated on a high hill, caused it to be regarded in former times as a fortress of great importance. It was sometimes the residence of the West Saxon princes. Here King Edward the Martyr was assassinated by his step-mother, Elfrida (A. D. 978 or 981). King John in his war with the barons deposited his regalia here for security: and Edward II. when he fell into the hands of his enemies was for a time imprisoned here. In the great civil war Corfe Castle was stoutly defended for the king by Lady Bankes, wife of Lord Chief Justice Sir John Bankes, the owner of it, with the assistance of her friends and retainers, and of a governor sent from the king's army. It was however taken by the parliamentarians by treachery, February, 1645-46, and dismantled.

The ruins are extensive, and from their high situation form a very striking object. The castle is separated from the town by a ditch, now dry, which is crossed by a bridge of four very narrow high arches. 'The vast fragments of the king's tower,' says Mr. Hutchins, 'the round towers, leaning as if ready to fall, the broken walls and vast pieces of them tumbled into the vale below, form such a scene of havock and desolation as strikes every spectator with horror and concern. The plenty of stone in the neighbourhood, and the excellency of the cement, harder to be broken than the stones themselves, have preserved these prodigious ruins from being embezzled and lessened.'

Corfe Castle was a borough by prescription previous to the reign of Elizabeth, who bestowed on it a charter; but the privileges granted by this charter were vested rather in the lord of the manor than the burgesses. Another charter was granted by Charles II. Corfe Castle never sent representatives to the House of Commons till the reign of Queen Elizabeth, and was disfranchised by the Reform Act. The parish is now included in the parliamentary borough of Wareham.

The living of Corfe Castle is a rectory, of the yearly value of 685*l.*, with a glebe-house. There were in the parish in 1833, three infant or dame schools with 65 children; five day-schools with above 250 children; four of these schools were chiefly supported by subscriptions and donations; and three Sunday-schools with above 200 children. One of the day-schools (supported by dissenters) had a lending library attached.

Milton Abbas, or Abbot, is said to derive its name (which is a contraction of Middleton Abbot) from its situation near the centre of the county. It is in the hundred of Whiteway, in a deep vale inclosed by steep chalk hills on the north and south side, 111 miles from London. The parish comprehends 2420 acres, and had in 1831 a population of 846 persons: above three-fourths of the population are agricultural. Its market and fairs have been given up.

Here was an abbey founded by King Athelstan, which alone gave any importance to the town, which was in former times more considerable than now. The abbey has been numbered among the mitred abbeys, but erroneously. Its value at the dissolution was 720*l.* 4*s.* 1*d.* gross, or 578*l.* 13*s.* 11*d.* clear. The buildings of the abbey were preserved for a long time, but were gradually pulled down, chiefly to be replaced by more modern erections. The hall yet remains, a noble and magnificent old room: part of the mansion of Milton Abbey, belonging to the Damer family, which enjoyed for some time the title of earl of Dorchester, now extinct. Milton has an almshouse and a grammar-school. The conventual church was for some time the parish church, but a late earl of Dorchester having built a new parish church, converted the old one into a private chapel. It consists of the choir, transepts, and tower of the old abbey church: the choir is chiefly of early decorated character, the transepts and tower perpendicular. The general appearance of this edifice is very fine.

The living of Milton Abbas is a vicarage, of the yearly value of 127*l.*, with a glebe-house. In 1833 the parish contained seven day-schools with about 70 children, and two Sunday-schools with about 50.

Markets were formerly kept at Abbotsbury, Bere Regis Evershot, Frampton, and other places. The inhabitants of Abbotsbury, which is near the western end of the Chesil Bank, are much engaged in the mackerel fishery. A large abbey of Benedictines was founded here in the eleventh century by Orc, steward of King Edward the Confessor. Very little of the monastic buildings now remain: the conventual church is, except the porch, entirely demolished.

Near Abbotsbury is an antient chapel of St. Catherine, which, from its elevated situation, is used as a sea-mark. Swannage, or Swanwich, near Corfe Castle, is a place of some resort as a bathing place.

Divisions for Ecclesiastical and Legal purposes.—In the earlier period of the Ecclesiastical constitution of England, Dorsetshire was included in the bishopric of Dorchester in Oxfordshire, a see founded by Birinus, first bishop of the West Saxons, about A.D. 626; and afterwards removed to Winchester. In the year 705 when Ina, king of Wessex, divided his kingdom into dioceses, Dorsetshire was comprehended in that of Sherborne, from which place the see was removed, about the middle of the 11th century, to Sarum. Upon the erection of the see of Bristol, A.D. 1542, Dorsetshire was transferred to the new diocese, of which it constituted the chief part, and it continued to be so, until transferred back by the late act to the diocese of Salisbury. Dorsetshire was an archdeaconry before it was transferred to the see of Bristol. It is subdivided into five rural deaneries, Bridport, Dorchester, Pimperne, Shaftesbury, and Whitchurch Winterbourne. While the county was in the diocese of Bristol the bishop held his triennial, and the archdeacon his annual visitations at Bridport, Dorchester, Blandford, Shaftesbury, Cerne Abbas, or Whitchurch: this arrangement we presume will be continued. The number of benefices it is difficult to give: Hutchins gives the parishes at 250; of these some are parochial chapelries; others, though separate and independent in other respects, are united under one incumbent.

This county is included in the Western circuit. The assizes were antiently held at Sherbourne; sometimes though rarely at Shaftesbury, but generally, especially in latter times, at Dorchester, where they may be considered as now fixed. The shire-hall and county gaol are at Dorchester. The Epiphany quarter sessions are held at Blandford, the Easter at Sherbourne, the Midsummer at Shaftesbury, and the Michaelmas at Bridport.

Before the passing of the Reform Act, twenty members were returned to the House of Commons from Dorsetshire, viz. two for the county, four for the united boroughs of Weymouth and Melcomb Regis, and two each for the boroughs of Bridport, Corfe Castle, Dorchester, Lyme, Poole, Shaftesbury, and Wareham. By the Reform Act the number has been reduced to fourteen, viz., three for the county, two each for the boroughs of Bridport, Dorchester, and Poole, and Weymouth, united with Melcomb Regis; and one each for the boroughs of Shaftesbury, Lyme Regis, and Wareham. Corfe Castle was disfranchised and included in the neighbouring parliamentary borough of Wareham. The chief place of election for the county is Dorchester: the polling stations are Beaminster, Blandford, Chesilton (in the Isle of Portland), Dorchester, Shaftesbury, Sherbourne, Wareham, and Wimbourne.

History and Antiquities.—This county was, in the earliest period noticed by history, inhabited by a people whom Ptolemy calls Δουροτριγες Durotriges, a name which Mr. Hutchins (after Camden) derives from the British words Dwr water and Trig an inhabitant, and interprets to mean dwellers by the water side. According to Asser Menevensis the Britons called this people Dwr Gwyr: the Saxons called them **Dorſettan** (Dorsettan,) whence the modern name of the county. The name Dorsettan is equivalent in meaning to the antient British name, given in a Greek form by Ptolemy. These Durotriges appear to have been of Belgic race. Upon the conquest of South Britain by the Romans, Dorsetshire was included in Britannia Prima.

Of this early period of our history there are several remains in various camps and earth works, stone circles, cromlechs, and barrows. In the north-eastern part of the county and the adjacent part of Wiltshire, are several embankments with ditches: they all run in a winding and irregular manner, mostly from south-east to north-west, having the ditch on the north-east side. Vernditch, which has given name to a part of Cranbourne chace, is of these, Grimsditch is another. On the right of the road from Cerne Abbas to Calstock and in other parts of the county are little banks, crossing one another in all kinds of angles: they are made of flints covered with turf. Neither their age nor their use seems to be known.

There are several Roman camps in the county. Mr. Hutchins enumerates twenty-five; and the walls and amphitheatre of Dorchester, and the coins and pavements found there, are monuments of the same victorious people. There were at least two Roman stations in the county, viz., Durnovaria, [Itin. Antonini,] or Δουνιον, Dunium [Ptolemy], Dorchester; and Vindocladia or Vindogladia, Vindelia in Richard of Cirencester, which some are disposed to fix at Wimbourne, others more probably at Gussage, between Blandford Forum and Cranbourne. To these Dr. Stukely would add a third, Ibernium, (mentioned by the anonymous Ravennas,) which he fixes at Bere Regis. Several places in the confused and barbarous list of names given by Ravennas, are conjectured by Baxter to be in Dorsetshire.

The Icknield or Ecknield way enters the county at its western extremity, coming from Hembury Fort [DEVONSHIRE], and runs east by south to Dorchester, near which it is very perfect, high and broad, and paved with flint and stone: from Dorchester it runs by Sheepwick and Sturminster Marshall, and the Gussages into Wiltshire. In this part it is called Ackling dike. Its passing near the Gussages gives support to the conjecture of those who fix Vindogladia at one of them. The remains of a Roman road may be traced on the south-west side of the Frome, leading from Dorchester in a north-west direction as far as Bradford Peverel, and Stratton, soon after which it disappears: another road may be traced from Dorchester, on the other bank of Frome, parallel to the former road, and uniting with it at Stratton; a third runs south from Dorchester in the direction of Melcomb Regis; and there are traces of several others.

When the Saxons established their octarchy, Dorsetshire was included in the kingdom of Wessex; and even after the West Saxon princes acquired the sovereignty of England, they resided occasionally in this county. Ethelbald and Ethelbert, the elder brothers of Alfred the Great, were buried at Sherbourne; and Ethelred I., another brother of the same prince, at Wimbourne.

In the invasions of the Danes this county suffered severely. Egbert, king of Wessex, fought a battle with them at Charmouth, near the western extremity of Dorsetshire, A.D. 833. Seven years afterwards his son Ethelwolf fought a second battle with them at the same place. In A.D. 876 they made themselves masters of Wareham, where they were besieged by Alfred, who obliged them to quit that place the next year, when 120 of their vessels were wrecked at Swanage. In A.D. 1002, Sweyn, king of Denmark, in his invasion of England, destroyed Dorchester, Sherbourne, and Shaston or Shaftesbury.

Throughout the middle ages, few events of historical interest connected with the county occur. The contest of the Roses little affected this part of the kingdom. The towns on the coast were flourishing, as appears from the following list of the vessels which they furnished to the fleet of Edward III. at the siege of Calais, A.D. 1347: Weymouth, 20 ships and 264 mariners, or, according to Hackluyt, 15 ships and 263 mariners; Lyme, 4 ships, 62 mariners; Poole, 4 ships, 94 mariners; Wareham, 3 ships, 59 mariners. To judge of the comparative importance of these armaments, it must be remembered that Bristol furnished only 22 ships and 608 mariners, and London 25 ships and 662 mariners; so that Weymouth furnished only 2 vessels less than Bristol, and only 5 less than London; they were, however, more weakly manned and probably smaller. To the fleet of the lord high admiral (Howard of Effingham) at the time of the armada, A.D. 1588, this county furnished 8 vessels (3 of them volunteers); the aggregate tonnage of 7 of these was 560 tons, and they carried 290 men; the tonnage of the eighth vessel is unknown; it carried 50 soldiers. The second engagement of the English fleet with the armada was off Portland Bill.

In the civil war of Charles I. the gentry were mostly for the king; but the people of the towns, where the clothing trade was then carried on, and of the ports, were for the parliament. In the beginning of the war, Sir Walter Earle and Sir Thomas Trenchard, partisans of the parliament, possessed themselves of Dorchester, Weymouth, Portland, Lyme, Wareham, and Poole, while Sherbourne Castle, Chideock Castle, and Corfe Castle were garrisoned by the king. The parliamentarians always retained Lyme and Poole, which were fortified; but the other towns, being open, fell into the hands of whichever party was master of the field. In March, 1642-3, Sir William Waller marched into the county with two regiments of horse, but did little; and the earl of Carnarvon entering the county with a body of royalists, took Dorchester and Portland, and raised the siege of Corfe Castle which the parliamentarians had formed. Several engagements took place in the county at a later period of the contest, but they were of little moment. Corfe Castle held out for the king till 1645-6. The year 1645 was distinguished by the rising of the club men in the counties of Dorset, Wilts, and Somerset; their object was to defend this part of the country from the outrages of both parties. Their assembling excited the jealousy of the parliamentarians, whose superiority was now established. Cromwell defeated a considerable body of them at Hamilton hill, and other bodies were persuaded to disperse.

STATISTICS.

Population.—Dorsetshire is principally an agricultural county, ranking the seventeenth in this respect. Of 37,861 males twenty years of age and upwards, inhabitants of Dorsetshire in 1831, there were 16,766 engaged in agricultural pursuits, and only 722 in manufactures or in making manufacturing machinery. Of these latter 400 were employed in the manufacture of hemp into twine and sailcloth, chiefly at Bridport; 80 were employed in the woollen manufactures, chiefly at Lyme Regis; about 40 in silk, mostly at Shaftesbury; there were a few glove-makers at Cerne-Abbas; and wire button-making still gives employment to a few hands.

The following summary of the population, as taken in 1831, shows the number of the inhabitants and their occupations in each division of the county.

DIVISIONS, &c.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.	Males twenty years of age.
Blandford, North	1,095	1,318	9	25	891	258	169	2,993	3,096	16,089	1,541
Blandford, South	2,415	2,697	19	65	1,371	476	850	6,251	6,563	12,814	3,032
Bridport	4,753	5,178	44	176	2,663	1,528	987	12,280	13,063	25,343	5,948
Cerne	1,509	1,844	14	56	1,179	386	279	4,186	4,331	8,517	2,143
Dorchester	3,968	4,545	57	198	2,041	1,025	1,479	10,460	10,891	21,351	5,144
Shaston, East	4,063	4,462	49	126	2,567	998	897	10,225	10,787	21,012	5,179
Shaston, West	1,756	1,990	20	44	1,171	502	317	4,589	4,860	9,449	2,228
Sherborne	1,206	1,516	19	44	969	322	225	3,365	3,513	6,878	1,690
Sturminster	2,139	2,300	13	71	1,248	606	446	5,607	5,612	11,219	2,690
Blandford, town	522	613	.	6	92	343	178	1,406	1,703	3,109	749
Bridport, borough	625	794	10	43	.	478	316	1,966	2,276	4,242	931
Dorchester, borough	426	558	2	11	27	333	198	1,481	1,552	3,033	877
Lyme Regis, borough	423	542	7	56	33	257	252	1,161	1,460	2,621	596
Shaftesbury or Shaston, borough	516	560	11	30	72	361	127	1,484	1,577	3,061	711
Sherborne, town	762	985	7	15	180	559	246	1,809	2,266	4,075	945
Wareham, borough	494	517	8	23	72	182	263	1,066	1,259	2,325	499
Weymouth and Melcombe Regis borough	1,320	1,769	10	135	19	847	903	3,323	4,332	7,655	1,694
Poole, town and county	1,315	1,426	11	76	6	645	775	2,884	3,575	6,459	1,264
Totals	29,307	33,614	310	1,200	14,601	10,106	8,907	76,536	82,716	159,252	37,861

The population of Dorsetshire each time the census was taken was:—

	Males.	Females.	Total.	Incr. per cent.
1801	53,667	61,652	115,319	.
1811	57,717	66,976	124,693	8.13
1821	68,934	75,565	144,499	15.88
1831	76,536	82,716	159,252	10.22

Showing an increase between the first and last periods of 44,933, nearly 39 per cent., which is 17 per cent. below the general rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

		£.		s.	d.	
1801	were	64,771,	which was	11	2	for each inhabitant.
1811	„	109,304	„	17	6	„
1821	„	85,647	„	11	10	„
1831	„	90,668	„	11	4	„

The sum expended for the same purpose in the year ending March 25, 1836, was 68,019*l.*; and assuming the same rate of increase in the population since 1831 as in the ten years preceding that period, the above sum gives an average of about 8*s.* 1¼*d.* for each inhabitant. These averages are beyond those for the whole of England and Wales.

The sum raised in Dorsetshire for poor-rate, county-rate, and other local purposes, in the year ending the 25th of March, 1833, was 108,495*l.* 14*s.*, and was levied upon the various descriptions of property as follows:—

	£.	s.
On land	85,991	0
Dwelling-houses	18,961	10
Mills, factories, &c.	1,520	10
Manorial profits, navigation, &c.	2,022	14

The amount expended was:—

	£.	s.
For the relief of the poor	90,488	16
In suits of law, removal of paupers, &c.	2,417	2
For other purposes	14,301	10
	107,207	8

In the returns made up for the subsequent years, the descriptions of property assessed for local purposes are not distinguished. The sums raised in the years 1834, 1835 and 1836 were 102,615*l.* 11*s.*, 94,915*l.* 15*s.*, and 82,148*l.* 12*s.* respectively, and the expenditure was as follows:—

	1834.		1835.		1836.	
For the relief of the poor	£84,293	0	£76,091	3	£68,019	7
In suits of law, removals, &c.	2,634	15	2,065	4	1,797	16
Payment towards the county-rate	11,914	19	9,058	4	6,528	19
For all other purposes			6,999	2	6,930	5
Total money expended	£98,842	14	94,213	13	83,276	7

The saving effected in the sums expended for the relief of the poor in 1836, as compared with the expenditure of 1834, was therefore 16,273*l.* 13*s.*, or rather more than 19 per cent., and the saving in the whole sum expended was 15,366*l.* 7*s.*, or nearly 15¾ per cent.

The county expenditure in 1834, exclusive of the relief for the poor, was 14,733*l.* 14*s.* 11*d.*, disbursed as follows:—

	£.	s.	d.
Bridges, buildings, and repairs, &c.	746	7	11
Gaols, houses of correction, &c., and maintaining prisoners, &c.	2,274	19	6¾
Shire halls and courts of justice—building, repairing, &c.	65	15	1
Lunatic asylums	2,251	7	0
Prosecutions	1,096	16	7¼
Clerk of the peace	565	1	0

	£.	s.	d.
Conveyance of prisoners before trial .	819	15	5
„ of transports . .	210	16	6
Vagrants—apprehending and conveying	147	10	0
Constables—high and special . .	16	8	10
Coroner	459	16	11
Miscellaneous	860	4	9

The number of persons charged with criminal offences, in the three septennial periods ending with 1820, 1827, and 1834, were 632, 866, and 1150 respectively; making an average of 90 annually in the first period, of 124 in the second period, and of 164 in the third period. The number of persons tried at quarter-sessions, in respect to which any costs were paid out of the county-rates, were 123, 135, and 109 respectively. Of this number, there were—

	1831.	1832.	1833.
Committed for felonies . .	82	83	65
„ misdemeanors	41	52	44

The total number of committals in each of the same years was 123, 135, and 109 respectively: of whom

	1831.	1832.	1833.
The number convicted was .	87	79	79
„ acquitted . . .	17	22	10
Discharged by proclamation .	19	34	20

At the assizes and sessions in 1836 there were 193 persons charged with crimes in this county. Of this number 15 were charged with offences against the person, 10 of which were for common assaults; 13 with offences against property, committed with violence; 158 with offences against property, committed without violence; 1 was committed for arson; 2 for counterfeiting coin and uttering the same; 1 for poaching; 1 for prison-breaking; and 2 for riot. Of the whole number of offenders, 118 were convicted and 75 acquitted, or no bill found against them. Of the number convicted, 5 were sentenced to death, which sentence was commuted to transportation; there were also 14 other persons transported; 1 sentenced to imprisonment for 2 years; 14 for 1 year and above 6 months; and 79 for 6 months and under; 2 were fined, and 3 were discharged on sureties. Of the total number of offenders, 162 were males and 31 were females. Among the whole not one had received superior instruction; 19 could read and write well, 106 could read and write imperfectly; and 63 could neither read nor write; the degree of instruction of the remaining 12 could not be ascertained. The proportion of offenders to the population, in 1836, was 1 in 866.

The number of turnpike trusts in Dorsetshire, as ascertained in 1834, was 17; the number of miles of road under their charge was 359; the annual income arising from the tolls and parish composition was 23,002*l.* 2*s.* 4*d.*, and the annual expenditure, 24,281*l.* 9*s.* 10*d.*

The number of persons qualified to vote for the county members of Dorsetshire was (in 1836) 6320, being 1 in 26 of the whole population, and 1 in 6 of the male population above twenty years of age. The expenses of the last election of county members to parliament were to the inhabitants of the county 233*l.* 13*s.* 11*d.*, and were paid out of the general county-rate.

There are nine savings-banks in this county. The number of depositors and amount of deposits on the 20th of November were:—

	1832.	1833.	1834.	1835.
Number of depositors .	5540	5562	6370	6799
Amount of deposits	£234,344	233,037	259,288	274,792

The various sums placed in the savings-banks in 1834 and 1835 were distributed as under:—

	1834.		1835.	
	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	2714	£22,468	2907	£23,693
„ 50	2005	60,948	2147	66,226
„ 100	928	64,454	974	66,711
„ 150	385	45,524	417	49,359
„ 200	246	41,902	256	43,657
Above 200	92	23,992	98	25,146
	6370	259,288	6799	274,792

Education.—The following summary is taken from the parliamentary inquiry on education, made in 1835:—

	Schools.	Scholars.	Total.
Infant schools	115		
Number of infants at such schools; ages from 2 to 7 years —			
Males . . .		859	
Females . . .		950	
Sex not specified		392	
			2,201
Daily schools	596		
Number of children at such schools; ages from 4 to 14 years:—			
Males . . .		6,493	
Females . . .		5,566	
Sex not specified		3,898	
			15,957
Schools . .	711		
Total of children under daily instruction			18,158
Sunday schools	316		
Number of children at such schools; ages from 4 to 15 and 16 years:—			
Males . . .		7,577	
Females . . .		8,144	
Sex not specified		4,109	
			19,830

Assuming that the population between 2 and 15 years of age has increased in the same proportion as the whole population since 1821, and that since 1831 the rate of increase has been in the same ratio as in the ten preceding years: there were in 1834 about 50,010 children in Dorsetshire, between the ages of 2 and 15. A very large number of the scholars attend both daily and Sunday-schools, but in what number or in what proportion is uncertain. Thirty-eight Sunday-schools, attended by 1268 children, are returned from places where no other schools exist: but in all other places Sunday-school children have opportunity of resorting to other schools also. Thirty-one schools, containing 1841 scholars, are both daily and Sunday schools, and duplicate entry is known to have been thus far created. We may therefore conclude that not more than two-thirds of the whole population between the ages of 2 and 15 were receiving instruction at the time of the inquiry.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	3	36	5	241	101	1,667	6	257
Daily Schools	46	1227	66	3,519	423	8,983	61	2228
Sunday Schools	10	703	296	18,645	2	60	8	422
Total.	59	1966	367	22,405	526	10,710	75	2907

The schools established by Dissenters, included in the above statement, are:—

	Schools.	Scholars.
Infant schools	3	72
Daily „	9	322
Sunday „	61	4,623

The schools established since 1818 are:—

Infant and other daily schools	373	9,684
Sunday-schools	150	11,810

Twenty-nine boarding-schools are included in the number of daily schools as given above. No school in this county appears to be confined to the children of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents.

Lending libraries of books are attached to 31 schools in this county.

DORSIBRANCHIA'TA, Cuvier's appellation for the second order of Annelids, which have their organs, and especially their branchiæ, distributed nearly equally along the whole of their body, or at least a part. *Chloeia* (Savigny) and *Cirratulus* (Lamarck), with many other genera which our limits do not permit us to enumerate, belong to this order. The reader is referred to Lamarck (*Animaux sans Vertèbres*, tome v.); to Savigny (Eg. Annel.); and to Cuvier (*Règne Animal*, tome iii.) as the principal guides on this subject. [ANNELIDA.]

DORSTE'NIA, a genus of plants of the family of the Urticaceæ. The roots of several species of this genus are all confounded under the appellation of Contrayerva root, but as they all possess nearly the same chemical composition and properties, it is of little importance which particular species yields what is used. Indeed, by the time the root reaches Europe, whatever virtues it originally possessed are lost, so that it has scarcely any sensible qualities, and very little effect on the system. It consists of volatile oil, extractive and starch. The first of these gives it some power over the nervous system, should it not have been dissipated by time. Hence it is recommended in the low stages of fever, especially of children; but serpentaria root may at all times be advantageously substituted for it. Contrayerva signifies antidote, and it was at one time supposed to be an antidote to all poisons, whether animal, vegetable, or mineral, except mercury.

DORT or **DORDRECHT**, in antient times called Thuredrecht, a city of South Holland, is situated on an island formed by the Maas, which was separated from the opposite shore in November, 1421, by an irruption of the waters. By this irruption the dikes were broken down, more than 70 villages were destroyed, and an immense number of the inhabitants were drowned. The city is situated twelve miles south-east from Rotterdam, in 51° 49′ N. lat. and 4° 38′ E. long.

Dort is said to have been founded by Merovæus in the fifth century. It is certainly one of the most antient cities in Holland, and was formerly the capital of the province. Its situation is naturally so strong, that although frequently invested it has always made successful resistance to the besiegers. It has a safe and good harbour, and is well situated for trade, having two canals, by means of which goods can be conveyed to warehouses in the heart of the city. The principal trade is that of corn and wood; large rafts of the latter are brought down the Rhine to this place, and there broken up for sale. There are many saw-mills in the town, and ship-building also forms a large branch of its industry. Dort contains about 18,000 inhabitants. Gerard Vossius and the brothers De Witt were natives of the town. The town-hall is a handsome building, and the principal church is 300 feet long and 125 feet wide, with lofty towers and chimes.

DORT, SYNOD OF, an Assembly of Protestant Divines convoked at Dort in the year 1618, by the States General, under the influence of Prince Maurice of Nassau, by which the tenets of the Arminians, in five points, relating to predestination and grace, were condemned by the followers of Calvinism.

At this synod ecclesiastical deputies were present from most of the States of the United Provinces, and from the churches of England, Hesse, Bremen, Switzerland, and the Palatinate. Those from England were Dr. George Carleton, bishop of Landaff; Dr. John Davenant, regius professor of divinity at Cambridge and master of Queen's College; Dr. Samuel Ward, master of Sidney College; and Dr. Joseph Hall, then dean of Worcester but afterwards bishop of Norwich. Dr. Hall's health, after two months, requiring his return, he was replaced by Dr. Thomas Goad. To these was afterwards added Walter Balcanqual, a Scots divine, deputed by King James on behalf of the churches of that nation. The synod was opened on November 13, 1618: it consisted of thirty-eight Dutch and Walloon divines, five professors of universities, and twenty-one lay-elders; the foreign divines amounted to twenty-eight. Those from England had the precedence, after the deputies of the States.

The person by whom the Arminians were headed in defending their cause, was Simon Episcopius, at that time professor of divinity at Leyden, who opened the proceedings, on the part of his sect, with a moderation and eloquence which did him honour. The remonstrants, however, as the Arminians were called, desiring to rest the main defence of their cause, not upon the grounds in reason and scripture on which their opinions were founded, but on their refutation of the opinions of the Calvinists their adversaries, difficulties arose, and their proposal was rejected. They were told that the synod was met to judge, not to confer.

The design of the Arminians, says Mosheim, in the proposal they made, was probably to get the people on their side, by such an unfavourable representation of the Calvinistic system, and of the harsh consequences that seem deducible from it, as might excite a disgust in the minds of those who were present, against its friends and abettors. And it is more than probable that one of the principal reasons that engaged the members of the synod to reject this proposal, was a consideration of the genius and eloquence of Episcopius, and an apprehension of the effects they might produce upon the multitude. When all the methods employed to persuade the Arminians to submit to the manner of proceeding, proposed by the synod, proved ineffectual, they were excluded from that assembly, and returned home complaining bitterly of the rigour and injustice with which they had been treated. Their cause was nevertheless tried in their absence, and, in consequence of a strict examination of their writings, they were pronounced guilty of pestilential errors, and condemned as corruptors of the true religion. This sentence was followed by its natural effects, which were the excommunication of the Arminians, the suppression of their religious assemblies, and the deprivation of their ministers.

Brandt, in the second and third volumes of his 'History of the Reformation in and about the Low Countries,' fol. London, 1720-1722, has given a very minut edetail of the proceedings in the successive sessions of this synod; they were a hundred and eighty in number, and continued till May 29th, 1619. Brandt, however, was an Arminian, and though he is to be relied upon for facts, the reasoning which he occasionally deduces from them requires a comparison with other writers. Maclaine in his 'Notes on Mosheim,' says, the reader will do well to consult the letters of the learned and worthy Mr. John Hales of Eton, who was an impartial spectator of the proceedings of this famous synod, and who relates with candour and simplicity what he saw and heard. All that appeared unfair to the Arminians in the proceedings of this synod, has been collected together in a Dutch book entitled 'Nullitegten, Mishandelingen, ende anbyllike Proceduren des Nationalen Synodi gehonden binnen Dordrecht, &c.'

Of the disputes which had prevailed in Holland for some years, between the Calvinists and Arminians, previous to the convocation of this synod, we have already spoken in the account of Barneveldt the grand pensionary, whose fate was sealed, when it had been sanctioned by the decision of this assembly. (See Brandt, ut supr.; Mosheim's 'Eccl. Hist.' 4to. Lond. 1765, vol. ii. pp. 524, 525; and 'The Articles of the Synod of Dort, and its rejection of errors: transl. from the Latin, with Notes, &c. by Thomas Scott,' 8vo. Lond. 1818.)

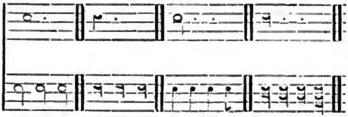
The presentation copy of the 'Acta Synodi Nationalis, autoritate illustr. et præpotentum DD. Ordinum Generalium Fœderati Belgii Provinciarum Dordrechti habitæ anno MDCXVIII et MDCXIX, fol. Lugd. Bat. 1620,' formerly belonging to King James I., splendidly bound in crimson velvet and embroidered with the royal arms, is still preserved in the library of the British Museum. A wood-cut representing the sitting of the synod is prefixed to 'Judicium Synodi Nationalis reformatarum Ecclesiarum Belgicarum habitæ Dordrechti, Anno 1618 et 1619.' 'The Collegiat Suffrage of the Divines of Great Britain concerning the Five Articles controverted in the Low Countries: by them delivered in the Synod, March 6, 1619, being their vote or voice foregoing the joint and publique judgment of the Synod,' was published in English, 4to., Lond. 1629.

An Album containing the signatures of the different members of the synod was delivered to each person at the breaking up of the assembly; one of them was disposed of in London at the auction of Mr. Van Sybstein's MSS. in 1825. The gold medal struck by the States in commemoration of the synod is engraved in the 'Histoire Metallique de la Republique de Hollande, par M. Bizot,' tom. i. p. 139.

In the sixth session, which was held on the 19th November, 1618, the synod of Dort proposed obtaining a translation of the Bible from the original texts into Dutch, which was judged to be a necessary work. In the seventh, and some of the succeeding sessions, the translation was finally agreed to, and rules laid down for the direction of the translators. In the thirteenth session, on the 26th November, the translators were appointed, when the following were chosen by a majority of votes: John Bogerman, the president of the synod; William Baudart and Gerson Bucer, for the Old Testament; Jacobus Roland, Herman Faukelius, and Peter Cornelius, for the New Testament and Apocrypha. The synod then chose sixteen supervisors of the translation; and also resolved, that in case any of the translators should die or be disabled by sickness, the president, with the two assessors, and the scribes of the synod, should be empowered to appoint successors.

After a delay of nearly ten years, the translators of the Old Testament assembled at Leyden, in 1628, and the next year, 1629, the translators of the New Testament; but as Herman Faukelius, pastor of the church of Middleburg, and Peter Cornelius, pastor of the church of Enchusan, had died previous to their meeting together, Anthony Walæus and Festus Hommius were chosen in their stead. When the translation of the Old Testament had advanced as far as the first chapter of Ezekiel, Gerson Bucer died, and was succeeded in his office by Anthony Thysius; Jacobus Roland also died when the translation of the New Testament had advanced to The Acts of the Apostles. The translation of the entire Bible was completed in 1632. The supervisors of the Old Testament met at Leyden, with the translators, in 1633; and those of the New Testament in 1634; and the revision was completed in October, 1635. The printing of the Bible was finished in 1637, when it appeared in folio from the presses of Leyden and the Hague, and in octavo from the press of Amsterdam. This is what is called 'The Dort Bible.' Editions of it were soon rapidly multiplied and extensively circulated. (See Brandt, ut supr. vol. iii. p. 25—28; Leusdeni, *Philologus Hebræo Mixtus*, Diss. x. et xi.; and Townley's *Illustrations of Biblical Literature*, 8vo. Lond. 1821, vol. iii. pp. 400, 401.)

DOT, in music, a point, or speck, placed after a note or rest, in order to make such note or rest half as long again. Thus a semibreve with a dot is equal to three minims. a crotchet rest with a dot is equal to three quaver rests. In modern music a double dot is often used, in which case the second is equal to half of the first. Thus a double dotted minim is equal to three crotchets and a quaver; a double-dotted quaver rest is equal to three semiquaver rests and one demisemiquaver rest. Examples:—



DOTIS, one of the four circles of the county of Comorn, in north-western Hungary. Dotis (in Hungarian *Tata*), the chief town of the circle, lies to the south-east of the town of Comorn, in 47° 38′ N. lat. and 18° 20′ E. long. The town is situate on an eminence next the river Tata, and with its suburb, Továros, which signifies 'Lake Town,' as it lies on the margin of a narrow lake about four miles in length, contains about 960 houses and 8870 inhabitants. Between the two are the ruins of an antient castle, celebrated for its strength in former days, and said to have been built by the Romans, which was a favourite residence of Mathias Corvinus, king of Hungary. Among the buildings of note are three churches, one of which is very old, a Capuchin and a Piarist monastery, the latter having a grammar-school, a head-district school, a military hospital, and some warm baths, much in repute. The inhabitants are industrious, have several flour and saw-mills, and manufacture coarse woollen cloths, earthenware and pottery, beer, bed-rugs, &c. In the adjoining village of Bay is a spacious cellar, capable of stowing away 50,000 aulms of wine: among them is a tun which holds 1420 aulms. The Esterházy family have a splendid castle here, with grounds laid out in the English style. At St. Ivány, near Dotis, are quarries of fine marble and freestone. There are vineyards, large sheep-grounds, and extensive forests, in the neighbourhood. Dotis, and much of the surrounding land, are the property of the Esterházy family. There are well attended annual fairs.

DOTTREL. [PLOVERS.]

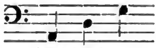
DOUAY, or **DOUAI**, a town in the department of Nord, on the river Scarpe, near where the canal of the Haute Deule meets it, on the road from Paris by Peronne and Cambray to Lille and Bruges, 121 miles from Paris. It is 108 miles from Paris in a straight line north by east, in 50° 21′ N. lat., and 3° 6′ E. long.

Douay is advantageously situated for commerce. It is surrounded by antient walls, flanked with towers: the walls afford an agreeable promenade. The town is further defended by a fort on the left bank of the Scarpe. The area inclosed by the walls is large, and contains almost as many gardens as dwellings. The streets are well laid out, and the town-hall, the church of St. Pierre (Peter), and the arsenal, one of the most considerable in France, are the principal buildings. The inhabitants, who amounted in 1832 to 18,793, are engaged in manufactures of various kinds, as linens, lace, gauze, cotton goods and yarn, soap, glass, leather, and refined sugar. A considerable trade is carried on in flax, woollen cloth, and cattle. There is every second year an exhibition of the articles of manufacturing industry; and prizes are distributed for the most useful and ingenious inventions or the best finished pieces of workmanship. Medals are likewise annually distributed by the Departmental Society of Agriculture, which has its seat in this town, not at Lille. Douay is the seat of a cour royale, which exercises jurisdiction over the departments of Nord and Pas de Calais. It is also the capital of an arrondissement. There are at Douay an *académie universitaire* or university, a *collège* or high school, a school for the artillery, and a school of drawing and music. The public library consists of 27,000 volumes, and there are a museum of natural history, a botanic garden, and a collection of paintings and antiquities, a foundling hospital, a theatre, two other hospitals (one military), and a military prison.

Douay is a place of great antiquity: it existed in the time of the Romans, and became under the counts of Flanders a place of considerable importance. Phillippe le Bel having a dispute with the count of Flanders, possessed himself of this town A.D. 1297, but it was restored to the counts in A.D. 1368 by Charles V. of France. With the rest of Flanders it passed under the dominions of the kings of Spain; and in A.D. 1552 Philip II. of Spain founded a university here. In 1667 Louis XIV. of France took possession of Douay: it was taken in 1710 by the allies under Marlborough and Eugene, but the French retook it after the English withdrew from the coalition against France. The arrondissement is divided into six cantons, and seventy communes: it had in 1832 a population of 92,750. Much flax is grown, and coal is dug in the neighbourhood of the town.

DOUAY BIBLE. [BIBLE.]

DOUBLE-BASE, the largest musical instrument of the viol kind. [VIOL.] In England, Italy, and France, the double-base has three strings, which are tuned in fourths:



(*An octave lower.*)

In Germany a fourth string is used, tuned a fourth below the deepest of the above.

The double-base, in full orchestral pieces, takes the notes written for the violoncello, when not otherwise directed, and if these are not too rapid, but always gives them an octave lower. It may be considered as the foundation of the band, for a want of firmness in this instrument is more fatal in its consequences than unsteadiness in any other.

In our concerts the Italian name of this instrument, *Contra-basso* (or, more strictly, *Contrab-basso*), is as frequently employed as its English appellation.

DOUBLE STARS. [STARS, DOUBLE.]

DOUBLOON. [MONEY.]

DOUBS, a river in the south-eastern part of France, belonging to the system of the Rhône. It rises in the loftiest ridges of the Jura, at the foot of Mont Rixon, near the village of Mouthe, in the department of Doubs, and flows 75 miles north-east through the lake of St. Point and past the town of Pontarlier to the village of Glovilier, near Porentruy, in Switzerland. Here it makes a sudden bend, and re-entering France, flows 20 miles west-by-south to the town of St. Hypolite, where it receives a small tributary, the Desoubre; below St. Hypolite it makes another bend, and flows north and then north-east 15 miles to the village of Audincourt, where it again turns to the west-by-south and west-south-west, and flows 100 miles, past Clerval, Baume-les-Dames, Besançon, which it nearly encircles [BESANÇON], and Dole, to Verdun-sur-Saône, where it joins the Saône. The whole course of the Doubs is about 210 miles. The lower part of its course is in the departments of Jura and Saône et Loire.

The source of the Doubs is copious; it is the outlet of a subterranean reservoir formed by the drainage of a con siderable surface; but the valley through which it flows in the upper part of its course is narrow, and the stream receives few additions until it reaches Audincourt, just below which it receives the Halle. This part of its course is over limestone; and its waters are partially (in one case, below Pontarlier, almost entirely) absorbed by the cavities which occur in the rock. Near the village of Morteau, a few miles below Pontarlier, there is a fall of 90 ft. The river is used for floating timber and rafts below Audincourt, and occasionally above that place; but the floating is subject to obstruction and danger from the rocks which have rolled down from the mountains into the channel of the river. It was formerly navigable for boats only near the mouth and in some other parts; now, by the formation of the canal from the Rhône to the Rhine, it has been rendered navigable to Clerval. Cuts have been made in some of the parts where the river was very winding, in order to shorten the navigation, which may be estimated at from 75 to 80 miles.

The valley of the Doubs is much wider below Clerval than it is above that place; but it is not very wide in any part; and the affluents of the Doubs are of little importance. The principal are the Laudeux, the Loue, 60 miles long, used for floating timber, the Doraine, and the Guiotte, all which enter the Doubs on the left bank.

DOUBS, a department in France, taking its name from the river Doubs, which has its source and a considerable part of its course within its boundaries. It is on the frontier of France, and is bounded on the south-east side and part of the east side by Switzerland; on the remainder of the east side it is bounded by the department of Haut Rhin; on the north by the department of Haute Saône, and on the west by the department of Jura. This department is irregularly shaped: its greatest length is, from north-east near Montbéliard to south-west near the source of the Doubs, 76 miles: its greatest breadth, at right angles to the length, is from near Marnay on the Oignon to Jougne, on the road from Pontarlier to Lausanne, 48 miles: the area is 2111 square miles, being below the average of the French departments, and about equal to the joint areas of the English counties of Wilts and Berks. The population, in 1832, was 265,535, not much more than two-thirds of the average population of the French departments, and rather less than that of the English county of Sussex; the relative population was 126 to a square mile; the average relative population of France being about 160 to a square mile, and that of England 260. The population is very unequally distributed: in the plains it is far above the average of France, but very thin indeed in the mountainous parts. The department is comprehended between 46° 33′ and 47° 33′ N. lat., and between 5° 42′ and 7° 8′ E. long. Besançon, the capital, is 205 miles in a straight line south-east of Paris; or 237 miles by the road through Provins, Troyes, Châtillon-sur-Seine, Dijon, and Dôle.

The south-eastern part of the department is traversed by the ridges of the Jura, which have a general direction north-east and south-west: the summits of Laumont, Chaumont, Mont Dor, and Rissons, are the principal: the last-mentioned is about 2170 feet high, and the highest point in the department. On these summits no vegetation appears; they are composed of bare rocks, covered with snow nearly two-thirds of the year. The slopes of these mountains are rocky, with patches of moss, and straggling thorns and hazels. On the south side the slopes afford good pasturage, and pleasant valleys sheltered by pine forests: in some of the valleys barley and oats are raised, but the temperature is too cold for wheat or rye. The few inhabitants of these highlands preserve the hospitality and simplicity of manners which mark the people of a mountain tract. Between the higher country and the valley of the Doubs is a district of inferior elevation, marked by a milder air and a more productive soil than belong to the district just noticed. Wheat, though in small quantity, is produced; and on some of the more favourable slopes the vine is cultivated; in the woods the oak and the beech replace the pine. Many tracts in this and the more elevated region are marshy, and from them flow the principal streams that water the department. The plain or valley of the Doubs occupies the rest of the department; it is fertile and populous.

The rivers are the Doubs, and its tributaries; and the Oignon, a tributary of the Saône, which, rising in the Vosges, flows south-west into the Saône; it touches the boundary of this department below Villersexel (Haute Saône), and separates it through a considerable part of its course from the department of Haute Saône. The tributaries of the Doubs which are within this department are, the Drujon, which falls into it below Pontarlier, the Desoubre, the Halle, the Laudeux, and the Loue. The Vaux, the Braine, and the Loisou are feeders of the Loue; and the Creuse and the Cusancin are feeders of the Laudeux. There are several lakes, but none of any size except the lake of St. Point, formed by the river Doubs, which is about five miles long and one or two broad.

The canal which unites the navigation of the Rhône with that of the Rhine traverses this department throughout, and consists partly of an artificial channel, partly of that of the river Doubs. The department is ill provided with roads; a road from Paris by Dijon, Besançon, and Pontarlier to Lausanne passes through it: another road from Bâle and Belfort to Dôle and Beaune passes along the valley of the Doubs through Baume les Dames and Besançon: a road from Besançon runs through Quingey to Poligny, in the department of Jura; and another from Pontarlier to Salins and Dôle, both in the department of Jura: another road runs from Besançon to Vesoul, in the department of Haute Saône; and another from Bâle to Clerval, where it falls in with the road from Bâle and Belfort to Besançon. The others are all bye roads.

The mineral treasures of the department are considerable. There were formerly silver mines in Mont Dor, but they are no longer wrought: oxide of iron is procured in abundance; freestone is quarried; and marl, sand proper for making glass, ochre, and a species of inflammable schistus are dug. Peat for fuel is procured in many places. The temperature is variable, and colder than the latitude would give reason to expect: the rains are frequent and heavy, but the climate is not by any means unhealthy. The soil is in different parts composed of sand, clay, or marl, or a combination of these substances. Wheat, rye, mixed corn, maize, hemp, potatoes, pulse, wine, and fruit are produced in the plain; barley, oats, a little flax, and timber in the higher grounds. The agricultural produce, except in barley, and perhaps oats and potatoes, is very far below the average of France. Oats and potatoes form a considerable part of the food of the poorer classes: the Spanish oat is that chiefly cultivated. Agriculture is in a backward state. The quantity of horses and oxen in proportion to the population is very considerable: cattle constitute the wealth of the mountaineer. The artificial grasses are cultivated; trefoil is found to be better suited to the climate than either lucerne or sain-foin. There are extensive common lands, on which cattle are fed. The number of sheep in the department is comparatively very small.

The department is divided into four arrondissemens or sub-prefectures: Montbéliard in the north-east and east, population 55,642; Pontarlier in the south, population 48,977; Besançon in the west, population 96,032; and Baume les Dames, centre and north, population 64,884. These four arrondissemens are subdivided into 27 cantons and 646 communes. The capital, Besançon, on the Doubs, has a population of 24,042 for the town, or 29,167 for the whole commune, and Baume les Dames, also on the Doubs, a population of 2209 for the town, or 2467 for the whole commune. [Baume; Besançon.] Of the other towns we subjoin some account.

Montbéliard is on the little river Halle, just before its junction with the Doubs. It was formerly the capital of a small principality; it is now a thriving and industrious town, the capital of an arrondissement. It is pleasantly situated in the valley which separates the ridges of the Jura from those of the Vosges, and is surrounded by vineyards. It is well built, and adorned by several fountains. An antient castle, once the residence of the princes of Montbéliard, and in which the archives of their principality are still preserved, commands the town: it now serves as a prison and a barrack for the gendarmerie. The market-house (*bâtiment des halles*) and the church of St. Nicholas, which has a roof 85 feet long by 53 broad without pillars to sustain it, are the buildings most worthy of notice. The inhabitants amounted, in 1832, to 4671 for the town, or 4767 for the whole commune: they manufacture watch movements, watchmakers' files, cotton yarn, hosiery, woollen cloths, kerseymeres, and leather: they carry on a considerable trade with Switzerland. The arrondissement of Montbéliard is distinguished by the prevalence of manufactures similar to those carried on in the town itself, with the addition of saw manufactories, glass-houses, paper-mills, and oil-mills. The number of tan-yards is great in every part of the department, but especially in this arrondissement.

Pontarlier is on the Doubs, in the upper part of its course, 36 miles south-south-east of Besançon, by the road through Ornans. It is near a natural pass from France into Switzerland, known to the antients, and defended by a fort (the Fort of Joux) on the pyramidal summit of Mont Joux. This fort of Joux was the place of the confinement and death of Toussaint L'Ouverture, the Haytian chief. Pontarlier has been supposed by D'Anville to be the Ariolica of the Itinerary of Antoninus, the Abiolica of the Theodosian Table; but the soundness of his opinion has been disputed: the most antient records give it the names of Pontalia, Pons Ælii, Pons Arleti, and Pons Ariæ. Until the fourteenth century, there were two adjacent towns, Pontarlier and Morieux, but they now form only one. It has been repeatedly destroyed by fire, the last time in 1754. It is well built, and is surrounded by an antient wall, but not fortified. There are a library, a high school, a custom-house, and a fine range of barracks for cavalry. The population has, from the increase of trade, doubled in the last forty years: the inhabitants, in 1832, amounted to 4248 for the town, or 4707 for the whole commune: they manufacture steel, bar iron, iron and steel goods of various kinds (among them are cannon, nails, steel wire, and watch and clock movements), porcelain, and calicoes: there is a copper foundery, at which are made church bells and cylinders for printing calicoes: there are also tan-yards and paper-mills. A great quantity of extract of wormwood is made here every year. Among the natives of Pontarlier was General d'Arçon, the contriver of the floating batteries at the siege of Gibraltar, in 1782. [ARÇON.] The neighbourhood of Pontarlier produces excellent cheese.

Ornans is seventeen miles from Besançon, in the arrondissement of Besançon, on the road to Pontarlier. It is walled: near the walls are the remains of an antient castle: there are a fine hospital and a public library. The inhabitants in 1832 amounted to 2858 for the town, or 2982 for the whole commune: they manufacture a considerable quantity of leather, some paper, cheese, and extract of wormwood. Immediately round the town cherries are cultivated in great quantity; and an excellent kirschwasser is prepared from them. The neighbourhood of Ornans abounds with natural curiosities; as the grottos of Baumarchais, Bonnevaux, Mouthier, and Châteauvieux, the cascades of Mouthier, and the well of Breme, which, when the rivers overflow their banks, is filled with a muddy water that rises in it, flows over the top, and inundates the valley in which the well is situated: on these occasions it throws up a number of fishes.

Beside the foregoing, there are in the arrondissement of Montbéliard the towns of Blamont, near the Doubs, and St. Hypolite, or Hippolyte, on that river. Blamont is a fortified town, but is very small. The inhabitants manufactured, at the commencement of the present century, fire-arms, cannon, iron wire, and paper: we have no later account. At St. Hypolite hard-wares are made and cheese. There are many iron factories in the neighbourhood. The town is in a valley, immediately surrounded with vine-covered hills, backed by mountains covered with wood. Near St. Hypolite is a curious cavern, between eighty and ninety feet high, which penetrates horizontally the perpendicular face of a rock: the name of the cavern, 'Le Château de la Roche,' is derived from an antient castle at the entrance, which was ruined in the religious wars of the sixteenth century; the ruins still remain. Audincourt, a village on the Doubs, has a population of 1000: the inhabitants manufacture iron goods and cotton yarn. Mandeure, another village in the arrondissement, is on the site of a Roman town, Epamanduorum. There are the remains of an amphitheatre, and medals and other antiquities have been dug up. At the village of Herimoncourt are manufactured wooden screws, and clock and watch movements: wooden screws are made at Dampierre.

In the arrondissement of Baume les Dames are the towns of Clerval on the Doubs, Rougemont, and Passavant. The inhabitants of Rougemont are engaged in the manufacture of iron goods: at Clerval, the Doubs, by the junction of the Rhône and Rhine Canal, becomes navigable. In the arrondissement of Besançon are the towns of Quingey and Villafans. Quingey is a town of less than 1000 inhabitants, who are engaged in the manufacture of iron goods. There is an antient castle, once the residence of the counts of Bourgogne; and near the town is a cavern, adorned with a variety of congelations. Near Boussière, which is not far from Quingey, is a remarkable cavern, consisting of a suite of apartments, extending above half a mile in length.

In the arrondissement of Pontarlier are the towns of Rochejean and Morteau on the Doubs, La Rivière on the Drujon, and Jougne on the border of Switzerland. At Rochejean are smelting houses for pig iron and cast iron, tan yards, and a saw yard; and at La Rivière are a saw yard and a linseed-oil mill. At the village of Levier, and in the neighbourhood, a good deal of cheese is made: near the village is a pit, the depth of which is unknown; it appears to consist of a succession of caverns on differen levels: it is used as a receptacle for the carcases of animal and other refuse. Two dogs which had by accident fallen into one of the caverns lived for a long time on the bodies thus disposed of, and brought forth young before they were discovered and rescued. The village of Mont Benoit (Benedict), on the Doubs, has a handsome Gothic church, formerly the conventual church of a considerable abbey which existed here. The neighbouring village of Remonnot has for its church a remarkable cave.

The department of Doubs sends four members to the Chamber of Deputies; it forms, with the department of Haute Saône, the diocese of the archbishop of Besançon. It is in the jurisdiction of the Cour Royale, or Supreme Court of Besançon, and in the sixth military division, of which the head-quarters are at Besançon. Education is more general in this department than in almost any other in France: there is one boy at school for every eleven persons.

The inhabitants of the mountains are tall, robust, and healthy; sober, economical, gentle, willing to oblige, hospitable, and true to their word, but untaught and credulous: those of the plain are neither so robust, nor temperate, nor obliging. This department is part of the former county of Bourgogne, or Franche Comté. (*Dictionnaire Universel de la France;* Malte Brun; Dupin, *Forces Productives de la France; Dictionnaire Géographique Universel.*)

DOUCHE. [BATHING.]

DOUCKER. [DIVERS.]

DOUGLAS FAMILY. This family derives its name from certain lands on the Douglas or Black water, in the shire of Lanark, which were granted out about the middle of the twelfth century by Arnold, Abbot of Kelso, to one Theobald, a Fleming, whose son was thence called William de Douglas.

William married a sister of Friskin de Kerdal, in the province of Moray, and had several children, all of whom, except the eldest, settled in the north. Brice, the second son, became bishop of Moray; Alexander, the third son, became sheriff of Elgin; and their sister, Margaret, married Hervey de Keith, great mareschal of the kingdom.

Archenbald, the eldest son, married one of the daughters and co-heiresses of Sir John de Crawford, of Crawford, and had two sons, William and Andrew, each of whom had two sons likewise. William's eldest son married a sister of Lord Abernethy, but dying without issue, was succeeded by his brother, some time governor of the castle of Berwick. Andrew's eldest son married the only daughter of Alexander, lord high steward of Scotland, and had two sons, the eldest of whom was Sir James Douglas of Loudon, so called to distinguish him from his cousin, 'the good Sir James,' one of the chief associates of Bruce in achieving the independence of his country. He was made a knight banneret under the royal standard at Bannockburn, where he commanded the centre division of the Scottish van. He died in a contest with the Saracens when, in fulfilment of the trust committed to him, he was on his way to deposit the heart of Bruce in the Holy Land.

William de Douglas, some time governor of Edinburgh Castle, was a natural son of Sir James of Loudon, whose eldest lawful son, also William de Douglas, had the earldom of Athol conferred upon him on the death of John Campbell without issue; but he soon afterwards resigned the title, and gave a charter of the earldom to Robert, lord high steward of Scotland. This William de Douglas was lord of Liddisdale, and though himself 'the flower of chivalry,' as he was called, is to be particularly distinguished from Sir William Douglas, the knight of Liddisdale, natural son of the good Sir James. The knight of Liddisdale long merited the eulogy which Fordun gives him, of being 'England's scourge and Scotland's bulwark;' but the praise of patriotism, and even of humanity itself, he outlived; for being hurt at Ramsay of Dalwolsey's appointment to the sheriffship of Roxburgh, he waited his opportunity, and came upon the brave and virtuous Ramsay with an armed band, wounded him, and dragged him away to Hermitage castle. There Douglas immured his unoffending victim, faint with thirst, and with his rankling wounds, till, after a period of seventeen days' suffering, death at length terminated his existence. The government of the country was in such a state at the time, that the king not only could not avenge the outrage, but was obliged to pardon the relentless murderer, and moreover to put him into the vacant sheriffship. He at last died by the hand of an assassin of the house of Douglas.

The good Sir James had another natural son, whom we shall mention presently, but having no lawful issue, he was succeeded by his brothers, Hugh and Archibald, the latter of whom married the daughter of John Cumyn, of Badenoch, by Marjory, sister of John Baliol, king of Scotland, and had two sons, the younger of whom, William, inherited the family estates, and became earl of Douglas, in which character we find him lord justiciar of Lothian the year in which King Robert II. ascended the throne. He was thrice married. He married first a daughter of the twelfth earl of Mar, and in her right was styled earl of Douglas and Mar. His son James, second earl of Douglas and Mar, married Margaret, eldest daughter of King Robert II., but leaving no surviving male issue, the earldom of Mar devolved on his sister, and the earldom of Douglas on Archibald Douglas, the natural son of the good Sir James above alluded to, by special settlement. This Archibald, third earl of Douglas, styled from his great prowess 'Archibald the Grim,' had himself a natural son, who married a daughter of King Robert II.

William, the first earl of Douglas, had no children by his second marriage. By his third marriage, which was with the Lady Margaret, sister and heir of the third earl of Angus, he had a son, George, who obtained, on his mother's resignation, a grant of the earldom of Angus. He also got a grant of the sheriffship of Roxburgh, and is found in that office anno 1398. The previous year he married Mary, second daughter of King Robert III.

Sir John Douglas, who gallantly defended the castle of Lochleven against the English in the minority of David II., was a younger brother of William, lord of Liddisdale, above mentioned. He had several children, three of whom only however we shall here notice, James, Henry, and John. The last of these married Mariota, daughter of Reginald de Cheyne, co-justiciar of Scotland beyond the Grampians, with John de Vaux. Sir Henry married a niece of King Robert II., and by her had a son, who married a granddaughter of the same king. Sir James, the eldest, succeeded his uncle, the lord of Liddisdale, in the lordship of Dalkeith and his other extensive possessions. He was twice married, his second wife being a sister of King Robert II. His eldest son, by his first marriage, married a daughter of King Robert III., and had a grandson, who married Johanna, daughter of King James I., and relict of James, third earl of Angus, and was on the 14th March, 1457-8, created earl of Morton.

We have thus three earls of the House of Douglas: the earl of Douglas, the earl of Angus, and the earl of Morton.

Archibald IV., earl of Douglas, eldest son of Archibald the Grim, married the eldest daughter of king Robert III., and by her had a son of the same name, who in the lifetime of his father was styled earl of Wigton. On the death of King James I. he was chosen one of the council of regency, and the next year made lieutenant-general of the realm. His two sons, particularly William, the young earl of Douglas, despising the authority of an infant prince, and encouraged by the divisions which arose among the nobility, erected a sort of independent power within the kingdom, and forbidding the vassals of the house to acknowledge any other authority, created knights, appointed a privy council, and assumed all the exteriors of royalty. They were both at length however beheaded, and the earldom of Douglas passed to a grand-uncle whose eldest son married his cousin, the fair maid of Galloway, and restored the house to its former splendour. He became lieutenant-general of the kingdom, and no less formidable to the crown than the last in his family who held that high office. But this power proved his ruin, and dying without issue, he was succeeded by his brother, in whom this great branch of the house of Douglas was cut down and overthrown for treason.

Archibald V., earl of Angus, great-grandson of William, first earl of Douglas, through George, who obtained the earldom of Angus on his mother's resignation as above mentioned, was some time warden of the East Marches, and on the death of Argyle was made lord high chancellor of the kingdom, and so continued till 1498, when he resigned. He was commonly called 'the Great Earl of Angus;' and, according to the historian of his house, was 'a man every way accomplished both for mind and body.' Gawin, bishop of Dunkeld, the translator of Virgil, was his third son by his first marriage, which was with a daughter of the lord high chamberlain of Scotland. The bishop's two elder brothers, George, master of Angus, and Sir William Douglas of Glenbervie, fell on the fatal field of Flodden; and their father, the old earl, who had in vain dissuaded the king from the ruinous enterprize, bending under the calamity, retired into Galloway, and soon after died. Sir Archibald Douglas of Kilspindie, the earl's son by a second marriage, was made lord treasurer of Scotland towards the end of the year 1526, by king James V., who used to style him his 'Grey Steil;' and the next year we find Archibald VI., earl of Angus, eldest son of the deceased George, master of Angus, lord high chancellor of the kingdom. This Archibald, the sixth earl of Angus, married Margaret of England, queen dowager of James IV., and had by her a daughter, who became the mother of Henry, lord Darnley, husband of Mary queen of Scots, and father of James I. of England. His brother, Sir George, was forfeited on his fall, and spent the remainder of James's reign in exile in England; and their sister Jean was burnt as a witch on the castle hill of Edinburgh. The son of Sir George succeeded his uncle as seventh earl of Angus; and on the death of his son, the eighth earl, commonly called 'the Good Earl of Angus,' without male issue, Sir William Douglas of Glenbervie, great-grandson of Archibald the great earl, succeeded to the earldom, and had soon afterwards a charter from king James V., confirming all the antient privileges of the Douglas, namely, to have the first vote in council, to be the king's lieutenant, to lead the van of the army in the day of battle, and to carry the crown at coronations.

The seventh earl of Angus had a younger brother, who became fourth earl of Morton, and was the famous Regent Morton. He was condemned to death for the murder of Darnley, and was executed by the *maiden*, an instrument which he himself introduced into Scotland.

Sir William Douglas of Glenbervie above mentioned conveyed the lands of Glenbervie to a younger son. His eldest son became tenth earl of Angus; and the son of the latter was in 1633 created marquis of Douglas, the same year in which another branch of the Douglas family was advanced to be earl of Queensberry. Archibald, eldest son of the first marquis of Douglas, officiated as lord high chamberlain at the coronation of king Charles II., and was thereupon created earl of Ormond. His younger brother William had been some years before created earl of Selkirk; but marrying afterwards Anne, duchess of Hamilton, he was on her grace's petition created duke of Hamilton for life, and a new patent of the earldom of Selkirk issued in favour of his younger sons, two of whom were themselves also elevated to the peerage. The third marquis of Douglas was advanced to be duke of Douglas; but on his death the dukedom became extinct, and the marquisate devolved on the seventh duke of Hamilton. His grace was one of the party to the great 'Douglas cause,' the subject of which was the Douglas estates; but these were ultimately awarded to his opponent, who becoming entitled to the estates, assumed the name and arms of Douglas, and in 1790 was raised to the peerage as baron Douglas of Douglas castle, in the shire of Lanark.

The year following, George, 16th earl of Morton, was enrolled among the peers of Great Britain as baron Douglas of Lochleven. The third earl of Queensberry had previously been raised to a marquisate and dukedom; and the fourth duke of Queensberry, who was also third earl of March, made a peer of England by the title of baron Douglas of Amesbury; but on the death of his grace in 1810, the English barony, conferred upon himself, and the earldom of March, conferred upon his grandfather, expired; while the dukedom devolved on the duke of Buccleuch, and the original peerage descended to the present marquis of Queensberry.

DOUGLAS, GAWIN, was born in the year 1474 or 1475, and was the third son of Archibald, sixth earl of Angus, surnamed Bell-the-Cat. (Scott's *Marmion*, canto vi., st. xi.) Being intended for the church, he received the best education which Scotland and France could give. He obtained successively the provostship of the collegiate church of St. Giles's, Edinburgh, and the rectorship of Heriot church. He was then made abbot of Aberbrothick, and lastly, bishop of Dunkeld, but his elevation to the archbishoprick of St. Andrews was prevented by the pope. In 1513 some political intrigues compelled him to retire to England, where he was favourably received by Henry VIII. He died of the plague in 1521 or 1522, at the Savoy, where he had resided during the whole of his stay.

In his early years he translated Ovid's 'Art of Love,' and composed two allegorical poems, 'King Hart' and 'the Palace of Honour:' but he is best and most deservedly known by his translation of Virgil's 'Æneid,' which, with the thirteenth book by Mapheus Vegius, was produced in 1513. To each book is prefixed an original prologue, some of which give lively and simple descriptions of scenery, written in a manner which proves their author to have been possessed of considerable poetical power.

At the end of the work (p. 380, ed. of 1553), he informs us that 'compilet was this work Virgilean' 'in eighteen moneths space,' for two months whereof he 'wrote never one word.' He is also solicitous that his readers should

> —— 'read leal, and take good tent in time
> They neither maul nor mismetre his rhyme;'

which reminds us of Chaucer's address to his book—

> 'So pray I God that none miswrite thee,
> Nor thee mismetre for default of tongue.'

Those who take the trouble to examine Douglas for themselves, will find his language not near so different from our own as might be imagined from a cursory glance at the pages. The chief difference consists in the spelling and the accent, which we may suppose to have borne, as in Chaucer, a considerable resemblance to the present pronunciation of French; at least without some such supposition it will be found impossible to scan either. (Warton's *Hist. Engl. Poetry* (who gives copious extracts), and *Biog. Brit.*, art. 'Douglas.')

DOUGLAS. [Man, Isle of.]

DOUR. [Hainault.]

DOURA, or **DURRA.** [Sorghum vulgare.]

DOURO in Portuguese, Duero in Spanish, one of the principal rivers of the Peninsula, rises in the Sierra de Urbion in the north part of the province of Soria in Old Castile. It first flows southwards, passing by the town of Soria, then turns to the west, through the provinces of Burgos, Valladolid, and Zamora, and receives numerous affluents both from the north and the south, the principal of which are, 1. the Pisuerga, which rises in the Asturian mountains, and after receiving the Alanzon from Burgos and the Carrion from Palencia, passes by Valladolid, and enters the Douro above Tordesillas; 2. the Seguillo, also from the north, passes by Medina del Rio Seco, and joins the Douro above Zamora; 3. the Esla, a large stream, comes from the mountains of Leon, and enters the Douro below Zamora. After receiving the Esla, the Douro reaches the frontiers of Portugal, where it turns to the south, and for about fifty miles marks the boundary between the province of Salamanca in Spain, and that of Tras os Montes in Portugal. In this part of its course it receives first the Tormes, a considerable stream, from the south-east, which rises in the lofty Sierra de Gredos, and passes by Salamanca, and then further south the Agueda, from Ciudad Rodrigo. The Douro then turns again to the west, and crosses the north part of Portugal, marking the limits between the provinces of Tras os Montes and Entre Douro e Minho on its north bank, and the province of Beira on its south bank. The principal affluents of the Douro in Portugal are the Coa from the south, and the Sabor and Tamega from the north. The Douro passes by the towns of Lamego and Oporto, and enters the Atlantic below the latter city, of which it forms the harbour. The whole course of the Douro with its windings is nearly 500 miles, through some of the finest and most fertile regions of Spain and Portugal.

DOUW, GERARD, was born at Leyden in 1613. In 1622 he was put by his father, a glazier, to study drawing under Bartholomew Dolendo, an engraver, with whom he remained eighteen months. He afterwards received the instructions of Peter Kouwhoorn, a painter on glass, and learned his art so well that he proved of great advantage to his father. The latter, however, alarmed at the danger he incurred by mounting to his work at church windows, made him study painting instead, and the illustrious Rembrandt was chosen for the lad's master. From that great painter Gerard learned the mastery of colour and chiaroscuro; but he differed entirely from his teacher in his manner of painting. Instead of growing bolder and rougher in his handling as he grew older, he became more and more delicate in his finish, elaborating everything which he touched with the most exquisite delicacy and minuteness, in so much that the threads of brocades, and of fine carpets are expressed even in his smallest paintings. Nothing escaped his eye nor his pencil. And yet with all his elaboration of detail his pictures are powerful in effect, and harmonious and brilliant in colour He was accustomed to prepare his own tools, that he might have them of the requisite fineness.

Gerard Douw has been charged with excessive slowness in finishing; and some anecdotes are told in proof of it. Sandrart says, that he once visited Gerard's study in company with Bamboccio, and on their both expressing their admiration of a certain miniature broom-handle in one of his pictures, he said, that he should spend three more days upon it, before he left it. It is said that his sitters were so wearied by his dilatoriness, and disgusted by the transcripts of their jaded faces, which he faithfully put upon the canvass, that others were deterred from sitting, and he was obliged to abandon portrait-painting. But Karel de Moor, who had been a pupil of his, averred that he was not so slow as had been asserted; and the number of his pictures tends to corroborate his statement. Douw got excellent prices for his paintings; generally from 600 to 1000 florins and Sandrart informs us that Spierlng, a gentleman of the Hague, paid him an annual salary of 1000 florins, for the mere right of refusal of all the pictures he painted, at the highest price he could obtain. Gerard Douw died in 1680 The most famous among his pupils was Mieris. His pictures are in all great collections. (Argenville; Sandrart.)

DOVE. [Columbidæ.]

DOVEDALE. [Derbyshire.]

DOVER, one of the Cinque Ports, a borough and market-town, having separate jurisdiction, in the eastern divisio of the county of Kent, 16 miles south-east by south fro Canterbury and 72 east-south-east from London. Dover i situated on the coast, at the opening of a deep valley forme by a depression in the chalk hills, which here present a transverse section to the sea. This depression runs into the interior for several miles, and forms the basin of a small stream

Dover was called by the Saxons Dwyr, from dwfyrh (a steep place), or from dwr (water), thre being a smal stream in the valley at the extremity of which Dover stand By the Romans it was called Dubris, whence Dover.

From its proximity to the continent, Dover has for man years been the usual port of embarkation for passenger going both from and to England. [Calais.] In the reign Henry VIII. the emperor Charles V. landed here, an Henry on that occasion contributed a large sum for th erection of a pier, which was subsequently completed the reign of Elizabeth. The castle, which is on the norther side of the town, is supposed to have been originally constructed by the Romans. The southern heights of Dov were originally strongly fortified during the late war, an extend in a semicircle as far as the famous Shakspeare Cliff, so called from the celebrated scene in 'King Lear.'

The boundaries of the present borough, in addition the old borough, include a part of the parish of Bucklan and comprise a population of 15,298 persons; 1651 we registered after the passing of the Reform Act. The b rough sends two members to parliament. It appears fro the Municipal Corporation Report to be doubtful wh ther there are any charters. A court of record is held thr times a week. The general sessions are held three times year before the recorder and other justices. There was hundred court, but it has fallen into disuse. The town consists principally of one street about a mile long, running the direction of the valley. A theatre and assembly-roo were erected in 1790. The town is now considered fashionable watering-place, and possesses every convenienc for sea-bathing. Many handsome houses have recent been built for the accommodation of visitors in the seaso The harbour is not very good, but it can accommodate shi of 500 tons, and is principally used for sailing and steam packets to France. It has now for some years (1837) been undergoing repairs and improvements, but it does not seem probable that it can ever be made a good port. Some corn is ground in the neighbourhood, and exported to London; and there are some paper-mills near the town. The market-days are Wednesday and Saturday. An annual fair is held on the 23rd of November.

There are two churches, St. James's and St. Mary's; the former worth 145*l.*, the latter 287*l.* per annum; as well as a new church, and places of worship for Baptists, Society of Friends, Independents, Wesleyan Methodists, Unitarians, and Roman Catholics. A charity-school for boys and girls was founded in 1789; it has received various donations, and in 1820 a new building, capable of containing 200 boys and 200 girls, was erected. The hospital of St. Mary, afterwards called the Maison-Dieu, was founded in the 13th Henry III. by Hubert de Burgh, earl of Kent and chief justice of England. [CINQUE PORTS.]

DOVETAIL, a term in joinery. A dovetail is the end of a piece of wood fashioned into the fan-like form of a dove's tail, and let into a corresponding hollow of another piece of wood. Dovetails are either exposed or concealed; 'concealed dovetailing is of two kinds, lapped and mitred.' (Nicholson's *Dict.*)

DOVRAFIELD. [NORWAY.]

DOWER (Law) is that part of the husband's lands, tenements, or hereditaments which come to the wife upon his death, not by force of any contract expressed or implied between the parties, but by operation of law, to be completed by an actual assignment of particular portions of the property.

Prior to the reign of Charles II., five, and until the passing of the act 3 & 4 Wm. IV., c. 105, four kinds of dower were known to the English law.

1. Dower at the common law.
2. Dower by custom.
3. Dower ad ostium ecclesiæ.
4. Dower ex assensu patris.
5. Dower de la plus beale.

This last was merely a consequence of tenure by knight's service, and was abolished by stat. 12 Charles II. c. 24; and the 3rd and 4th having long become obsolete, were finally abolished by the above-mentioned statute of Wm. IV.

By the old law, dower attached upon the lands of which the husband was seised at any time during the marriage, and which a child of the husband and wife might by possibility inherit; and they remained liable to dower in the hands of a purchaser, though various ingenious modes of conveyance were contrived, which in some cases prevented the attaching of dower: but this liability was productive of great inconvenience, and frequently of injustice. The law too was inconsistent, for the wife was not dowable out of her husband's equitable estates, although the husband had his courtesy in those to which the wife was equitably entitled. [COURTESY.] To remedy these inconveniences the statute above mentioned was passed, and its objects may be stated to be, 1, to make equitable estates in possession liable to dower; 2, to take away the right to dower out of lands disposed of by the husband absolutely in his life or by will; 3, to enable the husband, by a simple declaration in a deed or will to bar the right to dower.

'The law of dower,' say the Real Property Commissioners, in their Second Report, upon which this statute was founded, 'though well adapted to the state of freehold property which existed at the time when it was established, and during a long time afterwards, had, in consequence of the frequent alienation of property which takes place in modern times, become exceedingly inconvenient.' In short, dower was considered and treated as an incumbrance, and was never, except in cases of inadvertency, suffered to arise. The increase of personal property, and the almost universal custom of securing a provision by settlement, afforded more effectual and convenient means of providing for the wife. Dower at the common law is the only species of dower which affects lands in England generally; dower by custom is only of local application, as dower by the custom of gavelkind and Borough English; and freebench applies exclusively to copyhold lands. The former is treated of in Robinson's 'History of Gavelkind,' the latter in Watkins on 'Copyholds.'

In order to describe dower at the common law clearly, it will be advisable to follow the distribution of the subject made by Blackstone.

1. Who may be endowed.
2. Of what a wife may be endowed.
3. How she shall be endowed.
4. How dower may be barred or prevented.

1. *Who may be endowed.*—Every woman who has attained the age of nine years is entitled to dower by common law, except aliens, and Jewesses, so long as they continue in their religion. And from the disability arising from alienage, a queen, and also an alien licensed by the king, are exempt.

2. *Of what she may be endowed.*—She is now by law entitled to be endowed, that is, to have an estate for life in the third part of the lands and tenements of which the husband was solely seised either in deed or in law, or in which he had a right of entry, at any time during the coverture, of a legal or equitable estate of inheritance in possession, to which the issue of the husband and wife (if any) might by possibility inherit.

3. *How she shall be endowed.*—By Magna Charta it is provided, that the widow shall not pay a fine to the lord for her dower, and that she shall remain in the chief house of her husband for forty days after his death, during which time her dower shall be assigned. The particular lands and hereditaments to be held in dower must be assigned by the heir of the husband, or his guardian, by metes and bounds if divisible, otherwise specially, as of the third presentation to a benefice, &c. If the heir or his guardian do not assign, or assign unfairly, the widow has her remedy at law, and the sheriff is appointed to assign her dower; or by bill in equity, which is now the usual remedy.

4. *How dower may be barred or prevented.*—A woman is barred of her dower by the attainder of her husband for treason, by her own attainder for treason, or felony, by divorce *à vinculo matrimonii*, by elopement from her husband and living with her adulterer, by detaining the title-deeds from the heir at law, until she restores them, by alienation of the lands assigned her for a greater estate than she has in them; and she might also be barred of her dower by levying a fine, or suffering a recovery during her marriage, while those assurances existed. But the most usual means of barring dower are by jointures, made under the provisions of the 27 Hen. VIII., c. 10; and by the act of the husband. Before the stat. 3 & 4 Wm. IV., c. 105, a fine or recovery by the husband and wife was the only mode by which a right to dower which had *already attached* could be barred, though, by means of a simple form of conveyance, a husband might prevent the right to dower from arising at all upon lands purchased by him. By the above-mentioned statute, it is provided that no woman shall be entitled to dower out of any lands absolutely disposed of by her husband either in his life or by will, and that his debts and engagements shall be valid and effectual as against the right of the widow to dower. And further, that any declaration by the husband, either by deed or will, that the dower of his wife shall be subjected to any restrictions, or that she shall not have any dower, shall be effectual. It is also provided that a simple devise of real estate to the wife by the husband shall, unless a contrary intention be expressed, operate in bar of her dower. This statute however affects only marriages contracted, and only deeds, &c., subsequent to 1st January, 1834.

Most of these alterations, as indeed may be said of many others which have recently been made in the English real property law, have for some years been established in the United States of America. An account of the various enactments and provisions in force in the different states respecting dower may be found in 4 Kent's *Commentaries*, p. 34-72. (Bl. *Com.*; Park *on Dower*.)

DOWLETABAD, a strongly fortified town in the province of Aurungabad, seven miles north-west from the city of Aurungabad, in 19° 57′ N. lat., and 75° 25′ E. long. The fort consists of an enormous insulated mass of granite, standing a mile and a half from any hill, and rising to the height of 500 feet. The rock is surrounded by a deep ditch, across which there is but one passage, which will allow no more than two persons to go abreast. The passage into the fort is cut out of the solid rock, and can be entered by only one person at a time in a stooping posture. From this entrance the passage, still cut through the rock and very narrow, winds upwards. In the course of this passage are several doors by which it is obstructed, and the place is altogether so strong, that a very small number of persons within the fort might bid defiance to a numerous army. On the other hand, the fort might be invested by a very inconsiderable force, so as effectually to prevent any supplies being received by the garrison, who, owing to the intricacy of the outlet, could never make an effective sally. The lower part of the rock, to the height of 180 feet from the ditch, is nearly perpendicular, and it would be wholly impracticable to ascend it. The rock is well provided with tanks of water.

Since the seat of government has been transferred to Aurungabad the town of Dowletabad has greatly decayed; only a small portion of it is now inhabited. This place is said to have been the residence of a very powerful rajah in the thirteenth century, when the Mohammedans under Allah ud Deen carried their arms into this part of the Deccan. In 1306 the fort and surrounding country were brought under the dominion of the emperor of Delhi. About the close of the sixteenth century they were taken by Ahmed Nizam Shah of Ahmednuggur, and in 1634, during the reign of Shah Jehan, again came into the possession of the Moguls. Dowletabad has since followed the fate of that part of the Deccan, having been conquered by Nizam ul Mulk, with whose successors, the Nizams of Hyderabad, it has since remained.

DOWN, the fine hair of plants, is a cellular expansion of the cuticle, consisting of attenuated thin semitransparent hairs, either simple or jointed end to end, or even branched, as in the Mullein. When attached to seeds, it enables them to be buoyed up in the air and transported from place to place. When covering the external surface of a plant, it undoubtedly acts as a protection against extremes of temperature, and probably as a means of absorbing moisture from the air.

DOWN, a maritime county of the province of Ulster in Ireland; bounded on the north by an angle of Loch Neagh, the county of Antrim, and the bay of Belfast: on the east and south by the Irish channel; and on the west by the counties of Louth and Armagh, from which it is partly separated by the bay of Carlingford and the river of Newry. The greatest length from Cranfield point on the south-west to Orlock point on the north-east is 51 English miles; greatest breadth from Moyallan on the west to the coast near Ballywalter on the east, 38 miles. The coast line (including Lough Strangford) from Belfast to Newry, exclusive of small irregularities, is about 125 English miles. The area, according to the Ordnance Survey of Ireland, consists of—

	Acres.	Roods.	Poles.
Land	608,415	2	15
Water	3,502	1	14
Total	611,917	3	29

Statute measure, or 956 square statute miles nearly.

Down forms the south-eastern extremity of Ulster. The surface of nearly all the county is undulating; but the only uncultivated district is that occupied by the Mourne mountains and the detached group of Slieve Croob. The mountainous district of Mourne is bounded on the east by the bay of Dundrum and on the west by the bay of Carlingford, and covers an area of nearly 90 square miles. Beginning from the west, the principal elevations are Cleomack, 1257 feet; Tievedockaragh, 1557 feet; Eagle Mountain, 2084 feet, having on the north Rocky Mountain, 1328 feet, and on the south Finlieve, 1888 feet; Slieve Muck North, 2198 feet, from the north-western declivity of which the river Bann takes its rise at an altitude of 1467 feet; Slieve Muck South, 1931 feet: Slieve Bingian, 2449 feet; and north of these Chimney Rock Mountains, 2152 feet; Slieve Bearnagh, 2394 feet; Slieve Corragh, 2512 feet; and Slieve Donard, 2796 feet, the highest ground in the county, which overhangs the sea above Newcastle, a small town situated on the western shore of Dundrum bay. This mountain group contains much fine scenery. Its north-eastern declivities are clothed for several miles with the plantations of Tullymore Park, the splendid residence of the Earl of Roden; its western flanks overhang the beautiful vicinities of Warren's Point and Rosstrevor, and on the narrow strip between its southern declivities and the sea is situated the fine demesne of Mourne Park the residence of the Earl of Kilmorey. The Slieve Croob range covers an area of about ten square miles to the north-east of the Mourne Group. Slieve Croob, the highest elevation of the range, has an altitude of 1755 feet; on its north-eastern declivity the river Lagan rises at an elevation of about 1250 feet above the level of the sea.

The remainder of the county, about 850 square miles is productive, being either under cultivation or serving the purposes of turbary. The numerous hills which diversify the surface are seldom too high for arable cultivation; and the irregularity of the surface facilitates drainage, and likewise affords a shelter, which, from the scarcity of timber in some parts of the county, is of material advantage. A low chain of cultivated eminences, well timbered, and on the northern and western side covered with the demesnes and improvements of a resident gentry, commences east of Dromore, and extends under various names along the valley of the Lagan and the eastern shore of Belfast Loch, as far as Bangor. The only detached eminence of any consequence is the hill of Scrabo at the head of Loch Strangford, 534 feet. This range separates the basin of the Lagan from that of Loch Strangford.

The eastern shore of Belfast Loch has no anchorage for vessels above the third class. There is a small quay for fishing and pleasure-boats at Cultra, a mile below the bathing village of Holywood, where regattas are held. Out of Belfast Loch the first harbour on the coast of Ards is at Bangor, where a pier was built by parliamentary grant in 1757, forming a small harbour in the south-east part of the bay of about 300 ft. square. Fifteen sail of carrying vessels belong to this place, which are chiefly engaged in the export of corn and cattle to the coast of Scotland. Colonel Ward, the proprietor, is engaged in the construction of a pier, which, when completed, will afford fifteen feet at low water within the harbour. The coast here consists of low slate rocks; and there is a difficulty in getting stones of a sufficient size, which has hitherto retarded the completion of this desirable work. East of Bangor is the little harbour of Groomsport or Gregory's Port, where Duke Schomberg landed in 1690. Here is a small quay and about 100 houses, chiefly occupied by fishermen. South-east of Groomsport is Donaghadee, the only place of security for a large vessel from Belfast Loch south to the harbour of Strangford. [DONAGHADEE.] Off Donaghadee lie three islands, called the Copelands, from a family of that name which formerly held the opposite coast. On one of these, called the Cross or Lighthouse Island, there is a lighthouse, which marks the entrance to Belfast Loch from the south. This building, which was erected about 1715, is a square tower, 70 ft. high to the lantern: the walls 7 ft. thick. The mode of lighting practised in 1744, when Harris wrote his 'History of Down,' was by a fire of coals kindled on a grate, which was fixed on an iron spindle rising from the masonry. On a windy night this grate used to consume a ton and a half of coal. This island contains 40 acres; the other two, 295 and 31 acres respectively. The sound between Big Island, which lies nearest the land, and the shore of Down, is about a mile and a quarter in breadth. It has from 7 to 8 fathoms of water; but the side next the mainland is foul; and a rock, half a mile from the shore, called the *Deputy*, which has but 10 ft. of water at low ebb, renders the navigation difficult in hazy weather.

From Donaghadee south the coast is low, rocky, and dangerous. The rock of Sculmartin, covered at half-flood, and the North and South Rocks, the former never covered, the latter at every half tide, lie farthest off shore, and are most in the way of vessels coming up channel. The lighthouse of Kilwarlin was erected on the South Rock in 1797, and has since proved highly serviceable to all traders in the channel. At Ballywalter, Ballyhalbert, Cloghy, and Newcastle, in Quintin Bay, all situated on the eastern shore of Ards, are fishing stations. The first is very capable of improvement as a harbour, and there is a small quay for the supply of the Kilwarlin Lighthouse at the latter; but no shelter in any of them for vessels of more than 30 tons.

South from Newcastle is Tara Bay, much frequented by fishing-vessels, and capable of great improvement. The estimated expense of a breakwater pier, which would convert it into an excellent tide harbour, is 3306*l*. The peninsula of Ards runs out at Ballyquintin to a low rocky point south of Tara Bay. A rock, called the Bar Pladdy, having 11 ft. water at spring ebbs, lies immediately off Quintin Point; and the entrance to Strangford Loch is erroneously laid down in Mackenzie's Map as lying through the narrow intermediate channel called Nelson's Gut. Several shipwrecks have occurred in consequence. The true entrance to Strangford Loch lies west of the Bar Pladdy, between it and Killard Point, on the opposite side. The entrance is a narrow channel of about 5 miles in length by an average breadth of less than a mile. Within, the loch of Strangford expands into a very extensive sheet of water, extending northwards to Newtownards, and nearly insulating the district between it and the sea. The tide of so large a sheet of water making its way to and from the sea, causes a great current in the narrow connecting strait at every ebb and flow, and renders the navigation at such times very difficult. Across this strait is a ferry, which gives name to the town of Portaferry at the eastern or Ards side of the entrance. The town of Strangford, which lies opposite, is supposed to derive its name from the strength of the tide race between. The true channel, at the narrowest part of the strait, is little more than a quarter of a mile across, being contracted by rocks, one of which, called the Ranting Wheel, causes a whirlpool dangerous to small craft. There is another but less dangerous eddy of the same kind at the opposite side. Within the entrance there are several good anchorages, and landing-quays at Strangford, Portaferry, Killileagh, the quay of Downpatrick, and Kirkcubbin. Killileagh quay was built by parliamentary grant in 1765, and cost 1200*l.*, but is now much gone to decay. Strangford Loch contains a great number of islands, many of which are pasturable, and great numbers of rabbits are bred in them. From Killard Point the coast bears south-west, and is rocky and foul as far as Ardglass, where there is a pretty good harbour, safe for small vessels, by which it is much frequented, but exposed to a heavy ground swell in south-easterly gales. A pier was built here about 1819 at the joint expense of the old fishery board and the proprietor, Mr. Ogilvie. There is a small lighthouse at the extremity of this pier. Ardglass is a principal place of resort for the fishing fleets which frequent the channel. Immediately west of Ardglass lies the harbour of Killough, between Ringford Point on the east and St. John's Point on the west. A natural breakwater, easily improvable, extends between these points, and gives a pretty secure anchorage for large vessels within. There is an inner harbour for small craft, dry at ebb, with a quay, built about the beginning of the last century.

West of St. John's Point opens the great bay of Dundrum, which extends from this point on the east to the coast of Mourne on the west, a distance of about four leagues by a league in depth, running north by west. This bay is exposed, shallow, and full of quicksands, and so situated that, till the erection of the present pier, which forms a small asylum harbour at Newcastle, a well-frequented bathing-place on the south-western side of the bay, vessels embayed here with an east or south-east wind inevitably went on shore. From an inspection of the books of the resident revenue officer stationed at Newcastle, it has been ascertained that from 1783 to 1835, 58 vessels, valued at 209,050*l.*, have been wrecked in Dundrum Bay. The pier of Newcastle was erected at the joint expense of the old fishery board and the proprietor, Earl Annesley: the cost was 3,600*l.* It is highly serviceable as a station for the fishing-boats of the coast, and has been the means of saving four vessels within the last three years.

From Newcastle south to Cranfield Point the coast of Mourne possesses only three small boat harbours, the principal of which is at Derryogua, where there is a fishing station. On this part of the coast, near Kilkeel, is a lighthouse, 120 feet high. Between Cranfield Point on the east, and the extremity of the barony of Dundalk, in the county of Louth, on the west, is the entrance to the extensive harbour of Carlingford. This loch is about eight miles long by a mile and a half broad, and has steep mountains to the east and west along each side. From Narrow Water, where it contracts to the width of a river, the tide flows up to Newry, whence there is a canal communication with the Upper Bann river, which flows into Loch Neagh. There are numerous rocks and shoals at the entrance, where a new lighthouse is about being erected, and a bar all across, on which there are but eight feet of water at ebb tides. The middle part of the loch is deep, but exposed to heavy squalls from the mountains. The best anchorages are off Carlingford, on the south side, and opposite Warren's Point, and Rosstrevor, in the county of Down. There are two great beds of oysters in this loch, one off Rosstrevor Quay, two and a half miles long by half a mile broad; the other off Killowen Point, one mile long by half a mile broad. The marquis of Anglesey is the proprietor. The fishery is open to all persons paying 5*s.* yearly. About 1000*l.* worth of oysters are taken annually: they sell in Warren's Point at 7*s.* to 15*s.* per thousand, and are celebrated throughout Ireland for their excellent flavour. It has been proposed to carry the Newry canal, which terminates at Fathom, at the head of the bay, forward to the deep water off Warren's Point, where it is intended that it should terminate with a ship lock and floating basin. Warren's Point has a good quay, from which steamers sail regularly for Liverpool: most of the exports of Newry are shipped here from the small craft that bring them down the canal. The scenery on both sides of Carlingford Loch is of striking beauty.

With the exception of the Upper Bann, all the rivers of Down discharge their water into the Irish channel. The navigable river Lagan, which, throughout near half of its course, has a direction nearly parallel to the Bann, turns eastward at Magheralin, four miles north-east of which it becomes the county boundary, and passing by Lisburn, falls into the bay of Belfast, after a course of about thirty miles. The Ballynahinch or Annacloy river brings down the waters of several small lakes south-east of Hillsborough, and widens into the Quoile river, which is navigable for vessels of 200 tons a mile below Downpatrick, where it forms an extensive arm of Strangford Loch. The Quoile is covered with numerous islands, and its windings present much beautiful scenery. The Newry river rises near Rathfriland, and flowing westward by the northern declivities of the Mourne range, turns south a little above Newry, and after a short course falls into the head of Carlingford Loch. Numerous streams descend from the district of Mourne immediately to the sea, and there is no part of the county deficient in a good supply of running water.

The Lagan navigation, connecting Loch Neagh with Belfast Loch, gives a line of water communication to the entire northern boundary of the county; and the Newry Canal, connecting the navigable river Bann with the bay of Carlingford, affords a like facility to the western district, so that, with the exception of about ten miles between the Bann and the termination of the Lagan navigation, the entire county boundary is formed either by the coast line or by lines of water carriage. The Lagan navigation was commenced in 1755, and cost upwards of 100,000*l.*, but owing to mismanagement and the difficulties of keeping a rapid river navigation in repair, it has not proved a profitable speculation. The summit level, towards Loch Neagh, is 112 feet above the level of the sea.

The Newry Canal admits vessels of 50 tons through the heart of Ulster. It was commenced in 1730, by commissioners appointed under an Act of the Irish Parliament, passed in the 3rd of George II., and was wholly constructed by government. The original object was chiefly to afford a water carriage for the coals of Tyrone district to Dublin. The canal lies partly in the county of Down and partly in Armagh; it extends, from its junction with the Bann river near Guilford, to Fathom, on the bay of Carlingford, about 14 Irish or 17¾ English miles, having its summit level 77 feet above the sea. The average breadth of the canal at top is 40 feet: the locks are 15 in number, and 22 feet in the clear. The canal was opened in 1741, but being among the first works of the kind attempted in Ireland it required numerous repairs, and has not yet made any considerable return for the original outlay. From the year 1802 to the year 1817, the total amount of toll received was 27,838*l.* 13*s.* 6½*d.*, and the total expenditure was 70,495*l.* 18*s.* 8½*d.*, and for the succeeding ten years the gross receipts were 25,461*l.* 19*s.* 6*d.*, and the gross expenditure 16,897*l.* 14*s.* 7½*d.* This navigation was vested in the directors-general of Ireland navigation down to 1827. It is now under the control of the Board of Works.

Down is well supplied with roads. The great northern road from Belfast to Dublin passes through the county from north to south, by Hillsborough, Dromore, Banbridge, Loughbrickland, and Newry: this is the only turnpike road in Down. The other chief lines are from Belfast to Donaghadee by Newtownards; from Belfast to Downpatrick by Ballynahinch; and from Downpatrick to Newry by Castlewellan and Rathfriland. The roads in general are hilly, but well constructed, and kept in excellent repair by the grand jury. The Ulster Railroad, from Belfast to Armagh, will pass through parts of the parishes of Moira and Shankill in this county. The entire length, when completed, will be 36 miles and 291 yards. A railroad has been projected from Belfast to Holywood, a bathing-place much resorted to by the citizens of Belfast in summer

The vicinity of the sea prevents the continuance of frosts on the east and south; and the insulated position of the mountainous tract confines the heavier mists and rains to that part of the county where their effects are least felt. The general inequality of the ground carries off surface waters and prevents damps, so that the climate, although somewhat cold, is considered very wholesome. The prevailing winds in spring are from the east: westerly winds, although more frequent than from any other point, have not so great a prevalence as in the neighbouring counties. Larch timber thrives on very exposed situations on the Mourne mountains.

The chief geological features are strongly marked. The Mourne and Slieve Croob groups consist of granite. The boundary of this primitive district begins from the east at Dundrum, whence passing northward to Slieve Croob, it runs nearly due west, including the lordship of Newry, and passes into the adjoining counties of Armagh and Louth. This mass of granite reappears in Cavan, and probably is the same which rises on the opposite side of the island in the mountains of Sligo. Northward and eastward of the granite district the whole of the remainder of the county is occupied by an extension of the transition series which forms the southern basin of Loch Neagh. Clay slate in greater or less degrees of induration is the prevalent rock. Towards the sea on the north-east and east slate quarries are common. On the Antrim boundary near Moira an extension of the tertiary limestone formation which occurs throughout the basaltic district occupies a small portion of this county, and affords a most valuable supply of lime manure to the north-western baronies. Limestone boulders are found along the eastern shore of the Bay of Belfast; and at Carthespil, near Comber, on the western side of Strangford loch, there is a quarry of reddish granular limestone. Great quantities of marl are raised in the neighbourhood of Downpatrick. The junction of the greywacke and granite may be observed along the eastern branch of the river Lagan, where it rises on Slieve Croob.

Copper ore has been found in the mountains about five miles north-east of Rosstrevor; also near Portaferry, and at Clonligg, between Newtownards and Bangor. At the latter place is a lead-mine which has been worked with moderate success at various times. Lead ore occurs on the estate of Ballyleady, in the same neighbourhood, and on that of Bryansford, near Newcastle; also at Killough, and near Portaferry. A lead-mine has likewise been worked in the Blundel estate, half a mile from Dundrum. Indications of coal have been observed in the north-east of the county, and ochreous earths have been found in various places; but hitherto without leading to any practical result.

Chalybeate spas occur at Newry, Dromore, Magheralin, near Donaghadee and Rathfriland, and at various places in the barony of Ards. A chalybeate strongly impregnated with sulphur and nitre rises about two miles north-west of Ballynahinch, on the declivity of Slieve Croob mountain, which has been found very efficacious in scorbutic cases: the village of Ballynahinch has become a rather fashionable resort during the summer months in consequence.

The prevalent soil in the low district is a stony loam formed by the decomposition of the schistose rock. Clayey soils are confined to the north-east of the county and the barony of Ards, and are of a strong and productive quality, but they are wet and require a large quantity of manure. The richest soil in the county is in the district of Lecale, and a small tract of loam incumbent on limestone gravel in the neighbourhood of Moira and Magheralin: the timber here is of larger growth than elsewhere in Down. Alluvial tracts are frequent, and yield luxuriant crops of grass without manure. The bogs in general are not larger than is advantageous for purposes of turbary. Moory land is confined to the mountain district: the soil is here light and gravelly; but with proper cultivation, as in the vicinity of Newry and of Castlewellan, can be made to yield good crops of oats and barley. Considerable quantities of wheat are raised throughout the county, but chiefly along both shores of Strangford Loch; oats and barley are the chief produce of the south and centre of the county. Numerous resident nobility and gentry set an example of the best modes of cultivation; and several farming societies encourage competition among the landowners by annual ploughing matches and cattle-shows. The contrast between the slovenly farming of Meath and the workmanlike manner in which the land is fenced and laid down in this county strikes an observer travelling from Dublin to Belfast very forcibly. The system of green crops and stall feeding is now being pursued by most of the gentlemen-farmers; but has not yet become general among the ordinary landowners. Fences on the Antrim boundary and along the line of the Dublin road are of quickthorn; clay banks and dry stone walls are most common in the other parts of the county.

Large quantities of sea-weed are used as manure along the north-east and eastern coast. The distance of limestone quarries renders lime manure very expensive throughout the central baronies; but in the south and south-east there is an abundant supply of marl in the barony of Lecale. This valuable substance is found in morasses and alluvial tracts at the bottoms of hills, and consists entirely of marine exuviæ: the bed of marl is sometimes five feet in thickness. It was first brought into use in 1707, before which time the neighbouring country was only moderately fertile in oats and barley: but with a judicious use of this manure it now yields excellent crops of wheat. The immediate advance on the value of land which followed its introduction was four-fold, and a corn trade was opened from Strangford in consequence. The eagerness, however, with which this manure was applied led to the bad consequences which always attend strong manuring and over cropping; and it is said that so late as 1804 some of these lands had not yet recovered. The annual agricultural produce of Down has been valued at 1,396,000*l.*; the rental of proprietors at 172,329*l.* per annum, and the rent to occupiers of land, at 22*s.* per acre.

The following table exhibits the quantities of wheat, &c., sold at the principal grain markets of Down in the years 1834-5. The market of Newry is supplied from Armagh and other counties, as well as from Down; and large quantities of the produce of Down are disposed of at Belfast.

	Wheat. tons.	Oats tons.	Barley. tons.	Rye. tons.	Bere. tons.	Whether general grain market increasing or decreasing.
Downpatrick	3,200	380	2,400	200	450	Increasing.
Portaferry .	1,600	244	1,600	...	...	ditto
Strangford .	570	195	800	...	...	Decreasing.
Ardglass . .	400	390	400	...	...	ditto
Killough . .	1,600	200	1,000	...	...	Increasing.
Ballynahinch	3	1,700	7	4	...	Decreasing.
Killileagh .	1,900	900	140	...	...	Increasing.
Banbridge . .	1,330	...	...	...	...	ditto
Moira . . .	214	90	...	...	...	Decreasing.
Dromore . .	...	...	...	...	...	No return for 1835.
Newtownards.	1,000	700	800	...	...	Increasing.
Newry . . .	7,710	23,850	3,610	...	...	ditto

Down is not a grazing county, nor are there any sheep farms; but great numbers of pigs are reared for the provision markets of Newry and Belfast. The general condition of the people is much superior to that of the peasantry of the southern counties. Wages of labourers are 10*d.* per day in winter, and 1*s.* during the rest of the year: the average number of days' work obtained in agriculture each year is 160. The resident nobility and gentry are more numerous in proportion to the extent of the county than in any other part of Ulster. Among the principal may be mentioned the marquisses of Downshire and Donegal, and during a part of each year the marquis of Londonderry and Lord Clanwilliam, the earl of Roden, Earl Annesley, Lord Dufferin and Claneboy, Lord Bangor, Sir Robert Bateson, Mr. Ker, Colonel Forde, Mr. Sharman Crawford, &c., with incomes varying from 8000*l.* to 60,000*l.* per annum. The yeomanry of the county are an intelligent class. Blue cloth is the usual dress of the better class of the peasantry, and the loose frieze coat so common in Louth and the borders of Armagh is rarely seen here. The provisions of the lighting and paving act have been put in force in Newry and Downpatrick, and Banbridge, and are about being extended to Dromore.

Down contains seven baronies, and part of the lordship of Newry; the remainder of this division lying in Armagh. The baronies are—Ards, on the east and north-east, between Loch Strangford and the sea, containing part of the town of Newtownards, total population (in 1831) 4442; and the towns of Portaferry, population 2203; Bangor, population 2741; Donaghadee, population 2986; Ballywalter, population 664; and Kirkcubbin, population 537; Castlereagh, on the north-east and north, between Loch Strangford and the county of Antrim, containing the towns of Ballymacarratt (the eastern suburb of Belfast), population 5168;

Comber, population 1377; Holywood, population 1288; and Saintfield, population 1053. Dufferin, on the western shore of Loch Strangford, contains the town of Killileagh, population 1147. Iveagh, Lower, on the north and north-west towards Antrim, and Loch Neagh, containing the towns of Hillsborough, population 1453; Dromore, population 1942; and Moira, population 787. Iveagh, Upper, on the west and midland, containing the towns of Banbridge, population 2469; Rathfriland, population 2001; Loughbrickland, population 618; Warrenspoint, population 1856; Rosstrevor, population 996; and Castlewellan, population 729. Kinalearty, midland, between Upper Iveagh and Dufferin, containing the town of Ballynahinch, population 970. Lecale, on the south-east, between Strangford Loch and Dundrum bay, containing the borough of Downpatrick, population 4784; and the towns of Ardglass, population 1162; Killough, population 1162; and Strangford, population 583; Mourne, lying between Dundrum bay and Carlingford Loch, containing the town of Kilkeel, population 1039; and part of the lordship of Newry, containing part of the borough of Newry, the total population of which is 13,065.

Down returns four members to the imperial parliament, viz., two for the county, one for the borough of Newry, and one for the borough of Downpatrick. Besides these boroughs, Newtownards, Bangor, Killileagh, and Hillsborough returned members to the Irish parliament, and are still corporate towns. The lordship of Newry, the greater part of which lies within this county, is subject to a peculiar ecclesiastical jurisdiction exercised by the family of Needham as representatives of Sir Nicholas Bagnall, to whom, after the dissolution of religious houses in Ireland, the abbey of Newry with all its immunities and privileges was granted in fee by Edward VI. The manor of Mourne formed a portion of the original grant, and passed by marriage to the family of Paget, who claim the same ecclesiastical immunities for it in the diocese of Down as the Needham family for their portion in the diocese of Dromore, but hitherto without success. The authority of the representatives of the late Lord Kilmorey in his lordship of Newry extends to the presentation to livings, the granting of marriage licenses, probates, &c., in their ecclesiastical capacity, and to the holding of courts baron and leet, and discharging all recognizances to the Crown forfeited within that jurisdiction, in their civil capacity.

The linen manufacture is the staple trade of Down, and gives employment to a greater number of operatives, in proportion to the population, than in any other part of Ireland. In 1831 the number of linen weavers was 6711; and of weavers of damask, 6: the number of wheelwrights (makers of wheels for spinning linen yarn by hand) was 142; and of those employed in making other machinery for the manufacture of linens, millwrights, reed-makers, shuttle-makers, &c., 2207; together with 34 engaged in making machinery for drapers, and 32 for damasks; all exclusive of female hand-spinners throughout the county; so that the entire number to whom the trade gives occupation may be safely stated at 10,000. The linen manufacture has been long carried on in Ireland, but its first great impulse was in consequence of the settlement of French refugees on the revocation of the edict of Nantes, who, by introducing the improved machinery of the continent, and setting an example of more business-like habits, raised the manufacture to a high degree of perfection and importance. To M. Crommelin, who settled at Lisburn in the reign of William III., Down owes the introduction of the improved manufacture on an extensive scale: before his time no web finer than of the quality called 'a fourteen-hundred' had been made in Ireland. This enterprising individual imported a thousand looms from Holland, and gave the manufacture such importance as secured it the attention and patronage of government. In the 4th of Queen Anne the export duty on Irish linens was taken off, and from that time the trade has continued to flourish.

The importation of flax-seed employs a considerable capital in Belfast and Newry. It is generally thought necessary to renew the seed from year to year; but a few farmers have latterly saved their own seed, and the practice has so far proved successful. The dressing of the grown crop gives employment to numerous scutchers and hacklers throughout the county; but the introduction of linen spinning machinery has materially lessened the demand for hand labour in converting the dressed flax into thread. Manufacturers, however, prefer hand-spun thread for the weft, and the demand is still sufficient to give occupation to numerous females, who, except at the times of harvest, haymaking, and raising the potato crop, can make from 3*d.* to 4*d.* per day, besides attending to their ordinary rural concerns. Weaving is mostly carried on in the houses of small farmers, and there are few weavers who do not give part of their time to agriculture; hence they are generally a healthy and long-lived class of men. Hand-spinning and weaving are not confined to any particular district. When the webs are ready for the bleacher, they are carried to market. The following table, drawn up in 1802, exhibits the quality of cloth manufactured in the district surrounding each town. It is difficult to ascertain the quantity made in the county at large, as the markets of Lurgan, Lisburn, and Belfast, are in a great measure supplied from the northern parts of Down, and it not unfrequently happens that what is sold in one market is resold in another.

Linen Markets in Down.	Quality of Linens sold in each
Newry . . .	from 8 to 14 hundreds;
„ a few . .	up to 16 ditto
Rathfriland . .	from 8 to 14 ditto.
Kirkeel . .	„ 8 to 10 ditto.
Downpatrick . .	„ 8 to 16 ditto.
Castlewellan . .	„ 8 to 9 ditto.
Ballynahinch . .	„ 8 to 18 ditto.
Banbridge . .	„ 8 to 15 ditto.
Dromore . .	„ 10 to 20 ditto.
Hillsborough . .	„ 6 to 20 ditto.
Portaferry and Kirkcubbin } . .	„ 10 to 14 ditto.*

The next process, and that which employs nearly an equal number of hands, is the bleaching and preparing for market the green web as purchased from the weaver. The chief manufacturing district of this county, as of Ireland at large, is along the valley of the Upper Bann. The waters of this river are peculiarly efficacious in bleaching; and its rapid descent affords numerous sites for the machinery employed. From Tanderagie in Armagh, to five miles above Banbridge in Down, the banks of this river present an almost continuous succession of bleaching greens. On that part of the river which flows through Down there are eighteen of these establishments, each covering a large tract of ground, and giving employment to a numerous rural population. Besides these establishments, there are upon the Bann several extensive flour mills, a vitriol manufactory, and two factories for spinning linen thread by machinery. The waste of these bleach greens is found highly valuable as a manure. The neighbourhood of Guilford and Moyallan, about half way between Banbridge and Tanderagie, is celebrated for its rural beauty. Orchards are attached to all the better class of cottages, and the vicinity of so many bleach greens gives the effect of a continuous tract of rich park scenery on each bank of the river. The proprietors of the majority of these establishments are Dissenters and members of the Society of Friends, and the population generally is Protestant.

The cotton and muslin manufacture in 1831 gave occupation to 3278 individuals: of these 307 were muslin weavers, and 13 were weavers of corduroy. The principal market for muslin fabrics is Belfast. This trade is not on the increase. The leather manufacture is carried on pretty briskly in Newry and in various parts of the county. The number of operatives employed in both in 1831 was 89. There is an extensive iron foundry near Ballymacarratt, which supplies much of the machinery used in the factories of Belfast. Here also are salt and vitriol works, with a manufacture of coarse glass. The manufacture of kelp is carried on to some extent on the shores of Loch Strangford.

The exports and imports of Down are made almost entirely through the ports of Belfast and Newry. The net receipts of customs' duty at Newry in 1836 was 43,867*l.* About 80,000 firkins of butter are exported yearly from Down, and this as well as all other exports is increasing.

The fishery on the coast from Bangor to Carlingford bay is pursued with a good deal of industry, but hitherto without sufficient capital or skill. The herring fishery commences in July, and is pursued throughout the autumn and beginning of winter. The principal fishing ground lies off Lecale, at a distance of a quarter of a mile to two leagues from shore, in three to seventeen fathom water, and extends with little interruption from Newcastle on the south to the entrance to Strangford Loch upon the north. The fish taken are herrings, mackarel, haddock, cod, ling, glassan, bream, pollock, gurnet, plaice, bait, and turbot. Besides this there are several other fishing grounds off the coasts of Mourne and Ards.

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* The linens being one yard wide, are distinguished by the number of threads contained in that breadth; thus an eight hundred web is one whose warp contains that number of threads of yarn.

The following table exhibits the number of boats and men employed in the fishery in 1835 at each of the coast-guard stations as below:—

STATION.	Decked Vessels.			Half-decked Vessels.			Open sail boats.		Row-bts.		No. of Fishermen.
	No.	Tonnage	Men	No.	Tonnage	Men	No.	Men	No.	Men	
Cranfield	..	..	..	..	28	..	..	..	85	452	452
Leestone	..	..	..	..	..	..	..	..	21	126	126
Annalong	5	126	30	3	..	18	..	..	36	216	264
Newcastle	..	..	..	..	..	..	..	..	27	135	135
St. John's Point Killough	1	22	7	2	22	14	..	..	37	196	217
Ardglass	2	45	16	10	126	62	..	..	12	60	138
Gun's Island	..	..	..	6	55	30	2	8	6	26	64
Strangford	..	..	..	16	158	80	10	40	18	72	192
Cloghy	2	35	No return	16	174	No return	1	No return	32	No return	175
Ballyhalbert	1	23	6	18	180	108	..	..	24	120	234
Millisle	..	..	..	..	..	..	..	..	27	135	135
Donaghadee	..	..	..	3	30	15	..	..	29	87	102
Groomsport	..	..	..	9	99	36	8	40	..	..	76
Bangor	2	35	8	..	..	..	..	..	..	..	8
Holywood	..	..	..	..	..	..	2	4	4	10	14
	13	288	67	83	872	363	23	92	358	1608	2305

Upwards of 300 boats frequent Ardglass harbour during the fishing season. Of those about one-third are from England, one-third from the Isle of Man, and one-third from Arklow, Skerries, and other places on the Irish coast This concourse of fishermen causes a considerable trade in Ardglass. Three additional butchers have booths here for the sale of meat during the season. The English and Man boats are larger and better found than the Irish. Their tackle and gear also are of a superior description; and although so many inhabitants of the coast appear by the above table to be engaged in the pursuit, it is a remarkable fact that neither at Newry, Downpatrick, nor Belfast, is there a sufficient supply of fish, and that the salt herrings consumed throughout the county are invariably of Scotch curing. There is ample occupation for five times the number of men at present engaged in the fishing off this coast.

The county assizes are held twice a year at Downpatrick. Quarter sessions are held by the assistant barrister twice a year at Downpatrick, Newry, Dromore, and Newtownards. The constabulary force stationed in Down in the year 1835 consisted of 5 chief constables, 30 constables, 114 sub-constables, and 6 horses; and the expense of their support was 6,884*l.* 6*s.*, of which 3,297*l.* 10*s.* 8*d.* was chargeable against the county.

Before and for some time after the coming of the English, Down was known as Ulladh or Ulidia, the original of the name of Ulster. The antient inhabitants are supposed to have been the Voluntii of Ptolemy. The north-eastern portion of Down was at an early period occupied by the Picts, of whom there was a considerable colony so late as the 6th and 7th centuries, extending from Strangford Loch to the Lower Bann in Antrim. Whether these Picts, who are called *Cruithne* by the annalists, were of a nation essentially different from the bulk of the Celtic inhabitants of Ireland is still under discussion: the region occupied by them abounds with stone-circles, cromlechs, and subterranean galleries, which usually mark the presence of this peculiar people. The territory occupied by them was called Dalaradia, and extended from the Ravil river in Antrim over the southern part of that county and the north and north-east of Down.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort	36,636	..	..	..	..	..	..	201,500
1813	Under Act of 1212	53,310	..	..	..	..	..	..	287,290
1821	Under Act 55 Geo. III. c. 120	59,747	63,631	..	..	..	156,599	168,811	325,410
1831	Under Act 1 Wm. IV. c. 19	62,629	66,233	34,447	17,979	13,807	169,416	182,596	352,012

The presence of St. Patrick in this county in the sixth century is attested by authentic records, and can be traced with topographical exactness at the present day. Downpatrick, Saul, Dromore, Moville, and Bangor, are the chief ecclesiastical foundations of Patrick and his immediate successors. Of these the last was the most famous, having a college, which for many years rivalled the schools of Armagh and Lismore. The foundation of the abbey of Newry for Cistertian monks, by Maurice Mac Loughlin, king of Ireland, in 1153, is the most interesting event connected with Down prior to the English invasion, as the charter is still extant (O'Connor's *Rer. Hib. Scrip. Vet. Proleg.* ii., 153), witnessed by the celebrated primate Gelasius and by the petty kings of most of the northern provinces. The lands are conveyed with their woods, waters, and mills.

Down was overrun by the English under John de Courcy in 1177. The chief families introduced by the conquest were the Savages, Whites, Riddles, Sendalls, Poers, Chamberlains, Stokes, Mandevilles, Jordans, Stauntons, Logans, Papelaws, Russels, Audleys, Copelands, Martells. Of these the Savages, Whites, and Russels still remain: most of the other names have become extinct in consequence of subsequent conquests by the Irish, and forfeiture. The county was originally divided into two shires, Down, and Newtown or the Ards, to which sheriffs were regularly appointed until 1333, when the revolt of the Irish on the murder of William de Burgho [BELFAST] overturned the English authority throughout Ulster. The family of Savage, who had possessed the baronies of Ards and Castlereagh, were driven into the peninsula between Loch Strangford and the sea, and the Whites, who had held the centre of the county, were confined to that part of Dufferin which borders on Loch Strangford on the west. Castlereagh fell into the hands of the O'Neills; Kinelearty into those of the Mac Artanes; and Mac Rory and Magennis obtained the whole of Upper and Lower Iveagh. Lecale and Mourne, being protected until the middle of the seventeenth century by the castles of Ardglass, Dundrum, and Green Castle, held out against the natives, and having a sea communication with Louth, were considered as part of that county, while the rest of Down remained without the pale.

The Whites and Savages being separated from the English fell soon after into Irish habits, but still maintained an independence among the hostile tribes around them. Ardquin in Upper Ards, and Killileagh on the shore of Loch Strangford, were their respective places of defence. The attainder of Shane O'Neill, who was slain in rebellion in 1567, threw all Iveagh, Kinelearty, Castlereagh, and Lower Ards into the hands of the Crown. The dissolution of religious houses had already enabled the government to place an English colony at Newry, which had been granted to the family of Bagnall, and an attempt was made in 1572 to occupy the Ards and Castlereagh with a similar force under the family of Smith: but the son of Sir Thomas Smith, who led the expedition, being killed by Neal Mac Brian Artagh, one of the attainted O'Neills, the project miscarried. Some indulgence was now shown to the O'Neills, Magennises, and Mac Artanes, who upon submission acquired grants of their estates. In 1602, however, O'Neill of Castlereagh being seized on some slight pretext, and imprisoned in Carrickfergus Castle, contrived to make his escape by the assistance of one Montgomery, the brother of a Scotch knight of some fortune, who afforded the fugitive protection on his arrival in Scotland, and afterwards negotiated his pardon on the terms of having the greater part of O'Neill's estate made over to himself and Mr. Hamilton, his associate in the proceeding. The colony led over by Sir Hugh Montgomery settled chiefly about Newtownards and Greyabbey, along the north-eastern coast between Strangford Loch and the sea, and by their enterprize and industry soon raised that part of the county to a very flourishing condition. The general plantation of Ulster soon after gave security to their improvements. Sir Hugh was raised to the rank of viscount; and his colony proved of the greatest service during the subsequent wars which commenced with the rebellion of 1641. The family of Hamilton settled at Bangor and Killileagh. That of Hill, which about the same time acquired large estates in the north of the county, settled in the neighbourhood of Belfast, and soon after their arrival laid the commencement of a town at Hillsborough, the residence of their present representative, the marquis of Downshire. The forfeitures consequent on the rebellion of 1641 and the war of the revolution deprived almost all the old Irish and Anglo-Norman families of their estates. Magennis, Lord Iveagh, was the chief sufferer by the first; the Whites, Russels and Savages, were the principal families affected by the latter. At present the fee of the county is almost entirely in the hands of Protestant proprietors of English and Scotch descent.

Of the Pagan antiquities of Down, the most remarkable is a stone cromlech, inclosed by a circular ditch of extraordinary dimensions, called the Giant's Ring, near Shaw's Bridge, half way between Lisburn and Belfast. The inclosure is nearly half an English mile in circumference; and the rampart is still from 12 to 14 feet in height. There are stone monuments of the same character at Sliddeny Ford, near Dundrum, and Legaraney in the parish of Drumgoolan. There is a remarkable cairn, or sepulchral pile of stones, on the top of Slieve Croob. The main pile is 77 yards in circumference at bottom, 45 yards at top, and 54 feet high at its greatest elevation: there are twenty-two smaller cairns raised on the top. Along the Armagh boundary of Down there extends a great earthen rampart, called by the people of the country the Danes' Cast, and sometimes Tyrone's ditches. The native Irish call it *Glin na muic duibh*, or the Glen of the Black Pig, which is the name applied by the lowland Scotch to the wall of Antoninus. The Danes' Cast measures from 80 to 50 feet across, and occurs at intervals along the line of the Newry canal from the lands of Lisnagade, where it commences, near Scarvagh in Down, to the neighbourhood of Forkhill in the county of Armagh, west of which it has been traced to a great distance by the officers of the Ordnance Survey. Its origin is quite unknown. There are numerous raths or earthen entrenched mounds throughout Down, of which the most remarkable are at Downpatrick, Donaghadee and Dromore. Of the Anglo-Norman military antiquities of Down, the castle of Dundrum is the most important. It is imposingly situated on a rock over the bay, and consists of a circular keep with numerous outworks. It is said to have been built by De Courcy for the knights templars, who occupied it till the suppression of that order in 1313, when it was granted to the prior of Down. In 1517 it was taken from the Irish, who had seized it some time before, by Gerald earl of Kildare; and again in 1538 by the Lord Deputy Grey, with seven other castles in Lecale. It afterwards got into the hands of the Magennises, who held it for Shane O'Neill, who is said to have usually kept 200 tons of wine in his cellars here. In 1601 it was taken from Ever Magenn's by the lord deputy Mountjoy, and was finally dismantled by order of Cromwell during the progress of the war of 1641. It is now the property of the marquis of Downshire, as representative of Lord Blundell, to whom it came through the earl of Ardglass after its forfeiture by the Magennises. Green Castle in Mourne was a place of great importance in the early history of Ulster. In 1495 it was deemed so important a post, that none but an Englishman was permitted to be warden. The castle of Newcastle was built by Felix Magennis in 1588, and is still inhabited. The Magennises had castles also at Castlewellan and Rathfriland. There are extensive military remains at Ardglass, and the castles of Killileagh, Ardquin, Portaferry, Bangor, and Hillsborough, are the most important of those still standing. There are also some remains of the fortifications erected by General Monk for the defence of the passes into Armagh at Scarvagh, Poyntz, and Tuscan passes.

The chief ecclesiastical remains in Down are at Downpatrick, where there are the ruins of the cathedral, and of three other religious houses. The cathedral was 100 feet in length; the roof of the centre aisle was supported by five arches of fine proportions. Prior to 1790, a round tower 66 feet in height stood at the western end: it was taken down at the time of the partial rebuilding of the cathedral; and it is worthy of remark, that part of the wall of some more antient edifice was found to run below its foundations. There is another round tower at Drumbo, near Belfast. There are a few remains of the abbey of Bangor; and at Greyabbey there is still standing in good preservation a part of the antient abbey founded here in 1192 by Africa, daughter of the king of Man, and wife of De Courcy.

A mile and a half to the east of Downpatrick is a hill about 150 feet high, called Strual mountain, celebrated all over Ireland for the resort of the lower orders of Roman Catholics, who come here every Midsummer for the performance of penance. The ceremonies commence by the penitents climbing Strual mountain on their knees, with a large stone placed on the back of the neck, three, seven, or nine times, according to the circumstances of the case: after this they are turned thrice round in a stone seat called St. Patrick's chair, by a person who in 1830 used to come annually from the county of Mayo for the purpose of presiding over this part of the ceremony. The penitents then descend to a neighbouring plain, where they bathe promiscuously in a well dedicated to St. Patrick, and conclude by drinking from another well. Tents are erected in the adjacent fields, and the evening is generally spent in dissipation.

Education has made rapid progress since 1821; in that year the number of young persons receiving instruction was 9521; in 1824 it was 14,111; and in 1834 the number of young persons receiving daily instruction, in the two dioceses of Down and Dromore, which are together very nearly co-extensive with the county, was 36,446. These dioceses stand respectively fourth and twelfth in educational rank among the thirty-two dioceses of Ireland. According to Mr. D'Alton's return of funds designed for educational purposes in Ireland, the annual amount so designed in Down is 1092*l*. 2*s*. 8¼*d*.; the acreable possessions of the different schools is seventy-one acres, and the amount contributed by the National Board of Education is 645*l*. per annum.

County expenses are defrayed by grand jury presentments: average amount so levied during the twenty years preceding 1830, 31,000*l*. Down pays 13,817*l*. 9*s*. 6*d*. as share of the original expense of the district lunatic asylum at Belfast, and a share of the annual expense proportioned to its population. Two newspapers are supported at Newry: the number of stamps issued to these in 1831 was 122,600; and in 1836 the number was 121,961. The gross produce of customs' duties collected within the Newry and Strangford district in the year 1835 was 53,902*l*. 4*s*. 7*d*.

(Harris's *History of Down*, Dublin, 1744; *Statistical Survey of Down*, Dublin, 1802; Inglis's *Ireland in* 1834; *Report on Irish Fisheries*, 1837; *Reports on Education in Ireland*, 1837; Cox's *History of Ireland*.)

DOWN, a bishop's see in the ecclesiastical province of Armagh in Ireland. The chapter, which is regulated by patent of James I., consists of dean, precentor, chancellor, archdeacon, and two prebendaries. With the exception of part of one parish lying in Antrim, this diocese is situated entirely in the county of Down, of which it occupies the eastern portion. It extends in length from south-west to north-east 51 English miles, by 28 miles in breadth from east to west. It contains 42 parishes, constituting 37 benefices. In 1792 the number of churches was 33; and in 1834 the numbers were, churches of the establishment 40, Roman Catholic 37, Presbyterian 56, other places of worship 19. In the same year the gross population of the diocese was 188,558, of whom there were 27,662 members of the established church, 58,405 Roman Catholics, 98,961 Presbyterians, and 3,530 other Protestant Dissenters, being in the proportion of rather more than two Protestants of whatever denomination to one Roman Catholic. There were at the same time in this diocese 309 daily schools, educating 19,459 young persons, being in the proportion of 10.26 per cent. of the entire population under daily instruction, in which respect Down stands fourth among the 32 dioceses of Ireland. Of the above schools 46 were in connection with the National Board of Education.

The see of Down was founded about the end of the fifth century by St. Patrick, who appointed Cailin, abbot of Antrim, to the bishopric. The first episcopal seat was at Downpatrick, then called Ards Keltair and Rath Keltair, where it continued until after the plantation of Ulster in the reign of James I., when the church of Lisburn was by letters patent constituted the cathedral of the united diocese of Down and Connor; but the original episcopal seat was restored to Downpatrick by act of parliament about 1790. The most distinguished bishop of Down, prior to the English invasion, was Malachy O'Morgair, who succeeded in 1137, and assisted the Primate Gelasius in the introduction of the Roman discipline. In 1442, the union of Down with the see of Connor took place in the person of John first bishop of the united diocese. Among his successors, those of most note were, Leslie, bishop during the wars of 1641, and the celebrated Doctor Jeremy Taylor, who succeeded in 1660. From 1441 down to the end of the last century there has been no episcopal residence attached to this see. Doctor Taylor generally resided at Portmore, near Glenavy, in the county of Antrim. The present episcopal mansion stands within a mile of Holywood, on the eastern shore of Belfast Loch. The same ecclesiastical immunities are claimed by the Paget family for their manor of Mourne in this diocese as by the Needham family for their Lordship of Newry [Down] in the diocese of Dromore; but this claim has always been resisted by the bishops of Down. By act 3rd and 4th William IV. c. 37, the united diocese of Down and Connor is further augmented by the diocese of Dromore.

(Beaufort's *Memoir of a Map of Ireland; Ware's Bishops; Reports of Commissioners*, &c.)

DOWNING COLLEGE, CAMBRIDGE. The sole founder of this college was Sir George Downing, Bart., of Gamlingay Park, in Cambridgeshire, who by will dated 20th December, 1717, devised estates in the counties of Cambridge, Bedford, and Suffolk, first to Sir Jacob Gerard Downing, and afterwards to other relations in succession, and in failure thereof, to build and found a college in this university, upon a plan to be approved of by the two archbishops and the masters of St. John's and Clare Hall. This direction was the reason for giving them the power which they possess in elections and other matters by the charter and statutes.

Sir George died in 1749 and Sir Jacob in 1764, and (the other devisees having previously died without issue) upon this event the foundation ought to have been immediately carried into execution. But the estates were in the possession of Lady Downing, and afterwards of her devisees, without any real title; and when the university sued in chancery for the establishment of the college, the party in possession resisted the suit in that court. In 1769 a decree was obtained in favour of the foundation.

The persons named as trustees in the founder's will having died in his lifetime, the execution of the trusts devolved upon the heirs-at-law; who, after combating a long series of opposition and litigation, and overcoming obstacles of various descriptions, preferred a petition to the crown for a charter; and at length, in 1800, the privy council decided to recommend the foundation to his majesty.

On 2nd September, 1800, the great seal was affixed to the charter by Lord Loughborough: by this charter the college is incorporated with all the privileges belonging to any college in the university, and endowed with the estate devised by the founder, with a power to hold landed property (in addition thereto) to the value of 1500*l.* per annum.

The charter directs statutes to be framed for the government of the college, which was done in July, 1805, and shortly afterwards the stipends of the members began to be paid. By the statutes, no beneficial leases of the college estates are allowed, nor any fine to be taken for a grant or renewal. It is also provided that no new foundation shall ever be engrafted on this college which shall be inconsistent with the charter and statutes. But the college may accept any additions to their property in augmentation of the number or value of their present appointments, or to be applied in any other manner consistent with their present constitution. There is also a power given to the four electors and the master to alter the statutes, on application by a certain portion of the college.

A piece of land, nearly thirty acres, having been purchased for the site, and for grounds and walks, on the 18th May, 1807, the first stone was laid; since which time the building has proceeded at intervals, at the expense of above 60,000*l.* In 1821 buildings sufficient for opening the college, and comprizing nearly two sides of a large court, were completed; and in May, 1821, undergraduates were admitted to reside and keep terms.

This college will consist of a master, two professors (one of the laws of England and one of medicine), sixteen fellows (two of which only are clerical), and six scholars. The objects of the foundation are stated in the charter to be students in law, physic, and other useful arts and learning. At present only the master, professors, and three fellows, are appointed, for the purpose of taking possession of the estates, administering the revenues, superintending the building of the college, and for the other necessary purposes. The appointment of the remaining fellows is reserved until after the erection of the buildings necessary for the college. The scholars will also be elected after that period; but not more than two in each year. There are also two chaplains nominated by the master.

The master is elected by the archbishops of Canterbury and York, and the masters of St. John's and Clare Hall, from among those who have been professors or fellows. The electors to professorships are the same as to the mastership, with the addition of the master. The electors to the fellowships are, the master, professors, and fellows of the degree of M.A. After the building of the college is completed, the elections will be annually on the 21st of February. While the college remains uncompleted, the elections to fellowships are at uncertain times, depending upon vacancies. The clerical fellowships are to be tenable for life: the lay fellowships to continue only for twelve years. The present master is the Rev. Thomas Worsley, M.A., elected 1836; and the number of members upon the boards of the college forty-nine. The rectory of East Hartly, and the vicarage of Tadlow, both in the county of Cambridge, are in the patronage of this college.

(Ackermann's *Hist. of the Univ. of Cambridge*, 4to, Lond. 1815, vol. ii. p. 283—288; *Cambridge Univ. Calendar* for 1837.)

DOWNPATRICK, the assize town of the county of Down, in Ireland, distant from Dublin 73 Irish or 93 English miles; situated in the barony of Lecale, one mile to the south of the Quoil river, which opens into the south-western angle of Strangford Loch about four miles to the east. Downpatrick is the seat of a bishopric, and returns a member to the imperial parliament. Constituency, 525.

The boundaries of the borough embrace an extent of 1486 statute acres, containing 897 houses, of which 237 are thatched and 660 are slated: of the latter 285 are estimated to be worth 10*l.* per annum.

Downpatrick takes its name from St. Patrick, who is stated in many antient records to have been buried here. Before his time the place was called Rath Keltair and Dun-da-leth-glass, from an earthen fortification, the ruins of which still cover a considerable space, and present an imposing appearance on the north-west of the town. On the conquest of Ulster by the English in 1177, De Courcy made Downpatrick his head-quarters, and it continued in the hands of the English until about the time of the rebellion of Shane O'Neill, in 1567, when it fell into the hands of the Irish, but was retaken by Sir Richard Morrison soon after.

The town is pleasantly situated in a rich, undulating country, surrounded by hills. There is a good court-house, a ruined cathedral, one church, two Roman Catholic do., a Presbyterian meeting-house, a Methodist do., and a good market-house and gaol. An hospital was founded here about 1740, by Mr. Southwell, for the reception of decayed tenants. The provisions of the Paving and Lighting Act were put in force here in 1829, since which time the town has been lighted with oil: expense, about 360*l.* per annum.

There are branches of the northern banking company and of the provincial bank of Ireland at Downpatrick.

There are ten schools with small endowments within the deanery; a diocesan school, to which the bishop and clergy subscribe 90*l.* per annum; and a gaol school supported by the county; besides a male and female school, supported by Lady Harriet Forde, and twenty-four other schools: total number of young persons under instruction, 897 males and 462 females

Population in 1821, 4123; in 1831, 4784. [DOWN.]

DOWNS or DUNES, are little hillocks of sand formed along the sea-coast.

The mode of their formation is this:—the waves of the sea, in certain localities, drive upon the beach a certain quantity of fine sand, which, becoming dry during low water, is carried up still higher by the wind, till meeting with the obstruction of large stones, bushes, tufts of grass, &c., it is accumulated into little heaps: these offering still greater surface of resistance as the sand increases upon and against them, soon rise into mounds of considerable height, whose number, arrangement, and dimensions, depend naturally upon the size and distribution of the obstacles to which they owe their existence. If these obstacles are close-set, there will be little more than one range of sand hillocks, and, if very close, these will in time unite so as to form a continuous ridge. Should the arresting objects, on the contrary, be thinly scattered, and at different distances from the brink on a shelving coast, there will be several ridges of hillocks, the one behind the other.

The downs having attained a certain height, the wind has no longer the power to increase their elevation, and they are then urged forward upon the land.

The way in which this is effected is easily conceived. On the windward side of the hillocks the grains of sand are forced up to the top, whence they are swept off as they arrive, and fall by their own weight on the opposite slope. Thus the mass goes on invading the land, while fresh material is constantly brought by the sea.

This progress inland depends however upon the habitual direction of the wind and the relative direction of the coast-line. In Gascony the sand advances eastward, and generally along the whole coast of France, from Bayonne to Calais, the downs progress in a north-easterly direction, the wind blowing most frequently from the south-west; whereas from Calais to Dunkerque, the coast trending in the direction of the wind, they make no progress inland, but form a ridge or chain parallel with the coast.

The rapidity with which the sands advance is, in some cases, most alarming. Between the mouths of the Adour and the Garonne their progress is about sixty feet yearly; nor is it easy to arrest their march. The town of Mimizan is in part buried under the sands, against whose encroachment it has been struggling for the last five-and-twenty years. In Brittany also, a village near St. Pol de Leon has been entirely covered with the sand, so as to leave no part visible but the steeple of the church.

In the Boulonnais the advance of the downs has been almost wholly arrested since the works there executed by Cassini. The inhabitants plant a species of cyperacea (the *Arundo arenaria*), termed by them *oya*, which thrives well, and fixes the sands. This process is so much the more advantageous, as every hillock which becomes fixed is an effectual barrier against the invasion of fresh sand from the sea.

In Gascony the peasants force the wind, in some measure, to drive back what it brought. Thus, when the wind blows in a direction contrary to that which pushes the downs upon the land, they toss the sand high into the air with shovels, and in this manner get rid of a portion of it: this portion, however, is very small, and the prevailing winds being from the south-west the sands continue to advance in spite of all their efforts.

Downs sometimes intercept the flow of water to the sea, forming stagnant pools between and behind them which give rise to an aquatic vegetation and the occasional formation of a kind of peat.

DOWNTON. [WILTSHIRE.]

DOXO'LOGY, a form of giving glory to God, from the Latin *doxologia*, and that from the Greek *doxa* (δόξα), glory, and *logos* (λόγος), a word or saying. The doxology in the concluding paragraph of the Lord's Prayer, 'Thine is the kingdom, and the power, and the glory,' is left out of many of the antient copies of St. Matthew's Gospel, though it appears in others; St. Luke omits it entirely. The authenticity of this form of praise, as a paragraph of the prayer, has been a difficult subject of dispute. It does not appear in the Vulgate, but it seems to be established by the Greek MSS. and the Eastern versions. Doxology is also used for the short hymn, *Gloria Patri*, which we use in our church service at the end of every psalm, of every part of the hundred and nineteenth psalm, and of every hymn except *Te Deum*, which is a doxology of itself. Durand and other writers consider this exception to have been introduced into the Romish church by St. Jerome. The first express mention of it is in the second council of Vaison, A. D. 529. Amongst the Christians it was always considered as a solemn profession of their belief in the Trinity. (Wheatly *on the Common Prayer*, 8vo. Oxf. 1802, pp. 124. 132. Broughton's *Dict. of all Religions*, pp. 341, 342.)

DRACÆNA, a genus of endogenous plants, of the natural family Asparageæ of Jussieu, now arranged as a section of Liliaceæ by Dr. Lindley. The genus was established by Linnæus, and named from one of its species yielding the resinous exudation, familiarly known by the name of Dragon's blood, a translation of the Arabic name *dum al akhwain*, met with in Avicenna and other Arabian authors. Dracæna is characterized by having an inferior six-partite perianth, of which the segments are nearly erect, and have inserted on them the six stamens, with filaments thickened towards the middle and linear anthers. The style is single, with a trifid stigma. The berry two or three-celled, with its cells one or two-seeded.

The species of Dracæna are now about 30 in number, and found in the warm parts of the Old World, and in many of both Asiatic and African islands, whence they extend southwards to the Cape of Good Hope and New Holland, and northwards into China, and to the eastern parts of India, as the districts of Silhet and Chittagong. Species are also found in Socotra, and the Canary and Cape Verd Islands, as well as at Sierra Leone. From this distribution it is evident that the species require artificial heat for their cultivation in England. They are found to thrive in a light loam, and may be grown from cuttings sunk in a bark bed.

The species of Dracæna are evergreens, either of a shrubby or arboreous nature; and having long, slender, often columnar stems, they emulate palms in habit. Their trunks are marked with the cicatrices of fallen leaves; the centre is soft and cellular, having externally a circle of stringy fibres. The leaves are simple, usually crowded together towards the end of the branches, or terminal like the inflorescence: whence we might suppose that the name *terminalis* had been applied to some of the species, if Rumphius had not stated that it was in consequence of their being planted along the boundaries of fields. The structure of the stem and leaves is particularly interesting, as the fossil genera Clathraria and Sternbergia have been assimilated to Dracæna, the former by M. Adolphe Brongniart, and the latter by Dr. Lindley; and as Rumphius compares the leaves of a Dracæna with those of Galanga, it is as probable that the fossil leaves called Cannophyllites may be those of a plant allied to Dracæna, as that they belong to one of the Canneæ.

Of the several species of Dracæna which have been described by botanists, there are few which are of much importance either for their useful or ornamental properties. Among them, however, may be mentioned D. terminalis, a species rather extensively diffused. The root is said by Rumphius to be employed as a demulcent in cases of diarrhœa, and the plant as a signal of truth and of peace in the Eastern archipelago. In the Islands of the Pacific Ocean a sweetish juice is expressed from its roots, and afterwards reduced by evaporation to a sugar, of which specimens were brought to Paris by Captain D'Urville from the island of Tahiti. (Otaheite.) The root is there called Ti or Tii, and thence no doubt corrupted into *Tea-root* by the English and Americans. M. Gaudichaud mentions that in the Sandwich Islands generally an intoxicating drink is prepared from this root, to which the name *Ava* is often applied, as well as to that made with the roots of Piper methysticum.

Dracæna Draco is the best known species, not only from its producing Dragon's blood, but also from one specimen having so frequently been described or noticed in the works of visitors to the Canary Islands. The erect trunk of the Dragon-tree is usually from 8 to 12 feet high, and divided above into numerous short branches, which terminate in tufts of spreading sword-shaped leaves, pointed at the extremity. The most celebrated specimen of this tree grows near the town of Orotava, in the Island of Teneriffe, and was found by Humboldt in 1799 to be about 45 feet in circumference. Sir G. Staunton had previously stated it to be 12 feet in diameter at the height of 10 feet; and Ledru gave even larger dimensions. It annually bears flowers and fruit; and though continuing thus to grow, does not appear much increased in size, in consequence of some of its branches being constantly blown down, as in the storm of July 1819, when it lost a great part of its top. The great size of this enormous vegetable is mentioned in many of the older authors; indeed as early as the time of Bethencourt, or in 1402, it is described as large and as hollow as it is now; whence, from the slowness of growth of Dracænas, has been inferred the great antiquity of a tree which four centuries have so little changed. Humboldt, indeed, remarks that there can be no doubt of the Dracæna of Orotava being with the Baobab (Adansonia digitata) one of the oldest inhabitants of our planet, and as tradition relates that it was revered by the Guanches, he considers it as singular that it should have been cultivated from the most distant ages in the Canaries, in Madeira, and Porto Santo, although it comes originally from India. This fact he adduces as contradicting the assertion of those who represent the Guanches as a race of men completely isolated from the other races of either Asia or Africa. To this it may be replied, that we know too little of the Botany of the interior of Africa to be able to draw from it any inferences; while the Dragon-tree on the other hand is not known to exist further to the eastward than the island of Socotra.

DRACHM, or DRAM, a small measure of weight, the etymology of which is to be found in the Greek drachma (δραχμή). The drachm of our pound troy is stated to be nearly the same as the Attic drachma, or the Roman denarius (under the earlier emperors).

There are two drachms or drams remaining in our system of weights; the first is the sixteenth part of the ounce, which is the sixteenth part of the pound avoirdupois of 7000 grains: this is now totally out of use as no species of goods which are weighed by the avoirdupois weight are of such value as to make the sixteenth part of an ounce worth consideration. In the national standard, the troy pound of 5760 grains, there is no dram; but this weight occurs in that particular division of the troy pound which is used by apothecaries, in which the dram is the eighth part of the ounce, which is the twelfth part of the pound of 5760 grains. This is the real remnant of the Roman division; the denarius (which, according to Pliny, was the Attic drachma of his time) was, however, the *seventh* part of the ounce. The drachma or dram is used in England, France, Holland, Prussia, and in some parts of the Levant.

DRACHMA, from the Greek *drachme* (δράχμη), a silver coin. It was the chief coin in use among the Athenians, and probably other Greeks also. The didrachm or two drachms, the tridrachm or three drachms, and the tetradrachm or four drachms, were its multiples. The last was the largest form of Greek silver. The average weight of five drachmæ in the British Museum is 60.92 grains; and the average weight of three tetradrachmæ in the British Museum is 260.56 grains. The Attic drachma has been supposed to have been the same among the Greeks with the denarius among the Romans: others have disputed this; but both may be reconciled by the consideration that the number of drachmæ, as well as of denarii, which went to the ounce might have been subject to occasional variations.

(Pitisci *Lexicon Antiq. Gr. et Rom.*, v. Denarius; Pinkerton's *Essay on Medals*, vol. i., § 6; Kelly's *Universal Cambist*, 4to., Lond., 1821, vol. i. 3, 4. 9. 30. 34, &c.; vol. ii. 256.)

Drachma.

British Museum. Actual size. Silver. Weight, 61$\frac{6}{10}$ grains.

DRACI'NA, the name given by Melandri to the colouring matter of dragon's blood, and which he supposed to be a vegetable alkali; but Berzelius and Herberger are of opinion that it does not possess alkaline properties: the last-mentioned chemist, indeed, calls this colouring matter *draconin*, and he considers it to possess rather sub-acid properties than such as denote alkalinity.

DRACO, an Athenian legislator, who flourished about the 39th Olympiad, 621 B.C. Suidas tells us that he brought forward his code of laws in this year, and that he was then an old man. Aristotle says (*Polit.* ii. at the end), that Draco adapted his laws to the existing constitution, and that they contained nothing peculiar beyond the severity of their penalties. The slightest theft was punished capitally, as well as the most atrocious murder; and Demades remarked of his laws, that they were written with blood, and not with ink. (Plutarch, *Solon*, cxvii.) Draco, however, deserves credit as the first who introduced written laws at Athens, and it is probable that he improved the criminal courts by his transfer of cases of bloodshed from the archon to the ephetæ (Jul. Pollux, viii. 124, 125), since before his time the archons had a right of settling all cases arbitrarily, and without appeal, a right which they enjoyed in other cases till Solon's time. (Bekker's *Anecdota*, p. 449, l. 23.) It appears that there were some offences which he did not punish with death; for instance, loss of the civil rights was the punishment for an attempt to alter one of his laws. (Demosth. *c. Aristocr.*, p. 714. Bekk.) Draco was archon (Pausan. ix. 36, § 8), and consequently an eupatrid: it is not therefore to be supposed that his object was to favour the lower orders, though his code seems to have tended to abridge the power of the nobles. He died in the island of Ægina. On the legislation of Draco in general, see Wachsmuth, *Hellenische Alterthumskunde*, ii. 1, p. 239, and following.

DRACO (the dragon), one of the old constellations, referred by Higinus to the fable of the Hesperides. It is constantly stated by the older writers as being placed between Ursa Major and Ursa Minor, which hardly suits the present position of the constellation, since its principal stars are all contained between Ursa Minor, Cepheus, Cygnus, and Hercules. The two stars in the head (β and γ, the latter celebrated as passing very near the zenith of the south of England, and as being the one used in the discovery of aberration [BRADLEY],) are nearly in the line joining α Cygni (Deneb) and Arcturus; while seven or eight smaller stars wind round Ursa Minor in such a manner as to render the name of the constellation not unappropriate. The extreme star (λ) is very nearly between the pole star and its pointers. [URSA MAJOR.] The principal stars are as follows:—

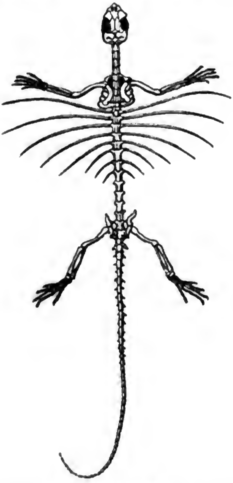
Character.	No. in Catalogue of		Magnitude.	Character.	No. in Catalogue of		Magnitude.
	Flamsteed and Piazzi.	Astron. Society.			Flamsteed and Piazzi.	Astron. Society.	
λ	1	1350	3½	*b*	39	2131	5
κ	5	1450	3	χ	44	2143	4
i	10	1586	5	*c*	46	2172	5
α	11	1607	3½	ο	47	2192	4
ι	12	1756	3		48	2203	6
θ	13	1842	3	υ	52	2209	4½
η	14	1892	3	(*n*)	53	2234	5
A	15	1903	4	(*p*)	54	2243	5
g	18	1918	5	δ	57	2253	3½
*h*¹	19	1950	5	π	58	2274	4
μ	21	1962	4½	τ	60	2272	4½
ζ	22	1977	4	σ	61	2306	4½
β	23	2016	2½		66	2374	6
ν¹	24	2022	5½	ρ	67	2371	5
ν²	25	2023	5½		76	2496	5
f	27	2030	5	(*z*)	78	2595	5
ω	28	2041	4		(10)	1404	5
ξ	32	2059	3		(37)	1135	5
γ	33	2071	2		(191)	2843	5
	36	2111	6		(380)	2084	5

DRACONIN, the *dracina* above mentioned, may be obtained, according to Melandri, by macerating dragon's blood in water acidulated with sulphuric acid: this becomes of a yellow colour, but does not act upon the draconin, which is of a fine red colour and very fusible: it may be worked between the fingers, and drawn into threads. It melts at about 130°: on solidifying it becomes of a crimson colour, and when triturated gives a cinnabar red colour. It dissolves readily in alcohol, and the solution, which is of a fine red, becomes yellow on the addition of an acid; but on the addition of an alkali the red colour is restored. It does not appear to have been analyzed.

DRAGOMANS, or **DROGOMANS** (from the Turkish *Trukéman*); the interpreters attached to the European consulates and embassies in the Levant are so called. At Constantinople they are the chief, and in most cases the sole medium of communication between Christian ambassadors, who are ignorant of the Turkish language, and the Ottoman Porte. They are men born in the country, and are chiefly descended from old Genoese or Venetian settlers. Their local interests and sympathies have often interfered with their duties; and though there have been honourable exceptions, they are not distinguished as a body for honour and integrity. The French, as early as the time of Louis XIV., saw the propriety of employing native subjects in this capacity, and instituted a small body of young men, technically called *Jeunes de langue*, who were sent to the country to learn the language and acquaint themselves with its laws and customs. But this good plan has not been sufficiently supported. The dragomans and their families enjoy the protection of the nations whom they serve, and are exempted from Turkish law.

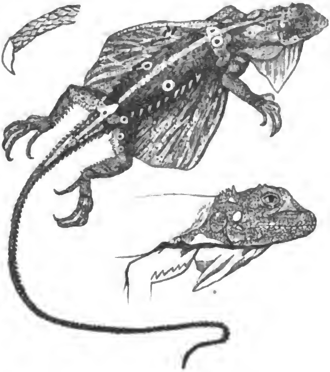
DRAGON. DRACO'NIDÆ, a family of Saurians, distinguished from their congeners in having their six first false ribs, instead of hooping the abdomen, extending in a nearly straight line, and sustaining a production of the skin which forms a kind of wing comparable to that of the bats, but independent of the four feet. This wing sustains the animal like a parachute when it leaps from branch to branch, but does not possess the faculty of beating the air, and so raising the reptile into flight like a bird. All the species are small, covered entirely with small imbricated scales, of which those of the tail and limbs are carinated. The tongue is fleshy, but slightly extensile, and slightly jagged (echancrée). Under the throat is a long pointed production (fanon), sustained by the hind part (queue) of the os hyöides, and at the sides are two other smaller ones, sustained by the horns of the same bone. The tail is long. The thighs have no pores. On the nape is a small dentilation. In each jaw are four small incisors, and on each side a long and pointed canine, and twelve triangular and trilobated molars.

Cuvier, whose description this is, says that the dragons have the scales and the gular appendage of the *Iguanas*, with the head and teeth of the *Stellionidæ*.



Skeleton of Dragon.

Geographical Distribution.—The known species which Daudin first extricated from confusion come from the East Indies.



Draco fimbriatus.

DRAGON'S BLOOD. [Calamus.]

DRAGOON. [Cavalry.]

DRAGUIGNAN, a town in France, capital of the department of Var. It is on the river Pis. or Nartuli, or Artuby, which falls into the Argens, 416 miles in a straight line south-south-east of Paris, or 552 miles by the road through Lyon, Valence, Avignon, Aix, and Brignolles; in 43° 32′ N. lat., and 6° 30′ E. long.

It has been supposed by some, but without sufficient reason, that Draguignan is on the site of the Forum Voconii of the Romans: it is however a place of considerable antiquity, having been mentioned in the titles of the earliest counts of Provence. Little historical interest is attached to it. Before the Revolution there were many religious houses here: the Reformed Dominicans, Augustinian Canons, Cordeliers, Minims, and Capuchins had convents; that of the Dominicans was very handsome; and there were nunneries for Ursulines and the nuns of the Visitation. The priests of the Christian doctrine had the direction of a college, and there was a tolerably well-built hospital. The bishop of Frejus had a palace here. The town is situated in a fertile plain surrounded by an amphitheatre of hills covered with vines and olive-trees. It is tolerably well built, and not badly laid out: it is adorned with numerous and copious fountains and many rows of trees. There is a clock-tower built upon a precipitous limestone rock, which crowns a small eminence, and rises as high as the roofs of the houses. The population in 1832 was 9070 for the town, or 9804 for the whole commune: the inhabitants manufacture coarse woollen cloths, leather, stockings, silks, wax-candles, and earthenware: there are many oil-mills. The environs produce excellent fruit and wines: gypsum is abundant, and there are stone-quarries in which large blocks of stone are quarried. There are a library, a cabinet of medals, a museum of natural history, containing chiefly the minerals of the department, a botanic garden, a high school, an agricultural society, and several prisons and foundling hospitals; the foundlings are chiefly illegitimate children.

The arrondissement, which is extensive, had in 1832 a population of 86,709.

DRAIN. [Sewer.]

DRAINING. As a certain quantity of moisture is essential to vegetation, so an excess of it is highly detrimental In the removal of this excess consists the art of draining.

Water may render land unproductive by covering it entirely or partially, forming lakes or bogs; or there may be an excess of moisture diffused through the soil and stagnating in it, by which the fibres of the roots of all plants which are not aquatic are injured, if not destroyed.

From these different causes of infertility arise three different branches of the art of draining, which require to be separately noticed.

1. To drain land which is flooded or rendered marshy by water coming over it from a higher level, and having no adequate outlet below.

2. To drain land where springs rise to the surface, and where there are no natural channels for the water to run off.

3. To drain land which is wet from its impervious nature, and where the evaporation is not sufficient to carry off all the water supplied by snow and rain.

The first branch includes all those extensive operations where large tracts of land are reclaimed by means of embankments, canals, sluices, and mills to raise the water; or where deep cuts or tunnels are made through hills which formed a natural dam or barrier to the water. Such works are generally undertaken by associations under the sanction of the government, or by the government itself; few individuals being possessed of sufficient capital, or having the power to oblige all whose interests are affected by the draining of the land to give their consent and afford assistance. In the British dominions there is no difficulty in obtaining the sanction of the legislature to any undertaking which appears likely to be of public benefit. In every session of parliament acts are passed giving certain powers and privileges to companies or individuals, in order to enable them to put into execution extensive plans of draining. That extensive draining in the counties of Northampton, Huntingdon, Cambridge, Lincoln, Norfolk, and Suffolk, which is known by the name of the Bedford Level, was confided to the management of a chartered corporation, with considerable powers, as early as the middle of the seventeenth century, and by this means an immense extent of land has been rendered highly productive, which before was nothing but one continued marsh or fen.

In the valleys of the Jura, in the canton of Neufchatel in Switzerland, which are noted for their industry and prosperity, and where the manufacture of watches is so extensive as to supply a great part of Europe with this useful article, extensive lakes and marshes have been completely laid dry, by making a tunnel through the solid rock, and forming an outlet for the waters. All these operations require the science and experience of civil engineers, and cannot be undertaken without great means. The greater part of the lowlands in the Netherlands, especially in the province of Holland, have been reclaimed from the sea, or the rivers which flowed over them, by embanking and draining, and are only kept from floods by a constant attention to the works originally erected.

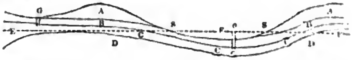
Where the land is below the level of the sea at high water, and without the smallest eminence, it requires a constant removal of the water which percolates through the banks or accumulates by rains; and this can only be effected by sluices and mills, as is the case in the fens in England. The water is collected in numerous ditches and canals, and led to the points where it can most conveniently be discharged over the banks. The mills commonly erected for this purpose are small windmills, which turn a kind of perpetual screw made of wood several feet in diameter, on a solid axle. This screw fits a semicircular trough which lies inclined at an angle of about 30° with the horizon. The lower part dips into the water below, and by its revolution discharges the water into a reservoir above. All the friction of pumps and the consequent wearing out of the machinery is thus avoided. If the mills are properly constructed, they require little attendance, and work night and day whenever the wind blows.

In hilly countries it sometimes happens that the waters, which run down the slopes of the hills collect in the bottoms where there is no outlet, and where the soil is impervious. In that case it may sometimes be laid dry by cutting a sufficient channel all round, to intercept the waters as they flow down and to carry them over or through the lowest part of the surrounding barrier. If there are no very abundant springs in the bottom, a few ditches and ponds will suffice to dry the soil by evaporation from their surface. We shall see that this principle may be applied with great advantage in many cases where the water could not be drained out of considerable hollows if it were allowed to run into them.

When there are different levels at which the water is pent up, the draining should always be begun at the highest; because it may happen that when this is laid dry, the lower may not have a great excess of water. At all events, if the water is to be raised by mechanical power, there is a saving in raising it from the highest level, instead of letting it run down to a lower from which it has to be raised so much higher.

In draining a great extent of land it is often necessary to widen and deepen rivers and alter their course; and not unfrequently the water cannot be let off without being carried by means of tunnels under the bed of some river, the level of which is above that of the land. In more confined operations cast-iron pipes are often a cheap and easy means of effecting this. They may be bent in a curve so as not to impede the course of the river or the navigation of a canal.

The draining of land which is rendered wet by springs arising from under the soil is a branch of more general application. The principles on which the operations are carried on apply as well to a small field as to the greatest extent of land. The object is to find the readiest channels by which the superfluous water may be carried off; and for this purpose an accurate knowledge of the strata through which the springs rise is indispensable. It would be useless labour merely to let the water run into drains after it has sprung through the soil and appears at the surface, as ignorant men frequently attempt to do, and thus carry it off after it has already soaked the soil. But the origin of the springs must, if possible, be detected; and one single drain or ditch judiciously disposed may lay a great extent of land dry if it cuts off the springs before they run into the soil. Abundant springs which flow continually generally proceed from the outbreaking of some porous stratum in which the waters were confined, or through natural crevices in rocks or impervious earth. A knowledge of the geology of the country will greatly assist in tracing this, and the springs may be cut off with greater certainty. But it is not these main springs which give the greatest trouble to an experienced drainer; it is the various land springs which are sometimes branches of the former, and often original and independent springs arising from sudden variations in the nature of the soil and subsoil. The annexed diagram representing a section of an uneven surface of land will explain the nature of the strata which produce springs.



Suppose A A a porous substance through which the water filtrates readily; B B a stratum of loam or clay impervious to water. The water which comes through A A will run along the surface of B B towards S S, where it will spring to the surface and form a lake or bog between S and S. Suppose another gravelly or pervious stratum under the last, as C C C bending as here represented, and filled with water running into it from a higher level; it is evident that this stratum will be saturated with water up to the dotted line E F F, which is the level of the point in the lower rock, or impervious stratum D D, where the water can run over it. If the stratum B B has any crevices in it below the dotted line, the water will rise through these to the surface and form springs rising from the bottom of the lake or bog: and if B B were bored through and a pipe inserted rising up to the dotted line, as *c o*, the water would rise, and stand at o. If there were no springs at S S the space below the dotted line might still be filled with water rising from the stratum C C C. But if the boring took place at G the water would not rise, but on the contrary, if there were any on the surface, it would be carried down to the porous stratum E C C, and run off. Thus in one situation boring will bring water, and in another it will take it off. This principle being well understood will greatly facilitate all draining of springs. Wherever water springs there must be a pervious and an impervious stratum to cause it and the water either runs over the impervious surface or rises through the crevices in it. When the line of the springs is found, as at S S, the obvious remedy is to cut a channel with a sufficient declivity to take off the water in a direction across this line, and sunk through the porous soil at the surface into the lower impervious earth. The place for this channel is where the porous soil is the shallowest above the breaking out, so as to require the least depth of drain;

out the solid stratum must be reached, or the draining will be imperfect. It is by attending to all these circumstances that Elkington acquired his celebrity in draining, and that he has been considered as the father of the system. It is however of much earlier invention, and is too obvious not to have struck any one who seriously considered the subject. In the practical application of the principle great ingenuity and skill may be displayed, and the desired effect may be produced more or less completely, and at a greater or less expense. The advice of a scientific and practical drainer is always well worth the cost at which it may be obtained.

When there is a great variation in the soil, and it is difficult to find any main line of springs, it is best to proceed experimentally by making pits a few feet deep, or by boring in various parts where water appears, observing the level at which the water stands in these pits or bores, as well as the nature of the soil taken out. Thus it will generally be easy to ascertain whence the water arises, and how it may be let off. When there is a mound of light soil over a more impervious stratum, the springs will break out all round the edge of the mound; a drain laid round the base will take off all the water which arises from this cause, and the lower part of the land will be effectually laid dry. So likewise where there is a hollow or depression of which the bottom is clay with sand in the upper part, a drain laid along the edge of the hollow and carried round it will prevent the water running down into it, and forming a marsh at the bottom.

When the drains cannot be carried to a sufficient depth to take the water out of the porous stratum saturated with it, it is often useful to bore numerous holes with an auger in the bottom of the drain through the stiffer soil, and, according to the principle explained in the diagram, the water will either rise through these bores into the drains and be carried off, and the natural springs will be dried up, or it will sink down through them as at G, in the section, if it lies above. This method is often advantageous in the draining of peat mosses, which generally lie on clay or stiff loam, with a layer of gravel between the loam and the peat, the whole lying in a basin or hollow, and often on a declivity. The peat, though it retains water, is not pervious, and drains may be cut into it which will hold water. When the drains are four or five feet deep and the peat is much deeper, holes are bored down to the clay below, and the water is pressed up through these holes, by the weight of the whole body of peat, into the drains, by which it is carried off. The bottom of the drains is sometimes choked with loose sand, which flows up with the water, and they require to be cleared repeatedly; but this soon ceases after the first rush is past, and the water rises slowly and regularly. The surface of the peat being dried, dressed with lime, and consolidated with earth and gravel, soon becomes productive. If the soil, whatever be its nature, can be drained to a certain depth, it is of no consequence what water may be lodged below it. It is only when it rises so as to stagnate about the roots of plants that it is hurtful. Land may be drained so much as to be deteriorated, as experience has shown.

When a single large and deep drain will produce the desired effect, it is much better than when there are several smaller, as large drains are more easily kept open, and last longer than smaller; but this is only the case in tapping main springs, for if the water is diffused through the surrounding soil, numerous small drains are more effective: but as soon as there is a sufficient body of water collected, the smaller drains should run into larger, and these into main drains, which should all, as far as is practicable, unite in one principal outlet, by which means there will be less chance of their being choked up. When the water springs into a drain from below, it is best to fill up that part of the drain which lies above the stones or other materials which form the channel with solid earth well pressed in, and made impervious to within a few inches of the bottom of the furrows in ploughed land, or the sod in pastures; because the water running along the surface is apt to carry loose earth with it, and choke the drains. When the water comes in by the side of the drains, loose stones or gravel, or any porous material, should be laid in them to the line where the water comes in, and a little above it, over which the earth may be rammed in tight so as to allow the horses to walk over the drain without sinking in.

It sometimes happens, that the water collected from springs which caused marshes and bogs below, by being carried in new channels, may be usefully employed in irrigating the land which it rendered barren before; not only removing the cause of barrenness, but adding positive fertility. In this case the lower grounds must have numerous drains in it, in order that the water let on to irrigate it may not stagnate upon it, but run off after it has answered its purpose.

The third branch in the art of draining is the removal of water from impervious soils which lie flat, or in hollows, where the water from rain, snow, or dews, which cannot sink into the soil on account of its impervious nature, and which cannot be carried off by evaporation, runs along the surface and stagnates in every depression. This is by far the most expensive operation, in consequence of the number of drains required to lay the surface dry, and the necessity of filling them with porous substances, through which the surface water can penetrate. It requires much skill and practice to lay out the drains so as to produce the greatest effect at the least expense. There is often a layer of light earth immediately over a substratum of clay, and after continued rains this soil becomes filled with water, like a sponge, and no healthy vegetation can take place. In this case numerous drains must be made in the subsoil, and over the draining tiles or bushes, which may be laid at the bottom of the drains, loose gravel or broken stones must be laid in to within a foot of the surface, so that the plough shall not reach them. The water will gradually sink into these drains, and be carried off, and the loose wet soil will become firm and dry. In no case is the advantage of draining more immediately apparent.

It is very seldom that a field is absolutely level; the first thing therefore to be ascertained is the greatest inclination and its direction. For this purpose there is an instrument essential to a drainer, with which an accurately horizontal line can be ascertained, by means of a plummet or a spirit level. A sufficient fall may thus be found or artificially made in the drains to carry off the water. The next object is to arrange drains so that each shall collect as much of the water in the soil as possible. Large drains, except as main drains, are inadmissible, since it is by the surface that the water is to come in, and two small drains will collect more than a larger and deeper. The depth should be such only that the plough may not reach it, if the land is arable, or the feet of cattle tread it in, if it be in pasture. All the drains which are to collect the water should lie as nearly at right angles to the inclination of the surface as is consistent with a sufficient fall in the drains to make them run. One foot is sufficient fall for a drain 300 feet in length, provided the drains be not more than 20 feet apart. The main drains, by being laid obliquely across the fall of the ground, will help to take off a part of the surface water. It is evident that the drains can seldom be in a straight line, unless the ground be perfectly even. They should, however, never have sudden turns, but be bent gradually where the direction is changed. The flatter the surface and the stiffer the soil, the greater number of drains will be required. It is a common practice with drainers to run a main drain directly down the slope, however rapid, and to carry smaller drains into this alternately on the right and left, which they call herring-bone fashion. But this can only be approved of where the ground is nearly level, and where there is very little fall for the main drain. A considerable fall is to be avoided as much as possible; and every drain should lie obliquely to the natural run of the water. It generally happens that, besides surface water, there are also some land springs arising from a variation in the soil; these should be carefully ascertained, and the drains should be so laid as to cut them off.

In draining clay land, where there is only a layer of a few inches of looser soil over a solid clay which the plough never stirs, the drains need not be deeper than two feet in the solid clay, nor wider than they can be made without the sides falling in. The common draining tile, which is a flat tile bent in the form of half a cylinder, and which can be made at a very cheap rate with the patent machine, is the best for extensive surface draining. In solid clay it requires no flat tile under it, it is merely an arch to carry the loose stones or earth with which the drain is filled up. Loose round stones or pebbles are the best where they can be procured; and in default of them, bushes, heath, or straw, may be laid immediately over the tiles, and the most porous earth that can be got must be used to fill the drains up: the stiff clay which was dug out must be taken away or spread over the surface; for if it were put in the drain, it would defeat the object in view by preventing the water from running into it from above. In grass land, the sod may be laid over the drain, after it has been filled up so as to form a slight ridge over it. This will soon sink to a level with the surface, and in the mean time serves to catch the water as it runs down. To save the expense of stone or tiles, drains are frequently made six inches wide at the bottom, a narrow channel is cut in the solid clay, two or three inches wide and six deep, leaving a shoulder on each side to support a sod which is cut so as to fit the drain, and rests on the shoulders: this sod keeps the earth from filling the channel; and the water readily finds its way through it, or between it and the sides of the drain. It is filled up as described before: such drains are made at a small expense, and will last for many years.

Where the clay is not sufficiently tenacious, the bottom of the drain is sometimes cut with a sharp angle, and a twisted rope of straw is thrust into it. This keeps the earth from falling in, and the running of the water keeps the channel open; the straw not being exposed to the air, remains a long time without decaying. This is a common mode of draining in Norfolk, Suffolk, and Essex.

The best materials for large main drains, where they can be procured, are flat stones which readily split, and of which square or triangular channel is formed in the bottom of he drain. If the drain is made merely as a trunk to carry off the water, it is best to fill it up with earth, well pressed in, over the channel made by the stones; but if it serves for receiving the water through the sides or from the top, fragments of stone should be thrown over it to a certain height, and the earth put over these. A very useful draining tile is used in Berkshire and other places, which requires no flat tile under it, even in loose soils, because it has a flat foot to rest on, formed of the two thick edges of the tile, which, nearly meeting when the tile is bent round, form the foot. The section of the tile is like a horse-shoe. It is well adapted for drains where the water springs upwards, and it is less apt to slip out of its place than the common tile. They are usually made twelve or thirteen inches in length, but they are more expensive than the common tiles.

In draining fields it is usual to make the outlets of the drains in the ditch which bounds them. The fewer outlets there are, the less chance there is of their being choked: they should fall into the ditch at 2 ft. from the bottom, and a wooden trunk or one of stone should be laid so that the water may be discharged without carrying the soil from the side of the ditch. If there is water in the ditch, it should be kept below the mouth of the drain. The outlets of all drains should be repeatedly examined, to keep them clear; for wherever water remains in a drain, it will soon derange or choke it. The drains should be so arranged or turned, that the outlet shall meet the ditch at an obtuse angle towards the lower part where the water runs to. A drain brought at right angles into a ditch must necessarily soon be choked by the deposition of sand and earth at its mouth.

As the draining of wet clay soils is the only means by which they can be rendered profitable as arable land, and the expense is great, various instruments and ploughs have been contrived to diminish manual labour and expedite the work. Of these one of the simplest is the common mole-plough, which in very stiff clay makes a small hollow drain, from 1 ft. to 18 in. below the surface, by forcing a pointed iron cylinder horizontally through the ground. It makes a cut through the clay, and leaves a cylindrical channel, through which the water which enters by the slit is carried off. It requires great power to draw it, and can only be used when the clay is moist. In meadows it is extremely useful, and there it need not go more than a foot under the sod. Five to ten acres of grass land may easily be drained by it in a day. It is very apt, however, to be filled in dry weather by the soil falling in; and the animals from which it derives its name often do much damage to it by using it in their subterraneous workings.

But a draining plough has been invented, which, assisted by numerous labourers, greatly accelerates the operation of forming drains, by cutting them out in a regular manner, when they are immediately finished with the usual tools and filled up. It has done wonders in some of the wet stiff soils in Sussex, and is much to be recommended in all wet and heavy clays. In stony land it cannot well be used. The subsoil plough, introduced to public notice by Mr. Smith of Deanston, may be considered in some measure as a draining plough, for it loosens the subsoil, so that a few main drains are sufficient to carry off all the superfluous moisture; and it has besides the effect of not carrying off more than what is superfluous. By means of judicious drains and the use of the subsoil plough, the stiffest and wettest land may in time become the most fertile.

The tools used in draining are few and simple. Spades, with tapering blades of different sizes, are required to dig the drains of the proper width, and the sides at a proper angle. Hollow spades are used in very stiff clay. When the drain begins to be very narrow near the bottom, scoops are used, of different sizes, which are fixed to handles at various angles, more conveniently to clear the bottom and lay it smooth to the exact width of the tiles, if these are used; for the more firmly the tiles are kept in their places by the solid sides of the drain, the less likely they are to be moved. (Elkington, Stephens, Johnstone, Donaldson, Young, Marshall.)

DRAKE, SIR FRANCIS, was born in or about the year 1546, in an humble cottage on the banks of the Tavy, in Devonshire. His father, who was a poor and obscure yeoman, had twelve sons, of whom Francis was the eldest. According to Camden, who derived his information from Drake himself, Francis Russel, afterwards earl of Bedford, stood as his godfather, and John Hawkins, a distinguished navigator, defrayed the slight expenses of his short school education. In the days of persecution under Queen Mary, his father, who was known in his neighbourhood as a zealous protestant and a man of some acquirements, fled from Devonshire into Kent, where Drake was brought up; 'God dividing the honour,' says Fuller, 'betwixt two counties, that the one might have his birth and the other his education.' Under Elizabeth his father obtained an appointment 'among the seamen in the king's navy to read prayers to them;' and soon afterwards was ordained deacon, and made vicar of Upnor church on the Medway, a little below Chatham, where the royal fleet usually anchored. Francis thus grew up among sailors; and while he was yet very young, his father, 'by reason of his poverty, apprenticed him to a neighbour, the master of a bark, who carried on a coasting trade, and sometimes made voyages to Zeeland and France.' This master kept Drake close to his work, and 'pains, with patience in his youth,' says Fuller, 'knit the joints of his soul, and made them more solid and compact.' When his master died, having no children of his own, he bequeathed to young Drake the bark and its equipments. With this he continued in the old trade, and had got together some little money, and was in the fair way of becoming a thriving man, when his imagination was inflamed by the exploits of his protector Hawkins in the New World; and suddenly selling his ship, he repaired to Plymouth, and embarked himself and his fortunes in that commander's last and unfortunate adventure to the Spanish Main. In this disastrous expedition Drake lost all the money he had in the world, and suffered not a little in character; for he disobeyed orders, and deserted his superior and his friend in the hour of need. He, however, showed skilful seamanship, and brought the vessel he commanded—the Judith, a small bark of 50 tons—safely home. A chaplain belonging to the fleet comforted Drake with the assurance that, as he had been treacherously used by the Spaniards, he might lawfully recover in value upon the king of Spain, and repair his losses upon him whenever and wherever he could. Fuller says, 'The case was clear in sea divinity; and few are such infidels as not to believe doctrines which make for their profit. Whereupon Drake, though a poor private man, undertook to revenge himself on so mighty a monarch, who, not contented that the sun riseth and setteth in his dominions, may seem to desire to make all his own where he shineth.' Being readily joined by a number of sea adventurers, who mustered among them money enough to fit out a vessel, Drake made two or three voyages to the West Indies, to gain intelligence and learn the navigation of those parts; but Camden adds, that he also got some store of money there, 'by playing the seaman and the pirate.' In 1570 he obtained a regular commission from Queen Elizabeth, and cruised to some purpose in the West Indies. In 1572 he sailed again for the Spanish Main, with the Pasha, of 70 tons, and the Swan, of 25 tons, the united crews of which amounted to 73 men and boys. He was joined off the coast of South America by another bark, from the Isle of Wight, with 38 men; and with this insignificant force he took and plundered the town of Nombre de Dios, and made great spoil among the Spanish shipping. He partially crossed the Isthmus of Darien, and obtained a view of the great Pacific, an ocean as yet closed to English enterprise; and with his eyes anxiously fixed upon its waters, he prayed God to grant him 'life and leave once to sail an English ship in those seas.'

After some extraordinary adventures, Drake returned to England, with his frail barks absolutely loaded and crammed with treasure and plundered merchandise; and on the 9th of August, 1573, anchored at Plymouth. It was a Sunday, and the townsfolk were at church; but when the news spread thither that Drake was come, 'there remained few or no people with the preacher,' all running out to welcome the Devonshire hero.

Drake being employed in the interval in the service of the queen in Ireland, was forestalled in the honour of being the first Englishman to sail on the Pacific by one John Oxenham, who had served under him as common sailor and cook; but as this man merely floated a 'pinnace' on the South Sea, and was taken by the Spaniards and executed as a pirate, he could scarcely be an object of envy.

In 1577, under the secret sanction of Queen Elizabeth, Drake departed on another marauding expedition, taking with him five vessels, the largest of which was of 100, and the smallest of 15 tons. The united crews of this miniature fleet amounted to 164 men, *gentlemen* and sailors. Among the *gentlemen* were some young men of noble families, who (not to mention the plunder anticipated) 'went out to learn the art of navigation.' After many adventures along the coasts of the South American continent, where some of his attacks were completely successful, Drake and his choice comrades came to Port Julian, on the coast of Patagonia, near the Straits of Magalhaens, where they were much comforted by finding a gibbet standing—a proof that Christian people had been there before them. Drake, during his stay in Port Julian, put to death 'Master Doughtie,' a gentleman of birth and education, whose fate is still involved in some mystery, notwithstanding the laudable endeavours of Dr. Southey to rescue the fame of one of our greatest naval heroes from the suspicion of a foul murder.

On the 20th of August Drake reached Cape Virgenes, and sailed through the Strait of Magalhaens, being the third navigator who performed that passage. On the 17th day after making Cape Virgenes he cleared the strait, and entered the Pacific or South Sea. Having obtained an immense booty by plundering the Spanish towns on the coast of Chili and Peru, and by taking, among many other vessels, a royal galleon called the 'Cacafuego,' richly laden with plate, he sailed to the north in the hope of finding a passage back to the Atlantic, a little above California. He reached lat. 48° N., where the extreme severity of the cold discouraged his men, and he put back ten degrees, and took shelter in Port San Francisco. After staying five weeks in that port, he determined to follow the example of Magalhaens, and steer across the Pacific for the Moluccas. He made Ternate, one of the Molucca group, in safety, and thence set his course for Java.

From Java he sailed right across the Indian Ocean to the Cape of Good Hope, which he doubled without accident, and thence shaped his course homewards. He arrived at Plymouth on Sunday, the 26th September, 1579, after an absence of two years and nearly ten months, during which he had circumnavigated the globe, and spent many months on the almost unknown south-western coasts of America. Drake was most graciously received at court, and Elizabeth now asserted more firmly than ever her right of navigating the ocean in all its parts, and denied the exclusive right which the Spaniards claimed over the seas and lands of the New World. And though the queen yielded so far as to pay a considerable sum out of the treasure Drake had brought home to the procurator of certain merchants who urged, *with some reason*, that they had been unjustly robbed, enough was left to make it a profitable adventure for the privateers. At her orders Drake's ship was drawn up in a little creek near Deptford, there to be preserved as a monument of the most memorable voyage that the English had ever yet performed: she partook of a banquet on board the vessel, and there knighted the captain. During part of the year 1585, and the whole of 1586, Drake was actively employed against Philip II. on the coasts of Spain and Portugal, in the Canaries, the Cape de Verdes, the West India islands, and on the coast of South America, where Carthagena and other towns were taken and plundered.

In the course of this expedition Drake visited the English colony in Virginia, which had been recently planted by Raleigh, and finding the colonists in great distress, he took them on board and brought them home with him. It is said that tobacco was first brought into England by the men who returned from Virginia with Drake. In 1587, when formidable preparations were making in the Spanish ports for the invasion of England, Elizabeth appointed Drake to the command of a fleet equipped for the purpose of destroying the enemy's ships in their own harbours. This force did not exceed thirty sail, and only four were of the Navy Royal, the rest, with the exception of two yachts belonging to the Queen, being furnished by merchant adventurers. In the port of Cadiz, the first place he attacked, he found sixty ships and many vessels of inferior size, all protected by land batteries. Drake entered the roads on the morning of the 19th April, and he burnt, sunk, or took thirty ships, some of which were of the largest size; and it appears he might have done much more mischief but for the necessity he was under of securing as much booty, in goods, as he could for the benefit of the merchant adventurers. He then turned back along the coast, taking or burning nearly a hundred vessels between Cadiz and Cape St. Vincent, besides destroying four castles on shore. This was what Drake called 'singeing the king of Spain's beard.' From Cape St. Vincent he sailed to the Tagus, and entering that river, came to anchor near Cascaes, whence he sent to tell the Marquis Santa-Cruz, who was lying up the river with a large force of galleys, that he was ready to exchange bullets with him. The marquis, who had been appointed general of the Armada preparing for the invasion of England, and who was esteemed the best sailor of Spain, declined the challenge, and he died (the English writers say of vexation at the mischief done by Drake) before that ill-fated expedition could sail.

The operations we have briefly related delayed the sailing of that armament more than a year, and gave Elizabeth time to prepare for her defence. Having thus performed the public service, Drake bore away to the Azores, on the lookout for the treasure ships from India, and he was so fortunate as to fall in with an immense carrack most richly laden. He took it, of course, and 'the taking of this ship,' says a contemporary, was of a greater advantage to the English merchants than the value of her cargo to the captors; for, by the papers found on board, they so fully understood the rich value of the Indian merchandizes, and the manner of trading into the eastern world, that they afterwards set up a gainful traffic, and established a company of East India merchants.' Drake generously spent a considerable part of his prize-money in supplying the town of Plymouth with good, fresh water, for hitherto there was none, except what the inhabitants fetched from a mile distance.

His next service at sea was as vice-admiral in the fleet under Charles Lord Howard of Effingham, lord high admiral of England, which, with the assistance of the elements, scattered and destroyed the 'Invincible Armada' of Spain. (ARMADA.) The seamanship of Drake, Hawkins, and Frobisher contributed largely to the happy result. In the following year, 1589, Drake was employed as admiral in an expedition sent to Portugal, in the hope of expelling the Spaniards, who had taken possession of that kingdom, by establishing the claims of Antonio, a pretender, around whom the English expected the Portuguese would rally. The whole expedition was badly planned, most miserably supplied with money and the other means of war, and but lamely executed after the landing of the troops. It was also disgraced by cruelties unusual even in that age, and inexcusable, notwithstanding the provocation which the English had so recently received on their own shores. In 1595 Drake and Sir John Hawkins, who had good experience in those parts, represented to Elizabeth that the best place for striking a blow at the gigantic power of Spain was in the West Indies; and an expedition thither was prepared, Drake and Hawkins sailing together with twenty-six ships, on board of which was embarked a land force under the orders of Sir Thomas Baskerville and Sir Nicholas Clifford. There were too many in command, and the usual bad consequences ensued. After losing time in debate they were obliged to give up an attempt on the Canaries with some loss. When they got among the West India islands Drake and Hawkins not only quarrelled but separated for some time, and before reaching the east end of Puerto Rico Hawkins died, his death being generally attributed to the agitation of his mind.

One of Drake's smallest vessels was captured by the Spaniards, who, by putting the crew of it to the torture, extracted information respecting the plans of the expedition. When Drake attacked Puerto Rico he found that place fully warned and prepared, and his desperate attack was defeated. Sailing away, he took and burned Rio de la Hacha, Rancheria, Santa Martha, and Nombre de Dios; getting no greater spoil than 20 tons of silver, and 2 bars of gold. Drake remained in the harbour of Nombre de Dios, a most unhealthy place, while Baskerville with a part of the land forces made a vain and ruinous attempt to cross the isthmus of Darien, in order to plunder and destroy the city of Panama. A fatal disease broke out among soldiers and sailors, and soon deprived them of the important services of the chief surgeon of the fleet. When many of his men and three of his captains had died, the hardy Drake himself fell sick, and after struggling some twenty days with his malady, and the grief occasioned by his failures, he expired on the 27th of December, 1595. On the same day the fleet anchored at Puerto Bello, and in sight of that place, which he had formerly taken and plundered, his body received a sailor's funeral—

The waves became his winding sheet,
  The waters were his tomb;
But for his fame the ocean sea
  Was not sufficient room.

So sang one of his admiring contemporaries.

Though the reputation of Drake as a skilful seaman and a bold commander was deservedly great, still, unless we judge him by the circumstances and the standard of the times, he must appear in many of his exploits in no other light than that of a daring and skilful buccaneer. (Southey, *Naval History*; Harris, *Collection of Voyages*.)

DRAKENBORCH, ARNOLD, was born at Utrecht, in 1684, studied in that university under Grævius and Peter Burmann, and at the age of 20 wrote an elaborate dissertation 'De Præfectis Urbis,' which established his reputation as a scholar. The heads of the chapters will best explain the various bearings and the classical importance of the subject. Ch. 1. is 'De Præfectis Urbis in genere,' in which the author explains the various kinds of magistrates at Rome who bore this name at different epochs, their various appellations, such as Custos Urbis, &c. 2. 'De Præfectis Urbis sub Regibus institutis,' who were appointed by several kings to take care of the city of Rome during their absence in war. Similar officers were occasionally appointed under the republic during the absence of the two consuls. 3. 'De Præfecto Urbis feriarum Latinarum caussa;' this was also a temporary magistrate appointed while the consuls were attending the Latin festivals on the Alban Mount. [Alba Longa.] 4. 'De ultimo Præfecto sub Imperatoribus creato.' Augustus created the permanent office of præfect of Rome, which was filled by a senator appointed by the emperor, sometimes for life, sometimes for a shorter period. Messala Corvinus was the the first præfect appointed, but he soon after resigned, and Mæcenas succeeded him. Panvinius, in his 'Annals,' has given a list of all the præfects of Rome from Augustus to the fall of the empire. In the following chapters Drakenborch explains the nature, importance, and various duties of the office. 5. 'De his qui ad Præfecturam Urbis admittuntur, eorumque dignitate.' 6. 'De Jurisdictione Præfecti Urbis.' 7. 'De Curâ Præfecti Urbis circa annonam.' 8. 'De Curâ Præfecti Urbis circa ædificia.' 9. 'Idem circa ludos.' 10. 'De variis Officiis ad Præfectum Urbis pertinentibus.' 11. 'De Insignibus Præfecti Urbis.' The præfect of Rome was the first civil magistrate of the city and country around as far as the hundredth milliary stone; he ranked next to the emperor, was supreme judge in all important causes, heard appeals from the inferior magistrates, had charge of the police of the city, the superintendence of the markets and provisions, and, what was no less important at Rome, of the public games. He had under his orders the 'milites urbanos et stationarios,' a sort of militia which kept guard in the city.

This valuable little work of Drakenborch has gone through several editions; that of Bareuth, 1787, contains an extract from the author's funeral oration, by Professor Oosterdyk, in which the other works of Drakenborch are mentioned. Upon leaving Utrecht he went to Leyden to study the law, but there also he devoted his chief attention to the classical lessons of Perizonius and Gronovius. He wrote, in 1707, another dissertation 'De Officio Præfectorum Prætorio,' in which he explains and illustrates the nature and duties of that important military office in the same manner as he had done for that of the præfects of the city. He states the changes made by various emperors, and lastly by Constantine, who, having abolished the prætorians, appointed four præfects of the prætorium, one for each division of the empire, who were supreme magistrates within their respective jurisdictions.

Drakenborch undertook, by the advice of Peter Burmann, an edition of Silius Italicus, which appeared in 1717. On Burmann's removal to Leyden, Drakenborch succeeded him in the chair of eloquence and history at Utrecht. His edition of Livy, on which he bestowed much time and labour, was published in 1738-46, in 7 vols. 4to. The value of the edition lies in the large collection of various readings, and the illustration of idioms by parallel passages drawn from the writings of Livy. The text is decidedly inferior to that which is found in the unpretending editions by Stroth, Raschig, &c. He published also, 'De Utilitate et Fructu humanarum Disciplinarum Oratio inauguralis;' 'Oratio funebris in Mortem Francisci Burmanni,' and other orations and dissertations, and also a 'History of Utrecht,' and 'Genealogies of the noble Families of Holland.' He died at Utrecht in 1747.

DRAMA, ATTIC (*δρᾶμα*, an action), is said by Aristotle (*Poet.* iv., 14) to have arisen from the recitations of the leaders of the Dithyrambus. To understand this statement we must bear in mind that a Greek tragedy always consisted of two distinct parts; the dialogue, which was written in the Attic dialect, and corresponded in its general features to the dramatical compositions of modern times, and the chorus, which to the last was more or less pervaded by Dorisms, and the whole tone of which was lyrical rather than dramatical. We must add that the metre of the dialogue, whether Iambic or Trochaic, was staid and uniform; while the choruses were written with every variety of metre. In a word, the dialogue was meant to be recited; the chorus was intended to be sung. It is obvious that these two elements must have had different origins. The one was an offshoot of the lyric poetry which sprung up among the Dorians, the other is to be referred to the rhapsodical recitations which were peculiar to the Ionian branch of the Greek nation; and as the Athenians stood in the middle between the Ionians and the Dorians, so the Attic drama may be considered as the point of intersection of the Ionian and Dorian literatures. That choral and consequently lyrical poetry should spring up among the Dorians was a natural result of the peculiar organization of a Doric state [Dorians]; and the Epos as naturally arose among the Ionians, the countrymen of Homer. (*Hist. of the Literature of Greece*, in the *Library of Useful Knowledge*, p. 41 and following.) [Homer.] The Ionian epic poetry, which was written in dactylic hexameters, was recited by a set of men called *rhapsodists* [Rhapsody]; and the gnomic and didactic poetry of Hesiod was recited in the same way. But the dactylic hexameter was not found suitable for gnomic poetry, and a modification of it, consisting also of six feet, but each foot shorter by a half-time than the dactyl, was substituted for it. This metre (the Iambic), or a lengthened form of it (the Trochaic), was used by Archilochus, Simonides of Amorgus, and Solon, whose verses were recited by themselves or by rhapsodists in the same way as the epic poetry which preceded them.

The lyric poetry of the Dorians was originally appropriated to the worship of Apollo, but the particular odes and choruses used in this worship were in process of time transferred to the cognate deity, Bacchus (who was, like Apollo, the god of the sun [Bacchus and Demeter]; and these odes and choral dances had, all of them, their representatives in the dramatic poetry of a later age. (Athenæus, p. 630, D.) But the Dithyrambus was the earliest species of choral poetry connected with the worship of Bacchus, and it appears from many allusions, and indeed from Dithyrambic fragments, that while the body of the song was composed in irregular metres, the poet himself, or some rhapsodist, acting as exarchus, or leader, in his place, recited trochaics as an introduction. Here then was a mixture of recitation and chorus perfectly analogous to the tragedy of later time, which was probably suggested by it; and it is in this sense, we doubt not, that Aristotle attributes to the leaders of the Dithyrambus the origin of tragedy.

We read of a lyrical tragedy long before Thespis, and this appears to have been a modification of the Dithyrambus, with a lyrical accompaniment instead of the flute-music to which it was originally danced, and with a substitution of men dressed as satyrs for the usual chorus, which alteration is attributed to Arion. The union of this lyrical tragedy with the recitations of rhapsodists is said to have been brought about by Thespis, a contemporary of Pisistratus and Solon, and may have been suggested as well by the recitations of the leaders of the Dithyrambus as by the union of rhapsodical recitations with Bacchic rites at the Brauronia. Thespis introduced one actor, an exarchus, or rhapsodist, who, standing on an elevated place, while the dithyrambic chorus were grouped around the altar of Bacchus, carried on a dialogue with them, or narrated some mythical story in character. The comedy of antient Greece originated in the festival of the vintage, when the country people went from one village to another, in carts or on foot, holding aloft the phallus, or emblem of productiveness, and indulging in rude jests and coarse invectives. From these effusions comedy was developed either in Megaris or in Sicily. Its first approach to perfection was owing to the genius of Epicharmus, who is said by Plato (*Theætet.* p. 152 E) to have borne the same relation to comedy that Homer did to tragedy. A similar comic drama sprung up about the same time at Athens, and was carried to a wonderful degree of strength and beauty.

The dramas of antient Greece were always performed at and as a part of the festival of Bacchus [DIONYSIA]. The plays for exhibition had previously been submitted by their authors to a board of judges, and approved by them.

It would occupy too much space to give a complete catalogue of the very numerous works written on the Greek drama. A list of some of the principal of these will be seen at the end of the introduction to the fourth edition of the *Theatre of the Greeks* (Cambridge, 1836,) from which this account has been borrowed.

DRAMATIC ART AND LITERATURE. Of all the liberal arts, the dramatic (which, indeed, in its superior walks may be said to combine all the others) is that which is capable at once of the greatest comprehensiveness and of almost endless variety. This will distinctly appear from an attentive consideration of the several important elements essential to the producing of the highest class of theatrical exhibitions.

The first and simplest of the dramatic elements may be found existing in a high degree in works neither intended for the stage nor capable of being transferred to it—in simple dialogues. When, however, the persons of the colloquy deliver thoughts and sentiments which, though opposed to each other, operate no change, but leave the minds of both in exactly the same state in which they were at the commencement, the conversation may indeed be deserving of attention, but cannot be productive of any dramatic interest. To awaken the latter, the conversation must be animated by a different spirit. For instance, when, in Plato, Socrates asks the sophist, Hippias, what is the meaning of the beautiful, the latter promptly returns a superficial answer, but is afterwards compelled by the disguised attacks of Socrates to give up his former definition, and shift his ground again and again, until, ashamed and irritated at the superiority of the sage who has convicted him of his ignorance, he is at length reduced to quit the field. This dialogue is not only philosophically instructive, but arrests the attention like a little drama: and owing to this animation in the progress of the thoughts, and the solicitude with which we consequently look to the result, the dramatic character of the dialogues of Plato has always been justly admired.

From this we may conceive the great charm of dramatic poetry. 'Of all diversions,' observes the modern German critic, Schlegel, in his very able lectures on dramatic literature and art, 'the theatre is undoubtedly the most entertaining: we see important actions when we cannot act importantly ourselves: the highest object of human activity is man; and in the drama we see men, from motives of friendship or hostility, measure their powers with each other, influence each other as intellectual and moral beings, by their thoughts, sentiments, and passions, and decidedly determine their reciprocal relations. The art of the poet is to separate from the fable whatever does not essentially belong to it; whatever, in the daily necessities of real life, and the petty occupations to which they give rise, interrupts the progress of important actions; and to concentrate within a narrow space a number of events calculated to fill the minds of the hearers with attention and expectation. In this manner it affords us a renovated picture of life—a compendium of whatever is animated and interesting in human existence.

'Nor is this all. Even in a lively verbal relation, it is frequently customary to introduce persons in conversation with each other, and to give a corresponding variety to the tone and the language. But the gaps which these conversations still leave in the story are filled up with a description of the accompanying circumstances, or other particulars, by the person who relates in his own name. The dramatic poet must renounce all such assistance; but for this he is richly recompensed in the following invention. He requires each of the characters in his action to be represented by a real person; that this person, in size, age, and figure, should resemble as much as possible the ideas which we are to form of his imaginary being, and even assume every peculiarity by which that being is distinguished; that every speech should be delivered in a suitable tone of voice, and accompanied by corresponding looks and motions; and that those external circumstances should be added which are necessary to give the hearers a clear idea of what is going forward. Moreover, these representatives of the creatures of his imagination must appear in the costume suitable to their assumed rank, age, and country; partly that they may bear a greater resemblance to them, and partly because there is something characteristic even in the dresses. Lastly, he must see them surrounded by a place which in some degree resembles that where, according to his fable, the action took place; because this also contributes to the resemblance: he places them on a scene. All this brings us to the idea of the theatre. It is evident that in the form of dramatic poetry, that is, in the representation of an action by dialogue without any narration, the ingredient of a theatre is essentially necessary. We allow that there are dramatic works which were not originally destined by their authors for the stage, and which would not produce any great effect on it, that still afford great pleasure in the perusal. I am, however, very much inclined to doubt whether they would produce the same strong impression upon a person who had never seen a play, nor ever heard a description of one, which they do upon us. We are accustomed, in reading dramatic works, to supply the representation ourselves.'

A visible representation, then, being essential to the dramatic form, a dramatic work may be considered in a double point of view—how far it is poetical, and how far it is theatrical. In considering its poetical qualities it is not the versification and the ornaments of language that we have chiefly in contemplation, but the poetry in the spirit and plan of a piece; and this may exist in a high degree, when even it is written in prose. To be poetical in the higher sense, it must in the first place be a connected whole, and complete within itself. But this is merely the negative condition of the form of a work of art, by which it is distinguished from the phenomena of nature, which flow into one another, and do not possess an independent existence. To be poetical, it is necessary that it should be a mirror of ideas, of thoughts, and feelings, in their character necessary and eternally true, though moulded into an imaginative whole.

But how does a dramatic work become theatrical, or fitted to appear with advantage on the stage? The object proposed is, to produce an impression on an assembled crowd, to gain their attention, and excite in them an interest and participation. This part of his task is common to the poet with the orator. The latter attains his end by perspicuity, rapidity, and force. Whatever exceeds the ordinary measure of patience or comprehension, he must carefully avoid. Moreover, a number of men assembled together constitute an object of distraction to one another, if their eyes and ears are not directed to a common object beyond their own circle. Hence the dramatic poet, as well as the orator, must at the very outset produce an impression strong enough to draw his hearers from themselves, and so become master, as it were, of their bodily attention.

'The grand requisite in a drama,' remarks Schlegel, 'is to make the rhythmus visible in its progress. When this has once been effected, the poet may the sooner halt in his rapid career, and indulge his own inclinations. There are points where the most simple or artless tale, the inspired lyre, the most profound thoughts and remote allusions, the smartest coruscations of wit, and the most dazzling flights of a sportive or ethereal fancy, are all in their place, and where the willing audience, even those who cannot entirely comprehend them, follow the whole with a greedy ear, like a music in harmony with their feelings. The great art of the poet is, to avail himself of the effect of contrasts wherever he can,—to exhibit with equal clearness, at some times a quiet stillness, the musings of self-contemplation, and even the indolent resignation of exhausted nature, and at others the most tumultuous emotions, the raging storm of the passions. With respect to the theatrical, however, we must never forget that much must be suited to the capacities and inclinations of the audience, and consequently to the national character in general, and the particular degree of civilization. Dramatic poetry is in a certain sense the most worldly of all; for, from the stillness of an inspired mind it exhibits itself in the midst of the noise and tumult of social life. The dramatic poet, more than any other, is bound to court external favour for applause.'

It is important that we should enter into a preliminary consideration of the distinction which, we think, has been too rigorously drawn, in treating of dramatic composition, between the tragic and the comic species. Least of all the arts will the dramatic admit of that mechanical mode of critical analysis, to which indeed the spirit of all true art is essentially repugnant. We have already observed, that, even above all other artists, the dramatist, on whatever subject he employs his talent, is bound to seek, first of all, to please. Whether tragedy or comedy has attracted the spectator to the benches of the theatre, it is entertainment that he is come in quest of. The dramatist who cares to succeed in his art must therefore make it his primary object to furnish that entertainment. Let it not be supposed, as seems to have been mistakenly thought even by some critics of eminence, that any one goes voluntarily to witness a tragedy for the sake of painful excitement. Among the numerous and extremely miscellaneous audience collected in a great national theatre (which very diversity is not one of the least interesting circumstances incidental to our subject) there is, indeed, to be found, at one and the same moment, every grade of intellect, of feeling, and of taste; but even the rudest and most ignorant spectator, in the most animated scenes of the most admirably exhibited drama, never once thoroughly mistakes illusion for reality. Were he once to do so, the pleasing spell would be dissolved. It is not the presence of deep distress or convulsive passion that holds the theatrical auditor in pleasingly fascinated attention; it is the vivid picture of it. This grand mistake of regarding the audience as considering themselves present at an actual transaction has vitiated in several most important respects the judgment of some of the ablest writers on the principles of dramatic art. Most of the spectators, on the contrary, know very well what they go to see in the scenes of a play,—a series, closely and artfully connected, of living, moving, and speaking pictures,—but nothing more. Between the contemplation of actual suffering and that of the most lively representation of it, there is, as the art of the dramatist shows us yet more vividly than that of the painter, all the difference between deep pain and genuine though melancholy pleasure. In the drama, as in painting, the most prosaic and literal imitation of nature, skilfully executed, whether the subject be mournful or cheerful, gives some pleasure to the most ordinary observer; while a poetical imitation affords a more refined gratification to the man of taste, whether the scene be one of joyousness or sorrow. The pleasure, indeed, which he will derive from a piece of art on a melancholy subject will bear a different hue from that afforded him by a mirthful or cheerful piece; but pleasure it will still be, and pleasure only. It is the power of art that captivates him, and to which he yields involuntary homage. The different kinds of pleasure that flow from dramatic representations, according as their subjects partake more or less of the cheerful or the melancholy ingredients, we shall shortly come to consider. Only we have thought it necessary to insist strongly in the first instance on the essential fallacy of the assumption that people go to a tragic representation to receive impressions analogous to those which they experience in the contemplation of actual woe

The first business of the dramatist, then, is to produce at least a faithful copy, but, if it be in his power, a poetical imitation of nature: this is the first condition of his giving pleasure. But as for the arbitrary distinction between tragedy and comedy, which criticism, whose birth is so long posterior to that of art, has established in so large a portion of civilised Europe, the more he has in him of the genuine artist the less will he feel inclined to conform rigidly to that critical demarcation. When we consider the infinitely chequered nature of human life and character, and consequently the boundless resources which it offers to the drama as its poetical mirror, we cannot but at once perceive that the images which that mirror is capable of presenting to us are susceptible of a diversity of features and of hues immensely exceeding the capabilities of any other single art—nay, of all of them combined. Now, among this boundless variety of pictures from human life, in all of which, embracing any considerable prospect, the serious and the mirthful must be mingled, it is plain that the proportions in which these two necessary elements exist in the same composition will admit of infinite gradation. In the nature of things, however, the portion of dramatic productions in which they may be taken to be equally balanced must be very small in comparison with that in which one of the two manifestly preponderates. This necessary preponderance, in the great majority of such works, of the mirthful or the serious element, is, it seems to us, the only sound and proper basis for the distinction between tragedy and comedy. The terms should be employed as convenient heads of classification, but as nothing more. Every work of art, in the higher sense of the word, is as much a work of inspiration as of ingenuity: it is a *growth* rather than a *structure;* and to reject a production of high dramatic genius because it should not fit into the conventional frame of tragedy, comedy, &c., so long the practice of one of the great dramatic schools of Europe, were no less absurd than it would be to exclude some newly-discovered plant from the domain of natural history because there should be no suitable place for it in the previously existing scientific nomenclature. This is a matter which we shall more clearly illustrate when we come, in another place, to speak of the dramatic genius of Shakspeare; but so much in general treatises on the drama has hitherto been written on the plan of making the principles of art subordinate to the distinctions of criticism, that it was impossible to take one satisfactory step in unfolding our view of the subject without explicitly protesting, in the first instance, against so vicious an inversion.

A complete history of the drama would be almost equivalent to a history of civilised society over the greater part of the earth. 'Man,' says Schlegel, 'has a great disposition to mimicry. When he enters vividly into the situation, sentiments, and passions of others, he even involuntarily puts on a resemblance to them in his gestures. Children are perpetually going out of themselves: it is one of their chief amusements to represent those grown people whom they have had an opportunity of observing, or whatever else comes in their way; and with the happy flexibility of their organization, they can exhibit all the characteristics of assumed dignity in a father, a schoolmaster, or a king. The sole step further which is requisite for the invention of a drama, namely, the separating and extracting the mimetic elements and fragments from social life, has however in many nations never been taken. In the very minute description of antient Egypt, in Herodotus and other writers, I do not recollect observing the smallest trace of it. On the other hand, the Etrurians, who in many respects resembled the Egyptians, had their theatrical representations: and, what is singular enough, the Etrurian name for an actor, *histrio*, is preserved in living languages down to the present day. The Arabians and Persians, though possessing a rich poetical literature, are unacquainted with any sort of drama

'On the other hand, we are by no means entitled to assume that the invention of the drama has only once taken place in the world, or that it has always been borrowed by one people from another. The English navigators mention, that among the islanders of the South Seas, who in every mental acquirement are in such a low scale of civilization, they yet observed a rude drama, in which a common event in life was imitated for the sake of diversion. And to go to the other extreme—among the Hindoos, the people from whom, perhaps, all the cultivation of the human race has been derived, plays were known long before they could have experienced any foreign influence. It has lately been made known to Europe that they have a rich dramatic literature, which ascends back for more than two thousand years. The only specimen of their plays (*nataks*) hitherto is the delightful *Sacontala*, which, notwithstanding the colouring of a foreign climate, bears, in its general structure, so striking a resemblance to our romantic drama that we might be inclined to suspect we owe this resemblance to the predilection for Shakspeare entertained by Jones (Sir William), the English translator, if his fidelity were not attested by other learned orientalists. In the golden times of India, the representation of this *natak* served to delight the splendid imperial court of Delhi; but it would appear that, from the misery of numberless oppressions, the dramatic art in that country is now entirely at an end. The Chinese, again, have their standing national drama, stationary perhaps in every sense of the word; and I doubt not that, in the establishment of arbitrary rules, and the delicate observance of insignificant points of decorum, they leave the most correct Europeans very far behind them. When the new European stage, in the fifteenth century, had its origin in the allegorical and spiritual pieces called *moralities* and *mysteries*, this origin was not owing to the influence of the antient dramatists, who did not come into circulation till some time afterwards: in those rude beginnings lay the germ of the *romantic* drama as a peculiar invention.'

In this summary we shall not enter into any further examination either of the antient or the existing oriental drama. Notwithstanding the great extent and fertility, the vast population and industry of those remoter Asiatic regions, the spirit of their social institutions, to whatever moral causes originally owing, seems to doom them (external influences apart) to a perpetual stationariness, excluding them as it were from the history of general civilization, which is essentially the history of progress. To the European races and nations it is plain that the destinies of human improvement, in all quarters of the earth, are chiefly committed; so that there is no impropriety, and little incompleteness, in confining our view to the nations of Europe, while taking a general survey of that important department of the belles-lettres and the fine arts which has held and must continue to hold so conspicuous a place among those things which, in the long stream of human history, have appeared successively as results and as causes of social amelioration.

We know that European civilization is now running at least its second course. We know that its former, and, as far as we have any historical indications, its first career began in Greece; and that in the small state of Athens especially, owing chiefly, it should seem, to the very high degree of civil freedom and equality which it acquired and long maintained, that early civilization, in all its nobler features, took a more vigorous and various development than it reached not only in any of the other Grecian states, but in the gigantic empire of Rome itself in its most polished days. The Roman drama in particular, for reasons which we shall indicate below, remained to the last little more than a faint imitation of the Athenian; so that it is not only primarily, but almost exclusively, the Grecian theatre, or, more strictly speaking, that of Athens, which we have to consider in treating generally of the antient drama.

Æschylus, the true father of the Attic drama (so far at least as we are acquainted with it,) was born in Attica about the year B.C. 525, and died probably about B. C. 456, having survived the splendid victories of Salamis, Platæa, and Mycale. Thus he may be said to have flourished during the vigorous youth of Athenian liberty and glory. He burned with all the ardour of a Grecian warrior of that day, when every citizen was a hero; and he commanded with distinction in the two most memorable actions of that illustrious period of his country's history, the battles of Marathon and Salamis. He just lived through the period in which both the democratic and the military spirit of Athens were excited to the highest pitch, and when consequently the heroic strains of Homer were in the highest favour among his countrymen, and would be recited with the most glowing enthusiasm. Conscious of such exalted poetical powers,—a witness and a sharer of such high patriotic achievement,—it is not surprising that the fiery genius of Æschylus should have inspired him to attempt to bring the powers of poetry to act upon his countrymen in some more vivid manner than lay within the province either of the lyric or the epic muse.

The substitution of dialogue and action in the place of mere recitation, the transition from the heroic narrative to the heroic drama, the making himself, in short, a dramatic Homer; such appears to have been the grand original conception, such the leading idea of Æschylus in his great literary invention. The highly-wrought poetical and martial enthusiasm of his countrymen sufficiently assured him of success in bringing his compositions before them; an effect which, like every man on the like occasion who with great inventive power combines great knowledge of actual life, he availed himself of such already existing medium as could with least violence be converted to his purpose. The festivals of Bacchus, as then celebrated, offered the fairest opening for his new experiment; he laid hold on the serious part of the celebration, the mixture of the dithyrambic chant with recitation, and modified that primitive species of tragedy into the heroic drama or regular tragedy, according to the subsequent acceptation of the term.

There are, however, three grand characteristics of tragedy as conceived by Æschylus, that distinguish it widely from the serious drama of modern times. These are, 1. The religious tone which pervades it throughout; 2. The ideal nature of the whole representation; 3. The large part in the composition still assigned to the lyric muse. These three matters we shall endeavour to place in a clear light before the reader, as upon a knowledge of them mainly depends the capability to form something like an accurate notion of the distinctive character of Grecian tragedy.

First, as regards the religious complexion of the Athenian drama. Modern readers, familiarised from their infancy with the names, attributes, and images of the antient deities, merely as presenting an inexhaustible storehouse of graceful poetic ornament, almost inevitably forget, in turning to peruse any original work of the antients, that, how much soever their philosophers, their poets, or their priests, might regard their principal divinities in a purely symbolical view, yet that to the minds of the people at large they were real and awful existences, having will, passions, and various kinds and degrees of dominion over the fortunes and the happiness of man. This important fact has not hitherto been sufficiently taken notice of in modern accounts of the antient drama. All the deities, male or female, celestial or infernal, were objects of fear and propitiation: only the inexorable Fates were unappeasable by god or man. Fate indeed, was the only omnipotence recognised in the mythological system of the Greeks; for Jupiter himself, the ruler of the celestial deities, the sovereign of Olympus, was regarded neither as eternal nor as infinite in power. Nowhere have poetry and her sister arts been so thoroughly devoted to the service of religion as they were in antient Greece. Thus we find the drama itself lying in embryo in the worship of Bacchus; and when in its maturity it lost the direct character of a religious rite, we still find the sacred character impressed on tragedy even more solemnly than upon any of the other productions of Athenian genius not primarily devoted to religious objects. So long, indeed, as the personages of a long established faith (and here we speak solely with reference to the purposes of art), whether the gods and heroes of the heathen world, or the mysterious persons of the godhead, the angels, devils, and saints of the Christian system,—so long, we say, as these awful personages can furnish fresh materials to an epic or dramatic poet of powers equal to such a class of subjects, the grand and successful performances of a Dante, a Tasso, and a Milton, show us, not less strikingly than those of a Homer or an Æschylus, that these are the most attractive themes for the exercise of the loftiest poetic genius, and those which it handles with the most powerful effect.

The *ideality* of the scenic representation, as arranged by Æschylus, necessarily resulted from the adoption, in the composition of the drama, of ideal and of nearly ideal characters. 'The use of masks,' observes Schlegel, 'which appears astonishing to us, was not only justifiable on this principle, but absolutely essential; and far from considering them in the light of a last resource, the Greeks would justly have considered as a last resource the being obliged to allow a player with vulgar, ignoble, or strongly-marked individual features, to represent an Apollo or a Hercules. To them this would have appeared downright profanation. . . . As the features of the player acquired a more decided expression from the mask, as his voice was strengthened by a contrivance for that purpose, so also the *cothurnus*, which consisted of several considerable additions to his soles, as we may see in the antient statues of Melpomene, raised his figure considerably above the middle standard. The female parts, too, were played by men, as the voice and other qualities of women would have conveyed an inadequate idea of the energy of tragic heroines. The forms of the masks[*] and the whole appearance of the tragic figures, we may easily suppose, were sufficiently beautiful and dignified. We should do well to have the antient sculpture always present to our minds; and the most accurate conception, perhaps, that we can possibly have, is to imagine them so many statues in the grand style, endowed with life and motion. But as in sculpture they were fond of dispensing as much as possible with dress, for the sake of exhibiting the more essential beauty of the figure; on the stage they would endeavour, from an opposite principle, to clothe as much as they could well do, both from a regard to decency, and because the actual forms of the body would not correspond sufficiently with the beauty of the countenance. They would also exhibit their divinities, which in sculpture we always observe either entirely naked or only half covered, in a complete dress. They had recourse to a number of means for giving a suitable strength to the forms of the limbs, and thus restoring proportion to the increased height of the player.

'The great breadth of the theatre, in proportion to its depth, must have given to the grouping of the figures the simple and distinct order of the bas-relief. We moderns prefer on the stage, as everywhere else, groups of a more picturesque description, more crowded, partly covered by themselves, and stretching out into distance; but the antients were so little fond of foreshortening, that even in their painting they generally avoided it. The gestures accompanied the rhythmus of the declamation, and were intended to display the utmost beauty and harmony. The poetical conception required a certain degree of repose in the action, and that the whole should be kept in masses, so as to exhibit a succession of plastic attitudes; and it is not improbable that the actor remained for some time motionless in the same position. But we are not to suppose from this that the Greeks were contented with a cold and spiritless representation of the passions. How could we reconcile such a supposition with the fact that whole lines of their tragedies are frequently devoted to inarticulate exclamations of pain, to which we have nothing correspondent in any of our modern languages? It has often been conjectured that the delivery of their dialogue must have resembled the modern recitative. For this conjecture there is no other foundation than that the Greek, like almost all the southern languages, must have been pronounced with a greater musical inflexion of the voice than our languages of the north. In other respects I conceive that their tragic declamation must have been altogether unlike recitative, much more measured, and far removed from its learned and artificial modulation. The antient tragedy has also been frequently compared to the opera, because it was accompanied with music and dancing. But this betrays entire ignorance of the spirit of classical antiquity. Their dancing and music had nothing in common with ours but the name. In tragedy the chief object was the poetry, and every other thing was strictly subordinate to it; whereas in the opera the poetry is merely an accessary, the means of connecting the different parts together, and is almost buried under its associates.'

In the syllabic composition, which then at least prevailed in the Grecian music, the solemn choral song had no other instrumental accompaniment than a single flute, which could not impair the distinctness of the words. The choruses and lyrical songs in general form the portion most difficult to understand of the antient tragedy, and must also have been the most difficult to contemporary auditors. They abound with the most involved constructions, the most unusual expressions, and the boldest images and allusions. Such labour and art would hardly have been lavished upon them by the poets merely to be lost in the delivery. Such a display of ornament without aim is very unlike the mode of thinking of the Greeks. In the syllabic measure of their tragedy there generally prevails a highly-finished regularity, which, however, by no means appears a stiff symmetrical uniformity. Besides the infinite variety of the lyrical strophes, they have also a measure to denote the mental transition from the dialogue to the lyric, the anapæst; and two for the dialogue itself, of which the one by far the most general, the iambic trimeter, denoted the regular progress of the action, and the other, the trochaic tetrameter, was expressive of sudden passion. Indeed, the simplicity of the Greek tragedy, of which so much has been said, attaches only to the plan; for the richest variety of poetical ornament is observable in the execution. It must be remembered, too, that the utmost accuracy in the delivery of the different modes of versification was expected from the player, as the delicacy of the Grecian ear would not excuse, even in an orator, the false quantity of a single syllable.

'Modern critics,' says Schlegel, 'have never known what to make of the chorus.' This has arisen from the error by which criticism has been almost universally pervaded, viz., the viewing a production of art not in relation to the manners and the circumstances which surrounded its author, but to those existing around the critic himself. A very moderate degree of attention to the circumstances amidst which the Athenian drama took its birth is sufficient to remove everything like astonishment at the share which the lyrical element preserved in its composition. Among the most poetical people that has ever existed everything of the nature of a spectacle demanded the aid of song. The warlike march, the religious and the convivial procession, the nuptial ceremony, the feast and the funeral, would to them have been utterly spiritless and unmeaning without this accompaniment. The epic form, too, under which their greater and more national compositions present themselves to us in their earlier times, had, for a long period before the rise of the dramatic art among them, been rivalled by the lyric; and many old subjects of high heroic song had been embodied under a new shape in grand choral compositions, which, observes Mr. Thirlwall (*Hist. of Greece*, chap. xii.) 'uniting the attractions of music and action with those of a lofty poetry, formed the favourite entertainment of the Dorian cities. This appears to have been the germ out of which, by the introduction of a new element, the recitation of a performer who assumed a character, and perhaps from the first shifted his mask so as to exhibit the outlines of a simple story in a few scenes parted by the intervening song of the chorus, Thespis and his successors gradually unfolded the Attic tragedy.'

We must therefore dissent from the view taken by Schlegel himself of the origin and objects of the dramatic chorus of the Greeks. In considering this, as well as some other characteristics of the Grecian theatre, he has laboured under somewhat of the disability which we have mentioned above as attaching to the critics of latter ages in general. He has judged of the Athenian dramatists too exclusively from their remaining productions, without sufficient regard to all that existed immediately before and around them. Writings, we must recollect, were exceedingly scarce. It was by oral recitation that the greatest and most favourite productions of the epic and the lyric poets were chiefly circulated, and transmitted with more or less completeness to the memories of the multitude; so that, inasmuch as they were in all times intimately associated with vocal delivery and animated gesture, even the simply epic and lyric chants had possessed among the Greeks much more of the vivid charms of dramatic recitation than is very readily conceivable by a modern to whom books are so easily and abundantly accessible. A modern poet writes, above all things, to be read; but the Grecian poet, even the epic poet, wrote, above all things, to be sung. In short, the union between music and poetry, among the Greeks more especially, down to the period which gave rise to the drama, was uniform and intimate, but with this important condition, that sound was ever kept subordinate to thought.

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[*] 'We have obtained a knowledge of these from the imitations in stone which have come down to us. They display both beauty and variety. That great variety must have taken place in the tragical department (in the comic we can have no doubt about the matter) is evident from the rich store of technical expressions in the Greek language for every gradation of the age and character of masks. (See the *Onomasticon* of Julius Pollux.) In the marble masks, however, we can neither see the thinness of the mass from which the real masks were executed, the still more delicate colouring, nor the exquisite mechanism of the joinings. The abundance of excellent workmen possessed by Athens in everything which had reference to the plastic arts will warrant the conjecture that they were in this respect inimitable. Those who have seen the masks of wax in the grand style, which in some degree contain the whole head, lately contrived at the Roman carnival, may form to themselves a pretty good idea of the theatrical masks of the antients. They imitate life even to its movements in a most masterly manner; and at such a distance as that from which the antient players were seen, the deception is most perfect. They always contain the apple of the eye, as we see it in the antient masks; and the person covered sees merely through the aperture left for the iris. The antients must have gone still farther, and contrived also an iris for the masks, according to the anecdote of the singer Thamyris, who, in a piece which was probably of Sophocles, made his appearance with a blue and a black eye. Even accidental circumstances were imitated; as, for instance, the cheeks of Tyro, down which the blood had rolled from the cruel treatment of his step-mother. Owing to the mask, the head must no doubt have appeared somewhat large for the rest of the figure; but this disproportion, in tragedy at least, would be obviated by the elevation of the cothurnus.'

Such being the firmly established practical circumstances of Greece, a transition all at once from the combined epic and lyric forms to the purely dramatic was, we conceive, neither practicable even to a genius of the first order, as we admit Æschylus to have been, nor very likely even to enter into his imagination. Æschylus by no means introduced the chorus into the drama: he may be much rather said to have introduced the drama into the chorus; and that of itself was no slight achievement. We have already remarked that the idea of any great public exhibition unaccompanied by choral songs was one into which the Greek taste and imagination of that day could by no means enter. So strong however was the bent of Æschylus towards the dramatic, that he not only retains the chorus as a lyrical accompaniment, but gives it also a participation in the action itself. This, in stamping the dramatic character upon the whole performance, was as far as he could venture to go, and, as we have already said, was most likely as far as he desired to go.

We must now, in order to complete the idea which we desire to present of the material forms of the Grecian drama, give a short account of the architectural structure and arrangement of the edifice itself in which the pieces were exhibited, when once, under the hand of Æschylus, their dramatic element was distinctly developed. Brief as we shall endeavour to make this description, some detail is indispensable, owing to the very different plan from the modern upon which the whole conception and design of the antient drama required that its theatres should be constructed.

The theatres of the Greeks were open to the sky, and their dramas were always acted during the day, a mode of construction and of exhibition which was highly favoured by the beauty of their climate. As regards the inconvenience which many modern critics have supposed the poets to have felt, from the necessity of always laying the scene of their pieces before houses, and thus often violating probability, it should be observed that the Greeks lived much more in the open air than we do, and transacted many things in public places which with us usually take place in houses; and the stage did not represent a street, but a space before the house and belonging to it, wherein stood an altar on which the sacrifices to the household gods were offered up. Here the women, who among the Greeks lived in so retired a manner, might appear without impropriety, even the unmarried ones. Neither was it impracticable to give a view of the interior of the houses: this was done by means of the encyclema, which we shall presently describe.

The Grecian theatres, destined, not like those of the moderns, for a long succession of daily exhibitions, but for the celebration of a few annual festivals, were of that colossal magnitude which was indispensable to contain, as it were, the whole body of the people, together with the concourse of strangers who flocked to these solemnities. The distance to which the eyes of the spectators were thus necessarily thrown from the acted scene presents another obvious reason for and justification of the artificial expansion, as we may term it, of the whole figure of the actor. The groups on the stage, not to appear absolutely insignificant, needed, if possible, to be represented larger than life; and besides the fundamental reason which we have already stated for the constant use of the mask, that play of the actor's features which it concealed could not have been perceived with any distinctness across the vast space which separated him from the audience. Analogous to the use of the mask, the buskin, &c., were certain contrivances for increasing the loudness of the voice. Vitruvius tells us also of vehicles of sound distributed throughout the building; and though of these we have no very clear account, we may safely assume that the theatres of the antients were constructed on very perfect acoustical principles. We know from existing remains that all who were present at the dramatic exhibition could be, in the literal sense of the word, spectators· the seats for them consisted of steps rising backwards round the semicircle of the orchestra, the name given to the whole internal area called in a modern theatre the pit. The lowest step of this amphitheatre was raised considerably above the orchestra; and opposite to it was the stage, placed at an equal elevation. The sunk semicircle of the orchestra contained no spectators, but served another purpose, which we shall shortly have to mention The stage consisted of a strip, which, forming the chord of the semicircle, extended from one end of the building to the other, but the depth of which bore little proportion to this length. This was called the logeum, or, in Latin, pulpitum, and the usual place for the dramatic action was in the middle of it. Behind this middle part the scene receded quadrangularly; still, however, with less depth than breadth: the space thus comprised was called the proscenium. The remaining part of the logeum, to the right and left of the scene, had, both in front on the verge of the orchestra, and at the back, a wall entirely plain, or at most architecturally ornamented, which rose to the level of the uppermost seat for the spectators.

The decoration was so contrived that the principal object in front covered the back-ground, and the prospects of distance were given at each side, which is just the reverse of the mode adopted on the modern stage. This was done according to certain rules: on the left appeared the town to which the palace, temple, or whatever occupied the centre, belonged; on the right was the open country, landscape, mountains, sea-shore, &c. The lateral decorations were three-sided constructions turning on a pivot fixed underneath, by which means the changes of scene were partly effected. In the back decoration it is probable that many things were exhibited substantially which with us are only painted. When a palace or temple was represented, there appeared in the proscenium an altar, which answered a number of purposes in the course of the performance. The central decoration was most frequently architectural, though sometimes it was a painted landscape; and from a passage of Plato it seems clear that the Greeks must have carried theatrical perspective to very considerable perfection.

In the back wall of the scene were a large main entrance and two side ones; and as the hinder decoration was generally a palace in which the principal characters of royal descent resided, they naturally came through the great door, and the servants made their entrance from the wings. There were two other entrances; one at the end of the logeum, whence the inhabitants of the town came; the other in the orchestra below for characters who were supposed to come from a distance; they ascended the logeum by a staircase from the orchestra which was applicable to a variety of purposes, as circumstances required. The situation of these several entrances explains many passages in the antient dramas, where the persons standing in the middle see some one advancing long before he comes near them. Beneath the seats of the spectators a stair was somewhere constructed through which the spectres of the departed, unperceived by the audience, ascended into the orchestra, and thence, by the staircase above mentioned, made their appearance on the stage. The nearest verge of the logeum sometimes represented the sea-shore. The Greeks were well skilled also in availing themselves, for scenic effect, even of what lay beyond the decorations: the frequent addresses to heaven were doubtless directed to the actual skies; and it was a general principle with them that everything imitated on the stage should, if possible, consist of actual representation; and only where this could not be done were they content with a symbolical exhibition. The machinery for the descent of gods to the earth or the withdrawing of men from it, was placed aloft behind the wall at each side of the scene, and so removed from the sight of the audience. There were hollow places beneath the stage, and contrivances for thunder and lightning, for the apparent fall or burning of a house, &c. An upper story could be added to the farthermost wall of the scene, when it was necessary to represent a tower having an extensive prospect, &c. The encyclema was a machine semicircular within, and covered above, which represented the objects contained in it as in a house: this could be thrust behind the great middle entrance; and we find it to have been so used for the production of a grand theatrical effect; the central entrance being then left open to exhibit the interior to the audience. A stage curtain is mentioned both by Greek and Roman writers; indeed its Latin appellation, aulæum, is borrowed from the Greeks: it seems, however, not to have been in use in the earlier period of the Attic theatre; and when brought into use, it covered, not the whole length of the logeum, but only the comparatively small front of the proscenium.

The entrances for the chorus were beneath, in the orchestra, in which it generally remained, and in which it performed its solemn dance, moving round first in one direction, then in the other, during the choral songs. In front of the orchestra, opposite to the middle of the scene, was an elevation with steps, resembling an altar, raised to the level of the stage, and called the thymele. This was the station of the chorus when it did not chant, but was taking an interest in the action. The leader of the chorus then took his or her station on the top of the thymele, to see what was passing on the stage, and to communicate with the characters. For though the choral song was common to the whole, yet when it entered into the dialogue, one of its number spoke for the rest, which accounts for the changing from the plural number to the singular, and *vice versâ*, in addressing them from the stage. The thymele was situated precisely in the centre of the building, and all the measurements were calculated from that point.

It is plain that the Grecian theatre, both in its architectural and its scenic arrangements, must have attained much higher perfection in the course of that illustrious period of Grecian art which we are accustomed to denominate, from its most characteristic and influential name, the age of Pericles, than it had reached at the termination of the dramatic career of Æschylus. The very building itself, which in the general and splendid restoration of Athens after the termination of the Persian war was reconstructed of massive stone, was originally of timber only. But as Æschylus was no less the creator of the theatre in all its essential parts than he was of the dramatic action itself, we have deemed this the fittest place in which to give some general notion of its structure and disposition.

Excepting only 'The Persians,' interesting rather as an historical than as a dramatic monument, the subject of each of the pieces of Æschylus that remain to us is either purely mythological, or taken from those traditions of the later heroic ages in which fable bears so large a part, or compounded from both those sources. In dealing with mythology (that is, as we have already requested the reader to bear steadfastly in mind, with the mystical personages immemorially fixed in the religious belief of his countrymen), Æschylus, like our own Milton, and, indeed, partly showing Milton the way, seems to have delighted to launch his imagination into that boundless and mysterious field which, according to the notions of antiquity, lay beyond and above the existence of even the greatest and the oldest of the Olympian deities. The dimness and vagueness of the prevailing ideas respecting those primæval powers of nature afforded the freest scope for the development of his most gigantic conceptions; and in that highest range of the mythological drama he found among the antients neither rival nor competitor. Above all, the opposition between inexorable fate and unconquerable will,—the only effectual shield, that of invincible fortitude, presented by a finite being against all that the awful and inevitable course of universal nature can inflict,—such appears to have been his favourite subject of contemplation. The sole mastery which he possessed in this sublime walk of tragedy demands that we should endeavour to present a more precise idea of his mode of applying such materials to the purposes of the drama. We shall therefore give a brief account of that one of his remaining pieces which most completely illustrates these peculiar powers of the great tragedian. This we shall do in the words of the eminent dramatic lecturer whom we have already repeatedly quoted; after first remarking that 'Prometheus Chained,' the tragedy in question, held a connected place between two others entitled 'Prometheus the Fire-bringer,' and 'Prometheus Loosed,' of both of which the Greek originals are lost, although a considerable fragment of the latter has come down to us in a Latin translation.

'The Chained Prometheus,' says Schlegel, 'is the representation of constancy under suffering, and that the never-ending suffering of a god. Exiled to a naked rock on the shore of the encircling ocean, this drama still embraces the world, the Olympus of the gods, and the earth of mortals, all scarcely yet reposing in a secure state above the dread abyss of the dark Titanian powers. The idea of a self-devoting divinity has been mysteriously inculcated in many religions, as a confused foreboding of the true: here however it appears in a most alarming contrast with the consolations of revelation. For Prometheus does not suffer on an understanding with the power by whom the world is governed; on the contrary, he atones for his disobedience, which disobedience consists in nothing other than an attempt to give perfection to the human race. . . . There is little external action in this piece. Prometheus merely suffers, and resolves from the beginning to the end, and his sufferings and resolutions are always the same. But the poet has contrived in a masterly manner to introduce variety and progress into that which in itself was determinately fixed, and given us a scale for measuring the matchless power of his sublime Titans in the objects by which he has surrounded them. We have first the silence of Prometheus while he is chained down under the harsh inspection of Strength and Force, whose threats serve only to excite a useless compassion in Vulcan, who carries them into execution; then his solitary complaints; next, the arrival of the tender ocean nymphs, whose kind but disheartening sympathy induces him to give vent to his feelings, to relate the cause of his fall, and to reveal the future, though with prudent reserve he reveals it only in part; the visit of the antient Oceanus, a kindred god of the race of the Titans, who, under pretext of a zealous attachment to his cause, advises him to submission towards Jupiter, and is on that account dismissed with proud contempt; the introduction of the raving Io, driven about from place to place, a victim of the same tyranny from which Prometheus suffers; his prophecy of the wanderings to which she is still doomed, and the fate which at last awaits her, connected in some degree with his own, as from her blood he is to receive a deliverer after the lapse of many ages; the appearance of Mercury as the messenger of the tyrant of the world, who, with threats, commands him to disclose the secret by which Jupiter may remain on his throne secure from all the malice of fate; and lastly, the yawning of the earth before Prometheus has well declared his refusal, amid thunder and lightning, storm and earthquake, by which he himself, and the rock to which he is chained, are swallowed up in the abyss of the nether world. The triumph of subjection was never celebrated in more glorious strains; and we have difficulty in conceiving how the poet, in the 'Prometheus Loosed,' could sustain himself on such an elevation.'

This and all the other remains of Æschylus that we possess concur to testify that it was his usual practice to compose three tragedies in connection with each other, and of which the first and second, at their conclusion, manifestly referred to the one which was to follow. This must be carefully borne in mind in judging of any of the four single pieces that have come down to us, detached in each instance from the two other tragedies which originally combined with them to form a dramatic whole. Only one of these trilogies, as they were sometimes called, has descended to us complete; and from this alone it is that we can venture to judge as to the full extent of the powers of Æschylus in the general conception and arrangement of a great dramatic composition. Fortunately, we have every reason to regard this threefold tragedy as the most mature and perfect of all his productions: he was sixty-seven years of age when he brought these dramas on the stage, the last which he ever submitted in competition for the prize at Athens. These three pieces are, 1, 'Agamemnon;' 2, the 'Choëphoræ,' or Libation-bearers; 3, the 'Eumenides,' or Furies.

In this triple drama, or *Orestiad*, as it has sometimes been called, we have the noblest display of that fervent character of religion, poetry, and patriotism, which so strongly distinguished the earlier Grecian tragedy; while, considering it simply as a production of art, the sublime retrospect which in the first part is cast over the war of Troy, its occasion, and its catastrophe—the terrible chapters which are next unfolded to us of the domestic horrors entailed upon the house of Pelops—and the concluding glory which is cast around the tutelary goddess and guardian institutions of the poet's native country, furnish a series of scenes and of strains which, for severe grandeur, relieved by majestic beauty, have rarely been equalled—never, we believe, surpassed.

The historical relation in which Æschylus stood to Sophocles enabled the latter to avail himself of the inventions of the former. 'The more artful construction of the dramas of Sophocles,' observes Schlegel, 'is easily perceived; the limitation of the chorus with respect to the dialogue, the polish of the rhythmus, and the pure Attic diction; the introduction of a greater number of characters; the increase of contrivance in the fable; the multiplication of incidents; a greater degree of development; the more tranquil continuance of all the movements of the action; the greater degree of theatrical effect given to incidents of a decisive nature; and the more perfect rounding of the whole, even considered in a merely external view.... To characterize the native sweetness and affection so eminent in this poet, the antients gave him the appellation of the Attic Bee. Whoever is thoroughly imbued with the feeling of this property may flatter himself that a sense for antient art has arisen within him; for the affected sentimentality of the present day, far from coinciding with him in this opinion, would, both in the representation of bodily sufferings and in the language and economy of the tragedies of Sophocles, find much of an insupportable austerity.'

It was indeed this thorough yet noble harmony of all his qualities, this dignified sweetness, that made Sophocles the favourite poet of the age of Pericles, to which we must observe, that the formation of the mind of Æschylus was just anterior. It was natural that the martial spirit of the warrior of Marathon should appear in his compositions with even more prominence than the calls of poetry strictly demanded; and thus it was remarked in his own age, in relation to one of his still existing pieces, the 'Seven Chiefs against Thebes,' that it was inspired by Mars rather than Bacchus. But with Sophocles the poetical vocation had predominated from the first, and occupied him during the whole of a lengthened and tranquil life. Grace, in the most refined sense of the term, is his grand distinction; but in boldness and comprehensiveness he was decidedly inferior to the mighty master who preceded him. The traditions respecting the Trojan war, and the tragic histories of the royal houses of Thebes and Mycenæ, furnished the principal themes to Sophocles, as they had done to Æschylus; and the 'Electra' of Sophocles, wherein he treated the same subject as Æschylus in the 'Choëphoræ,' fortunately remains to enable us to make a very exact comparison between the genius and style of the two poets.

We shall add but one concluding remark on these two great masters of the elder Grecian tragedy. The tendency of the genius of Æschylus in framing his great dramatic compositions was manifestly to embrace in the first instance a vast field of incident and invention, and reduce it to poetic order; while that of the mind of Sophocles was, to fix upon some given point of historic or mythologic interest, and, taking that as a nucleus, to expand it into poetic form. Æschylus was above all things a creator; Sophocles, a cultivator and adorner. The passion of the latter was more for the beautiful, that of the former for the sublime; but though Æschylus took the loftier and more adventurous flights, both moved in the elevated region of the ideal.

In characterizing the third great master of Grecian tragedy, we must take a course which we believe to be more conformable to reason, as well as more favourable to his genius than that adopted by many critics antient as well as modern, and among the latter by Schlegel himself. It is not fair, merely because Euripides necessarily treated these mythological subjects which were the common stock of the poets of his age, to force a strict parallel between himself and the tragic poets who preceded him. His mental training belonged to a later period of Athenian history and taste, and he possessed a genius essentially different from that of his predecessors, yet a genius assuredly great and rich. Sophocles, indeed, may justly be said to have belonged to the school of Æschylus; but Euripides was the founder of a dramatic school entirely new, and so was certainly more original than Sophocles, though moving, in one sense, in an inferior poetic sphere. That he not only did not pourtray mere men and women sufficiently according to the ideal standard, but that he drew down his demigods and his deities themselves to the level of human nature, seems to have been the gravest charge brought against Euripides in his own time by such as were attached exclusively to the ideal school of tragedy. But for these reproaches he was amply indemnified by the approbation and sympathy of the greater portion of the Athenian public. The great ideal representations to which they had previously been accustomed had, indeed, drawn abundantly on their admiration; but their sympathies had yet to be vividly and intimately stirred. This the habits and temper of Euripides inclined him to attempt, and this he successfully accomplished: nor need we wonder that, striking thus directly at the hearts of his auditory, he should have risen to share the public favour equally with Sophocles during the later part of the career of the latter, although, from the essential difference between their characteristic excellencies, there was no absolute competition between them. As nothing seems calculated to mark so distinctly the characteristic differences in the genius of great artists as an examination of their respective modes of treating one and the same subject; as the remarkable incident in the sanguinary annals of 'Pelops' line,' on which we have already had occasion to dwell, has been fated, as we shall see, to stand so prominently forward in the scrolls of modern as well as antient tragedy; and as the 'Electra' of Euripides remains to us among his extant pieces, we recommend it particularly to the attention of those readers who may find leisure for such examination, because, though far from being one of the finest of his remaining productions, it offers the best means of contrasting his dramatic character with the very different one of Sophocles.*

We shall, perhaps, form the best idea of the old Grecian comedy by considering it as a complete contrast to the ideal tragedy. Although the old comic writers gave the names of existing persons to their characters, they did not exhibit them on the stage with all the circumstances peculiar to certain individuals; for such historical characters have always with them an allegorical signification; they represent a class; and as their features were exaggerated in the masks, so their characters were overcharged in the composition. Still this constant allusion to the nearest reality, which not only allowed the poet, in the character of the chorus, to converse with the public in a general way, but also to point at certain individual spectators, is of essential import in any view of this species of composition. As the spirit of the elder tragedy delighted in harmonious unity, the old comedy, on the contrary, flourished in a chaotic exuberance, seeking out the most glaring and diversified objects, the most strongly marked oppositions, working up the most singular, unheard of, and even impossible adventures, with the local peculiarities nearest at hand. The comic poet, indeed, as well as the tragic, transported his characters to an ideal element; not, however, to a world subjected to necessity, but to one where the caprice of an inventive wit prevails without restraint, and all the laws of reality are suspended.

Comedy, in the hands of its Doric founder Epicharmus, borrowed its materials chiefly from the mythical world. Nor in its maturity did it altogether relinquish that field, as appears from the titles of many of the lost pieces of Aristophanes and his contemporaries. But as a violent contrast between the materials and the form is here quite appropriate, the subjects of the old comedy were naturally drawn from the most serious concerns of public life and the state: the private and family life was only introduced occasionally, and indirectly, with a reference to the public. The chorus, besides that it was essential to the complete parody of the tragic form, also contributed to the expression of that festal gladness of which comedy was the most unrestrained effusion; for, as already observed, in all the popular and religious festivals of the Greeks, choral songs were chanted, accompanied by dancing. On some of these occasions we find in the comic chorus such a display of sublime lyrical poetry that the passages might be transferred to tragedy without alteration. It is, however, one deviation from the tragic model, that often there are several choruses in the same comedy, who at one time all sing together and in opposite positions, and at other times change with and succeed each other without any general reference. But the most remarkable peculiarity of the comic chorus is the *parabasis*, an address by the chorus to the spectators, in the name and under the authority of the poet, which has no immediate concern with the subject of the piece. Herein he sometimes enlarges on his own merits, and ridicules the pretensions of his rivals; at other times he avails himself of his privileges as an Athenian citizen, to deliver proposals of a serious or a ludicrous nature for the public good. The parabasis may have owed its invention partly to the circumstance of the comic poets not having such ample materials as the tragic to fill up the intervals of the action, when the stage was empty, with affecting and inspired poetry. But this very departure from the strictness of dramatic form is consistent with the essence of the old comedy; just as an individual, while wearing a droll disguise may, in the same spirit of drollery, venture occasionally to put aside the mask.

Of the Grecian comic writers of the old kind there is but one of whom any work has descended to us, so that in judging of his merits we can have no aid from comparison with other masters. Aristophanes had many predecessors,

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* For some remarks on the Satiric Drama, the reader is referred to the article EURIPIDES.

Magnes, Cratinus, Crates, and others; he was indeed one of the latest comic authors of that school, as he survived even the old comedy itself. This writer, the very singularity of whose escape from the general wreck of the elder comic productions renders him so interesting and valuable to the history of dramatic art, has been very erroneously judged of in latter times, owing to two capital defects in the mode in which modern criticism has been applied to him, viz., the want of sufficiently understanding the spirit of Athenian society of that day in general, and yet more, the want of a just view of what constituted the essential character of the old comedy itself. It cannot be too repeatedly urged upon the attention of modern critics that an author must be judged with reference to all the circumstances, not which surround his modern censor, but which surrounded the author himself. It is much more reasonable to make use of the works of Aristophanes as a serious study of some remarkable features in the character of his age, than to cast them angrily aside, on the mistaken inference that because they contain much that is either disgusting or monstrous to modern taste, Aristophanes himself must have been a disgrace and a nuisance to any cultivated age.

This writer, too, is precisely one of those of whose qualifications and peculiarities it is most difficult to acquire an accurate notion without reading him in his original language. His diction is extremely elegant, displaying the purest Atticism, and accommodating itself with the greatest pliability to every tone, from the most familiar dialogue to the lofty elevation of the dithyrambic ode. His general elegance of language is found the more attractive from the contrast which he occasionally displays; for he not only indulges sometimes in the rudest popular expressions, in foreign dialects, and the mutilated articulation of the Greek in the mouths of barbarians, but extends the same arbitrary power which he exercised over nature and human affairs to language itself, and by new compounds, allusion to names of persons, or imitation of particular sounds, produces words of the most singular description.

'As Aristophanes,' says Schlegel, 'appears to me to have displayed, in the exercise of his separate but infinitely varied art, the richest development of almost every poetical property, whenever I read his works, I am equally astonished at the extraordinary qualifications which they suppose his spectators to have possessed. We might expect from the citizens of a popular government an intimate acquaintance with the history and constitution of their country, with public events and transactions, with the peculiarities of all their contemporaries of any note or consequence. But Aristophanes also supposes his audience to have possessed an extensive acquaintance with the mechanism of poetry; and, to understand his parodies, they must have had almost every word of the tragical masterpieces by heart. And how quick of apprehension they must have been to catch, in such rapid flight, the lightest and most complicated irony, the most unexpected sallies and unusual allusions, denoted often by the mere inflexion of a syllable! We may boldly affirm, that notwithstanding all the explanations that have come down to us, notwithstanding the accumulation of learning that has been displayed, one half of the wit of Aristophanes is altogether lost to the moderns. These comedies, which, amidst all their farcical peculiarities, display the most extensive knowledge of human life, could only, as a source of popular amusement, be properly understood and appreciated by the incredible acuteness and vivacity of the Attic intellect. We may envy the poet who could reckon on so clever and accomplished a public; yet this was in truth a very perilous advantage: auditors whose understandings were so quick would not be easily pleased. Aristophanes complains of the excessively fastidious taste of the Athenians, with whom the most admired of his predecessors were immediately out of favour when the smallest symptom of a falling off in their mental powers was perceivable. At the same time he allows that the other Greeks bore not the slightest comparison with them in a knowledge of the dramatic art. All the talents of Athens strove to excel in this department; and the competition was limited to the short period of a few festivals, during which the people always expected a succession of novelties. The distribution of the prizes (on which all depended, as there was no other remaining notification of the public opinion) was determined by a single representation. We may easily imagine to what perfection this representation would attain under the directing care of the poet. If we also take into consideration the high state of the tributary arts, the utmost distinctness of delivery of the most finished poetry, both in speaking and singing, with the magnificent extent of the theatre, we shall then have some idea of a theatrical enjoyment which has never in an equal degree been since known in the world.'

The old critics were of opinion that Cratinus was powerful in living satire and direct attack, but was deficient in a pleasant humour, in the talent of developing his subject advantageously, and filling up his pieces with the necessary details; that Eupolis was agreeable in his jocularity, and skilful in the use of ingenious allusions and contrivances, so that he never even needed the aid of the parabasis to say whatever he chose, but that he wanted satirical force; that Aristophanes united the powers of both those writers, and that in him we have satire and pleasantry combined in the most perfect and attractive manner. But one of the most honourable testimonies in this dramatist's favour is that of no less an authority than the sage Plato himself, who, in an epigram, says that the Graces would have selected his mind for their dwelling-place, who constantly read him, and who transmitted his comedy of 'The Clouds' to Dionysius the Elder, with the remark that from that play (which, be it remembered, contains the imputedly murderous attack on Plato's master, Socrates) Dionysius would be able to acquaint himself with the state of Athens.

Towards the end of the Peloponnesian war, when a few individuals, violating the constitution, had assumed supreme authority in Athens, a law was enacted empowering any person attacked by comic poets to bring them to justice; and a prohibition was issued against introducing real persons on the stage, or using masks which bore a resemblance to their features, &c. This measure put a violent and final termination to the genuine old comedy. For a short time after, the endeavour was made to continue the existence of this ideal species under the political restrictions thus imposed: but these shackles were soon found to be fatal to its spirit and popular attractiveness; and this transitional kind, which has since been commonly designated as the middle comedy, soon gave way to the introduction of the new comedy, which, like the later Greek tragedy already mentioned, aimed at presenting a poetic mirror of actual life.

It has been almost universally the practice of modern writers on this subject to cite the testimony of Horace (*Ad Pisones*, vv. 281-284), as decisive evidence of the justice and necessity of this suppression of the political spirit of the elder Grecian comedy. But we must not forget that Horace, living easily and contentedly under a virtual despotism, erected too, like the very power which put down the old comedy, on the ruins of a republican constitution, could have little sympathy with that broadly democratic spirit which pervaded every public institution of Athens, and was little qualified to judge impartially respecting any one of its developments. The old comedy flourished during the existence of the Athenian liberty; both were oppressed under the same circumstances and by the same persons. It was under the very same violent usurpation of power that the sportive censure of Aristophanes was reduced to silence, and the grave animadversions of Socrates were punished with death. As for the alleged persecution of the latter by Aristophanes, besides that 'The Clouds' was composed many years before the philosopher's condemnation, we do not find that the like attacks did any harm to Euripides the people of Athens beheld with admiration the tragedies of this friend of Socrates, and the parodies of them by Aristophanes, exhibited on the same stage. Nor can we too often repeat that notwithstanding the strong political tincture which, amidst a society like the Athenian, the unbounded license essential to the old comedy necessarily acquired, yet, from first to last, its primary aim was not so much effectiveness in satire as it was sublimity in the burlesque.

Although the new comedy developed itself only in the brief interval between the end of the Peloponnesian war and the first successors of Alexander the Great, yet the stock of pieces in this kind amounted to some thousands: time, however, has made such ravage among them that nothing remains to us but a number of detached fragments in the original language, often so disfigured as to be unintelligible, besides about twenty translations or copies of Greek originals in Plautus and six in Terence. Among the Grecian masters, Diphilus, Philemon, Apollodorus, and Menander, are four of the most celebrated names. The palm for elegance, delicacy, and sweetness, is universally yielded to Menander, who was contemporary with Demetrius Phalereus. Though instructed in philosophy by Theophrastus, his inclinations led him to the doctrines of Epicurus; and he boasted in an epigram, that 'if Themistocles freed his country from slavery, Epicurus freed it from irrationality.' Indeed, the Epicurean philosophy, which placed the highest felicity of life in the benevolent affections, neither inciting men to heroic action nor allowing them to feel the want of it, could hardly fail to be well received among the Greeks after the loss of their old and glorious freedom. We may likewise easily understand why they conceived a passion for the new comedy at the very period when they lost their liberty, seeing that it drew their attention from political transactions and human affairs at large, and absorbed it wholly in the considerations of personal and domestic interests.

The Greek theatre, as we have seen, was originally constructed for the exhibition of the higher walks of the tragic drama: its stage was open to the sky, and exhibited but little of the interior of the houses. Comedy was therefore under the necessity of laying the scene out of doors; and had often to make people come out of their houses to confide their secrets to each other in the streets. It is true that the poets were thus spared the necessity of changing the scene, as it was taken for granted that the families concerned in the action lived in the same neighbourhood; besides that the Greeks, like all other southern nations, lived much more in the open air than we do. The chief disadvantage in this construction of the stage is, the circumscription of the female parts. If the actual manners were to be observed, as the essence of the new comedy required, the secluded life of the fair sex in Greece rendered the exclusion of unmarried women, and of young women in general, inevitable. No females could appear but aged mothers, maid-servants, or courtezans. Hence, besides the necessary sacrifice of so many agreeable situations, this other inconvenience is produced, that the whole piece frequently turns on a marriage with or a passion for a young woman whom the audience never once see from the beginning to the end of it.

Athens, where the fictitious as well as the actual scenes were generally placed, was the capital of a small territory, and inferior to our principal modern cities in extent and population. The republican equality admitted no marked distinction of ranks: all were alike citizens, richer or poorer. Hence the Attic comedy could admit but little of those contrasts arising from diversity of tone and cultivation which appear in those modern comedies wherein the manners of a court and the refinement or corruption of a monarchial capital are pourtrayed.

As regards the relations between the two sexes, the Greeks had nothing resembling either the gallantry of modern Europe, or the union of love with enthusiastic and respectful admiration. All ended in sensual passion or in marriage. The latter, by their constitution and manners, was a matter much more of duty or convenience than of inclination. The society of a wife, who frequently had not been once seen before marriage, and had passed all her previous life within the walls of a house, proving no great source of entertainment, the latter was sought among women entitled to less ceremony, and who were generally either foreigners without property or emancipated slaves. The indulgent morality of the Greeks permitted almost every degree of freedom with women of this description, especially in the case of young and unmarried men; and consequently the old comic writers exhibit this kind of life very undisguisedly. Their comedies often end with a marriage—a catastrophe which, according to Schlegel, 'seems to bring seriousness along with it;' but with them marriage is frequently nothing more than a means of reconciliation with a father for the irregularities of a forbidden amour: sometimes, however, it happens that the amour is turned into a lawful marriage by a discovery that the woman supposed to be a foreigner or slave was by birth an Athenian citizen. From all the circumstances we have stated, it will appear little surprising that the poets of the later Grecian comedy had so small a circle of characters at their disposal: we enumerate the principal in the words of Schlegel:—'The austere and frugal or the mild and yielding father, the latter not unfrequently under the dominion of his wife, and making common cause with his son; the housewife, either loving and sensible, or obstinate, domineering, and proud of the accession brought by her to the family property; the young man, giddy and extravagant, but open and amiable, who, even in a passion, sensual at its commencement, is yet capable of true attachment;—the vivacious girl, who is either thoroughly depraved, vain, cunning, and selfish, or still well disposed, and susceptible of higher emotions;—the simple and boorish slave, or the cunning one, who helps his young master to deceive his old father, and obtain money by all manner of devices, for the gratification of his passions;—the flatterer or accommodating parasite, who, for the sake of a good meal, is ready to say or do anything that may be required of him;—the sycophant, whose business it was to set quietly disposed people by the ears, and stir up law-suits, to conduct which he offered his services;—the braggart soldier returned from foreign service, generally cowardly and simple, but assuming airs from the fame of his foreign achievements;—a female servant or pretended mother, who preaches a bad system of morals to the girl entrusted to her guidance;—and lastly, a slave-dealer, who speculates on the extravagant passions of young men.' The cunning servant is usually also the buffoon, who confesses his own sensuality and want of principle with a kind of self-complacent exaggeration, jests at the expense of the other characters, and even occasionally addresses the audiences. We must not, however, forget that the Greek servant was a slave exposed for life to the arbitrary caprice of his master, and often subjected to the severest treatment; so that cunning was his natural weapon of defence, and artifice his habitual practice.

It is remarkable that while in other respects the new comedy approached so much nearer to real life than the old, yet the masks in the former deviated farther from reality than in the latter, were more overcharged in the features, and bore a greater resemblance to caricature. It would seem that, as the dramatists were now forbidden to exhibit portraits of real persons on the stage, they were always in fear of stumbling accidentally upon some such resemblance, especially to any of their Macedonian rulers, and so endeavoured in this way to obviate all such danger. Yet the exaggeration in question would hardly be without its peculiar meaning; and accordingly we find it stated that an unequal profile, with one eyebrow drawn up and the other down, was expressive of useless and meddling activity; as, indeed, it is observable that persons accustomed to look at things with anxious minuteness are apt to acquire such distortions.

Though confined in their choice of subject to the narrow range of their civil and domestic life, the inventive genius of the Greek comic writers contrived to exhibit a wonderful variety in their productions: yet in the selection and arrangement of their incidents they were ever true to their national manners and circumstances. As Greece consisted of a number of small separate states lying near and round one another, on sea-coasts and islands, navigation was general, piracy frequent, and human beings were thus procured for the supply of the slave trade. Freeborn children were liable either to be carried off from their parents, or to be exposed by them, by virtue of the legal right which they possessed, and in some cases would be unexpectedly saved from perishing or delivered from captivity, and so recovered by their parents: here we see the groundwork of the numerous recognitions between parents and children, brothers and sisters, &c., which appear in the later Grecian comedy.

The writers in this walk employed themselves, too, on all the subordinate departments,—the farce, the piece of intrigue, the various gradations of pieces of character, from caricature up to the most refined species, and even the serious or sentimental drama. We find also, from the titles of the pieces, and other circumstances, that they sometimes introduced historical persons, as the poetess Sappho for instance, representing the love of Alcæus and Anacreon for her, and hers for Phaon; and we may well suppose that this occasional mixture of beautiful passion with the tranquil grace of the ordinary comedy was exceedingly attractive.

The Romans, whose drama immediately follows that of the Greeks, were not led to the invention of theatrical amusements from the want of representations to fill up the leisure of their festivals, and enliven the mind by withdrawing it from the concerns of life; but, in the despondency of a desolating pestilence, against which all remedies seemed insufficient (year of Rome, 391), they had, according to the story, recourse to the theatre as a means of appeasing the anger of the gods, having previously been acquainted only with gymnastic exercises and circus races. The *histriones*, for whom they sent to Etruria, were however merely dancers, who probably did not attempt pantomimic movements, but strove to delight their audience by a display of bodily activity. The oldest spoken plays, the 'Fabulæ Atellanæ,' were borrowed by the Romans from the Osci, the indigenous inhabitants of Italy. [ATELLANÆ.] They were satisfied with these amusements till Livius Andronicus, somewhat more than five hundred years after the foundation of Rome, began the imitation of the Greeks; and the regular compositions of tragedy and the new comedy (the old it was impossible to transplant) were then, for the first time, known in Rome. Thus the Romans owed the first idea of a play to the Etrurians, the effusions of a sportive humour to the Oscans, and the higher class of dramatic productions to the Greeks. They displayed, however, more originality in the comic than in the tragic department.

The Romans had, besides, their peculiar *mimi*. Their foreign name for these small pieces might lead us to conclude that they bore a great affinity to the Greek mimi: however, they differed considerably in form: we know also that the manners pourtrayed in them had a local truth, and that the subject was not derived from Grecian compositions. The later Greek mimi were dialogues in prose, yet written with a kind of rhythm, not designed for the stage; the Roman were in verse, were represented, and often delivered extempore. Their most celebrated authors in this way were contemporary with Julius Cæsar. These were, Laberius, a Roman knight, and P. Syrus, his freedman and scholar in the mimetic art. Not one of these compositions has descended to us entire. We have, however, a number of sentences from the mimi of Syrus, which, from their internal worth and elegant conciseness of expression, deserve to rank with those of Menander. One entire mimus, which unfortunately time has not spared for us, would have thrown more light upon the question than all the confused accounts of the grammarians, and all the conjectures of modern scholars.

The regular comedy of the Romans was for the most part *palliata*, that is, it appeared in a Grecian dress, and represented Grecian manners. This is the case with the whole of the comedies of Plautus and Terence. But they had also a *comœdia togata*, so called from the Roman dress which was worn in it. Afranius is celebrated as the principal writer in this department. We have no remains whatever of him; and the accounts of the nature of his works are so very scanty, that we cannot even determine, with certainty, whether the togatæ were original comedies of an entirely new invention, or merely Greek comedies adapted to Roman manners. The latter supposition is the more probable, as Afranius lived in a period when the Roman genius had not yet attempted to soar on the wings of original invention; and yet we cannot well conceive the possibility of adapting Attic comedies, without the most violent constraint, to local circumstances of so very different a nature. The Roman way of living was in general serious and grave, though in private society they showed a great turn for wit and joviality. The diversity of ranks among them was politically marked in a very decided manner, and the wealth of private individuals was frequently not inferior to that of sovereigns: women lived much more in society, and acted a much more important part than among the Greeks, through which independence they fully participated in the overwhelming tide of corruption, and the external refinement by which it was accompanied. With these essential differences in the social system, an original Roman comedy would have been a most interesting phenomenon, and would have enabled us to view those conquerors of the world under an aspect altogether new. That this however was not accomplished in the *comœdia togata*, the indifferent manner in which it is mentioned by the antients will hardly leave us room to doubt. Quintilian himself tells us in plain terms that the Latin literature was lamest in comedy.

It remains to say a few words of Terence and Plautus, of whom alone, among the Roman comic writers, we have any perfect remains. Among the Greeks, the poets and artists lived at all times in the most honourable social relations. Among the Romans, on the contrary, polite literature was at first cultivated by men of the lowest class, by indigent foreigners, and even by slaves. Plautus and Terence themselves, who lived about the same period, towards the end of the second Punic war, and in the interval between the second and third, were of the lowest rank; the former a poor day-labourer, the latter a Carthaginian slave, and afterwards a freedman. Their fortunes and associations however were very different. Plautus, when he was not composing comedies, was under the necessity of working at a hand-mill for subsistence; while Terence was admitted into familiar intimacy with the elder Scipio and his bosom friend Lælius. The different habits of life of the two dramatists distinctly appear in their respective modes of writing; the bold roughness of Plautus, and the coarse originality of his jests, betray his intercourse with the lower orders; while in Terence we discern the tone of good society. Plautus inclines to the exaggeratedly droll and farcical; Terence prefers the delicately characteristic, and approaches the seriously instructive and the sentimental. Some of the pieces of Plautus are taken from the Grecian comic writers Diphilus and Philemon, whom we have already had occasion to mention among those of whose works only fragments remain: there is little doubt however that he added much of his native coarseness to his originals. From whom he derived the other does not appear; except, as Schlegel remarks, we may consider ourselves warranted by the assertion of Horace, 'It is said that Plautus took for his model the Sicilian Epicharmus,' in conjecturing that he borrowed his 'Amphitryo,' a piece of quite a different kind from the others, and which he himself calls a tragi-comedy, from that old Doric writer, who employed himself chiefly on mythological subjects. Among the plays of Terence, whose copies from the Greek are probably much more faithful in details than those of Plautus, we find two taken from Apollodorus, and the rest from Menander. Julius Cæsar bestowed some verses of his own composition upon Terence, wherein he pays him the rather equivocal compliment of calling him a half Menander; praising the elegance of his style, and only regretting that he falls short of the comic strength of his original.

With respect to tragedy, it must first of all be observed that the Grecian theatre was not introduced into Rome without considerable changes in its arrangement; that the chorus no longer had a place in the orchestra (wherein the most distinguished spectators, the senators and knights, now sat), but remained on the stage itself. At the very introduction, too, of the regular drama, Livius Andronicus, a Grecian by birth, and the earliest tragic poet and actor of Rome, in the monodies (lyrical pieces chanted by a single person, and not by the chorus), separated the singing from the mimetic dancing, so that the latter alone remained to the actor; and instead of the former, a boy stood beside the flute-player, and accompanied him with his voice. Among the Greeks in better times, the tragic singing and the accompanying rhythmical gestures were so simple, that one person was sufficient to do at the same time the most ample justice to both. The Romans, however, it would seem, preferred separate skill to harmonious unity. Hence arose their fondness, at an after period, for pantomimes, of which the art was, in the time of Augustus, carried to the greatest perfection. From the names of the most celebrated of the performers, Pylades, Bathyllus, &c., it would appear that those who practised this mute eloquence in Rome were Greeks; and the lyrical pieces which their dancing expressed were also delivered in the Grecian language. Roscius frequently played without a mask, and in this respect probably did not stand alone; but so far as we know, there never was any such instance among the Greeks.

In the tragic literature of the Romans there are two epochs: the first is that of Livius Andronicus, Nævius, Ennius, and also of Pacuvius and Attius, who both flourished somewhat later than Plautus and Terence; and the second, the refined epoch of the Augustan age. The former produced only translators and imitators of Greek models; but it is probable that they succeeded better in tragedy than in comedy. Elevated expression usually appears rather stiff in a language not sufficiently cultivated, although it is attainable by perseverance; but to catch the negligent grace of social raillery, we must ourselves be possessed of humour and refinement. Here, however, as in the case of Plautus and Terence, we have not a single fragment of the Greek originals to enable us to judge of the accuracy and general felicity of the copies; but a speech of considerable length of the 'Freed Prometheus' of Attius is hardly unworthy of Æschylus, and is also, in versification, much more polished than the productions of the Latin comic writers generally are. This earlier style was carried to perfection by Pacuvius and Attius, whose pieces kept their place on the stage, and seem to have had many admirers down to the time of Cicero, and even later.

The contemporaries of Augustus were ambitious of measuring their powers with the Greeks in a more original way. The number of amateurs who attempted to shine in tragic composition was particularly great; and we find mention made even of works of the emperor himself. Hence there is strong reason for supposing that Horace wrote his epistle to the Pisos chiefly with a view to deter those young men from so dangerous a career, as they were probably infected by the prevalent literary passion without possessing the requisite talents. One of the most renowned tragic poets of that age was Asinius Pollio, a man of impassioned disposition, as Pliny informs us, and who, in plastic works, was fond of whatever bore the same character. It was he who brought with him from Rhodes the well-known group of the Farnesian Bull, and erected it at Rome. 'If,' observes Schlegel, 'his tragedies bore the same relation to those of Sophocles which this bold, wild, and rather extravagant group does to the tranquil grandeur of the Niobe, we have every reason to regret their loss.' But the political importance of Pollio might easily bias the judgment of his contemporaries as to the value of his poetical labours. Ovid, who tried so many departments of poetry, likewise attempted tragedy, and was the author of a 'Medea;' and Quintilian asserts that he proved here, for once, what he could have done had he chosen to restrain himself, instead of yielding to his natural propensity to diffuseness.

These and all the other tragic attempts of the Augustan age have perished. Yet, according to all appearances, the loss to the interests of dramatic art is not very great. The Grecian tragedy had at first to struggle in Rome with all the inconveniences of a plant removed to a foreign soil: the Roman religion was in some degree related to the Greek, though by no means so completely the same as many have supposed; but the heroic mythology of the Greeks was merely introduced into Rome by the poets, and was in nowise connected with the national recollections. And 'although,' as Schlegel remarks, 'the Romans were at length desirous of becoming thorough Hellenists, they were deficient in that milder humanity of which we may observe traces in Grecian history, poetry, and art, even in the time of Homer. From the most austere virtue, which, like Curtius, sacrificed every personal inclination to love of country, they proceeded, with the most fearful rapidity, to a state of corruption, from avarice and luxury, equally unexampled. In their character they always betrayed that their first founder was not suckled at the breast of a woman, but of a raging wolf. They were the tragedians of the world's history, who exhibited many a deep tragedy of kings led in chains and pining in dungeons: they were the iron necessity of other nations—universal destroyers, for the sake of rearing at last, from the ruins, the mausoleum of their own dignity and freedom in the midst of an obsequious world reduced to one dull uniformity. It was not given to them to excite emotion by the mitigated accents of mental suffering, and to touch with a delicate hand every note of the scale of feeling. They naturally sought also in tragedy, by overleaping all intervening gradations, to reach at once the extreme, both in the stoicism of heroism, and in the monstrous fury of criminal desires. Nothing of their antient greatness had remained to them but their contempt of pain and death, when, after an extravagant enjoyment of life, they were at length called upon to submit to those evils. They then impressed this seal of their former grandeur upon their tragic heroes, with a self-satisfied and ostentatious profusion.

'Finally, in the age of polished literature, among a people fond, even to a degree of madness, of shows and spectacles, the dramatic poets were still in want of a poetical public. In the triumphal processions, the fights of gladiators and of wild beasts, all the splendours of the world, all the wonders of every clime, were brought before the eye of the spectator, who was glutted with scenes of the most violent and sanguinary description. What effect could the more refined gradations of tragic pathos produce on nerves so steeled? It was the ambition of the powerful among them to exhibit in one day to the people, on stages erected for the purpose, and immediately afterwards destroyed, the immense plunder which they derived from foreign or civil war. The relation which Pliny gives of the architectural decoration of the stage erected by Scaurus borders on the incredible. When magnificence could be carried no farther, they endeavoured to surprise by the novelty of mechanical inventions. In this way, one Roman, at the burial solemnity of his father caused two theatres to be constructed in honour of him, with their backs resting on each other, and made to move in such a manner on a single hinge, that at the end of the play they were wheeled round with all the spectators within them, and formed together into one circus, in which gladiatorial combats were exhibited. In the gratification of the eyes that of the ears was altogether lost; rope-dancers and white elephants were preferred to every dramatic entertainment; the embroidered purple robes of the actor were applauded, as Horace informs us; and so little attentive and quiet were the great body of the spectators, that he likens their noise to that of the roaring of the ocean, or of a mountain forest in a storm.'

From the sole specimen of the tragic talent of the Romans that remains to us it would, however, be unfair to draw a conclusion as to the productions of better times: we allude to the ten tragedies which go under the name of Seneca. Respecting their real authorship the opinions of the learned are very much divided; some attribute them partly to Seneca the philosopher, and partly to his father the rhetorician; others ascribe them to one Seneca a tragedian, a different person from either. It is generally admitted that the several pieces are neither from the same hand, nor even of the same age. We might be induced to consider them as productions of a very late period; but Quintilian quotes a verse from the 'Medea' of Seneca, which is to be found in the play of that name in the collection in question, and hence the authority of this piece cannot be doubted, though in merit it does not seem in any way pre-eminent above the others. The state of violence and constraint in which Rome was kept under a series of sanguinary tyrants had also given an unnatural character to eloquence and poetry. Under the wise and mild government of a Vespasian, a Titus, and more especially a Trajan, the Romans returned to a purer taste. But whatever period may have given birth to these tragedies of Seneca they have been severely, perhaps, yet not unjustly, characterized as bombastical and frigid, unnatural in character and action, revolting from their violation of every propriety, and so devoid of theatrical effect as to induce a belief that they were never intended to leave the rhetorical schools for the stage.

With pagan Rome fell antient art. Nevertheless there are one or two links of connection between the antient drama and that of the middle ages, which modern writers have not always observed. There are even still existing some fragments of a play in Greek Iambics on a Jewish Scripture subject, taken from the Exodus or departure of the Israelites from Egypt. The principal characters are 'Moses, Sapphora, and God from the bush,' that is, God speaking from the burning bush. Moses delivers the prologue in a speech of 60 lines, and his rod is turned into a serpent on the stage. The author of this piece, a Jew named Ezekiel, is supposed by Warton, the historian of English poetry, to have written it after the destruction of Jerusalem, to inspire his dispersed and captive brethren with hopes of deliverance under a new Moses, and to have composed it in imitation of the Greek drama, at the close of the second century. (See the edition and German translation of L. M. Philipson, Berlin, 1830, 8vo.)

It appears that in the first ages of Christianity any one connected with the theatre was not allowed baptism. Among 'the fathers,' Cyril declares that when in our baptism we say 'I renounce thee, Satan, and all thy works and pomps,' those pomps of the devil are stage-plays and the like vanities. Tertullian, in like manner, affirms that they who in baptism renounce the devil and his pomps cannot go to a stage-play without turning apostates. Cyprian, Basil, and Clement of Alexandria are no less vehement on the same point; and Chrysostom exclaims loudly against such as could listen to a comedian with the same ears with which they heard an evangelical preacher. Augustine maintains that those who go to plays are as bad as they who write or act them. Tertullian, in his warmth against the buskined actors in particular, observes, with peculiar emphasis, that 'the devil sets them upon their high pantofles to give Christ the lie, who said nobody can add one cubit to his stature.' Rymer, in his 'Short View of Tragedy,' adds, that these flashes and drops of heat, from single authors, had no such wonderful effect, for that the tragedian still walked upon his high shoes. 'Yet,' says he, 'might they well expect a more terrible storm from the reverend fathers when met in a body together, in council œcumenical. Then indeed began the ecclesiastical thunder to fly about; and presently the theatres, tragedy, comedy, bear-baiting, gladiators, and heretics, are given all to the devil without distinction.' But when the blind zeal of the fathers against all heathen literature had been ironically seconded by the emperor Julian with an edict forbidding any Christian to be taught in the heathen schools or to make use of that learning, two ecclesiastics of that time, of considerable learning, undertook to supply in some degree the deficiency of instruction and entertainment experienced by their Christian brethren from the operation of Julian's law. These were Apollinarius, bishop of Laodicea, and his father, a priest of the same city. [Apollinarius.] The latter not only, in treating Scriptural subjects, imitated on a large scale the great epic and lyric poets of Greece, but also turned various historical passages of the Old and New Testament into comedies and tragedies after the Greek model. About the same time the celebrated Gregory Nazianzenus, patriarch and archbishop of Constantinople, composed plays from the Old and New Testament, which, converting the choruses into Christian hymns, he substituted for those of Sophocles and Euripides at Constantinople, where until then the old Grecian stage had continued to flourish. One only of Gregory's plays (or at least a play attributed to him) is extant, a tragedy, entitled 'Christ's Passion:' the prologue calls it an imitation of Euripides (it being, in fact, made up of scraps of that author), and at the same time acquaints us that in this piece the patriarch has the honour of introducing the Virgin Mary's first appearance on the stage. It is not known whether the religious dramas of the Apollinarii perished so early as some of their other writings, which were ordered to be destroyed for the very common offence of heresy; but certain it is that the species of literary culture which they endeavoured to supply gradually disappeared before the progress of Constantine's establishment.

In the general extinction of polite literature and liberal art, which darkened for so many centuries the moral face of Europe, every trace of truly dramatic performance or composition seems to have disappeared. The Saturnalian pageants—the Feast of Fools, the Feast of the Ass, &c.,—exhibited during that long interval, chiefly at the Christmas and New Year festivities, claim notice here, not as bearing much affinity to, but merely as in some degree filling up the place of, the old theatrical portion of the religious celebrations. To arrive once more at any indication of the general existence of what can with propriety be called a religious *drama*, we must descend to a later period of European history. And as in each of the great nations of modern Europe this religious drama gave way but gradually before that rise of the modern stage which accompanied the revival of letters, and has even, in one of those nations, strongly maintained its ground until very recent times, so as to become permanently incorporated, as it were, with the national theatre, we can most conveniently and effectively give such more particular notice of it in each nation as we have to present to our readers, in combination with the rapid view which we have to take of the rise and progress of the modern stage in each of the five great literary countries of Europe, viz., in Italy, Spain, France, Germany, and England. The theatre of each of these countries we shall consider, in the order of succession in which we have here enumerated them, but for the sake of convenience we have arranged the whole under English Drama.

If there really survived, throughout the darkest period of the middle ages, in the form of successive imitations, any traces of the Christianized Greek drama of the primitive church, they seem to have been preserved, where perhaps we should most naturally look for them, among the Italians. Dr. Burney, in his researches into the history of music, ascertained that a spiritual play was performed at Padua as early as the year 1243; and in 1264 a company or fraternity was instituted at Rome, whose chief business was to represent, in the Passion week, the sufferings of Christ, and whose statutes were printed at that city in 1654. In 1298 the Passion was played at Friuli; and the same year, at Whitsuntide, the clergy of Civita Vecchia performed the play of Christ, that is, of his passion, resurrection, ascension, judgment, and the mission of the Holy Ghost: in 1304 they acted the creation of Adam and Eve, the annunciation, the birth of Christ, &c. The late Rev. Mr. Croft and the Hon. Topham Beauclerk collected a great number of Italian mysteries; and at the sale of their libraries, Dr. Burney purchased many of the most antient, which he speaks of as being evidently much earlier than the invention of printing, from the gross manner in which the subjects are treated, the coarseness of the dialogue, and the ridiculous situations into which the most sacred things and persons are thrown.

DRAMMEN, a seaport town of Norway, situated on both sides of the broad and impetuous river of the same name, which here discharges its waters into the Drammenfiord, in the gulph of Christiania. It lies in 59° 39′ N. lat. and 10° 28′ E. long. The town is divided into three quarters, of which Bragnaes is situated on the northern, and Stroemsoe and Tangen on the southern bank of the river: they are united by a flying-bridge. Bragnaes consists of a row of houses about a mile in length. Altogether, it is a lively town; the main streets are chiefly composed of storehouses. Tangen is, in fact, the roadstead and landing-place, and is consequently the resort of mariners, fishermen, and small dealers. Drammen has a parish church and two filial churches, two superior and several elementary schools, and manufactures of leather, tobacco, sail-cloth, oil, &c. The number of houses is about 1000, and of inhabitants about 6000. It is extensively engaged in trade and navigation, in building ships, and in the export of timber, deals, iron, &c. The water in the harbour is of depth sufficient to allow all vessels to lie alongside the quays and other landing-places. There are marble quarries in the vicinity.

DRASTICS. [Cathartics.]

DRAVE, or **DRAU**, a river of Austria, which issues from a bed of limestone on the Toblacher Heide, or heath, near Innichen, in the western part of the Tyrol. It thence descends in a south-easterly direction to Villach, in Carinthia, whence it flows easterly as far as Mahrburg in Styria: it then winds, chiefly south-eastwards, until it falls into the Danube, about 13 miles below Eszeg, in Croatia, close to the castle of Erdödy, which lies on the right bank of that river. The whole length of the Drave, from its source to its junction with the Danube, is about 300 miles. It becomes navigable at Villach. Its tributaries are the Muhr, or Mur, which joins it at Legrad; the Gnil, which rises in the Carinthian Alps, near Villach, and falls into the Drave below Cszaktornya; the Gurk, Glan, Lavant, &c. The valley of the Drave, which commences not far from Innichen, in the Tyrolese vale of the Puster, runs by Lienz, Sachsenburg, Villach, Mahrburg, and Pettau, until it approaches Varasdin, in Croatia, from which point the river flows through a level country. The valley is bounded by mountains nearly as far as Spital, from which point they sink to gentle elevations, and the valley grows wider: the hills again approach, within a short distance, on each side of the river, near Villach, and skirt the Drave as far as its confluence with the Glan. The valley of the Drave is confined to a breadth of a hundred paces near Kossig, and is narrowed to a few feet of towing ground near Seidlach, as well as between Saldenhofen and Mahrenberg. In its descent from Mahrburg, the Drave is accompanied, on its left bank only, by a range of heights, which continue as far as the neighbourhood of Pettau and Friedau, where the precipitous sides of the Mutzel mountains form its right bank. The current of the Drave is very rapid until it reaches Sclavonia, where it flows sluggishly, forms swamps, and occasionally inundates the low country. Gold-dust is found in this river.

DRAWBACK, in commerce, is a term used to signify the sum paid back by government on the re-exportation of goods, upon the importation of which an equal sum has already been paid as duty. The object of this repayment is to enable the exporter to sell his goods in foreign markets unburthened with duties; and it is clear that if duties are required to be paid on the first importation, no transit trade can possibly be carried on unless drawback is allowed by the government. Payments of this nature, although they are sometimes confounded with bounties, are in principle essentially different from them. [Bounty.] Previous to the establishing of the warehousing system in this country in 1803, and when the payment of duties on all foreign and colonial merchandise, with the exception of tobacco and East India goods, was required on the first importation, drawbacks were in all cases allowed upon re-exportation. This course was injurious, not only to trade, but also to the revenue. It was injurious to trade, because of the larger capital which was necessarily employed, and it was prejudicial to the revenue because it gave rise to numerous and ingenious fraudulent expedients, by means of which greater sums were received for drawback than had been originally paid by the importers; besides which, the machinery required for the collection and repayment of duties was more complicated and expensive than would otherwise have been necessary. The amount of customs duty collected in Great Britain before the passing of the warehousing act in 1803 was usually from twice to three times as great as the sum paid into the exchequer, the greater part of the receipts being absorbed by drawbacks, bounties, and charges of management.

The only articles upon which drawback was paid at our custom-houses, and the amount of repayment in 1836, were as follows:—

Coffee . . .	£72	14	0
Rice in the Husk .	10,804	14	2
Thrown Silk .	52,488	17	5
Sugar . . .	556,153	15	5
Tea . . .	21	11	2
Timber . . .	81,987	1	5
Tobacco and Snuff .	18,735	16	5
Wine . . .	60,889	10	6
Total . .	£781,154	0	6

The drawback on timber is not indeed a payment made on its re-exportation, but an allowance upon such quantities as are used in the mines. The quantities of thrown silk, sugar, and tobacco entitled to drawback had already paid duty previous to their undergoing a manufacturing process, and drawback on wine is only paid when exported in bottles, for transferring it to which from the cask it was, until lately, necessary to pay the duty: by a recent regulation wine intended for exportation may be bottled in the warehouse without paying duty. There is every reason to conclude that the payments made on the exportation of refined sugar are not purely drawback, but partake of the character of bounty, the price of the raw sugar being uniformly higher in our markets than in the countries to which the refined goods are sent.

DRAWBRIDGE, a bridge used in antient castles and in modern fortresses over a ditch or fosse, and capable of being raised up at one end so as to cut off the means of access. Drawbridges for this purpose are usually formed of boards nailed to a frame forming a platform, which is furnished at one end with hinges fastened to a beam placed parallel to one end of the frame. The bridge is raised by means of chains passed through the masonry of the gate. These chains are worked either by wheels or by hand, and thus the platform is raised to a perpendicular.

'When drawbridges are made close on the outsides of gates, the masonry ought to be sunk so as to admit of the whole depth of the frame to lie within it, else the oblique fire from the besiegers' batteries would act on the edge of the frame and soon render it unserviceable.' Nicholson's *Dict.* Fortified towns, such as Portsmouth and Calais, have drawbridges.

DRAWING, in its strict meaning, is the art of representing objects on a flat surface by lines describing their forms and contours alone, independently of colour or even shadow, although the latter is closely allied with drawing, both in practice and in theory; because, notwithstanding form may be clearly expressed by outline alone, shadow, while it gives surface and substance, is dependent upon form, and in many cases requires to be accurately defined according to the rules of perspective. More particularly is this the case when shadows are cast from any regularly shaped body upon one or more planes, as, for instance, the shadow from a column upon a flight of steps, or that of a man upon the ground and a wall; which natural profile, as that of a human figure against a wall, has been supposed to have first given rise to the idea of delineating the contours of solid bodies, by tracing their outlines. It is true, that except in geometrical forms with sharp edges, very few such lines exist in nature, outline being no more than the boundary of surfaces as it exhibits itself to the eye. Thus, in the case of a globe or a cylinder, there are no lines whatever in the one, no edges down the latter; their outline being not on any part, but merely the termination of that portion of it which is visible. The same holds good with respect to the human form, and to that of animals, whose limbs have no determined edges, but consist of parts more or less curved, and even when nearly flat—take for instance the palm of the hand—never stopping so as to form a specific line or positive edge. The outline of the superficies will consequently vary according to the direction in which the object itself is viewed. Alluring as colour is to the eye, and principal as it seems to be in painting, it is really subordinate to drawing, because unless assisted by form, it is nearly valueless and unmeaning, incapable of expressing any thing; whereas form can distinctly represent objects without the aid of colouring, or even that of shadow, which latter is the adjunct and ally of the other two, being governed by both, inasmuch as form determines the position of shadows, colouring their proper tone and hue.

Although Drawing embraces all objects and their forms, in its more restricted technical sense, it is generally understood to imply the drawing of the human figure, as that species of it which is the most scientific in itself and the most important in art. Landscape painting requires comparatively little skill in drawing and no great exactness of hand, since the forms it deals with, such as those of trees, hills, rocks, birds, &c., being altogether irregular, general fidelity as to form is sufficient; while fidelity of colouring and aerial perspective, and the effect of light, are the qualities most essential to it. Colouring, indeed, may be said to be the very soul of landscape painting, for divested of that and reduced to mere outline, it loses its greatest charm, and nothing remains of it save the composition alone of the particular subject. Such, however, is not the case with historical painting, the chief merits of which are intimately connected with and capable of being displayed by outline alone. The painter of landscape, or of inanimate objects and mere imitative subjects, such as still life, &c., can trust to his eye alone, and even for perspective he has little occasion beyond an acquaintance with its general laws. Besides which his models are permanent and stationary, subject to little variation except in regard to certain casual and transitory effects of light and colour, that require to be hit off instantly; and therefore their forms may be studied and copied without difficulty. The same remark applies to those of the architectural draftsman, who has moreover the advantage of being able to apply the rules of perspective with unerring certainty upon every occasion. Far different is it with respect to drawing the human figure or animals, because, though their forms are regular and symmetrical, and require to be represented with the utmost correctness, they do not, like geometrical figures, admit of being delineated by the technical operations of perspective, since they consist of undulating surfaces and contours, whose perspective appearance and outline, according to the precise direction in which they are viewed, can be determined by the eye alone. Greater correctness of eye and expertness of hand are required to draw even a statue than a tree; the nicest observation of all the proportions, the most scrupulous attention to every lineament, to every minute detail, to every marking, every gradation of shadow however slight, are indispensable Yet in such case the draftsman has nothing more to do than patiently copy a perfectly immovable object. But how incomparably more arduous than such task is that of representing similar forms taken from the living subject. Here, unless he be also well disciplined and grounded in anatomical knowledge, the best models will avail him little save as studies of proportion, and of such positions and attitudes as, although they are intended to express motion, can yet be preserved for a considerable time. He may, indeed thus perfect himself in that particular species of anatomical perspective which is termed foreshortening, and he may do much in the way of training both his hand and his eye, yet for direct action and motion his model will serve only to inform him what muscles they are that are brought more forcibly into play, and other transitory phenomena that disappear almost as soon as they exhibit themselves. Indeed some motions are so exceedingly rapid and fugitive that they can hardly be studied at all from the life, but if attempted to be shown in painting, must be represented according to theory, based upon the most exact anatomical knowledge. Some attitudes and motions are either so exceedingly evanescent, as those of the figures hurled down in Rubens's picture of the Fallen Angels, or so purely imaginary, as when angels or winged genii are represented hovering in the air, that such theory alone will enable the artist to express them with any degree of apparent fidelity. The extremities, that is, hands and feet, are among the most difficult parts of the figure, and require great practice in drawing. Drapery, again, is, next to the figure itself, of the greatest importance, while it is less reducible to any positive rules for disposing it.

In order to attain to a complete mastery of the human figure, which after all is to be regarded only as the means to a higher aim, and the mechanical apparatus for effecting it, it is necessary to commence by studying what is tedious in itself, and seems almost foreign to the artist's purpose, namely, the internal configuration of the human frame. It is not enough to understand the proportions of the body and limbs, with the form and situation of the external muscles, but it is necessary that all the muscles, their purposes and functions should be well understood; nor must osteology, or the bones of the skeleton, be neglected. Indeed it is desirable that the artist should be able to draw the skeleton figure in any attitude, by which his figures will always be well put together. By way of practice in this respect, it has been judiciously recommended that as soon as he is a perfect master of the skeleton, the student should proceed to draw antique statues in that state, afterwards clothing them with muscles, as in the marble or cast before him. Without scientific knowledge of muscular action, the painter will be able to give his figures only attitudes, and those not always correct, should he have occasion to represent such as from their nature do not admit of being copied from the life. Unless, besides possessing a complete knowledge of the human body and the action of the limbs and muscles, he is also able to express the emotions of the mind, and that not as they display themselves in the countenance alone, but in gesture, attitude, and the whole frame, he will at the best produce only clever academical figures, skilfully drawn, but devoid of soul and sentiment. He must therefore endeavour to make himself master of expression, in the most comprehensive meaning of that very arduous and complex study, which, be it observed, depends entirely upon drawing and truth of delineation. For this purpose such works may be recommended as Bell's 'Anatomy of Expression.'

Perspective, which is generally treated of separately, and is therefore ordinarily considered a distinct study, is nevertheless a most essential part of drawing,—in fact its very grammar, all objects being subject to its laws, although, as already observed, they do not admit of being delineated according to the processes employed for drawing buildings, furniture, and such things as consist of strict geometrical forms. Yet even to those who may seldom have occasion so to apply it, it is eminently serviceable, were it only because it trains the eye, habituating it to notice the effects of position and distance, and affording ready and certain assistance, and an unerring test of correctness, in what might else be matter of perplexity and doubt. Abstruse too as it may seem in theory, and tedious in its application, its principles are few and simple, and subjects the most intricate and complex, and consequently operose in their delineation, demand no particular skill, but merely attention and patience alone. Reserving the science itself for the article **PERSPECTIVE**, we only advert to it here in order to press upon the student its importance, and that, instead of being an extraneous accomplishment, it is so inseparably connected with drawing, that it must of necessity be observed to a certain extent, although with no other guidance than what is derived from the eye, or else there will be no resemblance to nature; for perspective itself is based upon the laws of vision, and consists of practical rules deduced from them. It is true we frequently meet with glaring errors as regards both perspective and accuracy of form in the productions of many who are otherwise clever painters; yet so far from authorising similar negligence, in themselves they are imperfections which, although they may be redeemed by considerable merit in other respects, are nevertheless a drawback upon it.

The student would therefore do well to exercise himself thoroughly in drawing before he proceeds further; and the longer he confines himself to outline, with no other degree of shadow than what is necessary to express the character, the substance, or texture, and the different prominences or depressions in the superficies of objects, the more likely will he be to attain precision and correctness, as there will be nothing to conceal vagueness and inaccuracy of form, but form will be exhibited undisguisedly either in its beauty or the reverse. One great step towards correctness is to understand perfectly beforehand the object to be represented, its character both general and specific: when this is the case, the hand, supposing it to be sufficiently well trained, readily obeys the eye and the mind. Constant observation, therefore, and as careful an examination of objects as if he was preparing to draw them, will greatly promote the student's advancement, and he will be really learning, when, because he is not actually at work with his pencil, he may seem to be doing nothing.

Drawing, as far as regards facility in delineating common forms and objects so as to enable a person to describe them promptly with the pencil, ought to be considered nearly as indispensable a part of education as writing itself. By this, such a degree of proficiency is meant as would enable a person either to express or explain his ideas upon paper, or to sketch from nature. Sketching, in the more popular meaning of the term, implies little more than the act of writing down in a kind of graphic shorthand the characteristic lineaments of a landscape or any individual object, an acquirement little more than mechanical, and which stands in about the same relationship to drawing, in its more elevated character, as an ordinary letter does to a finished literary composition. Like the sketcher, the draftsman only copies the objects before him, and those generally inanimate ones; but with this difference, that his drawings are expected to exhibit perfect fidelity, and admit of being worked up to a high degree of finish and beauty. Still he is no more than a transcriber: he may display his taste and judgment, as well as his accuracy; he may fully enter into the spirit of what he represents, and set it forth to view in a very captivating manner, but without exercising any degree of inventive faculty; whereas drawing, as far as it is synonymous with design, comprehends invention and composition, the plan and idea of the whole subject.

There are various manipulations or modes of drawing, distinguished according to the materials or implements made use of, such as chalk, black lead pencil, sepia or other tinted drawings; which last-mentioned class are sometimes called washed drawings, in which some indication of colouring is occasionally introduced. But what is termed water-colour drawing, as now practised, is altogether a species of painting, although the process is totally different from that of oil colours, or even distemper. Pen and ink drawings in the style of etchings, either with or without the addition of wash of shadow, are capable of producing considerable effect.

Painters' drawings or studies, such as those of the old masters, are highly valuable because they often exhibit their first conceptions in all their energy, and admit us to immediate intercourse, as it were, with their ideas as they arose in their minds.

The invention of Lithography has been applied with great success in Germany to making fac-similes of such drawings: it also enables artists to make drawings at once upon stone, from which impressions may afterwards be taken that are equivalent to autograph delineations, and of course excellent practical studies for beginners, as to handling and the management of the pencil.

DRAYTON, MICHAEL, was born at Harshull in the county of Warwick, in the year 1563. His life is involved in great obscurity, and different circumstances concerning him are rather conjectured than affirmed. It is supposed that he went to the University of Oxford, but without taking any degree, and also that he was in the army at an early period of life. Nine or ten years before the death of Queen Elizabeth he is said to have written poems. His earliest work was published in 1593, under the title of the 'Shepherd's Garland:' it was afterwards revised and reprinted in 1619, under the name of 'Eclogues.' It is a collection of pastoral poems, among which is the ballad of 'Dowsabel,' extracted in Percy's Reliques. Shortly after the 'Shepherd's Garland' appeared his long historical poems, 'The Barons' Wars,' 'England's Heroical Epistles,' &c. His 'Polyolbion,' a descriptive poem on England, her natural productions and legends, made its appearance in 1613. This is the most celebrated of all his works: independently of its merits as a poem, the most respectable antiquaries refer to it for information, and consider it as authority. In 1626 we hear of Drayton as poet-laureate. He died in 1631.

The merits of Drayton as a poet are truly great. His historical poems have about them a heavy magnificence, the most gorgeous images and the boldest descriptions follow in stately array, clothed in well-turned and appropriate verse but unfortunately the obscurity of diction renders them exceedingly unattractive. The construction is most painfully involved: a nominative case is often parted from its verb by an interval of six or seven lines; and hence, though these poems contain but few obsolete words, the reading of them is a serious study. The same observations will apply to the 'Polyolbion,' which is an immense mass of good sterling matter. All the birds and rivers of England are named one after another, but the descriptions are so close, that what we gain in instruction we lose in amusement. This poem is written in Alexandrines, and the measure is admirably managed. 'The Wars of the Barons' are written in ottava rima. Drayton has left one work which, in its way, has never been surpassed—a short fairy poem, called 'Nymphidia.' A more elfin work than this could not be penned: the author has contrived to throw himself into the feelings of the diminutive beings whom he represents. His descriptions of helmets made of beetles, earwigs being used as chargers, and other oddities of a like nature, display the very highest powers of fancy · a Liliputian air breathes through the whole performance. Had Drayton written nothing but 'Nymphidia,' he would deserve immortality.

As few persons, except those who make the reading of English poetry a regular study, could be persuaded to go through the ponderous works of Drayton, we cannot recommend the general reader to a better book than Campbell's 'Selections from the British Poets,' where a specimen is given of every style in which this fine old author wrote.

Drayton has a tomb in Poet's Corner, Westminster Abbey.

DREAMS may be best described, in a few words, as trains of ideas presenting themselves to the mind during sleep. The person, to whose mind ideas present themselves in trains during sleep, is said *to dream*, and the word *dreaming* designates either the state of the mind in dreams, or else the susceptibility or potentiality of having dreams. We use the word in the former sense, when we speak of 'the state of dreaming;' in the latter, when we say that 'dreaming is a part of man's nature.'

It is the principal design of this article to present the reader with the *psychological* theory of dreams: to explain, first, the psychological law by which dreams, as being trains of ideas, are regulated, and to exemplify the operation of this law; and, secondly, by means of this law and of certain psychological circumstances peculiar to the state of sleep, to explain the differences existing between dreams, as being trains of ideas which occur in the state of sleep, and trains of ideas as they generally occur in the waking state. When dreams, as psychological phenomena, shall have been thus explained (in the scholastic phrase) *per genus et differentiam*, the reader will be in possession of the whole psychological theory of dreams.

But dreams may give rise, as they frequently have given rise, to an inquiry other than the psychological inquiry which we have indicated, viz., one which in common speech is called a *physical*, but which would be better called, by coining a word analogous to psychological, a *somatological* inquiry. Besides observing the mental phenomena of dreams, and referring these phenomena to a mental or (as we have before termed it) psychological law, together with certain psychological circumstances peculiar to the state of sleep, men may speculate on the manner in which the state of the body in sleep affects the mind—how the body when asleep is affected, and how again the body thus affected operates to the production of the phenomena of dreams. Of this physical or somatological inquiry, the greater and more important part, that which relates to the state of the body, belongs properly to the subject of sleep; while, as regards the manner in which the state of the body operates to the production of the phenomena of dreams, to determine which observation gives very small assistance, we shall state, in a second division of this article, the little that can be relied on.

In the third part of the article we shall give a few well-attested instances of dreams, accompanied by circumstances which, as they are related, do not seem to admit of explanation. And this will lead us naturally to say a few words concerning the supernatural character which, at different times and in different countries has been attributed to dreams.

I. We have said that dreams are trains of ideas presenting themselves to the mind during sleep. Occasionally, and under peculiar and definable circumstances, *sensations* are felt during sleep; some of which commonly do not awake the dreamer, while others, which awake him, are yet shown to have been felt during sleep by the circumstance that a train of ideas called up by them passes before the mind, invested with the attributes of dreams, in an interval between the sensation and the waking. These sensations, however, are, from the nature of the case, comparatively so few, and, even when they are felt, so unimportant in comparison with the ideas which they call up, that they may very well be excluded from notice in a general description of dreams.

Bearing in mind then the existence of these few and unimportant exceptions, we shall henceforward speak of dreams as consisting only of ideas. And that the feelings composing dreams, which are at the time believed to be sensations, are not sensations, but only ideas,—that we do not see, hear, smell, taste, and touch what we believe at the time that we respectively see, hear, smell, taste, and touch, but that we only have the ideas of these respective sensations, cannot need proof. At any rate, the only proof which the nature of the case admits is one to be furnished by each individual for himself. Knowing the circumstances which, when he is awake, are concomitant with the having the feelings called *sensations*, and the circumstances which are concomitant with the state of sleep and of dreaming,—knowing further that these two sets of circumstances are incompatible with one another; while, on the other hand, the circumstances concomitant, when he is awake, with the having the feelings called *ideas*, are such that he may very well have them likewise when he is asleep; he cannot but conclude for himself (and if he do not, other means of proving it to him there are none) that the feelings of which he is conscious during sleep are not, as at the time he believes them to be, sensations, but ideas. He knows that when he is asleep and dreams, he is so situated that he cannot have the sensations which at the time he believes that he has. He knows that he *may*, in his then situation, have ideas; and, if he has any feelings at all, *must* have ideas. He must conclude then that what at the time he believes to be sensations are in reality only ideas, and must consider the appearance of these ideas as sensations, as a matter to be explained by means of psychological circumstances peculiar to the state of sleep.

Dreams, then, being thus assumed to be trains of ideas, we proceed to investigate the law by which they are regulated, and to exemplify the operation of the law.

On observing, or (to use the phrase which, when mental phenomena are spoken of, is more common) reflecting upon, our waking trains of ideas, we find that when two sensations, or two ideas, or a sensation and an idea have occurred in proximate succession, the sensation that occurred first, or its idea, or the idea that occurred first, is afterwards followed by the idea of the sensation that occurred second, or (as the case may be) by the idea that occurred second, and that this happens the more surely in proportion as such proximate succession of the two sensations, or two ideas, or sensation and idea has been more recent, and in proportion as it has been more frequent. Such is a brief statement of what is called the law of association, and of its laws. [ASSOCIATION.]

'When a man thinketh on any thing whatsoever,' says Hobbes, 'his next thought after is not altogether so casuall as it seems to be. Not every thought to every thought succeeds indifferently. But as we have no imagination (idea), whereof we have not formerly had sense in whole or in parts; so we have no transition from one imagination to another, whereof we never had the like before in our senses.' (*Leviathan*, i. 3.) Hobbes has here enunciated the principle of previous proximate succession, or contiguity (whatever it may be called), and has spoken of it as the sole primary principle of association; the only defect in the manner in which he has enunciated it being the omission of the instances of two ideas, and of a sensation and idea occurring in proximate succession. Most subsequent writers on the subject have added other primary principles, more or less, to this one enunciated by Hobbes; and in so doing are, we think, chargeable with an imperfect analysis. Mr. Hume enumerated three principles, contiguity in time and place, causation, and resemblance; a fourth, contrast, which he named, he looked upon as a secondary principle resolvable into causation and resemblance. (*Essays*, vol. ii., p. 21.) Dr. Brown, finding great fault with Mr. Hume's enumeration, and observing that all suggestion (the phrase employed by him in the place of association) depends on prior co-existence (by which he means the same as we by proximate succession), nevertheless does not seem to have perceived the processes by which resemblance and contrast may be resolved into this principle, and furthermore treats the topic under the threefold division of resemblance, contrast, and contiguity in place or time, all which he inconsistently calls primary principles. (*Lect.* 34 foll.) Mr. Mill has two principles, subdivisions (and perhaps unnecessary subdivisions) of the one principle, as it is represented by Hume and Brown, contiguity; he calls them the 'synchronous order,' which, he says, answers to contiguity in place, and the 'successive order,' which, he says, answers to contiguity in time. (*Analysis of the Human Mind*, vol. i. p. 53.) He observes rightly, that the principles of causation, resemblance, and contrast, may be resolved into previous proximate succession; though he does not go through the analyses, and indeed the few hints which he gives of what he deems the necessary processes seem to show that he did not understand them.

The mode of resolving causation is obvious; causation indeed is but a name for previous proximate succession, under particular circumstances. Let us briefly explain (Mr. Mill not having done it) the modes of resolving resemblance and contrast into the same principle; taking, which is the most convenient method in such cases, a particular instance of each.

The sight of a man, A, calls up the idea of another man, B, who resembles him. Some of the sensations and ideas which are elements of the complex feeling called *the sight of A*, have been before present to the mind as elements of the complex feeling called *the sight of B;* and these sensations and ideas call up the ideas of the other sensations and the other ideas which go to make up the complex feeling called *the sight of B*, and which are not elements of the complex feeling called *the sight of A;* for with these other sensations and other ideas they have before existed in proximate succession, or (as we may say for shortness) have co-existed. These ideas, thus called up, co-exist (as we may again say for shortness) with the ideas of the sensations, and with the ideas, which, belonging both to the sight of A and the sight of B, called them up; and thus the idea of the sight of B, or the idea of B, is present to the mind.

Again, as regards contrast, the idea of a giant calls up the idea of a dwarf. One idea that is an element of the complex feeling called *the idea of a giant* is the idea of tallness, which idea is made up of the idea of height and that of greatness. The idea of tallness, and therefore that of height, is a vivid idea, or (changing the phrase) it is an idea on which the mind dwells, or which very frequently presents itself to the mind when a giant is being thought of; and so when a dwarf is being thought of, is the idea of shortness, which again includes the idea of height, a vivid idea. Now the idea of height being a vivid idea, or one which very frequently presents itself to the mind when a dwarf is thought of, is strongly (and strongly by reason of the frequent proximate succession of the two ideas) associated with the idea of a dwarf, as it is, for the same reason, strongly associated with the idea of a giant. The idea of the giant then calls up the idea of height, which has frequently before (as we may say for shortness) co-existed with the idea of the giant; and the idea of height thus called up, calls up, for the same reason, the idea of the dwarf.

We have dwelt thus at length on the psychological law of association, and its primary principle of previous proximate succession, because it may be said to be the key to the whole psychological theory of dreams. This law being fully comprehended at the outset, so much of the remainder of our task as consists in the exemplification of its mode of operation is made straightforward and easy.

We arrive at the law of association, as determining waking trains of ideas, by the processes of observation and of induction. We may either extend the law, thus arrived at in the case of waking trains of ideas, to the case of dreams, knowing independently that these are made up of ideas, and are therefore not different in kind from waking trains; or again we may arrive at the law, in the case of dreams separately, by the same processes of observation and induction. The former mode is as satisfactory as the latter; and in the way of this latter there are many difficulties, arising out of the nature of the case, which do not exist as regards the former. By the former mode, therefore, which is the easier, and which is at the same time logically correct, we come to the conclusion that, in dreams, one idea is followed by another idea, when either the sensation of which the first is the copy has, at a previous time or times, been followed by the sensation of which the second is the copy, or when one of the ideas has followed or been followed by (as the case may be) the sensation of which the other is the copy, or again when the ideas themselves have been, at a previous time or times, present to the mind in proximate succession; and that this happens the more surely, or (changing the phrase) the association between the two ideas is the more strong, in proportion as the previous proximate succession has been more recent, and in proportion as it has been more frequent. Of the law thus modified by the circumstances of recency and frequency, *causation*, *resemblance*, and *contrast*, are names for classes of instances; and in dreams, as in waking trains, the idea of what is called a cause is generally followed by the idea of what is called its effect; the idea of an object which resembles another object is generally followed by the idea of the object which it resembles; and the idea of an object which is said to be contrasted with another object is sometimes followed by the object with which it is said to be contrasted. We will now exemplify, with somewhat more particularity, the operation of this law of association in dreams.

1. The classes of associations which make up the greater part of our mental history when we are awake, those concerned in naming, in classification and abstraction, in memory, in belief, in reasoning (whether to ourselves or by word of mouth or in writing), in imagination, in desires and aversions, in affections, occur likewise during sleep, and make up a considerable part of our mental history in sleep, that is, of our dreams. It will not be necessary to give instances of the occurrence of each of these classes of associations, as every one who is conscious of having dreamed must be conscious of having had these several states of mind during his dreams. And further, the giving of the instances would be of little use, unless the instances given of the several states of mind were analysed, and the associations forming these several states of mind set forth in the particular instances given; but this, even were it relevant to our present purpose, would carry us to an unreasonable length. Referring the reader then to Mr. Mill's masterly work, entitled the 'Analysis of the Human Mind,' in which the working of the law of association is thoroughly developed, we shall content ourselves with some striking instances of reasoning and imagination, and with an exemplification of belief, of that kind which is most important for the full comprehension of dreams.

We not only converse, in dreams, with the persons whom we believe to be present, speaking to them, and again attributing to them connected words which we believe that they speak to us, but we frequently go so far as to make a speech or written dissertation, which, as remembered when we have awoke, is not only coherent, but often (owing to psychological circumstances peculiar to the state of sleep) more clearly and forcibly arranged than it would have been had we been awake, and had we actually spoken the speech or written the dissertation. Condillac is said to have often brought to a conclusion in his dreams reasonings on which he had been employed during the day, and which he had not completely worked out when he retired to bed. (Cabanis, *Rapports du Physique et du Moral de l'Homme*, ii. p. 395.) Cabanis says, in the same place, of Franklin:—'I knew a very wise and enlightened man who believed he had often been instructed in his dreams concerning the issue of events which at the time occupied his mind. His strong head, and his freedom, in every other respect, from prejudice, had not been able to guard him against a superstition in respect of these inward warnings. He observed not that his profound skill and rare sagacity continued to direct the action of his brain during sleep.'—The circumstances under which Mr. Coleridge composed the fragment called 'Kubla Khan' have been described by himself as the following, and we see no reason to discredit his statement.[*] He had taken an anodyne which had been prescribed to him in consequence of a slight indisposition, and fell asleep in his chair while he was reading in Purchas's Pilgrimage of a palace built by Khan Kubla; he remained asleep for about three hours, during which, as he himself tells us, 'he could not have composed less than from two to three hundred lines; if that indeed can be called composition in which all the images rose up before him as things, with a parallel production of the correspondent expressions, without any sensation or consciousness of effort.' On awaking he instantly sat down to commit his poem to paper. After having written so many lines as were afterwards published, he was interrupted by a person on business: and when he returned to the task the poem had vanished from his memory. The fragment begins thus:—

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[*] This account was ridiculed in the 'Edinburgh Review' (vol xxvii. p. 65), in one of a series of articles on Mr. Coleridge, concerning the truth and taste of which the world has now very unequivocally expressed its opinion. As no arguments are adduced in support of the reviewer's denial of Mr. Coleridge's statement we consider ourselves justified in retaining our own faith therein.

> 'In Xanadu did Kubla Khan
> A stately pleasure-dome decree:
> Where Alph, the sacred river, ran
> Through caverns measureless to man
> Down to a sunless sea.'

The poem proceeds as one stream of melody; and the diction is throughout beautifully appropriate and condensed. (*Poetical Works*, i. p. 266.)—There are many trite instances, which we shall only thus generally allude to, of writing performed during sleep, under the particular circumstances which constitute somnambulism. These particular circumstances, it will be observed, affect the body only, and in no wise affect the mind or its operations.

Our belief in the presence of external objects not present is one of the most curious and, from the frequency of its occurrence, together with its curiousness, one of the most important of the phenomena of dreams. This belief is a complicated case of association. When we are awake, and, having sensations of sight from a present object, believe that the object is present, we have, first, the sensations of sight which the object excites, then the ideas of distance and extension and figure, which are closely associated with these sensations: again, the ideas of all the other sensations which the object has at other times and in other circumstances excited (those of resistance, smell, sound, &c.), and of ourselves as having these sensations: and, lastly, the idea of a cause of all those sensations, whether present or past, whether those which are themselves, or those of which only the ideas or copies are present to the mind. All those ideas, inseparably associated with the sensations of sight of which we are conscious, make up the complex state of mind called *belief in the presence of external objects*, or *belief in the existence of external objects present*. The same ideas, inseparably associated with the ideas of the sensations of sight which were themselves present in the former case, constitute another complex state, which is also a state of belief in the existence of the external objects, but which, having ideas of the sensations of sight instead of the sensations themselves, is thus distinguished from the former state, and which may be called *belief in the existence of external objects not present*. This last state of mind is the one which occurs during sleep, appearing to be the former one. Why it so appears we shall explain presently. At present we have had to do only with what it actually is, and with the associations which it comprehends.

2. It is said that a man's character and pursuits influence his dreams. Now we mean by the phrase 'a man's character,' nothing more than certain classes of associations which occur to him most frequently; and his 'pursuits' again, viewed subjectively or in respect of himself pursuing, may be paraphrased in the same way. When we say then that a man's character and pursuits influence his dreams, it is only a way of saying that those associations which most frequently occur when he is awake will also occur most frequently, *cæteris paribus*, when he is asleep. This circumstance, therefore, observed in dreams, exemplifies the manner in which frequency strengthens association. It would be but a waste of words to bring particular instances in support of the general remark; and indeed it will be incidentally exemplified in some of the illustrations which we shall presently adduce of the influence of sensations on dreams.

3. Dreams turn upon subjects which have been present to the mind recently, rather than those which have been present to it at a greater distance of time. In other words, the most recent associations will recur, *cæteris paribus*, the most frequently in our dreams. As under the last head, therefore, was exemplified the influence of frequency on association, so under the present is that of recency exemplified; and it will not be necessary to dwell any longer upon this than upon the last topic.

4. We shall enter at rather greater length into the manner in which the sensations occasionally felt in sleep modify dreams through association. We have already alluded to the occasional occurrence of these sensations. They are themselves very unimportant parts of dreams, even when they occur; but they call up vivid and interesting trains of ideas, the connexion between which and the sensations it is amusing to trace. We shall take the different kinds of sensations separately.

a. Of the five external senses, sight is the least excitable during sleep. But a strong light brought before the eyes of a person sleeping generally affects the nerves concerned in the sensation of sight; a sensation of a light is generally felt; and whilst its ultimate effect is almost always to awaken the sleeper, a train of ideas associated with the sensation of a light is first called up, and passes before the mind in the interval between the sensation and waking. The sleeper probably awakes from a dream of some conflagration, whether one which has actually taken place (for instance, the conflagration of Moscow, or any other which may have been impressed on his mind), or else a conflagration of some house well known to him, perhaps even his own.

b. The least excitable of the senses, after sight, is taste. And even so far as it is excitable, the circumstances under which we sleep are such as to preclude almost entirely the possibility of its being brought into action. When, however, from ill-health, or in consequence of something which we have ate shortly before going to bed, there is (in the vulgar phrase) a bad taste in the mouth, this may have its effect on dreams. 'A bad taste in the mouth,' says Mr. Macnish, the author of a book called the 'Philosophy of Sleep,' which, however, is not exactly the book of a philosopher, 'presents us with everything bitter and nauseous in the vegetable world; a mercurial course perhaps with the mines of Spain, from whence that mineral is obtained.' (p. 69.)

c. Smell comes next of the senses, in respect of defect of excitability during sleep. The circumstances under which we sleep are again such as to preclude almost entirely the action of this sense; and it is difficult, while it is by no means important, to select an apposite instance of its operation in modifying dreams.

d. We come next to the sense of hearing. 'The sound of a flute in the neighbourhood,' says Mr. Macnish, 'may invoke a thousand beautiful and delightful associations. The air is perhaps filled with the tones of harps, and all other varieties of music; nay the performers themselves are visible; and while the cause of this strange scene is one trivial instrument, he may be regaled with a rich and melodious concert.' (p. 61.)—A loud noise taking place near the sleeper, heard by him, and eventually awaking him, calls up ideas of various loud noises, and these again various other ideas associated with them. The following curious instance, which exemplifies the tendency of ideas that have been most frequently and most recently present to the mind to recur in dreams, is taken from Dr. Abercrombie's work on the Intellectual Powers. At a time when the inhabitants of Edinburgh were all in constant alarm of a French invasion, and every preparation had been made for the landing of the enemy, it was further arranged that the first notice thereof should be given by a gun from the castle. 'A gentleman,' says Dr. Abercrombie, 'who had been a most zealous volunteer, was in bed between two and three o'clock in the morning, when he dreamt of hearing the signal gun. He was immediately at the castle, witnessed the proceedings for displaying the signals, and saw and heard a great bustle over the town, from troops and artillery assembling. At this time he was roused by his wife, who awoke in a fright, in consequence of a similar dream, connected with much noise and the landing of an enemy, and concluding with the death of a particular friend of her husband, who had served with him as a volunteer during the late war. The origin of this remarkable concurrence was ascertained, in the morning, to be the noise produced in the room above by the fall of a pair of tongs, which had been left in some very awkward position, in support of a clothes-screen.' (p. 277.)—Again, whispering in a person's ear when he is asleep is found sometimes to modify his dreams very considerably. Some persons, it is true, are instantly awaked thereby; others, who sleep on, are not conscious when they awake of having had dreams akin to the subjects on which the whisperer has discoursed; while others again may have their dreams modified at one time by the whispering, and not at another, according as the sleep is more or less deep. But instances are recorded of persons susceptible always, and, to a peculiar degree, of the influence of this whispering in the ear on their dreams. Dr. Abercrombie gives an amusing account of an officer in the expedition to Louisburg in 1758, on whom his companions in arms, knowing his susceptibility, used constantly to amuse themselves by practising the whispering. 'They could produce in him any kind of dream by whispering into his ear, especially if this was done by a friend with whose voice he was familiar. At one time they conducted him through the whole progress of a quarrel, which ended in a duel; and when the parties were supposed to be met, a pistol was put into his hand, which he fired, and was awakened by the report. On another occasion, they found him asleep on the top of a locker or bunker in the cabin, when they made him believe he had fallen overboard, and exhorted him to save himself by swimming. He immediately imitated all the motions of swimming. They then told him that a shark was pursuing him, and entreated him to dive for his life. He instantly did so, with such force as to throw himself entirely from the locker upon the cabin floor, by which he was much bruised, and awakened of course. After the landing of the army at Louisburg, his friends found him one day asleep in his tent, and evidently much annoyed by the cannonading. They then made him believe that he was engaged, when he expressed great fear, and showed an evident disposition to run away. Against this they remonstrated, but at the same time increased his fears by imitating the groans of the wounded and the dying; and when he asked, as he often did, who was down, they named his particular friends. At last they told him that the man next himself in the line had fallen, when he instantly sprung from his bed, rushed out of the tent, and was roused from his danger and his dream together by falling over the tent-ropes.' (p. 278.)

e. Of the five external senses, touch is the most excitable during sleep. In continually changing, as we do, our position during sleep, we are influenced by tactile sensations of which the bed and the bed-clothes are the causes. We are most easily awaked by being touched, the slightest tickling in the nose or the sole of the foot being sufficient for the purpose. And as regards the operation of sensations of touch in modifying dreams, let it suffice to observe generally, that those by which we are awaked may call up, in the interval between the touch and the waking, ideas of various causes of touch which will be pleasurable or painful ideas according to other circumstances.

f. Sensations of bodily pain, or of disorganization (as they have been named by Mr. Mill, who has been the first to treat of the munder a separate head), including the sensations of heat and cold, frequently occur to modify dreams. Hobbes has enunciated this modifying circumstance with distinctness, interweaving however a somatological hypothesis for its explanation which is neither necessary nor correct; but this hypothesis may be kept apart from the enunciation of the fact. 'And seeing dreams are caused by the distemper of some of the inward parts of the body, divers distempers must needs cause different dreams; and hence it is that lying cold breedeth dreams of fear, and raiseth the thought and image of some fearful object (*the motion from the brain to the inner parts, and from the inner parts to the brain being reciprocal*); and that as anger causeth heat in some parts of the body when we are awake; so when we sleep, the over-heating of the same parts causeth anger, and raiseth up in the brain the imagination of an enemy.' (*Leviathan*, i. 2.)—Dr. Abercrombie furnishes us with the following instance of a dream caused by cold. Dr. Gregory, who had recently been reading an account of Hudson's Bay, dreamt one night that he spent a winter in that part of the world, and suffered intensely from frost; and upon awaking he found that he had thrown off his bed-clothes during sleep (p. 276). Heat arising from an accumulation of bed-clothes will lead to a dream of an opposite character, the particular ideas associated with the sensation of heat which come in to make up the scenes being dependent, as in the case of Dr. Gregory's dream, on particular circumstances.—The same Dr. Gregory having applied a bottle of hot water to his feet one night in consequence of indisposition, dreamt that he was walking up Mount Ætna, and felt the ground under him warm. Dr. Reid, having one night a blister applied to his head, dreamed that he was scalped by a party of Indians. (Abercrombie, *id.*; Stewart's *Philosophy of the Human Mind*, vol. i. p. 335.) The writer of this article, when suffering once from acute pains in the back during a rheumatic fever, dreamt that he was pursued by enemies, who were shooting arrows at him, and whose every arrow told.

g. Sensations in the alimentary canal, sometimes pleasurable and sometimes painful, have a very important influence on dreams. These sensations indeed influence very considerably our waking trains of ideas; and much more, inasmuch as in sleep there are no external objects to call us away from the ideas which these sensations call up, do they influence our sleeping trains. When the digestion is good, and we have ate nothing which weighs upon or disagrees with the stomach, our dreams are, generally speaking, pleasurable. When, on the other hand, we suffer from indigestion, which, in respect of the effect, is but a name for an aggregate of painful sensations in the alimentary canal, we are afflicted with dreams of the most painful character. The exhilarating effects of opium and of intoxicating draughts, which effects are neither more nor less than sensations in the alimentary canal, are also discernible in dreams. And in connexion with this topic, we may allude to the dreams caused by the uneasy sensations attendant on obstructed respiration, which, sometimes caused by and sometimes combined with indigestion, constitute the most dreadful evils to which in sleep we are subject, and which are known to all under the name of nightmare.

We have thus explained the law of association which determines the formation of dreams, and have exemplified its operation. Thus far, it will be observed, we have spoken of dreams only in their generic character of trains of ideas; or, at least, any reference which we have made to the specific circumstances which distinguish them from trains of ideas in the waking state has been incidental. It remains, in order to complete the psychological theory of dreams, to state and explain the circumstances distinguishing dreams, as trains of ideas during sleep, from trains of ideas as they generally occur in the waking state. We say as they generally occur, because in the waking state there are trains of ideas, which occur under peculiar circumstances, resembling dreams, and differing from the generality of trains of ideas in the waking state in those very points by means of which dreams, and the generality of waking trains, are to be distinguished from one another. The trains of ideas which in the waking state occur thus under peculiar circumstances are those called *reveries*, or, more expressively, ***waking dreams***; and again, those which present themselves to the mind during delirium.

1. Ideas which occur in dreams are believed to be sensations: scenes fashioned by the fancy are believed to be real. What has been already said, when we were resolving this belief in the presence of external objects not present into its component elements, in order to exemplify the operation of the law of association in dreams, has expedited the explanation of this phenomenon. When we are awake we are conscious continually of two different states of mind, belief in the existence of external objects present, and belief in the existence of external objects not present. These two states of mind differ only in this point, that the former comprehends certain sensations of sight, while the latter, in the place of the sensations themselves, has but the ideas of the sensations. Now, when we are awake, ideas are compared with sensations, the belief in the existence of external objects not present with the belief in the existence of external objects present; and ideas are seen to be less vivid than sensations, the former belief than the latter belief. Thus, and thus alone, are these states of mind respectively distinguished from each other when we are awake; but when we are asleep we have no sensations with which to compare our ideas, and no external objects present, with the belief in whose presence we can compare the belief in their existence when they are not present. Ideas therefore, no longer viewed relatively, take the place of sensations; they are the most vivid representations which present themselves to the mind of the qualities of external objects; and, being the most vivid, are believed to be sensations. Whence it follows that the belief in the existence of external objects not present takes the place also of the belief in the existence of external objects present, or (changing the phrase) the belief in the presence of external objects. It may also be, that ideas when we are asleep are, from bodily causes which we cannot trace, actually more vivid than are the same ideas when we are awake: if this be so, which we cannot positively say, but which is probable, it will combine with the previous consideration to explain the above-mentioned phenomenon.

Dr. Hartley wrote upon this point with great sagacity; and the only fault in the following extract is the intrusion of a material hypothesis at the end of it 'The scenes which present themselves are taken to be real. Now this happens, first, because we have no other reality to oppose to the ideas which offer themselves, whereas in the common fictions of the fancy, while we are awake, there is always a set of real external objects striking some of our senses, and precluding a like mistake there, or if we become quite inattentive to external objects, the reverie does so far put on the nature of a dream as to appear a reality; secondly, the trains of visible ideas which occur in dreams are far more vivid than common visible ideas, and therefore may the more easily be taken for actual impressions. For what reasons these ideas should be so much more vivid, I cannot presume to say. I guess that the exclusion of real impressions has some share, and *the increased heat of the brain may have some likewise*. The fact is most observable in the first approaches of sleep, all the visible ideas beginning then to be more than usually glaring.' (*Observations on Man*, vol. i. p. 398, ed. 1810.)

Thus it is that we never dream of a past event as a past event. Any historical event of which we dream is believed to be taking place before our eyes, and any historical individual to be our companion. Another singular consequence is observable in the case of dreams produced by sensations of bodily pain. The sensation of the pain may call up, as well as kindred ideas of pain and its causes, an idea of that which will remove the pain, which, when we are awake, must often follow the sensation of pain; and this idea will be taken for the actual presence of that which is fitted to relieve us. When, for instance, we hunger or thirst in sleep, these uneasy sensations call up respectively the ideas of food or drink; we believe that we have food or drink in our possession, but (the hunger or thirst of course continuing) we go on to dream of some occurrence which prevents the satisfaction of our appetites; or perhaps we have the idea of the taste of the food or drink, and believe that we have the sensation of tasting, but yet the hunger or thirst is not allayed. Immediately some other viand or beverage presents itself to us; again are we debarred from the enjoyment, or again do we taste and profit not; and thus does the dream proceed until we awake.

The incongruity of dreams, or (in other words) the grouping of objects in our dreams which could not exist together in reality, results immediately from this mistaking of ideas for sensations. There is no more incongruity in the collocation of our ideas themselves during sleep, than in that of our ideas in the waking state. In both states they follow one another according to the same law. But when we have ideas of objects during sleep, we believe that the objects are themselves present; and though the collocation of the ideas is natural, and such as would excite no surprise in the waking state, the collocation of the objects is strange, and would then also excite surprise. Dreams, though only trains of ideas, are believed at the time (as has been explained) to be successions of objects; and when afterwards remembered as such, they seem strange and incongruous. Dryden's poetical description and instance may here relieve the weariness of our own prose:—

> 'Dreams are the interludes which fancy makes:
> When monarch reason sleeps, this mimic wakes,
> Compounds a medley of disjointed things,
> A court of coblers or a mob of kings.'

2. There being no sensations in sleep, as in the waking state, to break off the trains of our ideas, the associations which have been at any previous time or times formed between these ideas have more uninterrupted play when we are asleep than when we are awake. When we are awake, one idea calls up another, this perhaps a third, and thus a train of ideas is commenced, when of a sudden we see some object; the sensation then takes possession of the mind, and (in the common phrase) the attention is withdrawn from the train of ideas. When we are asleep this cannot happen; and an association between any two ideas has to give way only to a stronger association between one of them and a third.

The greater coherency, than if they were made by us when awake, of speeches or essays which we believe in our dreams that we speak or write, has been already noticed.

Thus it is that we often go through a repetition in our dreams with considerably greater ease than we can do it when awake. For the same reason again, ideas occur to us in our dreams of which we have not for a very long time been conscious when awake, and which we have been perhaps unable, when anxious to do so, to call up; and trains of ideas are gone through, which we have perhaps wished to complete, when awake but to no purpose, inasmuch as the associations between the several pairs of ideas in the trains are too faint to bear up against the continual interruptions of sensations. These ideas and trains of ideas occurring in dreams, which we are unable to call up when we are awake, are said to have been forgotten. Dr. Abercrombie gives an instance of a gentleman who, having been something of a Greek scholar in his youth, had afterwards so entirely forgotten the language that he could not even read the words, but who often dreamt of reading Greek works which he had used at college, and in such manner as to understand them. (p. 284.) Sir Walter Scott relates a very extraordinary dream of this kind in his Notes to 'The Antiquary,' in the last edition of the Waverley Novels, to which we must content ourselves with referring the reader.

We may observe, that the same revival of long-forgotten ideas and trains of ideas takes place often during delirium, the similarity between our trains in which state and our dreams we have already alluded to. A very singular instance of such revival during delirium is related by Mr. Coleridge, in his 'Biographia Literaria' (vol. i. chap. vi.).

To this head is to be referred a remark generally made concerning dreams, that the mind exercises no control over the ideas which compose them, or (as it is otherwise expressed) that the mind does not exert its will upon them, as it does upon ideas composing trains in the waking state. The mind is not diverted from the trains of ideas which pass before it by the occurrence of sensations; thus it need not desire, as it continually does in the waking state, to have the ideas composing the trains rather than the sensations; and thus the ideas are not presented to it, as they continually are in the waking state, in that particular combination which is called *desire of the ideas*, or *willing of the ideas*. This, we believe, is the full extent to which the remark concerning the absence of will (as it is called) over ideas in dreams is true; though, from the manner in which it is expressed, it seems, and indeed it is generally intended, to imply much more.

When we are awake, we are said to will bodily actions, and to will mental actions or ideas. Now, when we are asleep, we will bodily actions likewise; but from the manner in which the body is affected during sleep, the actions do not follow the state of mind called *will*, as they do when we are awake. We will to run from an enemy who, we believe, is pursuing us, but we cannot run; the muscles are so affected in sleep that their action does not follow the state of mind called *will*, as it does when we are awake. Every one who has dreamed must have experienced such a dream as this, and must remember the fear which follows it. But the circumstance that the action does not follow by no means affects the existence of the state of mind called *will* during dreams; and in sleep therefore, as in the waking state, we will bodily actions. Again, as regards mental actions or ideas, we exert our will over these, in the waking state, either by attending to them, or by endeavouring to recollect them, and in no other way; and every one who has dreamed must be conscious of attention to trains of ideas during his dreams, and of endeavours to recollect ideas. Thus neither as regards mental actions is there any absence during dreams of the state of mind called will.

The only difference in respect of this state of mind between dreams and waking trains is, as we have said, that in the former there is not so much need of attention to the ideas as in the latter; inasmuch as dreams are not interrupted by sensations, as are trains of ideas in the waking state.

3. Our measure of time during dreams appears not to coincide with that in the waking state. Having fallen asleep for a few moments, we believe that we go through, before we awake, a series of events which would occupy, did they really happen, days or months, or even years. And the same takes place often, when a sensation occurs to awake us, in the brief interval between the having of the sensation and the waking. Dr. Abercrombie gives the following instance, which will serve us as well as any other for illustration:—'A gentleman dreamed that he had enlisted as a soldier, joined his regiment, deserted, was apprehended, carried back, tried, condemned to be shot, and at last led out for execution. After all the usual preparations, a gun was fired: he awoke with the report, and found that a noise in an adjoining room had both produced the dream and awaked him.' (p. 279.) Again: 'A friend of mine,' says Dr. Abercrombie, 'dreamed that he crossed the Atlantic,

and spent a fortnight in America. In embarking on his return, he fell into the sea; and having awaked with the fright, discovered that he had not been asleep above ten minutes.'

This discrepancy between our notions of time when we are asleep and when we are awake may be very easily explained. The idea of time is only an idea of so many successions of events, or of ideas, whether called up by these events or otherwise. On looking back through any period of our mental history, if we remember many feelings that have succeeded the one to the other, we have the idea of a long time; if few, of a short one. Now ideas are remembered in proportion as they are interesting or vivid. In the waking state and in sleep the same ideas would pass before the mind during the same time; but in the waking state they would be viewed as ideas only, and the greater number would not be remembered. But in sleep they are believed to be sensations, the events thought of are believed actually to take place, and the ideas thus become interesting to such a degree that they cannot be forgotten. Looking back through these ideas, and remembering every one of them, we judge the time during which they have passed before the mind to have been a long time.

4. It remains to speak of the absence of surprise in dreams. It is not indeed true that the feeling of surprise is altogether absent from dreams, as is generally asserted; while in those cases in which it is absent, and in which its absence is thought worthy of remark, the explanation is simple. In our dreams we believe that we see persons who are either dead or in a distant country, and we are not surprised; we believe that we witness events which happened a very long time ago, and we are not surprised. Now we have the ideas of the persons and events, and we have not at the same time the ideas of the death or the distant country or the distant time at which the event took place; having the ideas of the persons and events, we believe these ideas, as has been already explained, to be sensations; and as we have not, together with the apparent sensations, the ideas of the death, distant country, &c., we have no ideas with which the apparent sensations are incongruous; and there being no incongruity, there is nothing to surprise us. We think of the persons or events, as we might think of them when awake, without certain additional ideas; and not having these additional ideas, we are not surprised at seeing, or believing that we see, the persons or events, any more than we should be surprised at seeing (could we by possibility do so) the same persons or events when we were awake, if we knew not that the person had died or was in another country, or that the event was one of history.

This explanation is confirmed by those instances in which we do feel surprise. The idea of a person or event believed to be seen may call up any of the additional ideas that have before been absent. We believe that we see a person, and we then think of his death; we are immediately surprised; and we dream that we are dreaming. Every one who has dreamed must have experienced such a dream as this.

II. This second part of the article was to contain so much of the little that is known concerning the state of the body in sleep as is relevant to the subject of dreams.

The organs of the five external senses are so affected by sleep, that the sensations which respectively pertain to them are either not felt at all, or are felt very much less often, and very much less, than when we are awake, and even when they are felt they generally awake us. But of this we have already spoken.

We have also spoken of the effects of sensations of bodily pain and of internal sensations on dreams. The manner in which sickness, through the medium of internal sensations, intensifies dreams, is familiar to every one.

It is a question whether sleep operates on the mind as well as on the body; whether, while it suspends the action of the body, it also, either through the body or otherwise, suspends the action of the mind. This is a question on which we cannot speak positively, and on which our opinion can be determined only by the greater *probability* of the one side or of the other.

Some writers assert that we do not always dream when we are asleep. They say that the proper effect of sleep is to suspend the action of the mind as well as of the body, and that, to the extent to which we dream, sleep is impaired. They speak of two kinds of sleep, the one in which we do not dream, and which they call *perfect* sleep; the other, in which we dream, and which they call *imperfect*. One of these writers is Mr. Locke, who has expressed a very decided opinion that during sleep we do not always think; his arguments in favour of the opinion being, that all of us are conscious of having no dreams during a considerable portion of the time that we sleep, that some persons even do not dream at all, and that a supposition that the dreams are forgotten almost the very moment after they have taken place is absurd. (*Essay on the Human Understanding*, 2, i. sec. ii.) If however we do not dream always, how is the beginning of our dreams accounted for? The mind is, on this supposition, at a particular period of sleep, void of ideas; an idea suddenly enters it, and dreaming begins. Now the idea was not called up by an idea antecedent to it, for antecedently there was no idea in the mind. How then did it come to enter the mind? This consideration appears to us adequate to set the question at rest as to whether we dream always or not.

Dreaming always, we may remember or forget our dreams according to whether our sleep is deep or slight, and remember them in proportion as it is not deep. One part of the same fit of sleep is more intense than another; the dreamer remembers the dreams of this last part, but forgets those of the first, as regards which it is the same as if he had not dreamt at all. In one state of health the same person has a greater amount of deep sleep than in another; he in consequence remembers his dreams better, or (as he would most probably express it) he dreams more in the second state of health than in the first. Again, one person's bodily constitution is such as to make his sleep generally more intense than that of another person, and in consequence he is less of a dreamer. There have been instances of persons who do not remember ever to have dreamed, and of others who have not remembered any dreams until at a very advanced period of life.

III. As regards the instances of dreams which we propose to relate, there are three possible cases; they are either untrue, or true and explainable by ordinary or natural means, or else true and not so explainable, and therefore (in the common phrase) supernatural. Now these instances are so far authenticated, that we are not authorized altogether to discredit them. Not discrediting them, we are yet unable to explain them by the ordinary means; though it is possible, certainly, that as the dreams and their attendant circumstances come to us, there may be both some exaggeration in the dreams themselves, and some omission of incidents previous to the occurrence of the dreams which might help to explain the attendant circumstances. On the other hand, the instances (and we are about to give merely a selection) are numerous. And again, there is another set of incidents, also well authenticated, which, like these instances of dreams, are, if we believe them as they are related, unsusceptible of explanation by ordinary or natural means. We refer to the many stories told of the appearance of persons, at the moment of death, to friends or relations at a distance from the spot where the death takes place. Now these incidents pave the way to some extent for a belief in the supernatural character of such dreams as we are about to relate. If these incidents are believed to be supernatural, there is no reason why there should not also be supernatural dreams. We must observe however that in calling either the incidents to which we have referred or the dreams supernatural, we mean no more than that they cannot be explained by natural means. We cannot say how they were brought about; neither can we say, looking at the particular circumstances under which they happened and the particular persons to whom they happened, why they were brought about.

The first instance that we give is of a dream which occurred to a gentleman now alive, and which was related by him to members of his family who are also now alive, and to other persons, on the day after he dreamt it, and before the event which he seems to have foreseen in his dream was known. We extract the account of the dream, making some immaterial alterations, from a book called the 'Royal Book of Dreams,' in which it is given with the greatest particularity. 'In the night of the 11th of May, 1812, Mr. Williams, of Scorrior House, near Redruth, in Cornwall, awoke his wife, and, exceedingly agitated, told her that he had dreamt that he was in the lobby of the House of Commons, and saw a man shoot with a pistol a gentleman who had just entered the lobby, who was said to be the chancellor; to which Mrs. W. replied that it was only a dream, and recommended him to go to sleep as soon as he could. He did so; but shortly after he again awoke her, and said that he had, a second time, had the same dream. The same vision was repeated a third time; on which, notwithstanding his wife's entreaties that he would lie quiet and endeavour to forget it, he arose (then between one and two o'clock) and dressed himself. At breakfast the dreams were the sole subject of conversation; and in the forenoon Mr. W. went to Falmouth, where he related the particulars of them to all of his acquaintance that he met. On the following day, Mr. Tucker, of Trematon Castle, accompanied by his wife, a daughter of Mr. W., went to Scorrior House on a visit. Mr. W. related to Mr. T. the circumstance of his dreams; on which Mr. T. observed that it would do very well for a dream to have the chancellor in the lobby of the House of Commons, but that he would not be found there in reality. Mr. T. then asked what sort of a man he appeared to be, when Mr. W. described him minutely. Mr. T. replied, "Your description is not at all that of the chancellor, but is very exactly that of Mr. Perceval, the chancellor of the exchequer." He then inquired whether Mr. W. had ever seen Mr. Perceval, and was told that he had never seen him, nor had ever had anything to do with him; and further, that he had never been in the House of Commons in his life. At this moment they heard a horse gallop to the door of the house; and immediately after a son of Mr. Williams entered the room, and said that he had galloped out from Truro, having seen a gentleman there who had come by that evening's mail from town, and who had been in the lobby of the House of Commons on the evening of the 11th, when a man called Bellingham had shot Mr. Perceval. After the astonishment which this intelligence created had a little subsided, Mr. W. described most minutely the appearance and dress of the man that he saw in his dream fire the pistol at the chancellor, as also of the chancellor. About six weeks after, Mr. W. having business in town, went, accompanied by a friend, to the House of Commons, where, as has been already observed, he had never before been. Immediately that he came to the steps at the entrance of the lobby, he said, "This place is as distinctly within my recollection, in my dream, as any room in my house;" and he made the same observation when he entered the lobby. He then pointed out the exact spot where Bellingham stood when he fired, and which Mr. Perceval had reached when he was struck by the ball, where he fell. The dress both of Mr. Perceval and Bellingham agreed with the description given by Mr. W., even to the most minute particulars.' This dream is related also by Dr. Abercrombie (p. 300), with a slight variation as to the time that elapsed between the dream and the announcement of the event, and with some additional circumstances.

The two following are among many instances mentioned by Dr. Abercrombie, who vouches for their truth. A Scotch clergyman, who lived near Edinburgh, dreamt one night, while on a visit in that town, that he saw a fire, and one of his children in the midst of it. On awaking, he instantly got up and returned home with the greatest speed. He found his house on fire, and was just in time to assist in saving one of his children, who in the alarm had been left in a place of danger. Two sisters had been for some days attending a sick brother, and one of them had borrowed a watch from a friend, her own being under repair. The sisters were sleeping together in a room communicating with that of their brother, when the elder awoke in a state of great agitation, and roused the other to tell her that she had had a frightful dream. 'I dreamt,' she said, 'that Mary's watch stopped; and that when I told you of the circumstance, you replied, "Much worse than that has happened; for ——'s breath has stopped also,"'—naming their sick brother. The watch, however, was found to be going correctly, and the brother was sleeping quietly. The dream recurred the next night; and on the following morning, one of the sisters having occasion to seal a note, went to get the watch from a writing-desk in which she had deposited it, when she found that it had stopped. She rushed into her brother's room in alarm, remembering the dream, and found that he had been suddenly seized with a fit of suffocation, and had expired. (Abercrombie's *Intellectual Powers*, pp. 289-302.)

The following is written in the fly-leaf of an old copy of Cotton's Concordance, belonging to a friend of the writer of this article. Its circumstantial manner of narration entitles it to belief; and the prediction of the beheading of Charles I. and of the fire to the old woman is no more extraordinary than that of the death of Mr. Perceval to a gentleman who had never seen him, and was in no way connected with him. It is signed Richard Fiennes, to whom, it is to be presumed, the Concordance once belonged; and it is dated September 14th, 1666, the year of the fire of London. 'In the yeare 1653, on the 26th day of May, Mr. Fortescue of Ware, in the county of Devon, a person of greate honoure and sobriety, told me at Heanton in the said county, in the presence of my nephew, Roll. and other gentlemen of quality, that there was a woman of his knowledge, that was then living, that many yeares before the warres had a vision of them, and of the king's beheading, and amongst many other particulars, of the destruction of London. This I writt down in my Almanack for the yeare 1653, the same day it was told me with *Avertat Deus* under it; but it hath pleased God that for our sinne London is allsoe now consumed. I pray God we may all receive instruction by it.'

We shall conclude these instances with an account of two concurrent dreams furnished by Dr. Abercrombie, which were not, like those we have already given, followed by the event on which they are said to have turned, but of which the coincidence is very extraordinary. 'A young man, who was at an academy a hundred miles from home, dreamt that he went to his father's house in the night, tried the front-door, but found it locked; got in by a back-door, and, finding nobody out of bed, went directly to the bed-room of his parents. He then said to his mother, whom he found awake, "Mother, I am going a long journey and am come to bid you good bye." On this, she answered under much agitation, "Oh dear son, thou art dead!" He instantly awoke, and thought no more of his dream, until a few days after, he received a letter from his father, inquiring very anxiously after his health, in consequence of a frightful dream his mother had on the same night in which the dream now mentioned occurred to him. She dreamt that she heard some one attempt to open the front-door, then go to the back-door, and at last come into her bed-room. She then saw it was her son, who came to the side of her bed, and said, "Mother, I am going a long journey and I am come to bid you good bye;" on which she exclaimed, "Oh dear son, thou art dead!" But nothing unusual happened to either of the parties.' (p. 295.)

Instances of such dreams as these have been related in all times. The dream of Cæsar's wife, Calpurnia, the night before the assassination (Sueton. *Cæsar*, 81), is such an instance.

There are many dreams recorded both in the Old and the New Testament, which, together with the attendant circumstances, rest on very strong historical evidence, resembling the instances occurring in what is called profane history; and a supernatural agency being admitted in them, there is no reason why it should not exist also in other instances of dreams. For when once we allow the inadequacy of natural means for the explanation of a particular phenomenon, we cannot stop where we please, and say there is a reason why supernatural causes should have operated in this case, but there is none why they should have operated in that. In speaking of supernatural causes or of supernatural agency, phrases to which we attach no definite positive meaning, and which we can only explain negatively, we confess our inability to account for the manner in which an event or events came to pass; and if unable to account for the manner, we cannot take upon ourselves to explain the reason of the occurrence.

The supernatural interpositions to which, in our difficulty, we resort for aid, must, if they exist, be determined by general laws, which in the course of time it either may or may not be given to men to know. At present we see only the particular interpositions, particular events belonging to another system, which we call supernatural, which is governed, however, doubtless, like our own or the natural system, by general laws, and which moves perhaps co-ordinately with this to a common end; and knowing not the laws of that system, nor the connexion between it and our own, we can do no more at present than record the particular instances. It is certainly not philosophical to refer each particular interposition to a particular providence, as is done by Bishop Bull in his sermon concerning the 'Holy Office of Angels;' but in an admission of our own ignorance, combined with an opinion that the interpositions (as they are called) are regulated by general laws, there seems to be nothing to be objected to.

Many dreams which have in former times been accounted supernatural, as revealing facts and truths of science, may doubtless be explained by means within our own knowledge. We have spoken of Franklin's belief in revelations made to him during dreams concerning political events, and have given a natural explanation of their revelations. The dream which is related in Sir Walter Scott's Notes to *The Antiquary* would, there is little doubt, have formerly been considered supernatural.

There are several instances of dreams, similar to those related of himself by Franklin and that related by Sir Walter Scott, given by Henry More in his 'Immortality of the Soul,' (ii. 16,) all of which may be explained similarly; as, for instance, the dream of Avenzoar Albumaron, an Arabian physician, to whom his lately deceased friend suggested in his sleep 'a very soverain medicine for his sore eyes.' Indeed all dreams of the appearance of ghosts, where they are believed to relate what may have been before known to the dreamer, may be explained by the two circumstances, that ideas in dreams are taken for sensations, and that trains of ideas associated together are not liable to be interrupted by sensations, as they are in sleep. Mr. Coleridge has very happily observed that, in the cases where ghosts are believed to appear in dreams, we have the idea of the person to whom the ghost belongs as being in the room in which we ourselves are sleeping; and further, that such ghosts always appear in a half waking state, when 'the impressions of the bed, curtains, room, &c., received by the eyes in the half moments of their opening, blend with, and give vividness and appropriate distance to, the dream image, which returns when they close again.' (*Literary Remains*, vol. i. p. 202.)

There is a long 'Essay on the Phenomenon of Dreaming' in Baxter's 'Inquiry into the Nature of the Human Soul;' the object of which is to prove that dreams are brought about by the agency of spirits. However fanciful is this object, the essay is valuable, as containing many facts and displaying much ingenuity.

The theory of dreams is treated briefly in Dr. Hartley's work, in Mr. Stewart's 'Philosophy of the Human Mind' (vol. i. chap. 8), in which, however, but little is done towards the elucidation of the subject, and in Dr. Beattie's 'Dissertations.' (Lond. 1783, 4to). Dr. Abercrombie's and Mr. Macnish's works are valuable for nothing else than the instances which they furnish. There is an article, occasioned by Mr. Macnish's book, and written by Sir William Molesworth, in the first volume of the 'London Review,' which shows great metaphysical acumen, and from which the reader will derive much instruction.

The works of Aristotle contain a short treatise on dreams (περὶ Ἐνυπνίων); and many valuable observations, as well as fancies, are scattered through the poem of Lucretius. There is also extant, in Greek, a work on dreams by **ARTEMIDORUS**, besides the Oneirocritikon of Astrampsychus, and that attributed to Nicephorus, a patriarch of Constantinople.

DRENTHE, a small province in the kingdom of Holland, bounded on the north by Groningen, on the east by the kingdom of Hanover, on the south by Overyssel, and on the west by Overyssel and Friesland. Drenthe lies between 52° 35′ and 53° 12′ N. lat., and between 6° 5′ and 7° E. long. Its extreme length from north to south is 41 English miles, and its greatest breadth 39 miles. The soil of the province is in general poor in quality, comprising a large proportion of marsh-land and of sandy wastes. There are only three towns requiring mention, viz.: Assen, the capital, Meppelt, and Koevorden. Assen is about 22 miles south of the town of Groningen; the population in 1814 amounted to 1175 souls, and at present is about 1900. Meppelt, which is in the south-west corner of the province, is more populous, and contains about 5500 inhabitants, many of whom are employed in weaving canvass. Koevorden, situated on the small river Aa, in 52° 41′ N. lat. and 6° 42′ E. long., stands in a morass. It is a place of great strength, being considered the chef-d'œuvre of Coehorn and the key to the provinces of Overyssel, Groningen, and Friesland. It was besieged in 1672 by the bishop of Munster, and taken by him through the treachery of the governor; but it was soon after retaken by the Dutch. The population is about 2200. In the statistical publications of the Dutch government Drenthe is for most purposes included with the adjoining province of Groningen, so that it is not possible to offer any details of that nature. The population of the entire province is about 50,000. [**KAMPEN**, &c.]

DRESDEN, the capital of the kingdom of Saxony (in the circle of Meissen), is situated on both banks of the Elbe, in 51° 8′ N. lat., and 13° 34′ E. long., at an elevation of about 410 feet above the level of the sea: it is equidistant from Frankfort and Hamburg, Vienna and Munich, Stockholm and St. Petersburg. The fine plain in which it stands is bounded on the east by the eminences which belong to the Saxon Switzerland and are mostly crowned with vineyards and gardens: on the south and south-west there are similar elevations, which are the termination of the Erzgebirge or Ore-mountains of Saxony and Bohemia, on this side. Westward lies the beautifully romantic 'vale of rocks,' or 'Plauische Grund,' through which the Weiseritz flows before it traverses part of Dresden and falls into the Elbe. On the north-western side of the city the Elbe winds round an enclosure planted with avenues of trees, and on the north the distance is bounded by a succession of hills, in general covered with firs and pines. Though Dresden does not rank among the largest, it is certainly one of the most agreeable and interesting capitals in Europe, and well deserves the appellation of the 'German Florence.' It is divided into three parts; on the left bank of the Elbe is Dresden Proper, or the 'Altstadt' (Old Town,) with its three suburbs, and the 'Friedrichs-stadt,' which is separated from it by the Weiseritz: these two quarters form by far the larger portion of the city, and are disjoined from the third, or the 'Neustadt' (New Town,) by the Elbe, which is here 480 feet in breadth. In continuation of the New Town, there are some later erections, called the 'Neue Anbau,' or new buildings, which form a kind of suburb to it. The space gained by levelling the fortifications in the years 1810 and 1817 has been appropriated to gardens, promenades, and building.

Dresden contains altogether 11 gates or entrances, 27 public squares, 146 streets, and 20 churches and chapels, viz. 13 for Lutherans, 1 for Reformed Lutherans, and 6 for Roman Catholics; besides 5 synagogues. The population about two hundred years ago was inconsiderable, as the average births from 1617 to 1725 did not exceed 500 yearly: at the close of the eighteenth century however they rose to 1950, but at the commencement of the present fell to 1600. After the year 1815 they increased again to 1800, and in 1830 had reached 2000. In 1833-1834 the average of births was 2108, and of deaths 2093. In 1813 the number of inhabitants was 41,218; in 1831 it was 63,979; and at present it is upwards of 66,000. Of this number about 4200 are Roman Catholics, and 800 Jews: the remainder are Protestants. The houses, in number about 3000, are principally built of Pirna freestone, and in general are from five to six stories in height.

The old town, sometimes called Old Dresden, has four squares and 41 streets. The most interesting structure in this quarter is the royal palace, 1300 paces in circuit, which faces the west side of the bridge: it is an irregular building in the Gothic style, embellished with a church, which has the highest tower and steeple in the town. The chief parts of this edifice are the royal audience chamber, the Roman Catholic church, called a chapel, adorned with paintings by Rubens and Mengs, the chamber of ceremony (prachtzimmer) on the second floor, the porcelain-cabinet, the walls of which are ornamented with porcelain, the Proposition-Saal (hall of propositions), in which the sessions of the Saxon legislature are opened, the royal library, the hall of audience, with a splendid ceiling painted by Sylvester, and the parade-chamber, with paintings by the same master. The celebrated Grüne-Gewölbe (green vault) opens upon the palace-yard, and contains a costly collection of precious stones, pearls, and works of art in gold, silver, amber, and ivory, arranged in eight rooms, the painting of which is green, and the walls are decorated with mirrors laid into compartments of marble and serpentine stone. This collection, which was begun by King Augustus, and has been gradually increased by his successors, is estimated at nearly one million sterling in value. Close to the palace are the chancery building, the depository for the national archives, and the Stallgebäude (mews), in which there are four noble collections in art, namely, the armoury, the gallery of arms, the cabinet of casts and models, and the picture gallery. The armoury contains upwards of 20,000 specimens of armour, weapons, &c., principally from all ages in Saxon and

German history; the gallery of arms, a hall one hundred paces in length, comprises 2000 specimens of antient and modern arms, weapons used in hunting, &c.; the cabinet of casts was formed by Raphael Mengs, purchased by the late king, and enlarged by casts moulded by Bianconi of Rome. The picture gallery, in the upper story of the building, is composed of the outer gallery, which runs round the four sides of the Stallgebäude, the inner gallery towards the yard, and the Pastell-cabinet. The outer gallery contains above 500 paintings of the Flemish school, 90 of the Italian, and many of the French and German: the inner gallery is occupied by 356 specimens of the Italian school; and the Pastell-cabinet comprises 150 paintings of various masters. Near this building stands the Palace of Princes, in which are a handsome chapel, a gallery of portraits of princes of the Saxon and Bavarian lines, a porcelain cabinet, a library of 10,000 volumes, and cabinet of engravings. It is the residence of the co-regent, Prince John. A covered way leads from this palace to the opera-house, where there is space on the stage for 500 performers, and in the house itself for 8000 spectators. The square adjoining it is called the Zwinger; three sides of it are occupied by six pavilions connected by a gallery one story high; the quadrangle contains four fountains and three hundred orange trees. The six pavilions, which are profusely ornamented, contain a museum of natural history, consisting of four galleries and six saloons; a cabinet of engravings, comprising 200,000 plates and upwards, arranged in twelve classes; a collection of mathematical and philosophical instruments; a collection of works of art in ivory, alabaster, silver, iron, wood, &c.; a chamber of models useful in hydrography, mining, military architecture, &c.; and a miscellaneous cabinet.

The other buildings of note in the Old Town are the Brühl Palace, at present the residence of one of the royal family. It is the principal depository for the Meissen china; and behind it are spacious gardens and grounds, commanding delightful views of the banks of the Elbe and the surrounding scenery. Immediately adjacent are the hall, in which there is an annual exhibition of the productions of Saxon artists; the Academy of Arts and School of Design, and the Gallery of Duplicates, in which there are 250 paintings for which there was not sufficient room in the Great Gallery, and the celebrated tapestries worked after Raphael's designs. On one side of the square of St. Mary's church is the Mint; and adjoining it is the Arsenal, which contains a valuable collection of every kind of arms, and in one of the apartments, the portraits of all the Saxon sovereigns from Maurice to the present times. Facing the Arsenal stands the Academical Building, now used for a medical and surgical school; below it there is a subterraneous hall decorated with paintings by Francisco Casanova. In the Pirna Street is the House of Assembly, a building of two stories, where the states hold their sittings and committees. The only handsome square in the Old Town is the Old Market Place, of which the town-hall is the great ornament. In this direction lie also the royal mansion and garden, now a botanical garden, New Post-Office, Kaufhalle (Traders' Hall), with its colonnade, Treasury, German theatre, two royal villas, with fine gardens and chapels, the Observatory and grounds attached, the Mews and Riding School, Military Hospital and gardens, and the Orphan Asylum and church. The most remarkable churches in the Old Town are, St. Mary's, built in 1726, after the model of St. Peter's at Rome; the Church of the Cross, a parallelogram, with a steeple 305 feet in height containing three tiers of columns; the Protestant church of St. Sophia, an irregular structure erected in 1351; and the Roman Catholic chapel or church of the court, begun in 1751 by Gaetano Chiavero, on which more than 30,000*l.* have been expended. This chapel is connected with the royal palace, has two side churches, and a pyramidically disposed steeple, with three tiers of columns, in all 302 feet high, and contains the vaults for the royal family, besides a multitude of paintings, statues, monuments, carvings, altars, &c.

Three suburbs are connected with the Old Town by means of as many avenues; the Pirna, See or Dohna, and Wildsruf suburbs. The first of these, which extends from the banks of the Elbe to the Kaidiz brook, has a long street, in which is the palace where the present king usually resides, with delightful grounds attached to it. The Botanical Garden, belonging to the Medical School, is close adjoining; and likewise Maurice's Avenue, on part of the site of the former fortifications. this avenue derives its name from a piece of sculpture in stone, nearly three centuries old, exhibiting Maurice, the elector, and Augustus, his successor, with their consorts, as large as life; Maurice being represented as threatened by the scythe of death, and delivering his electoral sword to Augustus. In front of the external entrance into the Pirna suburb is the Great Garden, which is nearly five miles in circuit; and to the right lies the Nursery of Fruit Trees, which contains upwards of 65,000 plants, and a building in the centre, where concerts are held every week. The See suburb covers the south-west, and the Wildsruf the western side of the Old Town. From the last-mentioned suburb is an avenue called the Ostra-Allee, on one side of which are Prince Maximilian's palace, gardens, and observatory, and the buildings where the silver bullion is pressed, cut, and prepared for use at the Mint: this avenue opens upon a massive bridge across the Weiseritz, which leads to the Friedrichs-stadt (Fredericstown or Neu-Ostra), the second grand quarter of Dresden, between which and the Elbe are the wooded grounds, called the Ostra-Gehege. Here are the cemetery and infirmary for Roman Catholics, in which is Balth. Permoser's monument to his own memory, chiselled by himself, and representing the Descent from the Cross; the Marcolini Palace and grounds, with an observatory, chapel, and collection of engravings, and drawings in sepia by Seidelmann, and in the grounds Mutielli's fine marble group of Neptune, drawn by sea-horses, and attended by marine deities and tritons, in the act of crowning Amphitrite with a wreath, the group serving as the channel for a cascade; the Freemason's Lodge; and a riding-house. This part of Dresden is inhabited almost entirely by mechanics and others of the lower classes.

The access from the old town to the new town, the third grand quarter of the city, which lies to the north east on the right bank of the Elbe, is across the palace square and celebrated stone bridge, called the Bridge of the Elbe, from its being the largest and handsomest structure of the kind which traverses that river. It is also denominated Augustus's Bridge, in honour of Augustus II., its founder. It is the work of Pöpelmann, rests on sixteen arches, is 1420 feet long and 36 broad, and was completed in the year 1731. The fourth pier, which was blown up by Marshal Davoust in 1813, was restored by the Russians in the following year. A cast-metal gilt crucifix, resting on a gilt copper globe placed on a mass of rustic stone about 28 feet in height stands upon the fifth pier. The bridge opens, on the new town side, upon an inclosed space, planted with linden-trees, 400 paces in length and 20 in breadth, and embellished with an equestrian statue of Augustus II., arrayed in the imperial costume of antient Rome, with a modern wig and field-marshal's baton, the work of Wiedemann, a coppersmith of Augsburg, and erected in 1723. A broad street, lined with linden-trees runs from the bridge to the northern extremity of the new town; on the western side of it is the Japanese Palace, and parade in front, and on the eastern a range of barracks for the cavalry and infantry, for 2300 officers and men, besides horses. The palace, now called the Augusteum, has this inscription in front, 'Museum usui publico patens,' and is the depository of four choice collections:—The Cabinet of Antiquities, founded in 1725, and arranged in 12 spacious and well-lighted rooms on the ground-flour, which contains some splendid statues and other remains of antient art; the Cabinet of Coins, founded in 1716, also on the ground-floor, and particularly rich in the coins of Saxony, as well as remarkable for a fine series of medals struck in honour of illustrious individuals of all countries; the Cabinet of Porcelain, displayed in 18 rooms, also on the ground-floor, and containing a rare and extensive collection of china, of Indian, Chinese, Japanese, Meissen, Sévres, &c. manufacture, besides specimens of Florentine and Roman mosaic work, Chinese decorations, Saxon works in marble, &c.; and the Royal Public Library, deposited in three saloons and 21 apartments in the first and second stories, and consisting of more than 220,000 volumes, 2700 MSS., above 150,000 pamphlets, and 20,000 maps. Among these are upwards of 1600 printed books of the fifteenth century. The new town also contains the Church of the Trinity; a Town-hall; the Cadet Academy; Engineers' School, and Academy for artillery cadets; and the commandant's residence and main guard. It has 22 streets in all. To the north-east of the new town lies what is called the Neue Anbau (new buildings), a part of the town once an unproductive waste, and first laid out as gardens by some Bohemian gardeners, who settled here in 1730, but the site of which is becoming gradually occupied by handsome residences. It contains a playhouse and baths, a house of industry, schools for the indigent and for the garrison of Dresden, and a spacious cemetery. The house for the reception of bodies of unknown persons has been lately decorated with the Dance of Death, a rude sculpture in stone containing 24 figures.

In the list of public establishments not hitherto noticed are a High School (the Kreutz-schule,) conducted by 12 masters, and attended by about 400 pupils; two schools for teachers, in which the deaf and dumb are taught; 23 free and elementary schools for about 3000 Protestant children; an asylum for the reformation of depraved children; three infant schools; several public schools for the children of the townsmen; the Schmalz foundation for educating poor children; and a public school for girls. Dresden contains altogether 71 establishments for Protestant education. The Catholics have a High School, the Josephina Foundation, for the education of the superior class of females, two ordinary schools, a free school, and a school for educating 12 soldiers' children, attached to the latter. To these should be added the Free Masons' School (with about 100 children) and a Veterinary School. The number of institutions for the sick and maimed and orphans is eight, including three hospitals. There are a variety of learned and other societies, the chief of which are the Academy of Arts, the Society of Economy, which promotes the various interests connected with Saxon industry, the Mineralogical, the Natural History and Medical, the Bible, the Missionary, and the Saxon Antiquities Societies. The number of benevolent institutions and societies of all descriptions is 78.

Dresden has no external trade or manufactures of much importance. It is a place of transit for colonial and other foreign produce from Magdeburg, Hamburg, &c., and has five general fairs, besides a yearly fair in June, at which a considerable quantity of wool is sold. Its mechanics have obtained some note in Germany for the manufacture of mathematical, mechanical, and musical instruments, engraving on steel and stone, the making of gloves, carpets, turnery ware, jewellery, straw hats, painters' colours, &c. These mechanics are incorporated into 60 fraternities. Morocco and other leather, refined sugar, tobacco, white lead, tin ware, glass, stockings, cotton goods, &c. are also manufactured, but not on an extensive scale. There is a foundry for bomb-shells and cannon, and a yearly exhibition of Saxon manufactures. The municipal expenses of the town are about 49,000 dollars (6900*l.*) a year.

The immediate vicinity of Dresden abounds in places of public resort, and its environs are full of attractions for strangers, among which we may notice the villages of Lochwitz, Kreischa, and Dohna, the scenery called the Schlottwitzer, and Plauische Grund, the antient burg of Tharant, the vale of Seifersdorf, the Saxon Switzerland, Pillnitz, with its summer palace, and the village of Schandau.

DREUX, a town in France, the chief place of an arrondissement in the department of Eure et Loir. It is on the river Blaise, a tributary of the Eure, 41 miles from Paris, in a straight line west by south, or 50 miles by the road through Versailles and Houdan; in 48° 43′ N. lat., and 1° 21′ E. long. It is on the great western road to Alençon, Laval, Rennes, St. Brieuc, and Brest.

Dreux was known under the Romans by the name Durocasses, and appears to have been included in the territories of the Carnutes. From Durocasses the name was contracted into Drocæ, from which the modern form Dreux is derived. The town with the surrounding district, forming the county of Dreux, was included in the acquisitions made by the Northmen or Normans in France, but was early taken from them, and became part of the domain of the French crown. It continued, after several changes, to be held by a remote branch of the Bourbon family up to the time (we believe) of the French Revolution. In December, 1562, a severe action was fought in the plain of Dreux, between the rivers Eure and Blaise, between the royal Catholic army under the Constable Montmorency and the army of the Calvinists under the prince of Condé and the Admiral Coligny. The Calvinists were defeated, and the prince of Condé taken prisoner. In A.D. 1593, Dreux, which was in the possession of the party of the League, was taken by Henri IV. after a vigorous resistance of 15 or 18 days.

The town, which is in a pleasant country, is traversed by the Blaise. On a hill which commands the town are the remains of the antient castle of the counts of Dreux: in the midst of these ruins rises the new chapel built on the site of a former collegiate church by the late duchess dowager of Orléans. The houses of the town are partly of brick, partly of wood, and partly of plaster: there is a small promenade, an alley of trees planted along the river, and called Boulevart. The town-hall is a Gothic building; and there is, beside the chapel mentioned above, a parish church, also Gothic: before the Revolution there were two parish churches. The population, in 1832, was 5166 for the town, or 6249 for the whole commune. The inhabitants manufacture serges, blankets, hosiery, and other woollen goods, hats, and leather: there are tan-mills and dye-houses: beside the articles which they manufacture, they carry on trade in sheep and cattle. There are three fairs in the year. There is a good hospital and a high school. The arrondissement of Dreux had, in 1832, a population of 70,532.

DRIFFIELD. [YORKSHIRE.]

DRILL, the course of instruction in which the soldier is taught the use of arms and the practice of military evolutions.

DRILL HUSBANDRY. [DRILLING.]

DRILLING is a mode of sowing by which the seed is deposited in regular equidistant rows, at such a depth as each kind requires for its most perfect vegetation. It has been practised by gardeners from time immemorial, and from the garden it has gradually extended to the field. In those countries where maize or Indian corn is extensively cultivated the seed is always deposited in rows; and during the growth of the plants the soil in the intervals is repeatedly hoed and stirred to a considerable depth, as is likewise the practice in vineyards. This cultivation not only keeps the land free from weeds, but by allowing the dews and the influence of the atmosphere to penetrate into the earth, greatly encourages the vegetation and growth of the plants.

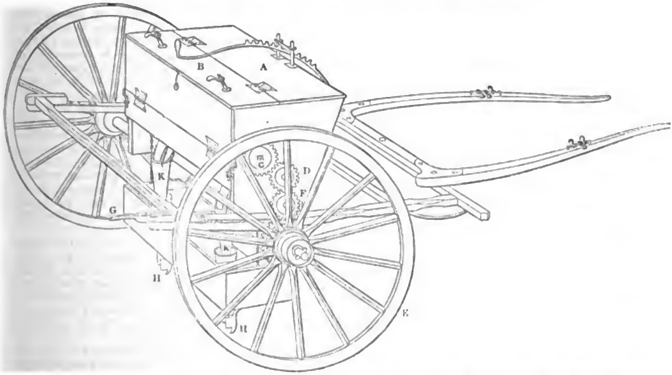
It was no doubt from observing the effect produced by stirring the soil that Jethro Tull and his followers adopted the theory, that finely-divided earth formed the chief food of plants; and this led to the adoption of the row culture for every species of plant, and horse-hoeing the intervals, from which the practice obtained the name of the horse-hoeing husbandry. This was at one time thought so important a discovery as to be called the new husbandry, which was expected by its most zealous supporters entirely to supersede the old methods.

The system of Tull has been long proved to have been founded on erroneous principles. Tull himself was ruined by his experiment; and his warmest admirers, Du Hamel, Du Monceau, and De Châteauvieu, were forced to admit its fallacy, after having suffered considerable loss by adopting its practice. But the advantage of sowing the seed in rows or drills has stood the test of experience; and the drill husbandry, by combining the advantages of continued tillage with those of manure and a judicious rotation of crops, is a decided improvement on the old methods of sowing all seeds broad-cast. The crops which are now most generally drilled are potatoes, turnips, beans, peas, beet-root, coleseed, and carrots; and in general all plants which require room to spread, whether above or under the ground. The distance between the rows in these crops is generally such as to allow the use of a light plough or horse-hoe to be drawn by a horse between them without endangering the growing plants. The most common distance is twenty-seven inches, where the row culture is practised in its greatest perfection, which is in the north of England and in Scotland. The Northumberland mode of cultivating turnips, which is adopted by most scientific farmers, and seems to have decided advantages, consists in placing the manure in rows immediately under the line in which the seed is to be drilled, and keeping the intervals in a mellow and pulverized state by repeated stirring. In this mode of sowing the seeds vegetate more rapidly, and are sooner out of danger from the fly, and the crop is more certain as well as heavier. Should the turnips fail, which with every precaution will sometimes happen, the land has had the benefit of a complete fallow, and is well prepared for any other crop.

The instrument used for sowing turnips and other seeds in single rows is sometimes a small light wheel-barrow, which a man pushes before him; hence called a drill-barrow. It has a box in which the seed is put, with a slide to regulate the quantity. This is allowed to fall on a wooden or metal cylinder below. In the circumference of this cylinder are several cavities where the seed lodges, and is carried down into a tin funnel below; the remainder is prevented from falling through by small brushes in which the cylinder turns. The motion is communicated from the wheel which runs on the ground to the cylinder by means of a chain on two pullies placed on the axes of the wheel and cylinder.

The improved Northumberland drill, of which a figure is annexed, is a more perfect as well as more complicated instrument. It is supported on two wheels, and drawn by a horse. It sows ground bones, ashes, rape cake, or any other dry manure at the same time with the seed. The body of the drill consists of two boxes, A and B, divided by a partition between them, and each again divided into two by another partition at right-angles to the first. In the box A is put the manure, in B the seed. Iron slides are fixed in each compartment to regulate the supply of seed or manure. In the lower part of the boxes, and just before the opening, which is regulated by the slides, are two cylinders, one for the box A and another for B. On the cylinder in A are fixed shallow cups with short stems, which dip in the bones and carry a certain quantity over the cylinder as it turns, which falling in the funnels K K is deposited in the furrows made by the coulters H H. The cylinder in the box B has projecting pieces of iron, with a small cavity in each near the end, which takes up a very small quantity of seed, and discharges it in the same manner into the two funnels K K. On the axis of the wheel E is a toothed wheel, which turns a small wheel D on the axis of the cylinder in A, and this turns another wheel C on the axis of the cylinder in B. As these two wheels move towards each other, the two cylinders turn in contrary directions, which is a convenience in throwing the seed and the manure into the funnels K K at the same time. The wheel F may be lifted up by means of a lever G, and then the cylinders do not revolve. There are various other contrivances which cannot well be explained without a more detailed figure of the different parts.

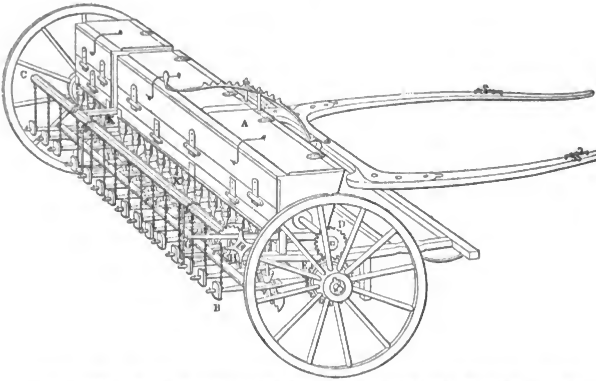
In some districts there is still a prejudice against the use of the drill even for turnips. In Norfolk, where the corn is usually drilled, the turnips are still very generally sown broad-cast. The cause of this appears to be, that as the cultivation of turnips was first introduced from Flanders into Norfolk, and in Flanders turnips are never drilled, because there they are generally sown as a second crop immediately after rye harvest, they have continued the old method first introduced, and the labourers are become very skilful in setting out the plants at proper distances with the hand-hoe. In the north they were introduced at a later date, and the improved mode of sowing in rows was immediately adopted. The Norfolk farmer insists that the barley, usually sown after turnips, is better when the manure has been equally distributed than when it lies in rows, as the land is only slightly ploughed after sheep have been folded on the turnips, and the manure remains in stripes. On the whole, however, drilling in the Northumberland method seems to be the best practice, and is adopted very generally by all scientific farmers



Northumberland Turnip Drill, drawn from one manufactured by Messrs. Cottam and Hallen, Winsley Street, Oxford Street, London.

On light friable soils, drilling the seed is very generally adopted. There is a neatness in the appearance which recommends it to the eye; and machines have been so improved, that the seed is sown more regularly and is better covered than it could possibly be by the best broad-cast sower followed by the harrows. In very stiff heavy soils, and in moist seasons, it is not so practicable to use the drill. It is sometimes impossible to get the land sufficiently dry and pulverized to allow of drilling to advantage; and when the land is wet the tread of the horses would greatly injure it. If wet clay soils were more generally underdrained, and the subsoil plough were used to loosen them to a considerable depth, they might be rendered so dry and friable that the drill could be used at all times.

In poor sandy and gravelly soils where bones have been found of so great advantage as a manure, drilling is the only mode by which the bones and the seed can be sown in contact with each other; an important circumstance. When the ground has been well prepared and laid into stitches of a convenient width, a whole stitch may be drilled at once, with so much regularity, that an instrument with as many hoes as there are drills, and of the same width, may be drawn over the land to stir all the intervals, without danger of injuring the plants. This requires great practice and attention; but it may be considered as the perfection of the drill system. Where drilling seed is generally adopted, and the farms are not so large as to make it prudent for the occupier to purchase expensive instruments, drilling is become a separate profession. An industrious man with a small capital buys improved drills, and undertakes to drill the seed at a certain price per acre. The farmer finds horses and seed, and the driller finds the machine, and attends to the management of it himself. By constantly doing the same thing he becomes very expert; and in a neighbourhood where there are many small occupiers, a good drilling-machine, which costs from 30*l*. to 50*l*., procures the owner a very good livelihood during the whole season of sowing; and if the instruments for hoeing were more generally used, the profession of a hoer of land might be advantageously united to that of the driller. Corn is generally drilled at the distance of eight or nine inches; and a machine which drills twelve rows will cover a stitch ten feet wide. Some prefer the rows to be nearer, but in that case the hoeing is not so easily performed with a machine, and it is done by hand. The most improved machine for drilling is Cook's patent lever drill, which sows



Cook's, or Suffolk Patent Drill, drawn from one manufactured by Messrs. Coltam and Hallen, Winsley Street, Oxford Street, London.

from ten to fifteen rows at once. The description of the Northumberland turnip-drill will make the construction of Cook's drill more easily understood. In the annexed figure the box for sowing manure is not added, as it is in the Northumberland drill. The drill is supported on a frame and two wheels. The box A, which holds the seed, lets it down gradually into a lower part, in which the cylinder, which has the small cups fixed to its circumference, is turned by the wheel D. By means of the lever G this may be raised so that its teeth are freed from those of the wheel E, and the motion of the cylinder is stopped. The coulters which make the drills are each fixed to a lever, at one end of which, B, a weight is fixed to press the coulter into the ground. Each coulter has a separate lever, so that it adapts itself to all the inequalities of the soil. A chain proceeds from the end of each, and may be wound round a cylinder C by turning the handles fixed to it at H, where there is also a racket-wheel to prevent its unwinding. The intent of this is to raise all the coulters out of the ground, when the drill is not intended to act, or is moved from place to place. When the drill is used, the box A is filled with seed, and the slide in it so adjusted as to supply it regularly; the lever G, which was fixed down, is raised, and the wheel D connected with the wheel E. As the horses proceed, the cylinder turns, the cups take up the seed, and throw it into the funnels K K, which conduct it to the drill behind the coulter. A light harrow, or a bush-harrow, follows, which covers the seed. In very loose soils the roller completes the operation.

DRIMYS. [CANELLA ALBA; WINTERA.]

DRIN, or DRINO. [ALBANIA.]

DROGHEDA is a seaport town, forming with its liberties the county of the town of Drogheda, in the province of Leinster in Ireland, situated between the counties of Meath and Louth, upon both sides of the river Boyne, about four miles from its entrance into the Irish channel, and 23½ Irish or 29¾ English miles from Dublin.

The town and liberties occupy the parish of St. Mary's, towards Meath, on the south side of the river, and the parish of St. Peter's, and part of the parish of Ballymakenny, towards Louth, on the north side of the river. The total area of the town and liberties is 5802 statute acres. The recent boundary act has not made any alteration in these limits.

The name Drogheda, of which Tredagh (as it is generally written in old books) is a corruption, signifies the bridge of the ford. A synod was held here by Cardinal Paparo, the Pope's legate, in 1152; which was very numerously attended by the Irish ecclesiastics, and at which the authority and discipline of the church of Rome were greatly strengthened in Ireland. After the conquest, the first care of the English seemed to have been the erection of a substantial bridge, as appears by a grant of pontage made in 1228 by Henry III., who in the same year also divided the town into two parts, viz., Drogheda versus Uriel, on the Louth side of the river, and Drogheda versus Midiam, on the Meath side. In 1412, the division of the town into two corporations being found productive of much animosity between the inhabitants of the opposite sides of the river, was repealed by Henry IV., since which time Drogheda on both sides of the Boyne has continued to be one body corporate. Being a frontier town of the pale, Drogheda was a principal rendezvous for the forces which were so frequently required in Ulster between the fourteenth and seventeenth centuries; and many of the Irish parliaments were held here, particularly during the fifteenth century. In the parliament which met at Drogheda in 1494 was passed the statute called Poyning's Act, which made it necessary to the validity of all future acts of the Irish parliament that the bills should first be certified as fit for the consideration of that assembly by the king in council (10 Hen. vii. c. 22). By this act the freedom of the Irish legislature was virtually destroyed, and in this state of subjection it continued until the assertion of independence by the Irish volunteers in 1782.

A mint was at this time established at Drogheda, and the town appears to have been a place of much greater importance than at any subsequent period.

On the breaking out of the rebellion of 1641, Drogheda was besieged by Sir Phelim O'Neill, and a large force of Irish, who invested the town on both sides on the 1st of December. The garrison consisted of only about 1000 men, under Sir Henry Tichborne and the Lord Moore, who having taken an oath to defend the place to the last extremity, not only repulsed several attacks of the Irish, but succeeded in capturing large booties and doing great damage to the rebels in numerous sallies, until the 28th of February, when they finally forced them to raise the siege.

On the arrival of Cromwell in Ireland in 1649, the Marquis of Ormond placed a garrison of nearly 3000 men in Drogheda, under the command of Sir Arthur Aston; and satisfied of its security, withdrew into the midland counties to recruit. Cromwell left Dublin on the 30th of August, and came before Drogheda on the 2nd of September, but, owing to some delay in the arrival of his artillery, which he had sent round by sea, he did not open any battery till the 9th. On the 10th, at 5 o'clock in the afternoon, having effected a breach, without the delay of making regular approaches, he gave the assault; and although twice repulsed, succeeded on the third attempt, which he led himself, in carrying the town. Quarter was promised by his officers and men, and the bulk of the garrison are said to have laid down their arms on that assurance: nevertheless they were all put to the sword, with the exception of a very few who escaped by the north gate, and about thirty whom Cromwell afterwards transported to Barbadoes. Drogheda was last held for the Roman Catholic party by the Lord Iveagh, with a garrison of 1000 men, in 1690, but it surrendered to a detachment of King William's army the day after the battle of the Boyne. [Boyne.]

The old walls and four gates were standing within the last fifty years. A few buttresses and St. Laurence's gate are all that now remain. The last is a striking object, and is in good preservation. Drogheda is rich in ecclesiastical antiquities. The Dominican Friary on the north part of the town was founded by Lucas de Netterville, archbishop of Armagh, in 1224, and is celebrated as the scene of the submission of four Irish princes to Richard II. in 1394. A lofty tower of this friary, called the Magdalen Tower, is still standing, together with some of the cloisters. The ruins of the Carmelite Friary, founded in 1240, on the south side of the river, are still to be seen on the right hand of the great northern road coming from Dublin. The present parish church of St. Mary's is partly built on these ruins. The Franciscan Friary on the north-east of the town is standing, although much ruined, and forms a striking feature in the view of Drogheda from the approaches on the Dublin side. A gable and bell-tower, with part of the aisle, of the Priory of Canons Regular also remain on the west of the town near the river; and there are some traces of the Priory of St. Laurence near the gate, and of the Hospital of St. Mary, beyond the Canons Regular. Besides these, there was an Augustinian Priory, founded before the coming of the English, of which no trace now remains; as also the Priory of St. John, and the religious houses of St. James and St. Bennet. The possessions of the Augustinians and Carmelites, as also of the Priory of St. Laurence and the house of the blessed Mary de Urso, came into the hands of the corporation by charter of 3 and 4 Philip and Mary, A.D. 1557.

Drogheda is governed by a corporation, consisting of mayor, sheriffs, 24 aldermen, and an unlimited number of freemen. This body is nearly self-elected, and has uniformly acted on the principle of excluding Roman Catholics. They hold their authority under numerous charters, from the 12th of Henry III. to the 3rd of William IV. Assizes for the county of the town are held here twice a year before the mayor and the judges of assize. Drogheda is the first town on the north-east circuit. A civil bill court is also held here twice a year before the assistant barrister of the county of Louth. Petty sessions are held once a fortnight. The gaol of the county of the town, on the road to Tirfecan, was lately built by grand jury presentment, and is in good condition, though sometimes deficient in accommodation. Drogheda is watched and lighted by rates imposed under acts of parliament. The expenses of paving, within the walls, are defrayed by the corporation: the roads and streets without the walls are repaired by grand jury presentments. The expense of watching in 1833 was 310*l.* 10*s.* 7*d.*; of lighting, 320*l.*; of paving within the walls, 213*l.* 13*s.*; and of repairing roads, &c. without the walls, 135*l.* 6*s.* 5½*d.* Drogheda returns one member to the Imperial Parliament.

The port and harbour are under the direction of harbour commissioners, constituted by 3 Geo. III. c. 39, and 7 and 8 Geo. III. c. 35. These and the corporate authorities under whose control the harbour was formerly, have received from time to time a sum of 6000*l.* for the improvement of the quays and river. Their receipts in tonnage dues for 1834 amounted to 11,668*l.*, and in 1835 to 5829*l.* Vessels of 250 tons come up to the bridge, and the channel of the Boyne is capable of great improvement. The amount of postage collected at Drogheda in each year from 1833 to 1836 was as follows:—1833, 1935*l.* 14*s.* 3*d.*; 1834, 2040*l.* 15*s.* 5*d.*; 1835, 2057*l.* 18*s.* 5*d.*; 1836, 2244*l.* 7*s.* 1*d.*

The increase under this head shows that the trade of the town is reviving.

This corporation is subject to the 'New Rules' of the 25th of Charles II. [Corporations of Ireland.] Their estates consist of 2032 acres, besides houses and tenements, producing an average annual revenue of 4500*l.* It is estimated that these estates, if out of lease, would now let for 12,000*l.* per annum. They are principally tenanted by members of the corporation, who, up to 1833, were alone permitted to become tenants, and who still enjoy peculiar advantages in renewing their leases.

Drogheda is a compact and well-built town; but the miserable suburbs extending north and south greatly disfigure the approaches. The chief part of the town lies on the northern side of the river, which is the higher ground. The principal street runs nearly north and south, and forms a portion of the great northern road. Other good streets branch east and west. About the centre of the town, on the western side of the main street, stands the town-house, a handsome building with a clock and cupola; and north of this, on the opposite side of the main street, is the parish church of St. Peter, a respectable edifice of cut stone, with a spire designed by Johnston. The Roman Catholic chapel of St. Peter is capacious and well-built; and there is a handsome Presbyterian meeting-house, and a Methodist chapel of chaste architecture. Besides these there are four other Roman Catholic chapels, and two nunneries; one of the latter, called the Sienna Nunnery, near the site of the Franciscan Priory, is a large establishment. There are two barracks.

There is a considerable import of coal from Workington and Whitehaven. It sells at from 12*s.* to 14*s.* per ton; but even this low price precludes the purchase of coal by the poorer classes, who in many instances burn little else than weeds and brambles.

The linen manufacture, about twenty years ago, was the staple trade of Drogheda. The articles manufactured were dowlas, sheetings, and a narrow web called market linen. The number of weavers in the county of the town at that time was about 2000. The quantity of linen sealed in the Drogheda market in 1820 was 53,697 pieces; and in 1821, 61,866 pieces: the average of the years from 1830 to 1834 (both included) was only 19,495 pieces. The number of looms now employed in Drogheda and the country around does not amount to 1000; the number of weavers at present (1837) employed in the town is not much more than 200; and the wages they earn rarely amount to 5*s.* per week. The lower class of the population are miserably poor; and as numerous vagrants pass through the town to and from Dublin, the streets are constantly filled with beggars, who collect in crowds round the different stage-coaches when changing horses, and seriously annoy travellers upon the northern road. A mendicity institution was established in Drogheda in 1821; the corporation give a house rent free, and the establishment is supported by voluntary contributions. The expenditure from the 1st May, 1831, to the 25th June, 1833, was 812*l.* 8*s.* 2*d.*; and the receipts were 786*l.* 2*s.* 2*d.* There is also an almshouse, with a rental of 241*l.* 12*s.* 6*d.*; and an hospital for the county of the town, constituted under the provisions of 47th Geo. III. c. 50, which receives 90 in-door patients, and gives dispensary relief to about 4000 poor annually. It is supported by a grant of 50*l.* per annum from the corporation, by voluntary contributions, and grand jury presentments: total receipts for 1833, 364*l.* 10*s.* 3½*d.* There is a savings bank in the town, the deposits in which are increasing. The total number of depositors in 1835 was 671; gross amount of lodgments 17,729*l.* 19*s.* 7½*d.*

There has been little or no increase in the population of Drogheda since the year 1798, when the lists which the inhabitants were obliged to put up on their doors gave a population of about 17,000. In 1821 the numbers were, males, 8702; females, 9416; total, 18,118: and in 1831 the numbers were, males, 8178; females, 9187; total, 17,365; showing a considerable decrease, which has been attributed partly to the emigration of decayed weavers, and partly to the mortality caused by the cholera, which, since 1831, is estimated to have carried off upwards of 1500 inhabitants. In the latter year, the number of males upwards of twenty years of age returned as employed in manufactures, or in making manufacturing machinery, was 946; of whom 153 are stated to be employed in the linen manufacture, 788 (not accurately classed) in the cotton and linen manufacture, and 5 in the manufacture of tobacco.

In 1821 there were in the county of the town of Drogheda 1147 young persons receiving daily instruction, and in 1834 the numbers were—

Parish.	Schools.	Males.	Females.	Total.
St. Mary's . .	1	56	16	72
St. Peter's . .	11	458	552	1010
Ballymakenny .	1	45	12	57
		559	580	1139

Of these schools three are in connexion with the National Board; and one, upon Erasmus Smith's foundation, has an income of 280*l.* per annum. The statute 5 Ed. IV. c. 46 grants a university to Drogheda; but the provisions of the act have never been carried into effect

The town expenses are defrayed by grand jury assessments. The total sum so levied in 1833 was 1863*l.* 14*s.* 3¾*d.* An obscure work, entitled 'A History of Drogheda,' was published some time ago in this town; but as yet this part of Ireland has not been made the subject of adequate historical illustration.

(Cox's *History of Ireland;* Temple's *History of the Ex. Irish Rebellion;* Bernard's *History of the Siege of Drogheda; Parliamentary Papers, &c.*)

DROHOBYCZ or **DROHOVITSCH**, a royal town in the circle of Sambor, in the Austrian kingdom of Galicia, situated on the Tyszmanika, a tributary of the Dniester. It lies in 49° 22′ N. lat., and 23° 35′ E. long. A great portion of the houses are filthy cabins, without chimneys, constructed of boards. The town however has several buildings of consequence, among which are the high-church, a fine structure of the Gothic order, a Basilian monastery, with a grammar-school conducted by the brotherhood, a chapter-house, several churches, a synagogue, castle, and seminary for teachers. The town, with its eight suburbs, contains about 1200 houses, and 7250 inhabitants. The royal salt works, including the adjacent works at Mobrzyc, Solec, and Stebnik, produce about 3700 tons annually, which are extracted from salt rocks and saline clay. There is a brisk trade in native and foreign produce, particularly wine, linens, cottons, leather, and grocery, which is mainly carried on by the Jews, who form full seven-eighths of the population; and the corn and cattle markets bring much profit to the place.

DROITS OF ADMIRALTY are the perquisites attached to the office of Admiral of England (or Lord High Admiral), and belonging, when that office is vacant, to the crown. Of these perquisites the most valuable is the right to the property of an enemy seized on the breaking out of hostilities. Large sums were obtained by the crown on various occasions in the course of the last war from the seizure of the enemy's property, most of which however was eventually given up to the public service. By the last arrangement of the civil list (1 Will. IV. cap. 25), whatever Droits of Admiralty may accrue during the present reign are to be paid into the Exchequer for the use of the public. The Lord High Admiral's right to the tenth part of the property captured on the seas has been by statute relinquished in favour of the captors.

DROITWICH. [WORCESTERSHIRE.]

DROME, a river in France, belonging to the basin of the Rhône. [DRÔME.]

DROME, a department in the south of France, bounded on the north and north-east by the department of Isère, on the east by the department of Hautes Alpes; on the south-east by the department of Basses Alpes, and on the south by the department of Vaucluse: on the whole of the west side it is bounded by the river Rhône, by which it is separated from the department of Ardèche. The form of the department is irregular: its greatest length is from north-north-west near the village of St. Rambert, on the Rhône, to south-south-east, near the village of Ferrassières de Montbrun, 88 or 90 miles; its greatest breadth, at right angles to the length, is from Pierre-latte, on the Rhône, to the neighbourhood of Lussettes, on the Buech, 60 miles. It is comprehended between 44° 6′ and 45° 20′ N. lat., and 4° 36′ and 5° 45′ E. long. The area is given by M. Malte Brun at 336 square geographical leagues, or 2570 square miles; about the area of the English county of Devon. The population in 1832 amounted to 299,556, about three fifths of the population of Devonshire. The area of the department is above the average of France, but the absolute and relative population (117 to a square mile) are both considerably below the average. Valence, the capital, is on the Rhône, 295 or 296 miles south-south-east of Paris, in a straight line, or 352 miles by the road through Melun, Auxerre, and Lyon.

The eastern side of the department is mountainous, being occupied by the branches sent off from the mass of the Alps. This mountainous tract occupies two-thirds of the department. The mountains are for the most part calcareous or argillaceous: the highest, which are on or near the eastern boundary of the department, have an elevation of about 5800 feet: they become lower toward the west, and gradually subside into the valley of the Rhône. Two of the mountains, the Inaccessible Mountain and Mount Devez, are reckoned among the curiosities of this part of the country. The Inaccessible Mountain is remarkable for its form, being in one part narrower at t base than at the summit, which gives it the appearance an inverted pyramid: the Mount Devez is considered to be the cause of a healthy breeze which pervades the territory of Nyons; it is said to be occasioned by the condensation of the vapours from the neighbouring mountains, which are, for a part of the year, covered with snow. The mountainous tract is intersected by valleys, communicating with each other by narrow and dangerous bye-roads, and watered by streams, which, when swollen by the melting of the snows, overflow their banks and occasion great devastations. These rivers are numerous, but none of them are very considerable.

The Rhône bounds the department on the western side for a distance of seventy miles, for the greater part of which its channel is full of small islands. It carries off the drainage of the whole department: its tributaries rise in the mountains of the eastern district, and flow westward into the main channel. The valley of the Rhône contains the most condensed population, and several of the principal towns are on its banks.

The Isère, one of the most important of the tributaries of the Rhône, which rises in the highest part of the Alps, near Mount Iseran, crosses the department in the northern part and falls into the Rhône on its border. About eighteen or twenty miles of its course belong to this department.

The Drôme rises on the eastern boundary of the department, and flows north-north-west about twenty-two miles to Die, receiving the little river Bes, or Bez, and some other streams by the way: from Die it flows seven or eight miles west to Pontaix, and from thence south five or six miles to the junction of the Rouane, or Roanne, which receives the Ribière, or Ribierre: from the junction of the Rouane the Drôme flows twenty-five miles west into the Rhône, receiving several streams by the way. Its whole course may be estimated at about sixty miles, all within the department: it is not navigable, but is used for floating timber below Luc sur Diois, about twelve miles from its source. From Luc to Die the timber is floated in rafts of twelve to fifteen trunks: from Die to Pontaix in single trunks, on account of the rocks which obstruct the bed of the river: below Pontaix tho timber is again collected and formed into rafts. The Bez is also used for floating.

The other rivers of the department are very small. In the part northward of the Isère are the Suzon (twenty-five miles long, chiefly belonging to the department of Isère), the Bancel, and the Galaure, which all flow into the Rhône, and the Herbasse, which flows into the Isère. In the country between the Isère and the Drôme are the Bourne, which flows into the Isère; the Vernaison and Lyonne, which flow into the Bourne; the Leoncel, which joins the Lyonne; and the Veoure, which flows into the Rhône.

In the country south of the Drôme are the Roubion and the Jabron, which unite at Montelimar, and fall into the Rhône just below that town: the Berre, which falls into the Rhône near Pierre-latte, and the Lez, the Aigues, and the Ouvèze, which all join the Rhône in the neighbouring department of Vaucluse. The Lez receives the Leron and some other streams, the Aigues receives the Oulle and the Zeynnées, and the Ouvèze receives the Tolerene. The Rhône and the Isère are, we believe, the only navigable rivers. There are no canals in the department.

The great road from Paris by Lyon to Aix, Marseilles, and Toulon, crosses the department from north to south, passing through the towns of St. Valier, Tain, Valence, Livron, Loriol, Montelimar, and Pierre-latte. From Valence a road runs north-east through Le Péage and Romans to St. Marcellin and Grenoble, in the department of Isère another road, from Pont St. Esprit, on the Rhône, into the department of Hautes Alpes, and by Mont Genèvre into Italy, just crosses the southern part of this department through Nions or Nyons. The other roads are all bye-roads.

The department is very deficient in the means of communication with other parts.

The calcareous and argillaceous strata which occupy the mountainous tract in the east of the department occupy also the valley of the Rhône from the neighbourhood of the Drôme southward: the banks of the Drôme, the valley of the Rhône north of that river, and the valley of the Isère, are occupied by the strata which are found above the chalk. The mineral treasures of the department are considerable; there are mines of copper and one mine of iron: granite, potters' clay, gypsum, coal, and fossil coal, are obtained;

and peat is dug for fuel. There are several mineral springs, but none of much repute.

The soil varies much; a considerable portion of it is so bad as to be hardly susceptible of cultivation. The highest parts of the mountains afford pasturage, but not wood; and the slopes, which might be expected to produce wood, present commonly nothing but bare rocks and steril hollows. But industry and care in manuring the land have rendered this department important, not only by the amount but the variety of its produce. The quantity of corn grown is not sufficient for home consumption; but there are olives, almonds, walnuts, and excellent wines, especially those of Tain (Hermitage, Côte Rôtie, &c.), L'Etoile, and Die. The neighbourhood of Romans and some other places yield truffles, which are considered nearly equal to those of Perigord. There are rich meadows and good pasture grounds, to which the flocks and herds of Provence are driven in the summer. Forests, chiefly of pine and beech, occupy nearly a seventh part of the department. Plantations of mulberry-trees, in which many silk-worms are reared, are numerous. Horses and neat cattle are not numerous; sheep are more so; the mules are small, the asses of good quality. The chamois, the wild goat, and a few bears, are found in the mountains. Game is abundant, but the rivers do not afford any great quantity of fish. The air is pure and healthy, and rather cold, except along the valley of the Rhône, where the heat in summer is very great.

The department is divided into four arrondissements: that of Valence, in the north, population 135,193; that of Die, in the east, population 65,663; that of Nyons, in the south-east, population 36,170; and that of Montelimar, in the south-west, population 62,530. The number of communes is 361, which are arranged in 28 cantons or districts, in the jurisdiction of a *juge de paix*. The chief towns are Valence, the capital, on the Rhône, population 8898 for the town, or 10,406 for the whole commune; Romans, on the Isère, population 7677 for the town, or 9285 for the whole commune; and Montelimar, near the Rhône, population 5816 for the town, or 7560 for the whole commune. [MONTELIMAR; ROMANS; VALENCE.] Of the smaller towns we subjoin some account.

In the arrondissement of Valence are Moras (population of commune 4053); Le Grand Serre, near the Galaure; Saint Vallier (population estimated at 2000), and Tain (population 2139 for the town, 2340 for the whole commune), both on the Rhône; Montrigaud and St. Donat (population of the town 1591, of the whole commune 2084), both on the Herbasse; Montmiral; Le Péage (population 3095 for the town, 3577 for the whole commune), on the Isère; Alixan; Montellier; St. Jean de Royans, on the Lyonne; Chabeuil (population of commune 4452), on the Veoure; Etoile; Livron (population 1719 for the town, 3275 for the whole commune) and Loriol (population 1784 for the town, and 3048 for the whole commune), both on the Drôme; and Mirmande. St. Vallier is in a pleasant country; it has a Gothic château: the inhabitants are engaged in throwing silk, weaving linens, silks, and crape, pressing oil, and making porcelain and hats. Tain has an antient altar. A bridge of iron wire, completed in 1825, connects this town with that of Tournon on the opposite side of the Rhône. The wines of the neighbourhood have been noticed. Potter's clay is dug near the town.

At St. Donat some silk manufactures are carried on. Le Péage, though forming a separate commune, is really a suburb of Romans. Chabeuil is a place of considerable business; it has corn, oil, paper, and fulling mills, and some manufactories for woollen cloths. Livron and Loriol, on the opposite banks of the Drôme, just above its junction with the Rhône, are connected by a fine bridge.

In the arrondissement of Die are, Die, the capital (population 3213 for the town, 3555 for the whole commune), Pontaix, Saillans, Aouste, and Crest (population 3895 for the town, 4901 for the whole commune), all on the Drôme; Chatillon on the Bez; Beaufort; Bordeaux, Saou, and Puy St. Martin, on or near the Roubion; and La Motte Chalançon on the Oulle.

Die was known in the time of the Romans by the name of Dea Vocontiorum, being in the territory of the Vocontii. [DAUPHINÉ.] It is not noticed by any of the antient geographers, but is found in the 'Itinerary' of Antoninus, and in that from Burdigala (Bordeaux) to Hiorosolyma (Jerusalem), and in the Theodosian Table. In the middle ages it was the capital of Diois, one of the subdivisions of Dauphiné, and the seat of a bishoprick established in the fourth century, and for a long time united to that of Valence, but separated from it by Louis XIV. after the revocation of the edict of Nantes; it has been since suppressed. Die suffered much during the religious wars of the sixteenth century from the Huguenots: these seem to have retained a predominance in the town, as they had, previously to the revocation of the edict of Nantes, an academy here. The 'Dictionnaire Universel de la France' (Paris, 1804) enumerates as its manufactures paper, thrown silk, fustian, and cotton goods.

Crest was successfully defended in the crusade against the Albigenses by Aimar, count of Valence, who supported the count of Toulouse against the Catholics under Montfort. It has an antient castle in a picturesque situation on the brow of a hill commanding a delightful prospect. This castle has been used as a state prison. The town is at the foot of the castle hill The inhabitants are engaged in the manufacture of woollen cloth, cottons, and silks; in dyeing and fulling cloths, and in pressing oil. (*Dict. Univ. de la France*, Paris, 1804; Vaysse de Villiers, *Itinéraire Descriptif de la France*, Paris, 1813.)

Aouste, which is mentioned in the Itineraries under the name of Augusta, and at which paper is made and oil expressed; Saillans, at which some silk and cotton manufactures are carried on; and Pontaix, at which some woollens are made, are all on the road between Crest and Die. At Beaufort, Bordeaux, and Saou, woollen goods are manufactured.

In the arrondissement of Nyons are only two towns, Nyons on the Aigues (population 2700 for the town, or 3397 for the whole commune), and Le Buis, on the Ouvèze (population 1886 for the town, or 2180 for the whole commune). Nyons is at the foot of Mount Devez, upon the slope of which it is partly built, and is divided into three quarters, each of which has an old wall inclosing it. It has a bridge built by the Romans, and in the environs are the ruins of an old castle demolished by the order of Louis XIII. Nyons was in the middle ages the frequent residence of the Dauphins of Viennois. The inhabitants are engaged in throwing silk and in making woollen stuffs and soap. It was the birth-place of Phillis, daughter of the Marquis de la Charce, a lady who, in 1692, put herself at the head of the inhabitants of the neighbourhood, and aided in repelling an invasion of the Savoyards. At Le Buis silk and leather are manufactured.

In the arrondissement of Montelimar are Marsanne, Dieu-le-fit on the Jabron (population of the town 3010, of the whole commune 3952), Châteauneuf du Rhône, Donzère, and Pierre-latte (population of the town 2388, of the whole commune 3447), all on the Rhône; Taulignan and Grignan, both near the Lez; and St. Paul-trois-Châteaux. Dieu-le-fit has in its neighbourhood three mineral springs: potter's clay and ochre are dug. Pottery and other earthenware, hats, woollen goods, and silks, are made in and about the town. Donzère produces wine, which has tolerable reputation. Pierre-latte is at the foot of a large rock, from which some would derive its name, Petra lata, or wide rock. At Taulignan and Grignan some silk manufactures are carried on: Grignan had formerly a castle, one of the finest in this part of France, now destroyed. Madame de Sevigné died at Grignan; her tomb remains in the church. St. Paul-trois-Châteaux was known to the Romans by the name of Augusta Tricastinorum, and was the chief town of the Tricastini. [DAUPHINÉ.] It was in the middle ages the seat of a bishoprick founded in the fourth century; the bishop was a suffragan of the archbishop of Arles. It has some slight remains of antiquity. The inhabitants carry on trade in fine oil, wine, and silk.

The department of Drôme sends three members to the Chamber of Deputies. It constitutes the diocese of Valence, the bishop of which is a suffragan of the archbishop of Avignon: it is in the jurisdiction of the Cour Royale, or supreme court, of Grénoble, and in the district of the Académie Universitaire, or academical council, of that city: it is comprehended in the seventh military division, of which the head-quarters are at Grenoble. It was formerly included in Dauphiné.

The inhabitants of this department are of middling stature, active, robust, lively, and brave, but not disposed to labour. They are long-lived. Education is more attended to than in the majority of the French departments: there is one boy at school for every twenty inhabitants. (*Dictionnair*

Universel de la France, Paris, 1804, *Dictionnaire Géographique Universel*, Paris, 1827; Vaysse de Villiers, *Itinéraire Descriptif de la France*, Paris, 1813; Malte Brun, Balbi, &c.)

DROMEDARY. [CAMEL, vol. vi., p. 191.]

DRO'MIA (Fabricius), a genus of brachyurous decapod crustaceans, placed by M. Latreille in the section of *Notopoda*, and referred by Dr. Leach to the family of *Thelxiopoda*.

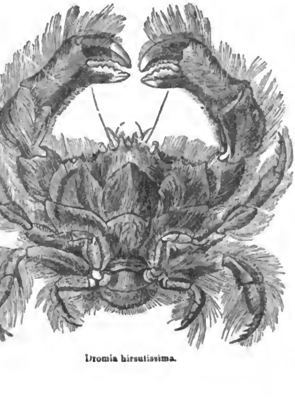
Generic character.—External *antennæ* small, inserted below the ocular peduncles; the intermediate antennæ placed below and a little within the eyes: external *jaw-feet* with their third joint nearly square, slightly notched at the extremity and within: claws (*chelæ*) great and strong; *feet* of the second and third pair terminated by a simple joint, and larger than those of the fourth and fifth pair, which are elevated on the back and provided with a claw, inasmuch as the last joint, which is bent and pointed, is opposed to a spine nearly of the same form, which terminates the penultimate joint: *carapace* oval, rounded, very convex, cut (découpée) on its anterior borders, hairy or rough (hérissée) as well as the feet and chelæ: *eyes* small, supported on short peduncles, rather approximated, and lodged in orbicular or cylindrical fossæ. (Desmarest.)

Geographical Distribution.—Probably extensive in the seas of warm climates. The Mediterranean, the Cape of Good Hope, and the Antilles, are given as localities.

Habits, &c.—The *Dromiæ* are indolent in their motions, and live in spots where the sea is moderately deep, choosing for their habitation places where the rocks are not hidden under the sand. They are almost always found covered with a species of *Alcyonium* or with valves of conchifers, which they retain with their four hinder feet, and which seems to serve them as a shield against their enemies. The *Alcyonia*, which are in general of the species named *Alcyonium Domuncula*, continue even to develop and extend themselves upon their carapace, which they at last entirely conceal. In the month of July, according to M. Risso, the females come out of the state of torpor (engourdissement) in which they ordinarily are, and betake themselves to the shallows for the purpose of depositing there a great number of eggs. (Desmarest.)

Place in the series.—*Dynomene*, according to Desmarest, should be placed next to *Dromia*, the former differing from the latter principally in having the feet of the fifth pair only instead of the four last, elevated on the back. In general the *Dromiæ* bear a great resemblance to the *Crabs*, properly so called, in the general form of the body, the structure of the parts of the mouth, the position of the antennæ, &c.: but they differ from them in the elevated situation of their four posterior feet and in their manners.

Example, *Dromia hirsutissima.* Carapace very convex, with six dentations on its lateral borders, and with a large sinus on each side of the front, which is nearly trilobated. Body covered with long red hairs. Locality, Cape of Good Hope.



Dromia hirsutissima.

DROMORE, a bishop's see in the ecclesiastical province of Armagh in Ireland. The chapter, which is regulated by patent of James I., consists of dean, precentor, chancellor, treasurer, archdeacon, and one prebendary. This diocese occupies the western portion of the county of Down, and extends partially into Armagh and Antrim. The greatest length from north to south is $35\frac{1}{2}$ English miles; and the greatest breadth, from east to west, $21\frac{1}{2}$ miles. It contains 26 parishes, constituting 25 benefices. In 1792 there were 27 churches of the establishment in this diocese: in 1834 the numbers were, churches of the establishment 27; Roman Catholic churches, 34; Presbyterian churches, 45; other houses of Protestant worship, 24. In the same year the gross population of this diocese was 188,209, of whom there were 41,737 members of the Established Church; 76,275 Roman Catholics, 69,264 Presbyterians, and 933 other Protestant dissentors. There were at the same time in this diocese 233 schools, educating 16,987 young persons, being in the proportion of $9\frac{3}{100}$ per cent. of the entire population under daily instruction, in which respect Dromore stands twelfth among the 32 dioceses of Ireland. Of the above schools 23 were in 1834 in connection with the National Board of Education.

The foundation of this see is attributed to St. Colman in the 6th century. Its early history is obscure, and there is no regular succession of bishops on record till after the 12th century. Dr. Jeremy Taylor who had the administration of this diocese granted him addition to that of Down and Connor by King Charles II. in 1661, and Dr. Percy, the learned collector of antient English ballad poetry, have been the most distinguished bishops of Dromore. The bishop's house, which is a plain mansion, was built by Doctor Beresford in 1792. Before his time the episcopal residence had been at Magheralin. By act 3rd and 4th Wm. IV. c. 37, this bishopric when void becomes incorporated with the united diocese of Down and Connor, and its revenues vest in the board of Ecclesiastical Commissioners.

DROMORE, a pretty well built town and thriving linen market, in the barony of Lower Iveagh and County of Down, is situated on the Lagan, 66 Irish or 84 English miles from Dublin on the great northern road to Belfast. The cathedral is a mean structure on the bank of the river. East of Dromore stands a remarkable mound, 60 feet high, with three concentric entrenchments, and an extensive outwork towards the Lagan. The population of Dromore in 1831 was 1942. (Beaufort's *Memoir of a Map of Ireland;* Harris's *Ware's Works; Reports, &c.*) [DOWN.]

DRONE. [BEE.]

DRONTE. [DODO.]

DRONTHEIM. [TRONDHJEM.]

DROPSY, HYDROPS, a preternatural collection of watery fluid in different parts of the body. In the state of health, there is constantly poured out upon every surface, cavity, and interstice of the body, a watery fluid derived from the blood and deposited by the capillary blood-vessels. [CAPILLARIES.] This fluid does not remain long where it is deposited, but by vessels appropriated to the office, termed absorbents, is soon taken up and reconveyed into the common circulating mass. As long as there is a perfect balance of action between these two sets of vessels, which is always the case in health, there is no accumulation of fluid, the exhalation and the absorption being always exactly equal. But if from any cause that balance be disturbed; if either the capillary blood-vessels pour out an unusual quantity of fluid, or if the absorbents fail to act with their accustomed energy, an accumulation of fluid must necessarily take place, and this accumulation, when it amounts to an appreciable quantity, constitutes the disease called dropsy. It follows that dropsy must always be the consequence either of increased exhalation or of diminished absorption.

The causes which lead to increased effusion are exceedingly various; but they are all resolvable either into those which produce a morbid condition of the blood-vessels, an obstruction to the free circulation of the blood, or a morbid condition of the blood itself. The morbid condition of the blood-vessels may be of two opposite kinds, either that of preternatural strength, in consequence of which their action may be so excited as to pour out an unusual quantity of fluid; or that of extreme debility, in consequence of which they may be unable to prevent a preternatural exudation of the thinner parts of the blood through their relaxed coats. These different states of the blood-vessels depend on two diametrically opposite conditions of the system, and accordingly the different species of dropsy are very generally divided into active or passive, acute or chronic, sthenic or asthenic.

Whenever an obstacle is opposed to the free return of the blood from the capillary arteries into the capillary veins, the blood accumulates in the capillary arteries, which are the exhalent vessels. By this accumulation of blood in the exhalents, either their action is increased, the consequence of which is increased exhalation; or their action is diminished and their tone destroyed, the consequence of which is equally increased exhalation. Various morbid conditions of many organs oppose a free return of the circulating blood from the capillary arteries into the capillary veins: any disease of the right side of the heart, for example, which prevents its receiving from the great venous trunks of the body the quantity of blood in a given time, which is necessary to maintain the balance of the circulation; any disease of the lungs, which prevents the lungs from receiving from the right ventricle of the heart the full quantity of blood which the heart has received from the great venous trunks; any disease of the liver, which prevents the liver from receiving by the great vein which ramifies through it the vena portæ, the full quantity of blood which it ought to receive from the different abdominal viscera; any disease of the great blood-vessels themselves, by which the current of the circulating blood is prevented from passing freely through them. Such a disease of the heart may be occasioned by an ossification of its valves; of the lungs, by an obliteration or compression of its air vesicles, upon the walls of which the capillary terminations of the pulmonary artery are distributed; of the liver, by an induration of its substance and a consequent mechanical compression of the minute branches of the vena portæ; of the great blood-vessels, by diseases of their coats giving rise to the tumours called aneurisms, or by the compression of tumours existing in neighbouring parts, scirrhous, fatty, or watery tumours, which may have their seat in any organ, or by the compression of the great venous trunks of the system by the bulk of the distended uterus in pregnant women.

When dropsy is the result of an increased action of the capillary blood-vessels, it is considered a primary or idiopathic disease, and constitutes the sthenic, tonic, active, or acute dropsy of authors. In this case the capillaries are conceived to be in that state, whatever it may be, which constitutes acute inflammation. The increased effusion, which constitutes the dropsy, is the result of that increased action, and by the effusion the inflamed state of the vessels is often removed.

This form of dropsy occurs most frequently in the young, the plethoric, and the robust. It is induced by all the causes of inflammation, such as cold, suddenly checked perspiration, suppression of any of the natural secretions and discharges, a plethoric condition of the system, a repulsion of acute diseases of the skin, &c. It has its seat most frequently in the serous membranes of the great cavities of the body, the walls of which are lined by those membranes, as those of the chest and abdomen, or of the viscera to which these membranes afford an external covering, as the brain, the lungs, the heart, the liver, and all the abdominal and pelvic viscera.

This form of dropsy is attended with a greater or less degree of fever, the invariable concomitant of acute inflammation. The febrile symptoms are general uneasiness, more or less restlessness, pains in the back and limbs, heat of skin, preceded by chilliness, headache, suppression of the secretions and excretions, and consequently a dry or clammy state of the mouth, a constipated state of the bowels, and a loss of appetite. The pulse is always excited, and is usually full and hard, or small and sharp. There is commonly some degree of pain in the organ in which the inflammation has its principal seat. When the inflammation and febrile symptoms are intense, the pain is usually acute and its seat clearly defined; but when the inflammation and febrile symptoms are not very intense, the pain may be slight and its seat correspondingly obscure; but some degree of pain or uneasiness may generally be found if carefully sought for, and at all events the true seat of the inflammation may be usually detected by the disordered function of the affected organ.

When this condition of the system exists with a certain degree of intensity it constitutes the most acute form of dropsy; but when it exists with less intensity it gives rise to another form of the disease, termed sub-acute dropsy, in which the symptoms are the same but less urgent. In this case there is often little or no local pain; the febrile symptoms are milder, the general uneasiness is less prominent, the skin less hot; there may be little or no thirst, and the pulse much less hard and sharp. This form of the disease is equally dangerous in itself, and often more fatal, in consequence of its true nature being overlooked, until it has made such progress that its course is no longer to be checked. It is often the consequence of more acute diseases, and frequently follows scarlet fever, measles, bronchitis, inflammation of the pleura, inflammation of the liver, influenza, &c. The original and urgent disease may subside, and then comes on slowly and almost imperceptibly this insidious and fatal malady.

The third form of dropsy is that termed asthenic, or passive. It is so generally the consequence of some other morbid condition of the system that it is not usually considered a primary or idiopathic disease, but merely a sequent or ultimate result of some other pathological state Its proximate cause is conceived to consist partly of a laxity of the tissues of the exhalant vessels, in consequence of which they are incapable of retaining the fluid part of the blood; and partly of an altered condition of the blood itself, in which its solid portions, namely, its albumen, fibrin, and red particles [BLOOD] are preternaturally diminished and its serum proportionally increased. The state of the system in which this form of dropsy usually comes on, and the causes which most frequently and obviously induce it, are supposed to conduce equally to this morbid state of the containing vessels and the contained blood. The state of the system in which it comes on is that of extreme debility, however induced; but its ordinary exciting causes have so obvious and great a tendency to exhaust the vital power, that they are usually denominated debilitating causes; such are fever, whether intermittent or continued, exanthematous or typhus, long continued and excessive evacuations, whether of natural discharges, or of preternatural effusions of blood, deficient or unwholesome diet, diseases of the digestive organs, by which the due assimilation of the food is prevented, intemperance in the use of intoxicating liquors, whence drunkards of all kinds, and especially dram-drinkers, so commonly, nay, almost invariably, die of dropsy.

The acute and inflammatory forms of dropsy ordinarily produce increased exhalation only into particular parts of the body; but this state of general debility may give rise to an increased exhalation into every cavity and interstice, and thus bring on a general dropsy. Thus it is by no means uncommon to have at one and the same time effusions into the cavity of the cranium, into that of the thorax, into that of the abdomen, and likewise into the cellular tissue almost over the whole body. In such cases the operation of a general cause is rendered manifest by these several dropsies increasing in one part as they diminish in another, and this alternately in the different parts. This combination of the different species of dropsy, or rather, as it may be justly termed, this universal dropsy, must, it is argued, be referred to a general cause, and in most instances, hardly any other can be thought of but a general laxity of the exhalants. It is this which constitutes what is called the hydropic diathesis, which frequently occurs by itself, and frequently concurring with other causes, is especially that which gives them their full effect. This state of the system, when it first comes on, gives rise to a disordered, enfeebled, and wasted appearance of the body, which is commonly called a breaking up of the constitution, and is technically termed a cachexy; in a very short space of time it is usually followed by general dropsy.

All the acute inflammatory and febrile symptoms so characteristic of the other forms of dropsy are of course absent in this. The skin, instead of being hot, is often unusually cold; the pulse, instead of being full and hard, is weak, small, unequal, and rapid; the contraction of the heart is so feeble that slight causes often completely arrest its action, and render it incapable of carrying on the circulation, whence the patient drops down dead instantaneously, perhaps on endeavouring to walk down stairs, or to move from one chair to another; the muscles in general are flaccid, all the movements are weak, irregular, and uncertain, and all the actions of the system exceedingly feeble

It is more especially this last form of dropsy which is induced by a morbid change in the constitution of the blood, namely, an increase in the proportion of its serum. An unusual quantity of water taken into the body, and not carried off by the excretory organs, may possibly give rise to such a condition of the blood, and accordingly it is said that suddenly drinking large draughts of very cold water has been immediately followed by dropsy, probably from the cold producing a constriction of the excretories; in consequence of which they are unable to carry off the water as it flows into the mass of blood and thus to maintain its proper constitution. A preternatural abundance of the more fluid parts of the blood may also accumulate in the circulating mass by a suppression or diminution of the ordinary aqueous excretions. Hence the influence of a cold and moist atmosphere in inducing dropsy; and the highly important influence of diseases of the kidneys in producing the disease. It is found that there are several different diseases of the kidneys of which dropsy is the ordinary result. It is the office of the kidney to remove from the blood a large proportion of its fluid parts; it is an excreting and depurating organ of the greatest importance. Any disorder of it which interferes with the performance of its function may therefore occasion an accumulation of the watery particles of the blood, and thus give rise to dropsy; and it is actually found that when the secretion of the urine is suppressed, the watery portion of the blood is often poured into some of the internal cavities. Moreover, large abstractions of blood are frequently followed by dropsy, because the albumen, the fibrin, and the red particles which constitute the solid parts of the blood are not so easily renewed as the serum, and the superabundant serum readily passes off by the exhalants preternaturally relaxed by the debilitated state of the system induced by the bleeding.

The parts of the body in which the dropsical effusions usually collect are the cavities of the cranium, chest and abdomen, and the interstices of the cellular tissue diffused over the whole body, and forming a constituent element of every organ.

The dropsical fluid itself consists for the most part of the serum of the blood; but its sensible properties and its chemical constitution vary exceedingly according to the form of the disease and the condition of the capillary vessels at the moment the effusion takes place. If the vascular action have been great, the fluid is yellow or straw coloured like whey, and is more or less turbid, and contains minute particles of albumen and fibrin. If, instead of excited vascular action, the effusion have been the consequence of an altered condition of the blood, the fluid is dark-coloured and turbid, probably from the admixture of the red particles of the blood. If the effusion have taken place very slowly in consequence of the operation of some cause progressively but not rapidly impeding the circulation more and more, the fluid is almost colourless and nearly destitute of animal matter. If the fluid have been long retained in the cavity containing it, it may be of all colours and consistence, and its sensible properties may be infinitely diversified, and these diversities are apparently increased by the admission of the external air to the cavity in consequence of the artificial removal of the fluid by the operation called tapping.

But another general cause of dropsy has been stated to be, interruption or diminution of the absorption which should take up the exhaled fluids from the several cavities and interstices of the body. It is obvious that absorption may be diminished, or may cease altogether, from a loss of tone in the proper absorbent vessels. Without doubt, a certain degree of tone or power is necessary in the absorbent extremities to enable them to perform their office: and it was justly observed by Cullen, that the same general debility which produces that laxity of the exhalant vessels which constitutes the hydropic diathesis, occasions at the same time a loss of tone in the absorbents; that therefore a laxity of the exhalants generally accompanies a loss of tone in the absorbents; that consequently a diminution of absorption must have a considerable share in the production of dropsy; and that this is rendered the more probable since dropsies are often cured by medicines which seem to operate by exciting the action of the absorbents.

There are many diseases of which dropsy is the sequent, and the dropsy induced in this indirect mode is called secondary, consecutive, symptomatic, or passive, in contradistinction to its primary acute and active forms. The diseases which precede dropsy as their ordinary consequent have their principal seat in the heart, and its great vessels, in the lungs, the liver, the spleen, the kidneys, the uterus, and the ovaria. When dropsy is the consequence of disease of the heart, the signs of disease of the heart commonly long precede the appearance of the dropsy. The diseases of the heart which most commonly give rise to dropsy are passive dilatation of its muscular parietes and ossification of its valves, the existence of which may be ascertained with tolerable certainty both by certain signs which are pathognomonic of these organic changes, and by auscultation. When dropsy is the consequence of disease of the heart, the effusion is commonly indicated first by swelling of the face, especially beneath the eyelids, and next by swelling of the feet and ankles, and of the hands and arms, particularly of the left. As in the progress of the disease the effusion collects and accumulates in the cavity of the thorax, or in that of the pericardium, it is denoted by a peculiar train of symptoms hereafter to be described. [HYDROTHORAX and HYDROPS PERICARDII.] The respiration is always more or less embarrassed; the horizontal position uneasy, and often impossible; the pulse, which is seldom or never natural, is very variously affected. Whenever there is a watery swelling of the face, hands, arms, or ankles, with an impaired state of the constitution, the consequence of protracted ill health, and without manifest disease of the lungs, it may be certainly inferred that there is a disease of the heart. The dropsy which results from disease of the heart is very often completely removed by appropriate remedies. The effusion often recurs indeed, and is again removed, and this successive recurrence and removal of the affection takes place indefinitely until the cardiac disease, on which the effusion depends, reaches a point which is no longer compatible with life.

Diseases of the coats of the great blood-vessels constituting aneurism, concretions within their cavities, or tumors of neighbouring parts, pressing upon their trunks, and obstructing the passage of the blood through their canal, are frequent causes of consecutive dropsy. Inflammation of the pleura lining the cavities of the chest, inflammation and congestion of the lungs, the consolidation or hepatization of the substance of the lungs, and the obliteration of the air-vesicles by the deposition of tuberculous matter, may give rise to effusion either into the cavity of the chest, or into the cellular tissue forming the parenchyma of the lungs, or into the cellular tissue diffused over the whole body.

Inflammation of the liver, generally of a slow or chronic nature, leading to a deposition of adventitious matter in its substance, and the consequent enlargement of the organ and the consolidation of its tissue, is a common cause of dropsy, occasioned by the obstruction to the circulation through the vena portæ, the effusion being in this case often confined to the cavity of the abdomen.

The spleen, which consists of a congeries of blood-vessels, and which is very apt to be enlarged and obstructed, may occasion effusion into the abdomen in the same manner as disease of the liver.

The kidneys are subject both to functional and organic diseases, which are followed by effusions into all the cavities, in consequence of the failure of these organs to remove from the common mass of blood the superfluous and noxious principles which it is their office to eliminate.

Dropsical effusions are often poured into the uterus and ovaria, in consequence of primary disease in these organs; at other times tumors are formed within or attached to them, which press upon and compress the trunks of neighbouring blood-vessels, and thus occasion dropsy by a mechanical obstruction to the circulation of the blood.

It is an interesting and important fact, that while in this disease the thinner parts of the blood are thus poured out into the several cavities and interstices of the body, the kidneys often remove to a very large extent the more solid portions of the blood, more especially the albumen, and sometimes even the red particles. Hence there are several forms of dropsy in which the urine is loaded with a preternatural quantity of albumen, the presence of which may be detected by the application of heat, nitric or muriatic acids, alcohol, or corrosive sublimate, to the urine, all of which coagulate the albumen and thus render it visible. But albumen is not always contained in the urine of dropsical patients. It is of some importance in practice to discriminate the cases with albuminous urine from those without it, since there are remedies of great efficacy in the latter form of the disease, which are useless, if not injurious, in the former. This fact would indicate that dropsy with albuminous urine has its seat in a particular set of organs, and is dependent on a peculiar morbid action of those organs; and although very much still remains to be ascertained in relation to these points, yet some progress has been made at least towards determining the seat of the malady, if not the nature of the affection when the urine is albuminous. The condition of the urine in this respect ought therefore always to be examined, because it may throw some light however small on the constitutional and local disorder, and may be some guide to the judgment in the selection of remedies.

Dropsy is always a formidable and often a highly dangerous disease. Its acute forms, though attended with the most urgent symptoms, are in general less unfavourable than most of its chronic forms, because in the former, though the disordered actions may be very intense and dangerous, yet they are more under the controul of remedial agents, and they often do not depend on any irreparable vice of the constitution, whereas the latter are the sign and the result of deep-seated and surely advancing disease. Of course the prognosis in any particular case must entirely depend on the seat and nature of the disease of which it is the sequent.

There is no disease which requires a more varied treatment than dropsy, because, like fever, dropsy may exist in, and be essentially connected with, diametrically opposite morbid conditions of the system. Dropsy may depend on a state of the system, for the removal of which all other remedies will be tried in vain unless their application be preceded by a decided abstraction of blood: dropsy may depend on a state of the system in which the abstraction of the smallest quantity of blood may prove almost instantaneously fatal: in the former case stimulants and excitants invariably increase the intensity of the disease; in the latter they are indispensable to the preservation of life. On the clear discrimination of these two different states of the system, and the two different classes of disease to which they give rise, and on the sagacious detection of the different shades by which they may appear to be blended with and lost in each other, the successful treatment of dropsy mainly depends.

In the acute form of dropsy dependent on active inflammation, blood-letting is necessary, just as it is in ordinary inflammation, the quantity of blood which it is proper to abstract depending, of course, on the organ inflamed, on the intensity of the inflammation, and on the strength of the constitution. One full bleeding will commonly suffice; but there are many cases in which its repetition is indispensable. In the great majority of cases, however, after a full bleeding from the arm, the local will be preferable to a repetition of the general bleeding.

The next indication after blood-letting is to equalize the circulation and to promote the secretions. This is most effectually accomplished by bringing the system under the influence of mercury, by calomel combined with James's Powder or with opium, and this treatment may be conjoined with diuretics, of which digitalis is the best.

In the subacute form the same general plan of treatment is necessary, but it can by no means be carried to the same extent, and in each individual case the application of the remedies employed must of course be modified according to the circumstances peculiar to that case.

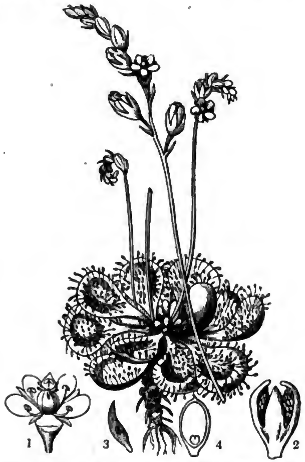
In the chronic, passive, or asthenic form, life would be destroyed by the employment of the remedies which alone are efficacious in the acute form. In this debilitated state of the system the abstraction of the smallest quantity of blood is highly pernicious. The safer and the most efficient remedies in this form of the disease are tonics, the laxatives called deobstruents, taraxacum, mild unirritating doses of mercury, and iodine, particularly in the form of the hydriodate of potass.

The only effectual treatment of consecutive dropsy is that which is proper to the removal of the primary disease. But the detection of the true seat and nature of those organic diseases which are antecedent to dropsy is often a matter of extreme difficulty, requiring patient and acute investigation, and an extensive and precise acquaintance with pathology. And the treatment of the disease when ascertained, the selection of the appropriate remedies, and the employment of these with due, and only with due, activity and vigour, is a delicate and difficult task, sometimes rewarded, when performed with sagacity and skill, with a degree of success not to have been anticipated. It is pre-eminently in cases like these that the scientific and discerning physician saves, when the ignorant, careless, and routine practitioner destroys. [Hydrocephalus, Hydrops Pericardii, Hydrothorax, &c.]

DROPWORT, a poisonous wild umbelliferous plant, with fleshy-fingered roots, inhabiting ditches and wet places. It has been sometimes sold fraudulently by itinerant gardeners as a new species of dahlia. Its botanical name is Œnanthe crocata.

DROSERA'CEÆ, a natural order of albuminous exogenous plants, consisting of marsh herbs, whose leaves are usually covered with glands or glandular hairs, and whose flowers are arranged in circinate racemes. The calyx consists of five sepals: there are five petals, five or ten hypogynous stamens, a one-celled many-seeded capsular fruit, and minute seeds, having an embryo lying at the base of a large quantity of albumen. There are many species of the genus drosera, called in English sundews, more remarkable for the singular structure of their glandular hairiness than for the beauty of their flowers, and of no known use. A few other little-known genera are associated with it; and it is probable that dionæa [Dionæa], whose singular irritable leaves have much analogy with those of drosera, also forms a part of the order, notwithstanding its indehiscent fruit and erect vernation.

De Candolle having inexactly described the embryo as lying in the axis of the albumen, the true affinities of the order were overlooked; they have lately however been more correctly determined to be with Cephalotaceæ and Francoaceæ rather than with Violaceæ, Polygalaceæ, or Frankeniaceæ.



A plant of Drosera rotundifolia. 1, a complete flower magnified: 2, a ripe capsule magnified—the seeds are seen between the valves of the capsule: 3, a seed very much magnified—the dark space in the middle is the nucleus, the remainder is a loose integument that invests the seed; 4, a section of the nucleus still more magnified—here the minute dicotyledonous embryo is seen at the base of the albumen.

DROWNING, the state of asphyxia [Asphyxia] produced by the immersion of the body under water. When a warm-blooded animal is immersed under water, and forcibly retained there, he immediately begins to struggle violently, and uses every effort to rise to the surface. These struggles are not at first the result of pain, but of fear. It is proved by direct experiment that the obstruction to the respiration which produces pain does not come on for some time. The point of time when the painful impediment to respiration occurs is well ascertained. For the reason assigned in the article Asphyxia, in the space of three quarters of a minute a violent effort is made to inspire, to expand the lungs with air, but no air can enter. Every effort to inspire is followed by a corresponding effort to expire. At each expiration a small quantity of air is expelled from the lungs, and is seen under the surface of the water in the form of bubbles; for although the water excludes the air from entering the lungs, notwithstanding the most violent efforts to inspire, yet it cannot prevent some portion of air from being expelled from the lungs by the violent efforts to expire. The ultimate result of these repeated and violent expirations is greatly to diminish the bulk of the lungs, and to bring them to the utmost degree of collapse to which it is possible to reduce them by any voluntary or instinctive efforts which the animal is capable of making.

When a human being is drowned by accident, if the fall has been from a considerable height and the water is not of very great depth, the body is precipitated to the bottom of the water; it then quickly rises to the surface, partly because the specific gravity of the body, when the lungs are full of air, is less than that of water, and partly because the body is rendered still lighter by the air, always amounting to a considerable quantity, which is collected and retained in the clothes. If the person be not able to swim, he generally struggles violently, and probably screams; by these efforts the lungs are partly emptied of the air they contained, the comparative weight of the body is increased, and consequently it again sinks to the bottom, but it soon again rises, and this alternate rising and sinking may occur several times in succession. Whenever the body comes to the surface and the mouth is above water, the painful impediment to respiration produces an instinctive effort to inspire, and a hurried gasp is made to obtain air. But often the mouth is not sufficiently above the surface of the water to obtain air without respiring a quantity of water along with it; but the quantity of water received in this manner is never great, probably not more than is expelled by the cough excited by the irritation of the glottis in consequence of the contact of the water and by the subsequent expiration. Every instant the body remains in the water, for the reasons immediately to be assigned, the powers of sensation and of voluntary motion rapidly diminish, and at length, perfectly insensible and motionless, it remains at the bottom of the water, where, if wholly undisturbed, it continues until the disengagement of various gases in the progress of putrefaction renders it again specifically lighter than water, and brings it once more to the surface.

The change in the system produced by continued submersion, the consequent suspension of respiration, and the necessary extinction of life, are all referrible to one pathological condition, namely, a change in the nature of the blood. The water prevents any portion of air from entering by the trachea to the air vesicles of the lungs; consequently no air comes in contact with the venous blood contained in the capillary branches of the pulmonary artery which are spread out upon the walls of these air vesicles; the venous blood which flows to the lungs is therefore incapable of being converted into arterial blood, whence the lungs can deliver to the left side of the heart only venous blood to be sent out to the system. As the circulation goes on, all the arterial blood in the body is at length converted into venous, and flows into the great venous trunks of the system, by which it is returned to the right side of the heart, and thence to the lungs, where it undergoes no change, but remains venous. These currents of venous blood, and of venous blood only, are successively sent out to the system. But venous blood is incapable of maintaining the action and vitality of the brain and spinal cord of the heart, of the voluntary muscles, or of any organ of the body, and consequently, when nothing but venous blood circulates in the system, the death of all the organs is the sure and quick result, and the organs die in the order and mode already described. [ASPHYXIA.]

Taking the average of a great number of experiments, it is found that when an animal is forcibly and continuously held under water, the blood in the arteries loses its vermilion colour, and begins to grow venous in the space of three quarters of a minute. In one minute and a quarter it is obviously dark. In one minute and a half, no difference can be distinguished between the blood in the arteries and the blood in the veins; consequently, in an animal that is submersed and that never rises to the surface, the system is brought completely under the influence of venous blood in the space of one minute and a half, and though the body should remain under water half an hour, the blood does not become sensibly darker, because it can only be completely venous.

Circumstances may make a few seconds difference in regard to the point of time when these phenomena take place. If for example an animal be submersed at the instant of expiration, the colour of the blood is lost somewhat sooner than when it is submersed at the instant of inspiration, and if the animal be much alarmed and struggle violently, the change takes place with greater rapidity; but the difference from any cause of this kind never amounts to more than a few seconds. Age however is capable of effecting a more remarkable difference. It is proved by numerous and accurate experiments that the younger the animal the longer it can live when deprived of air by submersion. If, as is commonly the case, an adult warm-blooded animal be irrecoverably dead in the space of four minutes after complete and continuous submersion, an animal of the same species only a few days old will live twelve minutes. A pup will live considerably longer than a young dog, a young longer than a middle aged dog, and a middle aged longer than an old dog.

Sensibility and the power of voluntary motion are diminished the moment the arterial blood begins to lose its vermilion colour; an animal is completely insensible, and has wholly lost all power of voluntary motion, that is, it is in a state of apparent death, as soon as the arterial blood is completely venous. In one minute and a half, then, after complete and continuous submersion, animal life is completely extinguished. But by the prompt and vigorous use of the appropriate remedies, recovery from this state is possible; because the organic functions go on for a considerable period after apparent death, and death is not real until the organic functions have wholly ceased. Nevertheless, though the organic functions may continue for an indefinite period after the animal functions are extinguished, from ten minutes to half an hour, or more, yet, in no instance in which the experiment has been fairly tried has any adult warm-blood animal that has been completely and continuously submersed for the space of four minutes been capable of resuscitation, though all the means of restoring animation may have been instantaneously and most actively and judiciously employed. Accordingly it is found in practice that the immediate and vigorous use of the best means for restoring animation often fail when the person has not been in the water more than four minutes. In general, however, if the body has not been in the water longer than from five to eight minutes, the prompt and persevering use of the proper means for restoring animation will succeed; no doubt, because in some one of or in all the times that the body has come to the surface air has been obtained and conveyed to the lungs in the hurried gasp instinctively made at these moments. Still it is exceedingly rare that persons are recovered who have been in the water fifteen minutes; occasionally however animation is restored after a submersion of twenty minutes, or even half an hour; and apparently authenticated cases are on record in which resuscitation was accomplished after the body had been in the water for three-fourths of an hour. In these cases, circumstances must have favoured the occasional inspiration of air; it is utterly impossible that life can have been maintained so long unless the individual had breathed at intervals during the time; and as none can tell what circumstances may have occurred favourable to the inspiration of air, it is an imperative duty in all cases to resort to the proper means for restoring animation with all the promptitude and energy possible.

When a person who has been drowned, who was previously in a state of sound health, is taken out of the water, the appearances presented by the body are the following:—

The whole of the external surface is cold; the colour of the skin is pallid, excepting in the parts where it is livid rather than pallid, as in the face, which is always either entirely pale or slightly livid. The eyes are half open, and the pupils much dilated. The mouth and the nostrils contain a great deal of frothy fluid. A large quantity of the same kind of fluid is contained in the trachea, the bronchial tubes, and the air vesicles of the lungs. The tongue is protruded between the teeth, and approaches to the under edge of the lips. The whole head is sometimes much swollen, and the features occasionally present the appearance of those of a person who has died from apoplexy; and this is said to be particularly the case with those who have fallen into the water in a state of intoxication. It is usually considered as a sign that a person has been drowned while living, and that the body has not been thrown into the water after death, that the ends of the fingers are excoriated, and that there is a collection of dirt or sand under the nails, appearances resulting from the efforts which the drowning person has made to avert his impending fate; but if the water be deep, no appearance of this kind is present, because the power of struggling is over before the body touches the ground, and a person in the state of intoxication, who falls into deep water, may expire without the power to make a single effort to save himself.

With regard to the internal organs, the heart and its great blood-vessels are always found preternaturally loaded with dark-coloured blood, sometimes to such an extent that the heart seems completely to fill the bag of the pericardium. This accumulation of black blood is always on the right side of the heart, which usually contains somewhat more than double the quantity contained in the left cavities.

The lungs are invariably very much reduced in volume, and are exceedingly loaded with black blood. Both the pulmonary arteries and veins are likewise distended with black blood.

The substance of the brain is of a darker colour than natural, and its vessels are commonly turgid with black blood; but sometimes the turgescence of the cerebral blood-vessels is not in proportion to the accumulation of blood in the other organs.

There is always a quantity of water mixed with frothy matter in the trachea and bronchi. Occasionally this frothy matter is mixed with blood. The quantity varies a good deal in different cases, but it is never very great. At one time it was thought to be so great as to be the cause of death in drowning. It was conceived that the water flows into the lungs by the trachea in such abundance as to occasion asphyxia. The controversy which was long agitated on this point is now set at rest by numerous and accurate experiments, which demonstrate that only a very inconsiderable quantity of water enters the trachea, and never sufficient to occasion death.

A similar controversy prevailed on the question whether water enters the stomach, which is now equally decided in the negative. It is proved beyond all doubt that no water passes into the stomach, or at least that no quantity enters it capable of contributing in the slightest degree to the fatal event. The establishment of this point is important, because the contrary notion had led to the adoption of most pernicious practices. With a view of evacuating the water supposed to be accumulated in the lungs and stomach, the bodies of the drowned, when taken out of the water, were held up by the heels, rolled on barrels, and subjected to other practices calculated rapidly to extinguish any remaining spark of life; and though the notion which led to these absurd practices is exploded, the practices themselves continue. In a paper published in the 'Medical Repository' for July, 1824, Mr. D. Johnson, surgeon, Farringdon, in detailing a case of suspended animation in a seaman who had fallen from a yard-arm into the sea when the ship was going at the rate of nine knots and a half per hour, and was afterwards picked up in an insensible state, says, 'When brought on board the ship he showed no signs of life. I had him immediately suspended with his head downwards, and well shaken for a minute or two. He was then laid on the cabin-table, and rubbed all over by two or three men with flannels, &c. Tartarized antimony was rubbed into the root of the tongue, and tobacco-smoke blown into the mouth and nostrils.' Short of decapitation no experiments could be devised better calculated to destroy the smallest chance of resuscitation.

The proper remedies for the recovery of the drowned are few and simple. The body, placed on a bed-chair, should be removed to the receiving house or any place where the conveniences required may be most easily obtained. The wet clothes should be stripped off as rapidly as possible, the body well dried and surrounded by warm air, if it can be readily procured, by the portable warm air bath, of which there ought to be one at every receiving house. At first the heated air should only be a few degrees above the temperature of the body, and the heat, which ought always to be ascertained by a thermometer, should be subsequently increased with caution. The body being thus surrounded with warm air, artificial respiration should be performed without the delay of a moment, and this should be assisted by electricity applied at first in the form of very gentle shocks.

By the application of heat the capillary blood-vessels are stimulated to action, the determination of blood towards the external surface of the body is favoured, and the internal organs are thus relieved of their oppressive load. By artificial respiration the cavity of the chest is enlarged, the collapsed state of the lungs is removed, and atmospheric air, the great agent needed for the decarbonization of the blood, and on the want of which all the dangerous phenomena of drowning depend, is transmitted to the lungs and brought into contact with the venalized blood. By electricity the organs which carry on the mechanical part of respiration, that is, those which alternately enlarge and diminish the capacity of the thorax are roused and excited to resume their natural action. There are some few other useful auxiliaries, but so important and efficacious are these three powerful agents, when judiciously and perseveringly employed, that they may be considered as the only remedies worth regarding. But unfortunately they are as potent for evil as for good. A slight mismanagement of any of them may utterly destroy that life which the delicate and skilful use of it would have reanimated. It is impossible in this place to enter into a detail of the dangers with which the incautious employment of these powerful remedies is fraught, or minutely to detail the mode in which they ought to be applied in practice. It is a subject which deserves much greater attention than it has hitherto received. The apparatus for heating the bodies of the drowned, for the artificial inflation of the lungs, and for the application of electricity, are susceptible of vast improvement both with reference to the efficacy and the safety of these remedies; and there are few subjects to which mechanical genius and scientific knowledge could be applied with greater prospect of conferring signal service on mankind.

DRUIDICAL BUILDINGS. [AVEBURY; CARNAC; STONEHENGE.]

DRUIDS. [BRITANNIA.]

DRUM, a pulsatile musical instrument, of which there are three kinds,—the *Side Drum;* the *Base* or *Turkish Drum;* and the *Double Drum.* The first is a cylinder, formerly of wood, but now invariably of brass, on each end of which is a hoop covered with vellum or parchment. This is the ordinary regimental drum. The second is formed as the first, but of oak, on a much larger scale, and used, not in conjunction with the fifes, but as part of the regimental band. It is likewise employed occasionally in the orchestra. The third is made of copper, nearly hemispherical, covered with a strong *head* of calf's-skin, and stands on three iron legs. The Double Drums vary in dimensions, from nineteen inches to three feet in diameter. They are always in pairs, and are tuned, by means of many screws which tighten the head, to the key-note and the fourth below. Very recently, however, a most decided improvement has been effected in the manner of tuning these instruments. By means of a lever operating on several hooks which act simultaneously on the head, or hoop on which the skin is strained, the tuning is performed at once, and with such rapidity, that, in our presence, the melody of 'God save the King' was performed on a single drum in a time not much slower than that usually adopted. A patent has been obtained by the ingenious mechanist (Mr. Cornelius Ward) to whom we are indebted for this useful invention; and it is to be presumed that in future all double drums will be constructed on his principle.

DRUM. [DOME.]

DRUMMOND, WILLIAM, the son of Sir William Drummond of Hawthornden, was born December 13, 1585. He was educated at Edinburgh, and studied civil law in France. On his father's death, in 1610, he relinquished his profession and devoted himself to literary pursuits at his paternal mansion of Hawthornden. He did not, however, experience that freedom from trials which he had probably anticipated in his retirement. His betrothed bride died on the eve of their marriage; and in order to divert his thoughts from brooding over this deep and bitter affliction, he undertook a tour which lasted eight years, during which time he visited Germany, France, and Italy, and collected a library of great value, of which part is now in the possession of the university of Edinburgh. In his 45th year he married a lady whose fancied likeness to the former object of his affections is said to have constituted her chief attraction for him. When the civil war broke out, his political bias exposed him to grievous annoyances, particularly that of being compelled to supply his quota of men to serve against the king. This, and regret for Charles's death, shortened and embittered his days, and he died at Hawthornden, December 4, 1649.

Southey has observed that he was the first Scotch poet who wrote well in English. A comparison of his works with those of his predecessors, Douglas and Dunbar, will show the progress made during the sixteenth century towards fixing and perfecting the language, as well in Scotland as in England. His sonnets, and indeed nearly all his poems, mark strongly that indulgence in sorrow which causes it to take the form of habit, and as such conveys a feeling of passive pleasure by its exercise. The resemblance which his versification presents to that of Milton's minor poems is so striking as only to require mention in order to be acknowledged; and few, we should think, could read his poem on the death of Prince Henry without being reminded of 'Lycidas.' Besides his poetical works, he wrote a history of the five Jameses, kings of Scotland, several pamphlets and tracts, which, with his letters, were published at Edinburgh in 1711. (*Biogr. Brit.* and *Retrospective Review*, vol. xi.)

DRUPA'CEÆ, the name given by some botanists to that division of rosaceous plants which comprehends the peach, the cherry, the plum, and similar fruit-bearing trees. They are more generally called Amygdaleæ.

DRUPE, a closed, one-celled, one or two-seeded seed-vessel, whose shell is composed of three layers, the outer membranous or leathery, the inner hard and bony, the intermediate succulent or fibrous. A peach, a cherry, a mango, are all fruits of this description. A cocoa-nut is a compound drupe, being composed of three consolidated, two of which are abortive; and a date is a spurious drupe, the hard inner shell being represented by a membrane. In theory the stone or inner bony layer of the shell is equivalent to the upper side of a carpellary leaf, the external membrane to the lower surface, and the intermediate pulp or fibre to the parenchyma.

DRUSES, DOROU'Z, a people who inhabit the chain of Libanus, in Syria, are under the government of their own chiefs, and have a religion peculiar to themselves. The vernacular language of the Druses is Arabic. Although the mountaineers of Libanus in general obey the emir, or prince of the Druses, yet they are not all Druses, but a great part, perhaps the greater part, of them are Christians of the Maronite communion, and belong to the western, or Roman church. [MARONITES.] There are Syrian Greeks, or Melchites, who belong to the western church, the chief difference between whom and the Maronites is, that the Maronites have their ritual in Syriac, and the others in Arabic. The Druses live together with the Christians in the towns and villages in perfect harmony, but without intermarrying with them. The Druses live chiefly in the south part of Libanus, east and south-east of Beiroot, and as far south as the district of Hasbeya, about the sources of the Jordan. But the dominion of the emir of the Druses extends also over the north part of Libanus as far as the latitude of Tripoli, which part of the mountains is chiefly inhabited by Maronites, whose patriarch resides at Canobin, south-east of Tripoli. Towards the east the jurisdiction of the emir extends over part of the Bekaa, or plain intervening between the Libanus and the Antilibanus. North of the Bekaa is the Belad, or district of Balbek, which is inhabited chiefly by Musselmans, and is under a distinct emir of the sect of the Metwalis, subject to the pacha of Damascus; but the emir of the Druses appears to have gained a sort of authority over this district also since Burckhardt's time. The emir of the Druses is tributary to the pachalik of Acre, on condition that no Turk shall reside within his territories. Burckhardt, *Travels in Syria;* Captain Light's *Travels in Egypt, Nubia, the Holy Land, Lebanon, and Cyprus in* 1814.) The capital of the emir of the Druses is Deir el Kamr, in a fine valley on the west slope of Libanus, about eight or nine hours' ride south-east of Beiroot: the town is said to have about 5000 inhabitants, partly Druses and partly Christians. There are two Maronite and two Melchite churches at Deir el Kamr. The town is built in the Italian fashion, and is said to resemble a second-rate country town of Italy. Captain Light saw about twenty silk looms at work round one of the squares. The emir resides at the palace or castle of Bteddin, about one hour's ride from Deir el Kamr: some of the apartments of the palace are described as very handsomely furnished, paved with marble, and adorned with rich folding draperies and divans, the walls inlaid with ivory and gilding, and adorned with passages of the Koran and Scriptures in Arabic, in large embossed gilt characters, enclosed in pannels of various size. The Reverend William Jowett (*Christian Researches in Syria*), who visited Bteddin in 1823, describes the palace as like a small town; 2000 persons are said to live in or about it, men of all trades, soldiers, scribes, carpenters, bricklayers, blacksmiths, breakers of horses, cooks, tobacconists, &c. Druses and Christians were intermixed together, and even Christian priests were among the attendants of the emir, who is said to have been christened in his youth, and had at one time a confessor, but of late showed no preference to any religion, and treated all his subjects, whether Druses or Christians, with the same impartiality. The emir Beshir, as he was called, was the same whom Captain Light had seen in 1814: he is described as an elderly man of an intelligent and prepossessing appearance, and said to be very regular and abstemious in his habits. He had come to the sovereignty by defeating several competitors, whom he imprisoned and put to death. (Light's *Travels.*) In 1822, having supported the rebellious Abdallah, pacha of Acre, he incurred the displeasure of the Porte, and took refuge in Egypt, but returned soon after by the mediation of Mehemet Ali, the pacha of Egypt. At the time of the occupation of Syria by Ibrahim, Mehemet's son, the Druses joined him at first; they afterwards quarrelled with him; but peace appears now to be restored. The emir has under him several subordinate emirs, or local chiefs, in various districts of the mountains, some of whom are Druses and others Maronites. As the whole population is armed and trained to the use of the gun, it is said that in case of need the emir can collect in a very short time 30,000 men; but this must be only part of the individuals capable of bearing arms, as the Maronite population alone is said to be more than 200,000, and the Druses cannot be much less in number. Dr. Hogg, in his 'Visit to Alexandria, Jerusalem, and Damascus,' London, 1835, has given the latest information concerning the Druses.

The religion of the Druses has been a subject of much inquiry, being involved in a kind of mystery. The Rev. W. Jowett had the following information from the physician to the emir, which agrees with the accounts of former travellers. The Druses are divided into three classes: the Djahelin, or 'the ignorant,' the partially initiated, and the adepts, or fully initiated. The second class are admitted to a partial knowledge of the secret doctrine; they may, if they like, return to the class of Djahelin, but must never reveal what they know. The third class, or adepts, continue late together at their places of meeting on Thursday evenings, performing their rites, after all others have been excluded. Should they reveal what they know they would incur the penalty of death, which would also be incurred by any one who should turn Mussulman or Christian. They make no proselytes. As to the nature of their secret doctrine, we have an account of it in De Sacy's 'Chrestomathie Arabe,' vol. ii.; but how far it can be relied upon is still a question with some, as it depends upon the authenticity of the books from which de Sacy has extracted it. (See also Adler's *Museum Cufico-Borgianum*, Rome, 1782.) Mr. Jowett saw MSS. shown about secretly, purporting to be the sacred books of the Druses, and a set of them was offered to him for the price of no less than 5000 dollars. It appears however pretty certain that the Druses are, or were originally, disciples of Hakem biamr Illa, the sixth Fatemite caliph of Egypt, who in the eleventh century proclaimed himself to be an incarnation of the Divinity, and who established a secret lodge at Cairo, divided into nine degrees, the last of which taught the superfluousness of all religions, the indifference of human actions, &c. (Von Hammer, *Geschichte der Assassinen*, 1818.) The Assassins themselves were a derivation of Hakem's sect, which was itself an offshoot of the great schism of the Ismaelites, a remnant of whom still exists in Syria, in the mountains east of Tortosa, near their antient stronghold Maszyad. (J. F. Rousseau, *Mémoire sur les Ismaelites et les Nosaïris de Syrie*, with notes by de Sacy.) Hakem disappeared, probably by assassination, in one of his solitary walks near Cairo, but his disciples expect his return, when he is to reign over the world. The Druses are said to believe in transmigration The story of their worshipping a calf's head is variously told. (De Sacy, *Mémoire sur le culte que les Druses rendent à la figure d'un veau*, in the 2nd vol. of the *Mémoires de la classe d'Histoire et de Littérature Ancienne de l'Institut.*) They are also accused, like the Nosaïris, of licentious orgies in their secret meetings, and yet Mr. Jowett was told by Christian residents that as soon as a young Druse becomes initiated, he leaves his former licentious course of life and becomes quite an altered man, at least in appearance. Burckhardt observes on this subject that the Druses are more observant of outward decorum than of genuine morality. All agree however in saying that they are industrious, brave, and hospitable: their country is a land of refuge from Turkish oppression; they pay few taxes, as the emir has lands or domains belonging to him, from which he draws his chief revenue. Silk is the staple article for exportation, by way of Beiroot. The mulberry, the vine, the fig, and other fruit-trees, are reared in the lower ridges of the Libanus, while the higher range affords good pastures. Cotton is also cultivated and manufactured. The plains, especially the Bekaa, produce corn. There are a number of convents scattered about the mountains; there is a Maronite college for the study of Syriac at Aain el Warka, and another for the Melchite students at Deir el Mhalles. Burckhardt, who crossed the Libanus in different directions, gives the names of many towns or villages inhabited by Druses and Maronites, some of them considerable places, such as Hasbeya, with 700 houses; Zahle, in the Bekaa, with 900; Shirrei, near Tripoli, &c. The Druses dress differently from the Maronites: the men wear a coarse woollen beneesh, or cloak, black, with white stripes, thrown over a waistcoat, and loose breeches of the same stuff, tied round the waist by a sash of white or red linen with fringed ends; their turban is swelled out from the head into a shape resembling a turnip, and flat at the top. The women wear a coarse blue jacket and petticoat, without any stockings, and their hair plaited and hanging down in tails behind. When they dress they put on their head the Takeel, a hollow tube of silver or tin, from six to twelve inches high, shaped like a truncated cone, over which is thrown a white piece of linen, which completely envelops the body; they also wear silver bobs tied to their tresses. (Light's *Travels*.)

DRUSUS, CLAU'DIUS NERO, son of Tiberius Claudius Nero and of Livia, was born in the year 38 B.C., three months after his mother's marriage with Augustus. He served early in the army, and was sent in 17 B.C., with his brother Tiberius, against the Rhæti and Vindelici, who had made an irruption into Italy. He defeated the invaders, pursued them across the Alps, and reduced their country. Horace celebrated this victory in one of his finest Odes (lib. iv. 4). Drusus married Antonia Minor, daughter of Antony and Octavia, by whom he had Germanicus and Claudius, afterwards emperor, and Livia or Livilla. In 14 B.C., being sent to quell an insurrection in Gaul occasioned by the extortions of the Roman tax-gatherers, he succeeded by his conciliatory address. In the following year he attacked the Germans, and carrying the war beyond the Rhine, he obtained a series of victories over the Sicambri, Cherusci, Catti, and Tencteri, and advanced as far as the Visurgis, or Weser, for which the senate bestowed the surname of Germanicus upon him and his posterity. In 9 B.C. Drusus was made consul, with L. Quintius Crispinus. He was soon after sent again by Augustus against the Germans, crossed the Visurgis, and advanced as far as the Albis or Elbe. He imposed a moderate tribute on the Frisians, consisting of a certain quantity of hides, which, being afterwards aggravated by the extortion of his successors, caused a revolt under the reign of Tiberius. (Tacitus, *Ann.* iv. 72.) He caused a canal to be cut, for the purpose of uniting the Rhine to the Yssel, which was known long after by the name of Fossa Drusi; and he also began to raise dykes to prevent the inundations of the Rhine, which were completed by Paulinus Pompeius under the reign of Nero. Drusus did not cross the Albis, probably because he thought he had advanced already far enough: he retired towards the Rhine, but before he reached that river he died, at the age of thirty, in consequence, as it was reported, of his horse falling upon him and fracturing his leg. (Livy, *Epitome*.) Tiberius, who was sent for in haste, and found his brother expiring, accompanied his body to Rome, where his funeral was performed with the greatest solemnity. Both Augustus and Tiberius delivered orations in his praise. Drusus was much regretted both by the army and by the Romans in general, who had formed great expectations from his manly and generous sentiments. One of his grandsons, Drusus, son of Germanicus and of Agrippina, was starved to death by order of Tiberius, and Nero, the other, was put to death in the island of Ponza.

NERO CLAVDIVS DRVSVS GERMANICVS IMP
TI CLAVDIVS CAESAR AVG P M TR P IMP
SC

Coin of Drusus.

British Museum. Actual Size. Copper. Weight, 428½ grains.

DRUSUS, the son of Tiberius by Vipsania, daughter of Agrippa, served with distinction in Pannonia and the Illyricum, and was consul with his father A.D. 21. In a quarrel he had with the favourite Sejanus, he gave him a blow in the face; Sejanus, in revenge, seduced his wife Livia or Livilla, daughter of Drusus the elder and of Antonia, and the guilty pair got rid of Drusus by poison, which was administered by the eunuch Lygdus. The crime remained a secret for eight years, when it was discovered after the death of Sejanus, and Livia was put to death. (Tacitus, *Annal.*)

DRYANDRA, a genus of Australian shrubs, with hard dry evergreen serrated leaves and compact cylindrical clusters of yellow flowers, seated upon a flat receptacle, and surrounded by a common imbricated involucre. It is in the latter respect that the genus principally differs from Banksia.

The species are much esteemed by cultivators for their beautiful evergreen leaves. They are commonly regarded as greenhouse plants, but will, in several cases, survive an English winter without injury, if protected by a glass roof in winter, and planted among rockwork high above the dampness of the level of the soil.

DRYDEN, JOHN, was born about the year 1631 or 1632[*].

Tradition gives Aldwinckle in Northamptonshire as his birth-place; but this much only is certain, that his father, Erasmus *Driden*, was the third son of Sir Erasmus Driden of Canons Ashby, in that county, who was created a baronet in 1619. The poet was educated at Westminster school under Dr. Busby, and came up as a Westminster scholar to Trinity College, Cambridge, May 11, 1650.

Almost the only notice which the college archives give respecting him is one dated July 19th, 1652, whereby he is 'put out of Commons for a fortnight at least,' confined to walls, and sentenced to read a confession of his crime at the fellows' table during dinner time[†].

In 1654 his father's death put him in possession of an estate worth about 60*l.* per annum; he did not however leave Cambridge till three years afterwards, when he was introduced into a subordinate public office by his maternal relation Sir Gilbert Pickering. The stanzas on Cromwell's death, his first poem of any importance, were written in the following year, and in 1660 he signalized himself by 'Astræa Redux,' a congratulatory address on the Restoration.

It seems scarcely worth while attempting to excuse this change of views. Dryden was yet a young man, and had probably never before been in a situation to express his own opinions, apart from the influence of his kinsman; and after all, the lines on Cromwell contain, as Sir W. Scott has observed, little or nothing in the way of eulogy which his worst enemies could have denied him. In the year 1663 Dryden began his dramatic career with 'The Wild Gallant.' The plague and fire of London soon interrupted him for a time, and he employed himself upon his 'Essay on Dramatic Poesy,' a performance containing much elegant writing, and worthy of notice as the earliest regular work of the kind in our language. It would be easy to show the deficiencies and mistakes of this composi-

[*] The monument in Westminster Abbey says 1632, but as it was not put up until twenty years after his death, the point is somewhat doubtful.

[†] What he could be doing in Cambridge during the long vacation is not so clear; but perhaps those on the foundation have, as now, always claimed the right of staying there.

tion, but they are fully counterbalanced by that manly avowal—the first since the Restoration—of the supremacy of Shakspeare. About this time he married a daughter of the first Earl of Berkshire.

On the revival of stage plays, he engaged to supply the King's Theatre with three plays a year, for the annual sum of 300*l.* to 400*l.* Malone has proved that the number really produced was far less than this, and did not amount to more than eighteen in sixteen years, while Shakspeare wrote, as is probable, two plays a year for several years, and Fletcher with assistance wrote more than thirty in ten years.

Towards the end of 1671, that celebrated attack on heroic dramas called the 'Rehearsal' was produced on the stage. Its effect, though sure, was not immediate; except that Dryden exchanged tragedy for comedy, and composed two comedies in 1672. A few years afterwards he took leave of rhyme; his last rhyming tragedy called 'Aureng-Zebe,' being brought out in 1675; but he continued to write for the stage until 1681, when the struggle between the parties of the Dukes of Monmouth and York seemed drawing to a crisis, and there appeared some need that the scurrilous abuse which had been in every way poured on the court party by means of epigram and satire should be rebutted in similar fashion.

This Dryden effected by the famous satire called 'Absalom and Achitophel,' wherein Monmouth figures as Absalom. Monmouth is treated with great levity, but all the vials of the poet's wrath are poured out on Buckingham, the author of the 'Rehearsal,' as Zimri, and on Shaftesbury as Achitophel. The last-named nobleman had been committed to the Tower, not long before, under a charge of high treason: he was however released upon the grand jury's refusal to find a true bill against him, which the Whig party celebrated by a medal struck for the occasion. This afforded Dryden a fresh subject, and in March, 1681, appeared 'The Medal,' a bitter lampoon on Shaftesbury, followed up in the next year by 'Mac Flecknoe,' and the second part of 'Absalom and Achitophel*,' which united gave the finishing stroke to his old enemies Settle and Shadwell, besides a numerous host of petty satirists. With Settle he had quarrelled some years before, whose chief supporter, Rochester having become implicated, and suspecting Dryden of indulging anonymous revenge, caused him to be attacked and beaten by bravos. This occurred in 1679.

During the four years from 1682 to 1685 Dryden produced nothing worth notice, with the exception of a translation of Maimbourg's 'History of the League,' undertaken, as Dr. Johnson says, to promote popery. We should be at a loss to account for this apparent want of purpose, but an event which occurred in the year last mentioned clears up the difficulty. Soon after the death of Charles II. Dryden turned Roman Catholic—not without due consideration—as the 'Religio Laici,' written nearly four years before, contains sufficient evidence of his mental struggles at that period, and not, it is to be hoped, otherwise than conscientiously, as indeed his subsequent conduct appears to show.

In 1690 Dryden returned to his old employment, and produced four plays between that year and 1694. This was no doubt owing to poverty, as the Revolution deprived him of the laureatship, which he had obtained on the death of Davenant in 1668, and the expenses of his family were now increasing. For the next three years he was busied in his translation of the Æneid, and about the same time with it appeared his celebrated ode on St. Cecilia's day†, which is perhaps one of the finest pieces of exact lyrical poetry which our language possesses, although not to be named with Wordsworth's Platonic ode.

In the middle of 1698 he undertook his adaptations of Chaucer, and about a year and a half afterwards completed his Fables. His last work,—a masque, with prologue and epilogue,—was written about three weeks before his death, which happened, after a short illness arising from neglected inflammation of the foot, May 1st, 1700. He was buried in Westminster Abbey, where a monument was erected to his memory by John duke of Buckingham. A portrait of him hangs in the hall of Trinity College, Cambridge.

It is extremely difficult to form an opinion on the character of a man of whose life we possess such scanty notice, and who, for the greater part of his literary career, wrote entirely to please others. Congreve has left a description of him, which, if it can be trusted, ensures for him the praise of modesty, self-respect, true-heartedness, and a forgiving spirit. His manners are said to have been easy without forwardness; but there seems little doubt that his powers of conversation were rather limited. It does not seem necessary that we should attribute his extreme indelicacy as a writer to corresponding coarseness or impurity as a man.

The close connexion which existed between the Cavaliers and the court of France had tended much to vitiate the taste of those who were the received judges of literary merit. To the Italian sources, whence Spenser and Milton drew, was preferred the French school; and the consequences are as apparent in the grossness of Dryden's comedies as in the stilts and extravagance of his heroic drama*. Perhaps no nation ever had so little national poetry as the French; whence the extreme worthlessness of that school in England which professed to imitate them. But of all French poetry the heroic drama, from which Dryden copied, is perhaps least worth imitation. The characters are not real, neither are they such as we should wish to see existing. They excite our surprise without engaging our sympathies. Poems such as Boileau's are only the legitimate offspring of a very artificial age. We may be astounded at the flattery which characterizes his 'Discours au Roi,' or amused at the bigotry of his 'Ode on the English;' but there is much pleasing versification to compensate for these defects. The same may be said of Pope in our own country: he will always find admirers: but who ever reads Dryden's plays? Those who deny to Pope the name even of *poet* will allow him to be an amusing and at times an instructive writer; but the heroic drama can serve to no end either of amusement or instruction. There is another class of poets, whose influence revived for a short time after the Restoration, those whom Dr. Johnson has with no reason at all called the metaphysical poets; and one of Dryden's chief excellencies is, that he soon saw reason to desert their bombastic absurdities for a more chaste style; although the fashion of the day, which he alternately led and followed, obliged him occasionally to make use of expressions such as his better taste must have disowned. He appears to have been very late in discovering that style for which he was most fitted, namely, satire, in which he has never been surpassed, and rarely equalled. His translations of Virgil and Juvenal deserve very high praise, particularly when they are compared with the style of translation usual in his time. In his version of Chaucer he has not been so successful. That substitution of *general* for *particular* images which characterizes the performance is always a step away from poetry. Perhaps the most striking instance of the superiority of Chaucer is that description of the Temple of Mars which occurs towards the close of the second book of 'Palamon and Arcite' in Dryden, and a little past the middle of Chaucer's 'Knighte's Tale.' This passage is also curious as an instance of Dryden's hatred of the clergy; he introduces two lines to convert Chaucer's 'smiler with the knife under the cloak' into a priest.

Dryden's prose works consist mostly of dedications, the extravagant flattery of which is only palliated by custom. His 'Essay on Dramatic Poesy' has been already noticed. He also wrote Lives of Polybius, Lucian, and Plutarch (*Biog. Brit.*), and assisted in translating the last-named author: perhaps, however, only from the French.

Dr. Samuel Johnson has been highly praised for his critique on Dryden. He has not, however, escaped that spirit of verbal criticism which was so prevalent in his days; and his comparison of our poet with Pope shows how little competent he was to do more than judge of the externals of poetry. Sir Walter Scott's life of Dryden is a beautiful piece of critical biography, uniting research only equalled by Malone's to taste and style of an order far surpassing Johnson's.

(Langbaine's *Dramatic Poets;* Johnson's, Malone's, and Scott's *Lives of Dryden; Quarterly Review for* 1826; *Edinburgh Review*, 1808; *Biographia Britannica; Life of Sir W. Scott*, vol. ii.)

DRYOBALANOPS, a genus established by the younger Gærtner, from specimens of the fruit found in the Banksian collection, supposed by him to belong to the tree which yielded the best cinnamon. But Mr. Colebrook, from specimens sent to Dr. Roxburgh, which in the absence of the latter he received, ascertained that the fruit belonged to the camphor-tree of Sumatra, which he accordingly named *Dryobalanops camphora*, 'until its identity with D aromatica (of Gærtner) be established.' (*Asiat. Researches*, xii.) Dr. Roxburgh had, in his MS. Flora Indica, already named it Shorea camphorifera. Some botanists are of opinion that the genus is not sufficiently distinguished from Dipterocarpus, but Blume, the latest author, and one who has had the fullest opportunity of examining the subject, has, in the article on *Dipterocarpeæ*, in his 'Flora Javæ given it as his opinion that Dryobalanops should be kept distinct; as, like Shorea, it has all five instead of only two of its sepals prolonged into long foliaceous wings, while its cotyledons are unequal and rumpled.

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* Partly written by Tate.

† This was the second on that subject. The first he wrote in 1687.

* It should be observed that Spain was the birthplace of that form of comedy which Dryden derived immediately from France.

According to Blume, the existence of this camphor-yielding tree was first indicated by Grimm in *Ephem. Nat. Cur.* Kæmpfer was so well acquainted with its distinctness, that in describing the Camphor-tree of Japan (*Laurus Camphora*), he says, 'that natural camphor, of crystal-like appearance, which is scarce and of great value, is furnished by a tree of Borneo and Sumatra, which is not of the Laurel genus.' The first notice of the tree is in the 4th volume of the *Asiatic Researches*, where we learn that a tree near Tappanooly on the west coast of Sumatra yielded above 3 pounds of camphor, and at the same time near 2 gallons of camphor oil; that the tree resembles the bay in leaves, is fond of a rich red loam tending to a blackish clay, and that it grows principally on the north-west coast of Sumatra, from the Line to 3° of north lat. The fullest account is given by Mr. Prince, resident of Tappanooly, who describes the tree as growing spontaneously in the forests, and as being found in abundance from the back of Ayer Bongey as far north as Bacongan, a distance of 250 miles: he says that it may be classed among the tallest and largest trees that grow on this coast; several within daily view measuring 6 or 7 feet in diameter. But it will produce camphor when only 2½ feet in diameter. The same tree which yields the oil would produce camphor if unmolested, the oil being supposed to be the first state of the secretion, which ultimately changes into concrete camphor, as it occupies the same cavities in the trunk which the camphor afterwards fills: consequently it is found in young trees. The produce of camphor of a middling-sized tree is about eleven pounds, and of a large one double that quantity. (*Fl. Ind.* ii. p. 616.) As stated in the article Camphor, this kind of camphor is very highly esteemed by the Chinese. It is commonly called Malay Camphor, or Camphor of Barus, from the port of Sumatra whence it is mostly shipped. Its price in China is 100 times greater than that of the common camphor of commerce. (M'Culloch's *Com. Dic.*) In the same work it is mentioned that camphor oil being nearly as cheap as spirits of turpentine, might perhaps be profitably imported into England as a substitute for that article or for medicinal use.

Camphor, which in many respects resembles the essential oils, has been shown by Dumas to be an oxide of hydrocarbon identical in composition with pure oil of turpentine; hence the term *camphene* has been applied to it. But Dr. Thomson informs us that its camphor oil differs in some respects from camphene, as he was not able to produce camphor with the same facility or in equal quantity by driving a stream of oxygen gas through highly rectified oil of turpentine, which Dumas regards as *pure* camphene.

DRY ROT, a well-known disease affecting timber, and particularly the oak employed for naval purposes. When dry rot is produced by the attacks of fungi, the first sign of it consists in the appearance of small white points, from which a filamentous substance radiates parallel with the surface of the timber. This is the first stage of growth of the seeds of the fungus, and the filamentous matter is their thallus or spawn. As the thallus gathers strength it insinuates its filaments into any crevice of the wood, and they, being of excessive fineness, readily pass down and between the tubes from which the wood is organized, forcing them asunder, and completely destroying the cohesion of the tissue. When the thalli of many fungi interlace, the radiating appearance can no longer be remarked; but a thick tough leathery white stratum is formed wherever there is room for its development, and from this a fresh supply of the destructive filamentous thallus is emitted with such constantly increasing rapidity and force, that the total ruin of timber speedily ensues where circumstances are favourable for the growth of the fungi.

It is generally stated that dry rot consists of the thallus of Merulius lacrymans, or Polyporus destructor, two highly-organized fungi, whose fructification is sometimes found upon rotten timber. But it is a great mistake to suppose that dry rot belongs exclusively to those two species, or that they are even the common origin of it; on the contrary, there is reason to believe that any of the fungi that are commonly found upon decaying trees in woods are capable of producing dry rot, and it is quite certain that one of the most rapidly-spreading and dangerous kinds is caused by the ravages of different species of Sporotrichum. The latter throw up from their thallus whole forests of microscopic branches loaded with reproductive spores, of such excessive smallness that they may insinuate themselves into the most minute crevices or flaws even in the sides of the tubes of which timber consists, and they are infinitely more dangerous than Merulii or Polypori, which seldom fructify. It is the genus Sporotrichum that at the present moment is causing the dry rot in ships under repair at Sheerness.

The circumstances that are most favourable to the development of the dry rot fungi are damp, unventilated situations, and a subacid state of the wood. The latter condition, especially in oak, is easily produced by a slight fermentation of the sap which remains in the timber, especially if the latter has not been well seasoned before being employed. It has been proved experimentally that fluids which, in their ordinary state, will not produce fungi generate them abundantly if ever so slightly acidulated. Dutrochet found that distilled water holding in solution a small quantity of white of egg will not generate fungi in a twelvemonth, but upon the addition of the minutest quantity of nitric, sulphuric, muriatic, phosphoric, oxalic, or acetic acids, it generated them in eight days' time in abundance. Alkalescent infusions possess the same property. This observer also found that the only poisons which will prevent the appearance of fungi are the oxides or salts of mercury. A solution of fish-glue yields fungi rapidly and in great abundance; but a small quantity of red precipitate or corrosive sublimate destroys this power entirely. It is moreover an important fact that no other mineral preparation has any such properties. Dutrochet ascertained that other metallic oxides acted differently. Oxides of lead and tin hastened the development of fungi; those of iron, antimony, and zinc, were inert; and oxides of copper, nickel, and cobalt, although they retarded the appearance of fungi, yet did not prevent their growth in the end. These facts confirm in a striking manner the statement of Mr. Kyan, as to the impossibility of timber, steeped in a solution of corrosive sublimate, becoming a prey to dry rot, so far as dry rot is produced by a fungus.

Of Animal Dry Rot, that is, of death caused in animals by the attack of fungi, little was was known till lately, and great doubt was entertained respecting its existence. And yet, if the subject is rightly considered, there is nothing improbable in its occurrence: it is well known that living vegetable matter is subject to the ravages of fungi, as in all the cases of mildew, smut, rust, &c., with which the farmer is familiar, and therefore there is no intelligible reason why living animal matter should be exempted from the same fate. Specimens of hymenopterous insects resembling wasps have been brought from the West Indies, with a fungus allied to Sphæria militaris growing from between their anterior coxæ, and it is positively asserted by travellers that the insects fly about while burthened with the plant. Upon opening the bodies of the wasps they are found filled with the thallus of the fungus up to the orbits of the eyes and the points of the tarsi; the whole of the intestines being obliterated. In such cases it is to be supposed that the thallus of the sphæria first kills the wasp by compressing and drying up the body, and then, continuing to grow, occupies the whole of the cavity of the shell of the insect. A more common instance of animal dry rot is the disease in silk worms called La Muscadine. Silk-worms of all ages are occasionally liable to become sickly and to die, soon after death becoming stiff, and acquiring such a degree of firmness as to be readily broken. They then throw out from their surface a sort of white efflorescence, which is the fructification of the fungus called Botrytis Bassiana, their inside being filled by the thallus of the same plant. If some healthy caterpillars are placed beneath a bell-glass, along with a small portion of worm killed by the Botrytis, they soon catch the disease, exhibit the same symptoms as those already mentioned, and eventually perish; having, no doubt, been infected either by rubbing themselves against the dead worm, or, which is more probable, having received upon their skins the infinitely minute seeds dispersed by the Botrytis. If healthy crysalids are inoculated by the introduction below their shell of a little of the Botrytis matter upon the point of a needle, they also sicken and die.

In these cases effects are produced upon insects similar to those upon timber; that is to say, vitality in the one case and cohesion in the other is destroyed by the growth of the thallus of certain fungi, which spread with great and irresistible rapidity, and fructify where occasion offers.

DSHIKKETEI (*Zikketei*). Cuvier writes the word *Dzigguetai*, and Buffon *Dzigithai*, the native name for the *Eques Hemionus* of Pallas, *Asinus Hemionus* of Gray. [HORSE.]

DUAL NUMBER. The Greek, Sanscrit, and Gothic of antient, and the Lithuanian of modern languages, in addition to the undefined plural which they share with other tongues, possess also forms of the verb and noun in which *two* persons or things are denoted, called the dual number. On a careful consideration of the suffixes which are supposed to convey this notion, there seems reason for believing that the idea of duality was not originally contained in them, but simply that of unlimited plurality.

The suffix of plurality which belongs to the Indo-Teutonic languages seems to have had two forms, *en* and *es*, as in the English *housen* and *houses*. Thus the Greeks had two forms for the first person plural of their verbs active, *tuptomen* and *tuptomes*. In the second person, the Latin language gives the suffix *tis*, *scribitis*; probably the Greek, in its oldest character, would have presented us with a suffix *tes*, but the forms of that language which have come down to us give only the abbreviated *te*, *tuptete*. But if there existed a double form for the second person as well as for the first, we should in that case have also *tupteten*, or rather *tupteton*, seeing that to the Greek ear *ton* was a more familiar termination. In the third person the dual *ton* might well represent a plural, as the oldest form of that person in the singular gives a suffix *ti*, *esti*; and this, with the plural termination *n*, would produce a syllable which might readily take the same shape as the second person dual.

In the nouns the same analogy prevails. The nominatives and genitives of the dual and plural differ no more than might be expected in two dialects; in the dative, the difference consists in the one number having a final *n*, the other an *s*; while the accusative dual has lost the final sigma, a fate common enough with that letter in the Greek language, as may be seen even in the plural nominatives, *mousai*, *logoi*, which the analogy of the other declensions proves to have once possessed that letter. We have already seen an example of the same loss in the second person plural of the verb. In the pronouns, again, the same confusion of the two numbers prevails. Thus the Greek dual of the pronoun *I* contains the very same element, *no*, which in the Latin is appropriated to the plural.

In the Gothic verb the same principle may be traced. A specimen may be seen in the second person dual which has the suffix *ts*, a form more closely approaching the old plural suffix *tis*, which has been above mentioned, than even the *th*, which is the suffix of the same person in the plural.

Again in the Lithuanian, while the first person plural of the verb, which ends in *ma*, has derived that suffix from the older form *mus* or *mes*, the dual of the same person ends in *wa*, which has a strong resemblance to our plural *we*. The same observation applies to the Sanscrit verb of the Parasmaipadam form of the potential and imperative moods, and of the preterits called by Bopp 'Præteritum augmentatum uniforme et multiforme.' The terminations of the first persons of the dual and plural respectively in the present of the Parasmaipadam are *was* and *mas*; of the second and third persons dual respectively, *thas* and *tas*; and of the second person plural, *tha*.

If it be admitted then that the dual in its origin was not confined to the notion of two, it remains to consider how that notion was superadded. Perhaps the following may not be an unreasonable conjecture. In many countries there are two or more dialects co-existing, one among the educated and in towns, the other belonging more particularly to the cottage. In the places of public meeting, whether for religious or political purposes, the dialect which happens to belong to the more educated class will prevail, while the other, as genuine, though not so fortunate a dialect, will still maintain its ground by the fireside. The former will be addressed to hundreds, the latter commonly to one or two individuals. Hence the colloquial and friendly dialect of the cottage may well be borrowed by even the public speaker when speaking of two persons; and thus the notion of duality which at first was only accidentally united with a certain suffix becomes in the end the inseparable and essential meaning thereof. Something parallel to this may be seen in the double forms of the English verb *to be*. While *am*, *art*, *is*, are honoured by the favour of the learned, the unlearned still retain, and with as good a title, the genuine forms *be*, *best*, *bes* or *be*. These are both indicatives, yet it is already a common practice to look upon the latter set of forms as constituting a subjunctive.

An interesting discussion by William Humboldt on the dual is printed in the Transactions of the Academy of Sciences of Berlin for the year 1827 (*Abhandlungen der historisch-philologischen Klasse* der Königlichen Academie der Wissenschaften zu Berlin, aus dem Jahr 1827,) page 161-187), to which we refer our readers, though the views explained in that essay differ from those in the present article.

DUBLIN, an archbishopric of Ireland, including the dioceses of Dublin, Kildare, Ferns, Leighlin, and Ossory; and extending over the counties of Dublin, Wicklow, Wexford, Kilkenny, Carlow, Kildare, Queen's County, with the exception of one parish, and part of King's County. By act 3rd & 4th William IV., c. 37, sec. 46, so soon as the archiepiscopal see of Cashel becomes void, the jurisdiction of the archbishopric of Cashel is to be vested in the archbishop of Dublin for the time being.

In 1834 the total population of this province was 1,247,290; of whom there were 177,930 members of the Established Church; 1,063,681 Roman Catholics; 2,517 Presbyterians, and 3,162 other Protestant Dissenters; being in the proportion of rather more than 13 Roman Catholics to 3 Protestants of whatever denomination. In the same year there were in this province 1612 daily schools, educating 108,474 young persons; being in the proportion of 8$\frac{70}{100}$ per cent. of the entire population under daily instruction, in which respect Dublin stands second among the four ecclesiastical provinces of Ireland. Of these schools there were in the same year 204 in connection with the National Board of Education.

DUBLIN, a bishop's see in the ecclesiastical province of Dublin. The chapter consists of dean, precentor, chancellor, treasurer, two archdeacons, and nineteen prebendaries. The collegiate chapter of Christ Church, in Dublin, consists of dean, precentor, chancellor, treasurer, archdeacon, and three prebendaries: this deanery has heretofore been held in commendam with the bishopric of Kildare. By 3rd & 4th William IV., cap. 37, sec. 50, the deanery of Christ Church, when next void, is to be united as to spiritualities, with the deanery of St. Patrick; and the temporalities, as portion of the revenue of the see of Kildare, are to be vested in the ecclesiastical commissioners.

This see comprehends the county of Dublin, the greater part of the county of Wicklow, parts of Carlow and Kildare, and some small portions of King's and Queen's Counties. In 1834 it contained 178 parishes, constituting 95 benefices, in which there were 124 churches of the Establishment, 9 other places of worship in connection therewith, 121 Roman Catholic ditto, 7 Presbyterian ditto, and 27 other places of Protestant worship. The gross population in the same year was 501,977; of whom there were 106,599 members of the Established Church, 391,006 Roman Catholics, 2290 Presbyterians, and 2082 other Protestant Dissenters, being in the proportion of rather more than seven Roman Catholics to two Protestants of whatever denomination. In the same year there were in this diocese 509 daily schools, educating 37,219 young persons; being in the proportion of 7$\frac{41}{100}$ per cent. of the entire population under daily instruction, in which respect this diocese is much inferior to the province at large, and ranks on a par with the see of Cork, nineteenth among the 32 dioceses of Ireland. Of the above schools, 62 were in the year 1834 in connection with the National Board of Education.

There is no certain mention of the see till the seventh century. In the year 1152 it was erected into an archbishopric in the person of bishop Gregory; and in 1214 it was united with the see of Glendaloch, which had been founded in the sixth century. The archbishops of Dublin did not, however, obtain full possession till the year 1479. The union of the sees of Dublin and Glendaloch still subsists.

The first Protestant archbishop of Dublin was George Browne, who had been an Augustinian friar of London. The present (1837) archbishop is Dr. Whateley. The archiepiscopal residences are St. Sepulchre's, now disused, and converted to a police barrack; at Tallaght, where archbishop Hoadley repaired the old mansion in 1729; and in Stephen's Green, in Dublin.

DUBLIN, a county in the province of Leinster in Ireland; bounded on the north-west and north by the county of Meath; on the east by the Irish channel; on the south by the county of Wicklow; and on the south-west by the county of Kildare. Greatest length from Gormanstown on the north to Bray upon the south, 25 Irish, or 31¾ English miles. Greatest breadth from the promontory of Howth upon the east to the boundary of Kildare at Leixlip on the west, 15 Irish, or 18¼ English miles. The coast line from Bray to the point of junction with Meath is about 55 Irish, or 70 English miles. Until the publication of the Ordnance Survey Map of Dublin, the area cannot be stated with certainty. It is given by Dr. Beaufort at 228,211 statute acres, or 355 square statute miles, including the county of the city of Dublin. According to the more accurate survey made for the grand jury in 1821, by Mr. Duncan, the superficial contents are, arable 132,042 acres; not arable 16,191 do. Total, exclusive of county of city, 148,233 acres. Exclusive of the county of the city of Dublin, the population in 1831 was 176,012.

The county of Dublin, excepting a small tract on the south, is a champaign country highly cultivated. The only portions of the county not under cultivation are the promontory of Howth, and the range of mountains which separates Dublin from Wicklow on the south. The Dublin mountains, of which the central group has an average height of 1000 or 1200 feet, are partially separated from the loftier elevations of the county of Wicklow by the valley of Glencullen on the east, and by that of Ballynascorney or Glenismael on the west; a neck of elevated land, intervening between these valleys, connects the advanced range with the group of Kippure and Seechon on the south. The elevation of Kippure, part of which is in the county of Dublin, is upwards of 2700 feet. The whole range forms a fine mountain back-ground to the rich scenery of the plain of Dublin.

The northern part of Dublin county is more undulating than the immediate vicinity of the capital. A low range of cultivated eminences, called the Man-of-War Hills, extends across the line of communication with Meath and Louth, and the ground on the north-western border next Meath and Kildare is pretty much broken by picturesque valleys. The only marked eminences, however, north of the mountainous tract, are the islands of Lambay and Ireland's Eye, and the hill of Howth. The isthmus which connects Howth with the mainland is a low narrow neck, which gives Howth very much the appearance of an island. The highest point of the promontory of Howth is 567 feet above the level of the sea. The cliffs towards the bay and channel are lofty, and the whole promontory contributes much to the picturesque effect of Dublin bay.

The principal creeks north of the bay of Dublin are those of Baldoyle, Malahide, and Rogerstown; but these tide-harbours are of little commercial advantage. The only tolerable harbour north of Howth is that of Balbriggan. The town of Balbriggan, which in 1831 contained 3016 inhabitants, has taken its rise almost solely in consequence of the construction of a pier here by the late Baron Hamilton, who received 1500*l.* towards this work from the Irish parliament in 1761, and a further sum of 3752*l.* for the same purpose in 1765. The total cost is stated at upwards of 15,000*l.* The quay is about 600 feet in length, and is frequently occupied with craft; but it would still require a large expenditure to make it complete for vessels of the second class. From 80 to 100 cargoes of coal are annually delivered here, besides rock-salt, bark, slates, &c. There is an excellent light-house on the pier-head, built by the Ballast Board. Four miles south from Balbriggan is Skerries, the chief fishing village on the east coast of Ireland, with a pier for small craft 450 long, built in 1755.

South of Skerries the sandy shore gives place to a limestone cliff as far as the creek of Loch Shinney, another site well adapted for the construction of a harbour. One mile south from Loch Shinney is Rush, a considerable village, with a small pier for fishing boats. Off the creek of Malahide is the rocky island of Lambay. In 1821 the population was only thirty-four. There is good anchorage all round the island in five to eight fathoms water, clear ground; it has also a small pier and harbour. The Muldowny bank lying off the creek of Malahide is a good artificial oyster bed. The peninsula of Howth contains about 1500 acres, and excepting towards the low isthmus which connects it with the mainland, stands in deep water. The sound between Howth and Ireland's Eye, a rocky picturesque island of thirty acres, which lies about three quarters of a mile off the northern side of the promontory, being a sheltered situation with considerable depth of water, was selected by government in 1807 for an asylum and packet harbour; but unfortunately this object has not been accomplished. The work, which was completed under the direction of the late Mr. Rennie, consists of two piers, of which that on the east is 2493 feet in length, and that on the west 2020 do. On the extremity of the eastern pier is a lighthouse. The entrance between the extremities of the piers is 300 feet across; and the space enclosed 52 English acres. The whole work is faced with cut granite, except the sloping glacis under water which is of red grit from Runcorn in Cheshire. The entire amount expended on Howth harbour from the 2nd July, 1807, to 5th January, 1832, was 420,472*l.* 8*s.* 5½*d.* The deepest and best anchorage afforded by the sound is left outside the piers; one half of the space enclosed is dry at half-ebb, and two-thirds at low-water; and the sands from the bank on the west side are daily accumulating in the entrance; so that the mail packets for want of water in the basin have been latterly transferred to the Kingstown station. From Howth round to the sands of the North Bull the whole of the promontory which stands in deep water is rocky and precipitous towards the sea. On a detached rock at the south-eastern extremity, called the Bailey, stands a lighthouse, which marks the northern entrance to the bay of Dublin. Another lighthouse now disused stands on the brow of the promontory above, a little to the north.

From the Bailey of Howth to the island of Dalkey at the opposite extremity of the bay of Dublin, is a distance of 6¾ English miles. Between these points the bay recedes in a semi-elliptical sweep to a depth of about six miles inland. The shore surrounding the head of the bay, where the Liffey, Tolka, and Dodder rivers empty themselves, is low: it rises, however, towards Blackrock and Kingstown, and beyond the latter town is of a very bold and picturesque character The river of Bray, which discharges itself about half a mile north of the bold promontory of Brayhead, is the county boundary.

As a harbour, the bay of Dublin is materially encumbered by a great tract of sand, which is bisected by the Liffey in a direction from west to east. The portion on the north of the Liffey is called the North Bull, and that on the south the South Bull. In order to protect the navigation of the Liffey from the sands of the South Bull, a pier consisting of a mound of gravel contained between double stone walls was undertaken by the Irish government in 1748. It runs from the suburb of Ringsend along the northern margin of the South Bull, to a distance of 7938 feet. Here the main work at first terminated in a basin and packet station, called the Pigeon-house; and the remainder of the channel, extending 9816 feet from the Pigeon-house to the north-eastern extremity of the Bull, was protected by a range of frame-work and piles. The expense however of keeping this part of the wall in repair was found so heavy, that in 1761 a light-house was commenced at the extremity of the Bull, and from it the wall was carried inwards towards the Pigeon-house until completed in 1796. This sea-wall is composed of two parallel walls of hewn granite, alternate headers and stretchers, laid without cement. The space between is filled to a certain height with gravel and shingle; over which is a course of stone-work imbedded in cement; and the whole is finished on the top with a course of granite blocks of large dimension, laid in tarrass. The wall is thirty-two feet broad at bottom, and twenty-eight at top. The Pigeon-house, since being disused as a packet station, has been converted into a strong depôt for artillery and military stores. The amount of parliamentary aid given to the construction of the south wall from 1753 to 1780, was 57,169*l.* 4*s.* 6*d.* Another wall, running nearly south-east from the opposite shore of Clontarf, is intended in like manner to confine the sands of the North Bull, and to scour the channel. This, which is called the north wall, has been constructed by the Ballast Board of Dublin, and cost from 1819 to 1824 a sum of 103,054*l.* 19*s.* 11*d.* Notwithstanding these great undertakings, the navigation of the Liffey is still very imperfect, and requires constant dredging. The bar, on which there are but five feet of water at spring-ebbs, runs across the channel immediately outside the lighthouse.

The insecurity of the bay, joined to the failure of the works at Howth, led to the commencement of the present noble asylum harbour of Kingstown, on the site of the old harbour of Dunleary, on the south side of the bay, in 1817. The small pier and tide harbour at Dunleary have been enclosed within the new works, and are now crossed by the Dublin and Kingstown railroad. The new harbour is entirely artificial, consisting of an area of about 200 acres contained between two piers, of great dimension. There is a depth of 24 feet at the pier-head, at the lowest springs, which is sufficient for a frigate of 36 guns, or an Indiaman of 800 tons. The work was commenced under the authority of two acts of the 55th and 56th George III.; the latter of which grants certain duties on all vessels entering the port of Dublin, to be vested in commissioners for carrying the work into execution.

The Liffey has a course of little more than eight miles from the point where it enters Dublin county to the bay of Dublin at Ringsend. It is navigable for vessels of 200 tons to the Custom-house, and for barges and row-boats to Chapel Izod, about two miles farther up. The Dodder, the course of which lies almost wholly within this county, takes its rise from numerous small streams descending from Kippure mountain, and forming a rapid stream which descends in a course of about ten miles into the bay of Dublin at Ringsend. The Tolka is a small river rising near Dunbryna in the county of Meath; it flows east by south, through Blanchardstown and Glassnevin to the north-western extremity of Dublin bay, which it enters by Ballybough bridge.

The Royal Canal running west by north from its chief terminus at Broad-stone on the north-west of the city of Dublin, unites the capital with the Upper Shannon at Richmond harbour in the county of Longford. A short branch encircling the north-east of the city connects the basin at Broad-stone with docks opening into the Liffey east of the Custom-house. The width of the line throughout, at top is 42 feet, and at the bottom 24 feet, with locks, and a depth of water calculated for boats of from 80 to 100 tons. The entire length of the canal from the Liffey to the Shannon is 91 English miles. Loch Ouil, in Westmeath, supplies the summit level, which is at a height of 307 feet above high-water mark in the Liffey docks. The supply of water to the northern part of the capital is drawn from the Royal Canal. The canal is the property of a company of subscribers which was incorporated by royal charter in 1789.

The chief terminus of the Grand Canal, the most important line of water-carriage in Ireland, is at James's Street Harbour, on the south-west of the city, from which it crosses the counties of Dublin, Kildare, and King's County, in a direction west by south to the Shannon at Shannon Harbour, about two miles north of Banagher. The summit level commencing at 17 Irish miles from Dublin, is 261 feet 10 inches above the tide-water in the Liffey. This level is supplied by the Middletown and Blackwood rivers, which are branches of the Barrow; and is ascended from James's Street Harbour by four double and fourteen single locks. The total length from the western extremity of the capital is 79 English miles. From the summit level, at a distance of 20¼ Irish miles from Dublin, a branch of similar dimensions with the main trunk descends 103 feet half an inch in 22¼ Irish or 28¼ English miles, through two double and nine single locks, by Rathangan and Monasterevan to the navigable river Barrow at Athy. The dimensions throughout are, at the top, 45 feet; at the bottom, 25 feet; the depth of water, 6 feet in the body of the canal, and 5 feet on the sills of the lock-gates. The locks are generally 70 feet long, 14 wide, and calculated to pass boats of 60 tons in from two and a half to five minutes.

The Grand Canal has a second terminus in an extensive range of docks covering an area of 25 English acres on the south side of the Liffey near Ringsend. The communication with the river is by three sea locks, and the basins within are capable of containing 600 sail in 16 feet of water Attached are three graving-docks for vessels of different dimensions, with several extensive piles of stores; the whole being surrounded by spacious wharfs. This portion of the works has failed in a remarkable manner. The stores have long been unoccupied, and the wharfs are for the most part overgrown with grass.

The Dublin and Kingston railway passes the western dock by a viaduct and raised causeway, and a factory for the repair and supply of locomotive engines is being erected by the proprietors of the railway on the southern side of the same basin. The communication between the Grand Canal docks and the line from James's Street harbour is by a branch canal of about three miles, running from the docks round the south-east and south of the city. The canal is now the property of a company which was incorporated in the year 1772, and who are stated to have spent from time to time on these works a sum of a million and a half sterling. The supply of water for the southern part of the capital is drawn chiefly from the canal.

The main roads subject to turnpikes, which issue from Dublin, are those to Howth, Malahide, Drogheda by Swords, and the Naul, Drogheda by Ashbourn, Ratoath, Navan, and Mullingar, Carlow by Rathcoole and Tallaght. The chief lines free from toll are the military road and the roads to Enniskerry, Bray, and Kingstown.

The only railway at present completed in Ireland is that between Dublin and Kingstown in this county. It is the property of a company incorporated by 1st & 2nd William IV., c. 69, with a capital stock of 200,000*l.*, in shares of 100*l.* each. The line extends from Westland Row, in Dublin, to the jetty opposite the main street of Kingstown, called the Forty-foot road, a distance of nearly six English miles.

The entire line is lighted with gas. The railway bed consists of layers of gravel and concrete, with numerous cross drains. The sleepers are massive blocks of granite, which it was supposed would give unusual solidity to the structure, but the want of elasticity in these supports causes the engines to work harshly. The railway was opened for traffic on the 17th of December, 1834, between which day and the 1st of March, 1836, the number of passengers carried was 1,237,800, being, on the average, 2000 persons daily. Since that period the number of passengers had increased considerably, as appeared by the following statement for the year 1836 of the number of passengers conveyed by the Dublin and Kingstown Railway:—May, 119,000; June, 119,080; July, 146,000; August, 139,000; total, 523,000.

The cost of constructing the railroad and stations, locomotive engines, carriages, &c., and the expenses of obtaining the act of incorporation, amounted, on the 1st of March, 1836, to 237,000*l.*, or upwards of 40,000*l.* per mile, exclusive of 972 yards since added. Of this sum, 75,000*l.* has been advanced as a loan by Government. At the same period the company had realized a net profit of 11,517*l.*, yielding about 8 per cent. per annum on the capital paid by the shareholders.

By act 6th and 7th William IV., c. 132, a company is incorporated for the purpose of making a railway from Dublin to Drogheda. At present the only incorporated railway companies in Ireland are those above mentioned, and the Cave-hill and Ulster Railway Companies. [DOWN.]

The climate of Dublin is temperate; frosts rarely continue more than a few days, and snow seldom lies. The heaviest fall of snow on record is that which commenced on the 18th of January, 1814, and continued undissolved till the beginning of the next April. The prevailing winds are from the west. The average proportion of winds, as stated by Rutty, is west, south-west, and north-west, to east, south-east, and north-east, as 9061 to 5141. Of 68 storms noted by Rutty, 57 were from the south-west, and but two from the east and north-east. The easterly and north-easterly winds which prevail in spring not being broken by any high grounds, are violent and ungenial. On an average of forty-one years there were in this county—of springs, 6 wet, 22 dry, 13 variable; of summers, 20 wet, 16 dry, 5 variable; of autumns, 11 wet, 11 dry, 19 variable. It also appears by a mean of observations that the dry days in Dublin are to the rainy as 110 to 255. The quantity of rain is, however, by no means as great as at Cork or Belfast. In 1792, one of the wettest years on record, the depth of rain which fell in Dublin was 30.7 inches; of this 5.8 inches fell in the month of August. The average annual depth of rain which fell in Dublin during the sixteen years preceding the year 1817, was 23 inches 7 lines.

The greater part of the county of Dublin is occupied by a tract of mountain limestone, being a part of the central limestone field of Ireland, which extends from the Atlantic to the Irish sea. This secondary tract extends into Meath on the north, and is bounded in this county on the south by primary rocks. Along the northern coast also there are patches of primitive rock, as the greenstone and argillaceous schists, which form the Man-of-war Hills and the island of Lambay, and the stratified quartz and schist of Howth. Lambay consists of strata of argillaceous schist and greenstone porphyry. The schistose strata are much indurated and contorted. In Howth the stratification is very obvious, and the schistose beds exhibit a great diversity of hues from purple to red. Some of the strata rest on their edges, others are undulated, and sometimes curved upon themselves so as to resemble the concentric crusts of some spheroidal formation (Dr. Scouler). The primitive formation on the south of the limestone plain consists of a ridge of granite supporting flanks of micaceous and argillaceous schists. The granite extends on the south from Dalkey island to Blackrock, and from thence to Dundrum and Rathfarnham; it then takes a southerly direction and crosses the range of the Dublin mountains by the line of the military road; whence, crossing the northern extremity of Glenismael, it extends into the group of the Kippure mountains. On the south it runs from Dalkey to the hill of Killiney, and thence inland by Rochestown hill to the Scalp, whence, holding a southerly course, it passes on to Glencree, in the county of Wicklow, and so southward to a distance of nearly sixty miles, forming the nucleus of the entire range from Killiney to Blackstairs mountain, between the counties of Carlow and Wexford. The granite comprising the greater part of this range is of a coarse texture, and easily disintegrated; in Glenismael particularly, it is frequently found decomposed to a depth of several feet, and hence probably the uniform outline presented by the summits of the range. At Dalkey, however, and generally along the eastern and north-eastern limits of the granite district, the stone quarried is of the closest grain, and excellently adapted to all purposes of building. It is here free from hornblende; the felspar is of a pearly whiteness, and in the stone obtained from the quarries of Kilkenny the mica, instead of occurring in plates, is found in the form of plumose mica.

This mass of granite is almost everywhere in contact with the micaceous schist, both on its western and eastern flanks; and the junction of the rocks may be observed at Killiney, the Scalp, and Rathfarnham. The argillaceous schist approaches it very closely at Ballynascorney; and between Blackrock and Dundrum the edges of the limestone field are in several places within a few yards of the granite, the intervening rocks of the series not being observable. The limestone which elsewhere possesses the usual character of carboniferous limestone, is extremely compact along the margin of the field towards the primitive series, and has a schistose structure (the Calp of Kirwan), which renders it highly useful as a material for building. Dolomite, or magnesian limestone, occurs near the junction of the primary and secondary strata, at Sutton on Howth. Magnesian limestone also occurs on the Dodder, near Milltown. It dresses with peculiar sharpness under the hammer or chisel, and is the material of some beautiful specimens of building; among others, of the Lord-Lieutenant's chapel in the castle of Dublin.

The only mines at present worked (and that but partially, in the county of Dublin, are the lead mines at Ballycorus) within half a mile of the Scalp. Galena, potters' clay, and manganese have been found on Howth. Fuller's earth of a middling quality has been found at Castleknock, on the north bank of the Liffey.

The soil of Dublin abounds in mineral springs: of those within the city, ten were analysed about the year 1750: they are all saline purgative springs, and some of them so strongly impregnated as to yield on evaporation from three to four hundred grains of salts per gallon: of some of those salts two drachms operated as a brisk cathartic. In 1758 a spring strongly impregnated with sulphureted hydrogen gas was discovered in the vicinity of a disused chalybeate spa at Lucan, on the south bank of the Liffey. These waters have been found very efficacious in cutaneous diseases. There are tepid springs near Finglass and Leixlip; the heat is 75½ degrees Fahr. In general the water, which rises from the Calp district around Dublin, is impregnated with a considerable portion of sulphate or nitrate of lime, which renders it unfit for most domestic purposes, unless with the use of large quantities of soda. It deposits a copious sediment on the vessels in which it is used; and in one distillery mentioned by Whitelaw an incrustation of sienite half an inch in thickness, had frequently to be cleared from the inside of the boilers.

The vegetable soil of the county of Dublin is generally shallow. On the granite bottom it is a light gravel, which requires strong manuring. The subsoil of the Calp district is a tenacious clay, which retains the water and renders the loamy soil wet and cold; but drainage and an unlimited supply of scavengers' manure from the city have brought that part of this district, which lies immediately round the capital, into a good state of productiveness. The quality of the land improves towards the west and north, and the district bordering on Meath is not inferior to the generality of wheat lands in the midland counties. The soil along the junction of the northern primary strata and the limestone is also of excellent quality. There is but a small proportion of the county under tillage. Villas, gardens, dairy farms, kitchen gardens, and nurseries occupy the immediate neighbourhood of the capital, and grazing farms and meadow lands extend over the country which is not occupied by demesnes, to a distance of ten and twelve miles beyond those on the west and north. The mode of feeding generally pursued is grazing during summer and hay feeding in winter. Many extensive farmers and resident proprietors however pursue the system of green crops and stall-feeding the year round. The total annual value of the agricultural produce of the county of Dublin has been estimated at 1,145,800*l.*; the rental of proprietors at 343,700*l.* per annum, and the rent paid by them at 3*l.* per acre. The rents paid by land-occupiers vary from 4*l.* and 4*l.* 10*s.* to 10*l.* in the vicinity of the capital.

Dublin County is divided into nine baronies; namely:— I. Balrothery on the north, containing the towns of Balbriggan, population in 1831, 3016; Skerries, population 2,556; Rush, population 2144. II Nethercross, scattered through the other baronies in seven separate divisions, of which six lie north of the city of Dublin, containing the towns of Swords, population 2537; Lusk, population 925; and Finglass, population 840. III. Coolock, on the north-east of the city of Dublin, containing the towns of Clontarf, population 1309; Baldoyle, population 1009; Howth, population 797; and Glassnevin, population 559. IV. Castleknock, on the north-west of tho city of Dublin, containing part of the town of Chapel Izod, total population 1632. V. Newcastle, on the west and south-west of the city of Dublin, containing the towns of Lucan, population 1229; Rathfarnham, population 1572; Crumlin, population 544; and Newcastle, population 3915. VI. Donore, a small barony, embracing a portion of the south-west of the city of Dublin, with a population of 11,153. VII. St. Sepulchre's, a small barony embracing a portion of the south of the city of Dublin, with a population of 13,631. VIII. Uppercross, on the south-west of the city of Dublin, containing the towns of Ranelagh (a suburb of Dublin), population 1999; Rathmines (do.), population 1600; Harold's-cross, population 1101; Milltown, population 673; Rathcoole, population 602, Clondalkin, population 756; Dalkey, population 544; and Ballymore Eustace, in the detached portion of the county, population 841. IX. Half Rathdown, on the south-east of the city of Dublin, containing the towns of Kingstown, population 5756; Blackrock, population 2029; Little Bray, population 1168; Stillorgan, population 650; and Dundrum, population 680.

There is not at present in the county of Dublin any town exercising corporate privileges. Swords and Newcastle each returned two members to the Irish parliament. The county of Dublin, the city of Dublin, and the university of Dublin are each at present represented by two members in the imperial parliament.

The commerce of the county of Dublin, exclusive of the capital and its immediate vicinity, is limited to the small coast trade carried on at Balbriggan, Bray, and the other coast towns. The cotton and stocking manufactures are carried on at Balbriggan with considerable spirit. There are two cotton factories, and numerous establishments for stocking weaving; the Balbriggan hosiery has long held a high character in the market. Considerable quantities of flour are manufactured in this county. The principal cornmills are on the Liffey, the Balbriggan river, and the Kimmage brook, on the south-west of Harold's-cross.

In 1835 the number of boats belonging to the county of Dublin, which were employed in the fisheries, was as follows —

Decked vessels, 121; tonnage, 4651; men, 789:—half-decked vessels, 27; tonnage, 265; men, 150:—open sail-boats, 66; men, 297:—row-boats, 65; men, 249; number of fishermen, 1505.

The fishing grounds lie in from 15 to 60 fathoms water between the Dublin coast and the Isle of Man. The fish consist chiefly of turbot, brit, sole, and plaice, which are sent to market daily throughout the year. There is a well-known fishing ground between Rush and Lambay Island, on which cod, ling, haddock, whiting, &c., are taken. Trawling is the mode of fishing generally practised by the decked and half-decked boats. White trout and salmon are taken at the bars of the Bray river and Liffey. Since the withdrawal of bounties the fisheries along the coast, as well as elsewhere in Ireland, have declined.

Table of Population. (*Exclusive of the County of the City of Dublin.*)

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	10,760	..	..	..	..	..	..	54,000
1813	Under Act of 1812 . . .	16,633*	..	..	..	..	..	..	110,437*
1821	Under Act 55 Geo. III. c. 20	20,791	33,695	..	..	..	71,661	78,350	150,011
1831	Under Act 1 Wm. IV. c. 19 .	23,819	31,570	10,127	8,769	12,674	82,299	93,713	176,012

* Return incomplete.

The census of 1831, as compared with that of 1821, exhibits an increase of population and houses, and a decrease in the number of families, which, if not arising from some error in the returns, is very remarkable.

The civil history of the county of Dublin is immediately connected with that of the capital. The whole of the fee of the county, with the exception of the estates of the St. Lawrence family, and with the exception, to some extent, of the estates of the families of Barnwall, Lutterel, and Talbot of Malahide, has frequently changed hands since the period of the Reformation. The forfeitures consequent on the rebellion of 1641 extended to 67,142 acres, 2 roods, 26 perches, profitable, and 1666 acres unprofitable, in this county. The amount of forfeitures in the county of Dublin, consequent on the war of the Revolution in 1688, was 34,536 acres profitable, of the then annual value of 16,061*l.* 16*s.*, and of the then total estimated value of 208,796*l.* 18*s.* The families which chiefly suffered by these confiscations were those of Barnwall, Fleming, Plunket, Walsh, Peppard, Archbold, Cruise, Fagan, Hackett, Archer, Sweetman, Dowdall, and Trant.

The Pagan antiquities of the county of Dublin are not numerous. There is a cromlech on the hill of Carrickmoor in Howth. Another cromlech stands to the south of Killiney, on the descent into the vale of Shanganagh; and at Brennanstown, on the Bray road, 6½ miles from Dublin, there is a third, of large dimensions. Dublin is, however, rich in ecclesiastical and military antiquities. The round tower of Clondalkin, 4½ miles from Dublin, on the southern road by Rathcoole, is in better preservation than most other similar edifices in Ireland. The door is at a height of 15 ft. from the ground; the entire height of the tower is 84 ft., and its diameter above the basement 15 ft. The explosion of 260 barrels of gunpowder in the powder-mills in the vicinity, in 1797, did not in the slightest degree injure the round tower. The antiquities at Swords, on the great northern road, 7 miles from Dublin, consist of a palace of the archbishops of Dublin, in ruins, a square steeple of the old church, and a round tower, 73 ft. in height. This tower is also in good preservation, and retains its conical stone capping. At Lusk, on the same road, 4 miles farther north, there is an antient church with a square steeple, attached to three of the angles of which are round towers with graduated parapets, and at the remaining angle a round tower of greater altitude and superior construction, supposed to be the original building. Between Swords and Baldoyle, 5 miles from the capital, is the hamlet of St. Doulagh's, containing one of the most singular stone-roofed churches in Ireland. The entire edifice measured but 48 ft. by 18 ft. It is divided into a rude nave and choir, which communicate by a narrow square-headed doorway, not sufficiently high to admit a full-grown person upright. The entire construction is rude and capricious: the building does not stand due east and west. Some of the arches are altogether nondescript in their shape, and for several of the recesses and nooks between the roof it is difficult to assign any probable use. It is perhaps the only edifice in the empire which exhibits the square-headed doorway, the Saxon arch, and the trefoil Gothic and lancet window, in such close juxtaposition. Near the church is a consecrated well, inclosed in an octagon building, the interior of which retains some paintings in fresco executed in the beginning of the seventeenth century. In the vicinity of Howth Castle are the ruins of St. Fintan's Church and of the collegiate church and abbey of Howth. On the opposite side of the Bay of Dublin the vicinity of Dalkey exhibits the remains of an antient town erected here at an early period for the protection of the shipping and merchandize of the capital, to which the creek of Bullock served for a length of time as port. There are also some druidical remains on the commons of Dalkey. The castles of Clontarf, Baldongan, Naul, and Castleknock are among the principal detached military edifices.

In 1821 the number of young persons in the schools of this county, exclusive of the county of the city of Dublin, was 9442, being nearly in the proportion of 6 per cent. of the entire population under instruction. The proportion of young persons under daily instruction in the diocese of Dublin, in 1834, was 7.28 per cent., in which respect the diocese, which may be taken as an index of the county, ranks nineteenth among the thirty-two dioceses of Ireland.

The grand jury presentments for the county of Dublin average about 18,000*l.* per annum. The circumstance of so many of the roads in the county being under the control of turnpike-trustees renders this assessment comparatively light in proportion to the extent of the district on which it is levied.

The constabulary force of the county, on the 1st of January, 1836, consisted of 1 stipendiary magistrate, 5 chief constables of the first class, 1 do. of the second class, 29 constables, 113 sub-constables, and 6 horse. The expense of maintaining this force for the year 1835 was 6129*l.* 16*s.* 7*d.*, of which 2890*l.* 7*s.* 2*d.* was chargeable against the county. The county of Dublin, together with the county of the city of Dublin, the county of the town of Drogheda, and the counties of Meath, Louth, and Wicklow, contribute, in proportion to their relative populations, to the support of the Richmond Lunatic Asylum, built in Dublin in 1815. The fever hospitals and dispensaries throughout the county are supported by equal voluntary contributions and grand jury presentments.

A survey of the county of Dublin, on a scale of 3 inches to the mile, was made by order of the grand jury in 1821. A survey on a scale of not quite 6 inches to 3 English miles had been published in 1760 by John Rocque. A chart of Dublin, by Seale and Richards, was published in 1765, and another has since been published by Captain Bligh. An interesting account of the chief localities of this county is contained in Brewer's 'Beauties of Ireland,' London, 1825. The 'Statistical Survey of Dublin County,' published by the Royal Dublin Society in 1801, is extremely meagre; and there is not at present any published work on the topography or statistics of the county at all adequate to the importance of the subject. A 'History of the Archbishops of Dublin,' comprising a topographical and statistical survey of the county, by Mr. D'Alton, a writer of considerable reputation, has been stated to be ready for the press, but is not yet published.

DUBLIN, the chief city of Ireland, forming by itself a county of a city, on both sides of the river Liffey, at its entrance into the bay of Dublin. Lat. of Dublin Castle 53° 20′ 38½″ N.; long. 6° 17′ 29″ W. The situation, as considered with reference to the whole of the United Kingdom, is central, there being more places of importance in Great Britain and Ireland accessible in a given time from Dublin than from either London or Edinburgh.

With regard to its boundaries, Dublin may be considered either as a county of a city with separate corporate jurisdiction; or as a city having a local police, and returning representatives to parliament; or as a city consisting of a collection of continuous buildings. In each character its boundaries are different.

Pending the publication of the Ordnance Survey map of Dublin, the areas contained in these various limits cannot be accurately stated. The map constructed by order of the grand jury of the county of the city in 1821 gives the area contained within the limits of corporate jurisdiction at 5217 Irish or 8450 statute acres; the Report of the Boundary Commissioners states that of the city, as limited for the purposes of the elective franchise, at 3538 statute acres; and the Rev. Mr. Whitelaw in 1805 estimated the entire area then occupied by buildings at 1264 statute acres.

Dublin appears to have been known by something approaching nearly to its present name in the second century, as it is found written Eblana in the geography of Ptolemy. The name is written in historical documents Dublin, Dyflin, Dyvelin, &c., being all varieties of the Irish *Dubh-linn*, or *Black-pool*, which appears to be the true etymology. It is also called, and is still generally known among the Irish, by the name *Ath-cliath*, which may be rendered *Hurdle-ford*, from the causeway laid on hurdles which formerly led to the channel of the river across the ooze at either side.

In the various political contests that have afflicted Ireland from the earliest history of the country Dublin has always borne a conspicuous part; but these events belong rather to the general history than to that of the city. [IRELAND.] Dublin, however, under all circumstances, continued to maintain and increase its importance and its extent. In 1205 the castle was ordered to be built and the city to be fortified; and in 1215 a stone bridge was built over the Liffey. In 1316 the first material extension of Dublin took place in consequence of the pulling down of some of the old walls, and the erection of a new line of defence by the citizens when threatened with a siege by Edward Bruce. The Reformation had commenced in Dublin, in 1535, by the consecration of George Brown, a denier of the papal supremacy, to the archbishopric. In 1550, on Easter Sunday, the liturgy was read in English, for the first time, in Christ Church, and printed, the next year, by Humphrey Powell: this is supposed to have been the first book printed in Ireland. The foundation of the great Protestant University of Trinity College followed close on the establishment of the Reformation. In consideration of the leading part it had taken at the Restoration, the city of Dublin was honoured by the king with a collar of S S., and the mayor was soon after (1665) invested with the title of Lord Mayor, together with an estate of 500*l.* per annum towards maintaining that dignity. After the struggles immediately preceding and following the Revolution of 1688, on the settlement of affairs by the public cancelling of all the arbitrary proceedings of the abdicated government, October 2, 1695, the improvement of the city was resumed, and from this till the period of the Union the increase of Dublin proceeded with great rapidity.

Although Dublin has decidedly fallen off as an emporium of trade and a centre of society since the act of Union removed the seat of legislation to London, it has, during the last period, not only increased in size and population to a great extent, but continues to advance in architectural improvement.

Stephen's Green, Merrion, Rutland and Mountjoy squares, with almost all the streets on the north-east of the river, were built round during the period between the middle of the 18th century and the Union. Fitzwilliam-square and the adjoining streets, which are at present among the most fashionable places of residence in Dublin, have been completed since, and a great extension has taken place in private residences towards the south-east; a considerable portion of the north-east of the city also belongs to this period.

The use of brick and stone in private buildings was not general until after the Restoration; and there are now few or no remains of private dwellings of so early a date. The walls almost entirely disappeared in the extension of the city in the 18th century. Christ Church and St. Patrick's are the chief objects of antiquarian interest. The Castle, although occupying a very antient site, contains but a small portion of the original building. The Tholsel and old courts of law have disappeared, and the oldest of the bridges now standing is Barrack Bridge, occupying the site of a wooden bridge built so late as 1671.

The corporation of Dublin consists of the Lord Mayor, two Sheriffs, 24 Aldermen, and 144 Common Councilmen, made up of 48 Sheriffs' Peers and 96 Representatives of the Guilds. There are 25 Guilds, of which Trinity Guild, or the Guild of Merchants, is the most important, returning 31 of the 96 representatives of the whole. The number of freemen is not correctly ascertained, but is supposed to be about 4000. The chief officers of the corporation are the recorder, coroners, president of the court of conscience, and the governors and keepers of the several prisons. This corporation is subject to the New Rules of the 25th Charles II., modified by the provisions of the 33rd George II., c. 16. The corporation has for upwards of two centuries maintained a strict Protestant character; and the exclusion of numerous wealthy merchants of the Roman Catholic religion, or of what are termed liberal principles, has rendered it comparatively inefficient as a municipal body.

The jurisdiction of the corporate magistrates of the county of the city extends over the various liberties within the Circular Road, although these are situated within the county of Dublin. They are not however permitted to sit at sessions of the peace for the county. The court of quarter sessions of the peace for the county of the city, at which the recorder, lord mayor, and two aldermen preside, has, by the 48th George III., c. 140, a criminal jurisdiction extended to all crimes and offences, excepting high-treason, committed on or within the Circular Road; and by its sittings and adjournments affords 12 gaol deliveries each year. The trial of serious offences is generally reserved for the commission court for the county of the city, held before two judges of the superior courts, with whom the lord mayor is joined in commission. The lord mayor holds a weekly court for the determination of small claims of wages, and the infliction of fines for infringement of municipal regulations: the operation of this court is not considered efficient.

The chief civil jurisdiction of the corporation is exercised in the lord mayor and sheriffs' court, which is held once every three months, with a cognizance of all actions for sums exceeding 40*s.* late Irish currency. The recorder's civil bill court for the recovery of debts over 40*s.* is held quarterly. The court of conscience, for the determining cases between party and party, under 40*s.* Irish, sits every day from 10 o'clock A.M. The practice of these courts is considered open to much improvement, particularly in the adjustment of fees, and the remuneration of certain officers by fixed salaries.

The gaol of the county of the city is Newgate, which is also the gaol for that part of the county of Dublin within the Circular Road. It was founded in 1773, and is situated in Green-street, beside the City Sessions'-house, on the north-west of the city. Contiguous to Newgate is the Sheriffs' prison for debtors, erected in 1794. The City Marshalsea is a small prison for debtors committed from the lord mayor's court and court of conscience; the condition of this prison is very wretched. The Smithfield Penitentiary, erected at the charge of government, is a house of correction for the reception of convicted offenders of both sexes; this prison is well conducted. The males are employed and instructed in weaving; the females in needlework, and in washing for the Sheriffs' prison and the gaol of Newgate. The Richmond Bridewell, another government establishment, is also a house of correction for male and female convicts. Weaving is the principal employment of the males; those sentenced to hard labour are put to the tread-mill. The prisoners on being discharged are paid one-third of the earnings of their labour. The condition of this bridewell is highly creditable to the authorities. The current expenses of these establishments are defrayed by presentments of the grand jury of the county of the city, and in the year 1833 the gross outlay was 11,763*l.* Besides these, there is the House of Industry, with lunatic asylum, hospitals, &c. attached, which is supported by an annual grant of 20,000*l.* from government.

The Four Courts Marshalsea prison is situated within the city, but is not connected with the corporation. The county gaol of Kilmainham stands beyond the western suburbs, and is one of the most severe places of confinement in Ireland.

The revenues of the corporation arise chiefly from rents, certain dues on shipping for slippage and anchorage, renewal of leases, fines levied by the city authorities, and pipe-water taxes. The rents arise out of four several estates granted to the city at various times.

The gross amount of revenue and loan received by the corporation in the year commencing 29th September, 1833, was 38,346*l.* 13*s.* 2¼*d.*, being equal to the expenditure of the year. The principal item in the expenditure is interest on bond, which amounts to upwards of 14,000*l.* per annum.

The police of Dublin and the surrounding district is regulated by the 48th George III. c. 140, amended by the 5th George IV. c. 102. By these Acts the castle of Dublin, and all places within eight Irish miles thereof, not being within the jurisdiction of the Court of Admiralty, are united into one district, and this district is divided into four divisions. Each of these divisions embraces about a quarter of the city, and extends over the adjoining district to the exterior limit of the jurisdiction. To each is attached a divisional office of police, with an establishment consisting of one barrister, one alderman, and one member of the common council, being the divisional justices for that district. The Castle district is the seat of the head police-officer, to whom the divisional justices of the other districts make weekly reports.

The funds applicable to the expense of the police and watch establishments are derived from various sources, namely, from the watch-tax, from pawnbrokers' licences, from publicans' and other licences, from fines and fees, and from government grants. The total disbursements of the Dublin police establishment for the year ending 31st March, 1834, was 41,548*l.* 3*s.* 6¼*d.*

The paving, cleansing, and lighting of the city of Dublin are regulated by the 47th George III. (loc. and pers. sess. 2, c. 109), amended by the 54th George III. (loc. and pers. c. 221). The Paving Board is a corporation, and consists of three commissioners appointed by the lord-lieutenant. They derive their income from various assessments and other receipts. The total amount of the receipts of the commissioners for paving, &c., for the year ending 5th January, 1833. was 41,115*l.* 8*s.* 6*d.*; and the total amount of their expenditure was 41,997*l.* 7*s.* 5*d.* The streets in general are Macadamized, the footpaths for the most part flagged, and the curb-stones and crossings of cut granite. The city has been well lighted since 1825 with gas, for the supply of which there are four incorporated companies, the works at three of which are at present in operation.

The supply of water is regulated by a committee of the corporation, entitled the Committee of the Pipe-water Establishment. The pipe-water rent, collected by the corporation, forms a large item in their income.

The commissioners of wide streets are constituted by various Acts of Parliament, of which the earliest is the 31st George III. c. 19, and the latest the 2nd George IV. c. 110. The board consists of twenty-five; the lord mayor and representatives of the city and county for the time being are members. Their funds, since the coal-duty ceased in March, 1832, arise almost solely from the wide-street tax, which produces from 5000*l.* to 5500*l.* per annum; and this is allocated to pay the interest, at 3 per cent., on a loan of 36,895*l.* 6*s.* 5*d.* from the government.

The port and harbour are under the management of the Ballast Board, constituted by 26th George III. c. 19. Their funds arise from taxes on shipping entering the port. The tonnage duties received by the Ballast Board in 1832 amounted to 11,960*l.* 17*s.* 9*d.* In the same year the expenditure of the Ballast Board on the harbour was 7,469*l.* 11*s.* 10*d.*, and on the great north wall 160*l.* 13*s.* 5*d.* Upwards of 4000*l.* per annum of the receipts of the board goes to pay the interest on debt.

The supply of fuel is almost wholly by colliers from the opposite coast of England. The colliers which entered the port in 1832 measured 230,878 tons. Turf is retailed for lighting fires, &c., in which mode considerable quantities are used: the supply is furnished from the extensive bogs of Kildare and Westmeath by the boats of the Grand and Royal canals.

The ground on which Dublin stands rises gently from the river towards the north and south-west: the highest ground in the city is at Broadstone harbour, which is 62 feet above the level of high water in the Liffey. The eastern division on the south of the river lies almost wholly without the limits of the antient city on level ground, the northern part of which has in a great measure been reclaimed from the former bed of the Liffey. Six extensive plots of open ground ornament and ventilate this portion of the city; viz., on the south, the Coburg Gardens and Fitzwilliam-square; on the east, Merrion-square; on the north, the park of Trinity College; on the west, the Castle Gardens; and in the centre, Stephen's Green. Dame-street, which leads from the castle to the university, expands towards its eastern extremity into College Green, from which all the leading lines of communication radiate.

The whole area of College Green on the east is occupied by the front of Trinity College, a rich and dignified pile of building of the Corinthian order, built in 1759, and extending north and south 300 feet, a little in advance of the provost's house, which stands on the eastern side of the entrance into Grafton-street.

Separated from the college by the entrance into Westmoreland and College streets, stands the Bank of Ireland, formerly the Irish house of parliament, founded in 1729, which presents a portico of six Corinthian columns towards College-street, and a semicircular façade with a receding centre of extraordinary magnificence towards College Green. The effect of this combination of grand architectural objects is peculiarly striking. West from College Green, Dame-street consists of uniform and lofty houses, occupied by persons in trade, having the Commercial Buildings, founded in 1796, about midway on the north, and the Royal Exchange, founded in 1769, at its southern extremity.

Of the squares which lie east and south of College Green, Stephen's Green, laid down in 1670, is the first in point of extent as well in Dublin as in the United Kingdom. The area within the railing is a rectangle of 1220 by 970 feet, being somewhat more than 27 statute acres, and is now handsomely laid out, although so late as the year 1818 it was a marshy flat surrounded with a stagnant ditch and mean wall. The surrounding buildings are, however, very unequal.

The eastern division of the city lying north of the Liffey occupies higher ground, and is the airiest and most cheerful part of Dublin. Mountjoy-square and Rutland-square occupy the crest of the hill, and from these respectively the chief lines of communication are Gardiner's-street and Sackville-street, the first leading to the Liffey at the Custom House, the latter to Carlisle Bridge, Westmoreland-street, and College Green. The façade of the Lying-in Hospital and Rotunda Rooms forms a striking termination to Sackville-street on the south.

From Rutland-square Sackville-street extends with a scarcely perceptible descent to Carlisle Bridge, a distance of three-quarters of an English mile. The breadth throughout is 40 yards, and the buildings on each side lofty, and, with few exceptions, uniform. About midway between Carlisle Bridge and the Rotunda stands a fluted Doric column, on a pedestal of large proportions, bearing a colossal statue of Lord Nelson. This monument was erected in 1808. West of Nelson's monument the General Post-Office presents a cut-granite front of 223 ft. to the street. In the centre is a portico of Portland stone.

At the southern extremity of Gardiner-street the Custom-house occupies a detached plot of ground on the quay leading from Carlisle Bridge to the north wall. This splendid building, founded in 1781, is 375 ft. in length by 205 ft. in depth, and exhibits four decorated fronts of the Doric order; the columns, &c., being of Portland stone, and the body of the building of cut granite. To the east of the Custom-house are docks and stores, the latter on a very extensive scale, surrounded by a lofty wall. The business of the customs-duties department is however so trifling, that half the accommodation here provided would be amply sufficient.

Between Gardiner and Sackville streets runs Marlborough-street, parallel to each. On the western side of Marlborough-street, about midway between its extremities, stands the Roman Catholic Metropolitan Church, founded in 1816. St. George's Church, the beautiful spire of which is conspicuous from the bay and many parts of the city, occupies the highest ground in this district. It is the most sumptuous of the modern churches of Dublin, from a design by Johnstone, and cost 70,000*l.*

The western division of the city, north of the river, is not intersected by any street of large proportions, and is almost exclusively occupied by dealers, tradesmen, and labourers. The portion of it which lies along the quays and towards the Blue Coat Hospital is however well built and respectably inhabited. The Four Courts, situated on King's Inn Quay in this district, was commenced in 1786, and is a building of great extent and splendour. Westward from the courts of law, the Royal Barracks occupy an elevated site over the river, at the extremity of the city on this side. On the outskirts of this division of the city, from the Royal Barracks north-east, are the Blue Coat Hospital, founded in 1773; the Richmond Bridewell and Penitentiary, and the House of Industry and hospitals attached; the Linen Hall, opened in 1728; and the King's Inns. In the eastern part of the district, near Capel-street, are Newgate, the Sheriffs' prison, and the Sessions House for the county of the city.

West of the Royal Barracks is the entrance into the Phœnix Park, a finely-wooded demesne of 1089 Irish or 1759 English acres, containing the vice-regal lodge, and the lodges of the chief and under secretary; the Zoological Society's gardens and establishment; the Royal Military Infirmary; the Hibernian Society's school for the education of the children of soldiers; a powder-magazine and artillery station; and a grand obelisk, erected in commemoration of the victories of the Duke of Wellington. The park was first enclosed and laid down for the recreation of the citizens in the reign of Charles II., and was completed by the Earl of Chesterfield while Lord Lieutenant of Ireland. The greater portion of the lands belonged to the dissolved priory of Kilmainham.

The division of Dublin which lies west from the Castle, on the south side of the Liffey, is the oldest part of the city, and is now almost exclusively occupied by persons in trade, small dealers, and the labouring classes. The Castle of Dublin, at the north-eastern extremity of this district, consists of two handsome quadrangles, surrounded, except on one side, by the apartments of state and the offices of government.

West of the Castle stands Christ's Church Cathedral, a venerable cruciform structure, part of which is of a date anterior to the coming of the English. South from Christ Church, at a distance of rather more than a quarter of a mile, is the Cathedral of St. Patrick, situated at the foot of the declivity, the ridge of which is occupied by the castle and older cathedral. St. Patrick's is an imposing pile, consisting of nave, transepts, and choir, with a chapter-house at the east end. Attached is the antient archiepiscopal palace, now converted to a police barrack, and the deanery house, a commodious residence built in the last century. At the back of the old palace is the library founded by Archbishop Marsh in 1694. On the south of this division are a penitentiary, the Portobello barracks, and several hospitals; and on the west, towards Island Bridge, these extensive establishments,—the Royal Hospital of Kilmainham, built at the cost of the army in 1684; the Foundling Hospital; Swift's hospital for lunatics; Stephens's hospital; Kilmainham gaol and the county court-house, and the artillery barracks at Island Bridge.

The Liffey is quayed in throughout its entire length, and crossed by eight bridges, five of which are executed in cut stone, and two in metal. These quays give a great air of magnificence to the views up and down the river.

The condition of the poorer classes in Dublin is wretched in the extreme; yet there are few cities in which charitable institutions are more numerous or better supported. The number of persons totally destitute is estimated at 25,000; of labouring persons who, getting only occasional employment, are frequently in a destitute state, at 25,000; and of poor tradesmen, frequently in the same condition from want of employment and other causes, at 18,000.

The principal charitable institutions of Dublin are the following:—Association for the suppression of Mendicity; Society for the relief of Sick and Indigent Room-keepers; the Strangers' Friend Society; the Benevolent Strangers' Friend Society; the Charitable Association; Society for the Relief of the Industrious Poor; Sir Patrick Dunn's Hospital, Meath Hospital and County Infirmary, Jervis-street Infirmary, Mercers' Hospital, Maison de Santé (these five are general hospitals for the poor); Simpson's Hospital (for lame and gouty poor); Lying-in Hospital, Stephens's Hospital (general), Cork-street Fever Hospital, Whitworth Fever Hospital, City of Dublin Hospital (general), United Hospital of St. Mark and St. Ann (general), Hospital for Incurables, Westmoreland Lock Hospital, Hospital of the House of Industry, Lunatic Asylum of the House of Industry, Swift's Hospital (for lunatics). For these charities the total amount of vested estates is 13,262*l.* 19*s.* 4*d.*, and the parliamentary and grand jury grants are 30,200*l.*

In addition to these institutions there are six minor lying-in hospitals in the city, numerous houses of relief, and female penitentiaries, and about twelve dispensaries supported by voluntary contributions and local assessment. The number of out-door patients so relieved is very great, probably not less than 50,000 per annum.

The total number of charitable schools in the city of Dublin is 199. Of these 132 are day-schools, 34 are schools where the scholars are lodged, boarded, clothed, &c., 27 are schools for orphans, or in connexion with orphan societies, 4 are schools belonging to societies, and 2 are daily model-schools of the National Board of Education. The total number receiving instruction at these schools is 15,797; the total annual expenditure is about 37,100*l.*

The trade of Dublin consists chiefly in the supply of the midland districts with articles of import. The silk manufacture has long been carried on with considerable success in the production of a superior article, but the trade has latterly declined, and is now very languid. The woollen manufacture was also carried on with good success, but has likewise fallen off of late years. The firm of Messrs. Willans continue to manufacture broadcloths, but this is almost the only house in the trade. The printing of calicoes and muslins has been brought to great perfection by Mr. David Henry, of Island-bridge.

That part of the trade of Dublin which is carried on with the ports of Great Britain has greatly increased since the general adoption of steam-vessels, but there are no means for distinguishing its amount, the intercourse between the two islands having been placed upon the footing of a coasting-trade. The vessels that entered the port from foreign countries during each of the five years from 1832 to 1836, and the amount of their tonnage were as follows:—

	British.		Foreign.		Total	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
1832 .	210	38,202	16	2,823	226	41 025
1833 .	240	45,939	35	6,550	275	52,489
1834 .	212	36,074	27	5.456	239	41,530
1835 .	201	32,439	34	6,247	235	38,686
1836 .	189	38,058	28	5,052	217	43,110

A large proportion of the foreign trade is carried on through Liverpool and Bristol by means of steam-vessels, which convey goods to those ports for shipment.

The amount of customs' duties collected in Dublin in the four years from 1833 to 1836 was:

1833 . .	£654,754
1834 . .	768,632
1835 . .	918,801
1836 . .	898,630

The tonnage of commodities conveyed upon the Grand Canal and the Royal Canal to and from Dublin exceeds 380,000 tons per annum. The greater part of that which is conveyed to Dublin consists of agricultural produce, cattle, and turf. From Dublin are sent building materials, coals, salt, manure, and general merchandise.

The intercourse between England and Dublin has been much encouraged by the establishment of steam-packets. The number of passengers conveyed by the post-office packets alone, between Dublin and Holyhead and Liverpool, in each of the three years, 1833 to 1835, was as follows:—

	Between Dublin and Holyhead.	Between Dublin and Liverpool.	Total.
1833	9,189	9,292	18,481
1834	11,564	12,425	23,989
1835	11,558	14,040	25,598

The population of Dublin has been vaguely ascertained from time to time as follows:—

A.D.	Houses.	Inhabitants.
1644	No return	8,159
1777	17,151	137,208
1788	14,327	114,616
1798	16,401	172,084
1803	15,958	109,528
1804	16,234	172,042
1813	15,104	176,610

and with great precision in 1821 and 1831; viz.—

	1821.		1831.	
	Houses.	Population	Houses.	Population
County of the city of Dublin, as limited by its antient boundary	14,029	178,603	16,042	204,155
Dublin inside the Circular Road	18,116	224,317	No return.	232,362
Dublin inside and outside the Circular Road and canals	18,567	227,335	No return.	265,316

The classification of the population of the county of the city in the latter year was as follows:—Males, 91,557; females, 112,598; males 20 years of age, 50,234; occupiers employing labourers, 14; do. not employing do., 26; labourers employed in agriculture, 508; employed in manufacture and making manufacturing machinery, 155; employed in retail trade or in handicraft, as masters or workmen, 23,576; capitalists, bankers, professional, and other educated men, 8620; labourers employed in labour not agricultural, 10,820; other males 20 years of age (except servants), 3612; male servants 20 years of age, 2903; do. under 20 years of age, 556; Female servants, 11,572.

The university of Dublin is incorporated as 'the College of the Holy and undivided Trinity near Dublin, founded by the most serene Queen Elizabeth.' The collegiate body consists of a provost, seven senior fellows, one of whom is vice-provost, eighteen junior fellows, seventy scholars, and thirty sizars. The number of students at present on the books is about 2000. The permanent income of the university arises out of landed estates, which produce a rent of 13,846*l*. 2*s*. per annum, exclusive of the provost's separate estate, which produces a rent of 2400*l*. per annum. The income accruing by the class-fees of pupils amounts to about 30,000*l*. per annum, and a large sum is annually drawn in rents of chambers, and fees for commons, &c.

The Royal Dublin Society, incorporated by George II., 1749, occupies the late residence of the Duke of Leinster in Kildare-street. The income of the society arises from subscriptions of members, and an annual parliamentary grant of 5300*l*. Their museum is open to the public twice a week; and their professors deliver public and *gratis* courses of lectures in their several sciences. A considerable number of youths are also instructed gratis in the fine arts in the schools of the society.

The Royal Irish Academy, for promoting the study of science, polite literature, and antiquities, was incorporated in 1786. The funds of the academy are assisted by a parliamentary grant of 300*l*. per annum. The academy house is in Grafton-street, where there is a good library peculiarly rich in antient Irish MSS.

The Royal Hibernian Academy of painting, sculpture, and architecture, incorporated in 1803, also receives a parliamentary grant of 300*l*. per annum. The academy house in Abbey-street was bestowed on the body by Mr. Johnstone, the distinguished architect; and here there is an annual exhibition of painting and sculpture.

The other chief societies for the promotion of science and general knowledge, which are not incorporated, in Dublin, are the zoological, phrenological, geological, agricultural, horticultural, and Dublin-library societies.

A considerable stimulus has been given to the literary pursuits in Dublin by the establishment from time to time of various periodical works. The newspaper press of Dublin consists of eighteen different papers.

(Harris's *History of the City of Dublin*, Dublin, 1766; Whitelaw and Walsh's *History of the City of Dublin*, London, 1818; Mason's *History of the Cathedral of St. Patrick*; Brewer's *Beauties of Ireland*; *Picture of Dublin*, Curry, Dublin, 1835; *Reports of Commissioners and Parliamentary Papers*.)

DUBNO, the capital of a circle of the same name, the richest and most productive of the subdivisions of the Russian government of Volhynia. It is situated on the Irva, in 50° 25′ N. lat., and 25° 40′ E. long., and belongs to the prince of Lubomirsky, who takes from it a ducal title as its owner. The Polish nobility of these parts held their 'contracte,' or annual sessions, at Dubno from 1774 till Western Poland was usurped by Russia. Dubno is an extremely irregular town in construction; the streets are narrow, crooked, and unpaved: it contains about 1190 houses, almost wholly of wood, and 5700 inhabitants, among whom are a great many Jews; and has a ducal residence, a Greek abbey of the order of St. Basil, several Greek and Roman Catholic churches, and a grammar-school. The people carry on much traffic in corn, flax, tobacco, fish, and cattle, the produce of the adjacent country, and hold a large fair at Whitsuntide.

DUBOS, JEAN BAPTISTE, was born at Beauvais in the year 1670. He began to study theology, but soon abandoned it for politics. He was employed by M. De Torcy, minister of foreign affairs, on several secret negotiations, and on account of his talents was rewarded by a pension. Having retired from his political avocations, he devoted himself entirely to literature, and the merit of his works was sufficient to procure his admission into the Académie. He died at Paris in 1742, after a long illness.

The work by which he is chiefly known, 'Réflexions Critiques sur la Poésie et sur la Peinture,' is excellent. He first inquires into the cause of the fine arts, and discovers it in the love of excitement which is naturally implanted in the human breast: man, he thinks, would rather be unpleasantly excited than not excited at all. He then proceeds to the cause of the pleasure felt in witnessing tragical representations. He observes that, from the before-named love of excitement, people are fond of looking at executions, &c., and then remarks that, when the excitement caused by the contemplation of a real scene of misery has subsided, it is followed by the unpleasant reflection that one of our fellow-creatures has been suffering intensely. Hence a method should be devised by which we may have the excitement without the painful reflection. This end is accomplished by tragedy or a tragical picture, where the suffering, being feigned, leaves behind no feeling of regret. Keeping this principle in view, he goes on to inquire what are the proper subjects for poetry and painting, using as the standard of his judgment the greater or less degree of excitement occasioned by such and such subjects. His discussions whether the hero of a tragedy should be a person of antient or modern history, on the appropriate use of allegories, and similar topics, are managed in the pleasantest style possible, and are besides, if we make due allowance for the French dramatic prejudices, very instructive, as well for the critical views which they contain as for the historical anecdotes with which they are illustrated. Dubos is also known as an historian by his 'Histoire de la Ligue de Cambrai,' and 'De l'Etablissement de la Monarchie Française dans les Gaules,' works which were admired by some of his contemporaries, and slighted by others.

DUCAREL, ANDREW COLTEE, an eminent English antiquary, was born in 1713, in Normandy, whence his father, who was descended from an antient family at Caen in that province, came to England soon after the birth of his second son James, and resided at Greenwich. In 1729, whilst a scholar at Eton, he was for three months under the care of Sir Hans Sloane, on account of an accident which deprived him of the sight of one eye. In 1731 he was admitted a gentleman-commoner of St. John's College, Oxford; B.C.L. 1738; LL.D. 1742; and became a member of Doctors' Commons in 1743. He was elected commissary of the exempt jurisdiction of the collegiate church of St. Katharine, near the Tower of London, in 1755, and was appointed commissary and official of the city and diocese of Canterbury by Archbishop Herring in 1758. Upon the incorporation of the Society of Antiquaries, in 1755, he was appointed one of its first fellows.

His earliest publication (without his name) was 'A Tour through Normandy, described in a Letter to a Friend,' published in 1754, in 4to., enlarged and republished in folio in 1767, under the title of 'Anglo-Norman Antiquities, considered in a Tour through part of Normandy, by Dr. Ducarel, illustrated with twenty-seven plates.' His second publication was 'A Series of above two hundred Anglo-Gallic, or Norman and Aquitain Coins of the autient Kings of England, exhibited in sixteen copper-plates, and illustrated in twelve Letters, addressed to the Society of Antiquaries of London and several of its Members,' 4to., London, 1757. His portrait, engraved by Perry from a painting by A. Soldi, 1746, was first prefixed to this work, which was the result of his acquaintance with M. de Boze, keeper of the French king's medals. In 1760 he printed for private distribution, in 4to., an account of his friend Browne Willis, read at the Society of Antiquaries that year. In 1763 he published 'A Repertory of the Endowments of Vicarages in the diocese of Canterbury,' in 4to., which was reprinted with large additions, in 8vo., in 1782, with the further addition of a repertory of endowments of vicarages in the diocese of Rochester. Dr. Ducarel gave a manuscript abstract of the large history of the Benedictine Abbey of Bec, in Normandy, drawn up by Dom John Bourget, a monk of that house, to Mr. John Nichols, who printed it in 1779, in 8vo., with an appendix of original deeds; and who likewise printed in the same year, in 2 vols. 8vo., 'Some Account of the Alien Priories, and of such lands as they are known to have possessed in England and Wales,' the chief materials of which were also collected by Dr. Ducarel. The greater part of the materials of the 'Collection of Royal and Noble Wills,' from the Conqueror to Henry VII., printed by Mr. Nichols in 1780, were likewise furnished by Dr. Ducarel.

In 1782 he published 'The History of the Collegiate Church of St. Katharine, near the Tower of London, from its Foundation in 1273.' This work had been compiled by the doctor for the use of Queen Charlotte, this church being the only ecclesiastical preferment in the gift of the queen consort of England. An appendix to this work was published in 1790, in No. LII. of Mr. Nichols's 'Bibliotheca Topographica Britannica.'

In 1783 he published, as No. XII. of the 'Bibliotheca Topographica Britannica,' 'Some Account of the Town, Church, and Archiepiscopal Palace of Croydon, in the County of Surrey, from its Foundation to 1783,' 4to., originally drawn up by him in 1754 at the request of Archbishop Herring. He also drew up in the 'Bibliotheca Topographica Britannica,' No. XXVII., 'The History and Antiquities of the Archiepiscopal Palace of Lambeth, from its Foundation to the Present Time,' 1785, 4to. dedicated to Archbishop Moore.

Dr. Ducarel's life was one of indefatigable industry. Exclusive of the works already mentioned, the publication of Snelling's plates of English medals originated with him. He wrote in the 'Philosophical Transactions' upon the subject of trees indigenous to Great Britain, followed by an account of the early cultivation of botany in England. His letter to Gerard Meerman, grand pensionary at the Hague, on the dispute concerning Corsellis as the first printer in England, translated into Latin by Dr. Musgrave, with Meerman's answer, was published in the second volume of Meerman's 'Origines Typographicæ' in 1765. He entered deeply into the Rowleian controversy, of which he entertained what is now the general opinion. He completed a list of various editions of the Bible and parts thereof, in English, from 1526 to 1776, an improved edition of which was published in 1778 at the expense of Archbishop Cornwallis. His memoirs of Archbishop Hutton and his family, fairly written, were purchased, at the sale of his library, by Dr. Lort for the Hutton family. He perfected the catalogues of the different portions of the Lambeth library, and made a general index to all the archiepiscopal registers at Lambeth, from Pecham to Herring, in forty-eight volumes in folio, his own duplicate of which was bought at the sale of the late Mr. Gough's library, for the MS. department of the British Museum. In addition to all these literary labours, his official attendance to the duties of Doctors' Commons was unremitting.

Dr. Ducarel died at his house at South Lambeth, May 29th, 1785. The immediate cause of the disorder which carried him off was a sudden surprise, on receiving, whilst at Canterbury, a letter informing him that Mrs. Ducarel was at the point of death. He was buried in his favourite church of St. Katharine, near the altar, in a vault which he had long before selected for that purpose. (Nichols's *Literary Anecdotes*, vol. vi. p. 380—404; Chalmers's *Biogr. Dict.* vol. xii. p. 375—385.)

DUCAT, DUCATOON. [MONEY.]

DUCIS, JEAN FRANÇOIS, was born at Versailles in 1732, and became a dramatic writer somewhat late in life. His first pieces made but little impression, and it was not until he had produced a version of Shakspeare's 'Hamlet' that his name began to acquire some celebrity. 'Romeo and Juliet,' the second tragedy from Shakspeare, had great success. But Ducis has so altered the works of our great author, that were it not for the name we should with difficulty discover any connexion between the original and the version. He subsequently tried to imitate the Greek drama in a tragedy called 'Œdipus with Admetus;' but he soon returned to Shakspeare, and wrote, among other pieces, 'Macbeth,' 'Othello,' and 'Lear.' In 1778 he was called to the Académie to fill the vacancy left by Voltaire. He afterwards became secretary to Louis XVIII., and was ever most devotedly attached to him. Even when almost starving, he refused a pension of 40,000 francs and the cross of the legion of honour, which were offered him by Napoleon. The restoration of his beloved king rendered his old age happy. At his first audience the king recited to him some of his own verses: 'I am more fortunate,' cried the old poet in ecstacy, than Boileau or Racine; they recited their verses to Louis XIV., but my king recites my verses to me.' He died in 1816.

DUCKBILL. [ORNITHORHYNCHUS.]

DUCKS, ANATI'NÆ, a subfamily of the *Anatidæ*, including the *true ducks* of Swainson only.

The third book of Belon is entitled 'De la Nature des Oyseaux vivants le long des rivières, ayants le pied plat, nommés en Latin *Palmipedes* Aves,' and comprehends all the web-footed birds known to him.

Willughby distinguishes the 'whole-footed birds with shorter legs into such as want the back-toe and such as have it; these latter into such as have all four toes webbed together, and such as have the back-toe loose or separate from the rest; these latter again' he subdivides 'into narrow-billed and broad-billed; the narrow-billed have their bills either hooked at the end, or straighter and sharp-pointed. The hook-billed have their bills either even or toothed on the sides. Those that have straighter and sharp-pointed bills are either short-winged and divers, called *Douckers* and *Loons*, or long-winged and much upon the wing, called *Gulls*. The broad-billed are divided into the *Goose* kind and the *Duck* kind. The *Duck* kind are either *Sea-ducks* or *Pond-ducks*.' He afterwards, in his section on the *Broad-billed Birds of the Duck kind*, thus treats (chap. i.):— *Of the Duck in general.* 'The *Duck kind* have shorter necks and larger feet in proportion to their bodies than *Geese*: lesser bodies. Howbeit, the biggest in this kind do equal if not exceed the least in that. They have shorter legs than *Geese*, and situate more backward, so that they go waddling; a broader and flatter back, and so a more compressed body; and lastly, a broader and flatter bill. Their tongue is pectinated or toothed on each side, which is common to them with *Geese*.'

'These are of two sorts, either wild or tame. The wild again are of two sorts—1. *Sea-ducks*, which feed mostwhat in salt water, dive much in feeding, have a broader bill (especially the upper part) and bending upwards (to work in the slem), a large hind-toe, and thin (likely for a rudder), a long train, not sharp-pointed. 2. *Pond-ducks*, which haunt plashes, have a streight and narrower bill, a very little hind-toe, a sharp-pointed train, white belly, speckled feathers, black with glittering green in the middle wing, with a white transverse line on either side. For this distinction of *Sea-ducks* and *Pond-ducks* we are beholden to Mr. *Johnson*.'

Ray divides his 'Palmipedes latirostræ minores, seu Anatinum genus' into *Anates Marinæ* and *Anates fluviatiles, aquas dulces præcipuè frequentantes, Anates exoticæ Brasilienses*, and *Anates Domesticæ*. Brisson's twenty-fourth order, consisting of birds with four toes, the three anterior being joined together by membranes, the posterior separated, and with a dentilated bill, includes the genera *Harle, Oie*, and *Canard (Goosanders, Geese*, and *Ducks)*. This order is placed between that order of birds the arrangement and connexion of whose toes is similar to the modifications of those parts in the twenty-fourth order, but which have a bill without dentilations (Puffins, Petrels, Gulls, Terns, &c.), and the twenty-fifth order, which is distinguished by the birds arranged under it having all the toes joined by membranes (the Darters, Boobies, Pelicans, &c.)

Linnæus, under his third class of birds, *Anseres*, included the genera *Anas*, *Mergus*, *Alca*, *Procellaria*, *Diomedea*, *Pelecanus*, *Plotus*, *Phäeton*, *Colymbus*, *Larus*, *Sterna*, and *Rynchops;* in short, all those birds which possess a rather blunt bill, covered with an epidermis, gibbous at the base, dilated at the apex, and with denticulated fauces, a fleshy tongue, and palmated natatorial feet. The class stands between the *Picæ* and the *Grallæ*. The genus *Anas* comprehends the swans, the geese, and all the ducks, in the general acceptation of the term.

Pennant's twenty-fourth genus, *Duck*, is placed between the genus *Merganser* (Goosander) and the genus *Corvorant;* and it comprehends the swans, the geese, and all the ducks, like the Linnean genus *Anas*.

Latham, who divides the birds into *terrestrial* and aquatic, makes his ninth order, *Palmipedes*, consist of two great sections: the first consisting of those with long feet —Avoset and Flamingo for example,—and the second of those with short feet, comprehending all the short-limbed aquatic birds with webbed feet.

Lacépède's second subclass of birds consists of those the lower part of whose legs is denuded of feathers, or have many toes united by a membrane. The first division of this subclass consists of those which have three anterior toes and one posterior toe, or none. The first subdivision consists of the *Water Birds*, *Oiseaux d'Eau;* and the twenty-third order of Lacépède comprehends those genera which have a dentilated bill, viz., *Canard*, *Anas;* *Harle*, *Mergus;* *Prion*, *Prion*. The genus *Anas* consists of all the birds which combine with the characters above stated a wide bill, rounded at its extremity, and furnished around the mandibles with small vertical laminæ.

Duméril (*Zoologie Analytique*, 1806) divided the birds into six orders. The last of these is formed by the Palmipèdes; and the first family of that order, the *Serrirostres* or *Prionoramphes*, contains the genera *Canard*, *Harle*, and *Flammant* (Flamingo).

Meyer's ninth and last order, *Natatores*, contains three sub-orders; the second of these, *Lamelloso-dentati*, includes *Cygnus*, *Anas*, *Anser*, and *Mergus* (1810).

Illiger (1811) made the *Natatores* his seventh and last order, and the *Lamelloso-dentati*, the third section, comprehends the genera *Anas*, *Anser* (Brisson), and *Mergus*.

Cuvier's sixth and last order is the *Palmipèdes;* and the last family of that order, *Lamellirostres*, contains the great genus *Des Canards* (*Anas*, Linn.). Cuvier remarks that they are commonly divided into three subgenera, the limits of each of which are not very precise, viz., the swans (*Cygnus*, Meyer), the geese (*Anser*, Brisson), and the ducks, in the general acceptation of the term (*Anas*, Meyer). The other great genus of Cuvier's *Lamellirostres* is *Mergus*, Linn.

Cuvier separates the genus *Anas* into two divisions. The first consists of those whose hind toe is bordered by a membrane, whose head is larger and neck shorter in comparison, and which have also the feet placed more backwards, the wings smaller, the tail stiffer, the tarsi more compressed, the toes longer, and the webs more entire. They walk badly, live more exclusively upon fishes and insects, and dive more frequently. (*Platypus*, Brehm; *Hydrobates*, Temminck; *Fuligula*, Charles Bonaparte.) This first division contains the following subdivisions: *Les Macreuses* (*Oidemia* Fleming, *Anas nigra*, *A. fusca*, Linn., &c.); *Les Garrots* (*Clangula*, Leach; *Anas glacialis*, *A. histrionica*, Linn., &c.); *Les Eiders*, Eider ducks, *Somateria*, Leach, *Anas mollissima*, Linn.; *Les Millouins*, *Fuligula*, Leach.

The second division is formed by those ducks which are without the membranous border on the hind toe, and have the head smaller, the feet less, the neck longer, the bill more equal, and the body less clumsy (épais). These walk better, and seek aquatic plants and their seeds as much as fish and other animals. It would seem, adds Cuvier, that the swellings of their tracheæ are of a homogeneous bony and cartilaginous substance. It is to this division that Charles Lucian Bonaparte, prince of Musignano, confines the appellation *Anas*. The following are the subdivisions: *Les Souchets*, *Rhynchaspis*, Leach; *Les Tadornes*, *Anas tadorna*, Linn., &c.; those which have naked parts about the head, and often a boss or convexity on the base of the bill, as the Muscovy duck; those with a pointed tail, *Anas acuta*, Linn., for instance; those whose male has curled feathers in the tail, as the wild duck, *Boschas*, *Anas Boschas*, Linn.; those which have a tuft on the head and the bill rather narrower anteriorly, as the Summer duck, *Anas sponsa*, Linn., and the Mandarin duck, *Anas galericulata*, Linn., *Dendronessa*, Swainson; those which have the bills of ducks, but legs even longer than those of the geese, and which perch and nestle in trees, *Anas arborea*, Linn., &c. One of these Cuvier observes has the feet only semipalmated, *Anas semipalmata*, Latham. Finally, Cuvier goes on to state that we possess, especially in winter, among those which have nothing remarkable about them, *Anas strepera*, Linn., *A. Penelope*, Linn.; and many small species which are distinguished by the name of *Sarcelles*, Teals, *Anas querquedula*, Linn., the common Teal, for example.

Vieillot's fifth and last order is again denominated *Natatores:* it consists of three tribes, viz., the *Téléopodes*, the *Atéléopodes*, and the *Ptiloptères* (*Ptilopteri*). The third family of the *Téléopodes*, the *Dermorhynques*, contains the genera *Harle*, *Oie*, *Cygne*, and *Canard;* and this family is placed between the Divers (Plongeurs) and the *Pélagiens*, consisting of the gulls, terns, &c.

The *Palmipèdes* form M. Temminck's fifteenth order, which contains the whole of the true web-footed birds. The genera are numerous, and, among them, the duck (*Canard*) and the goosander (*Mergus*) are placed between the albatros and the pelican (1815 and 1820).

M. de Blainville (1815, 1821, 1822) divides *Natatores* or Swimmers into the *Macroptères* (Mouettes), *Syphonorhiniens* (Petrels), *Cryptorhyniens* (Pelicans), and *Colymbiens*. The latter he subdivides into the *Ailés* (*Canards*); *Sub-Ailés* (*Plongeons*); and *In-Ailés* (*Manchots*, Penguins).

Mr. Vigors, in his paper 'On the natural Affinities that connect the Orders and Families of Birds,' read before the Linnean Society, December 3, 1823 (*Trans. Linn. Soc.*, vol. xiv., p. 395), makes his fifth order *Natatores* consist of the families stated in the article DIVERS (vol. ix., p. 36). The family of *Anatidæ* (Leach), to which he leads his readers from the preceding order (*Grallatores*) by means of the connexion between the *Rallidæ* and *Cereopsis*, consists, he observes, of the groups which compose the Linnean genera *Anas* and *Mergus*, and, with respect to the affinities that prevail throughout the families of the order, he remarks that the more extensive subdivisions of the Linnean *Anas* which have been acknowledged by all systematic writers, either under the name of sections or genera, display in conjunction with *Mergus* a regular series of affinities conformable to the principles advanced by him as regulating the order. The first group, he observes, upon which we enter in this first aberrant family of the order, has been formed into a sectional subdivision by M. Temminck, under the denomination of '*Les Oies;*' and with equal signification and more effect has been made into a genus, under the title of *Anser*, by M. Illiger, who therein followed the older naturalists that preceded Linnæus. These birds retain much of the manners of the *Waders*. They are endowed with considerable facility in walking, are found to swim but seldom, and do not dive at all. In these characters, as well as in other particulars, they correspond with the family of *Laridæ*, which meets them at the other extremity of the circle of *Natatores*.

To this division succeeds *Cereopsis*, Lath., strongly allied to the preceding *Anseres* by its general structure, but still more typical in the family in consequence of the length and nakedness of the *tarsi* above the knee: characters which indicate a greater power of walking, and a greater deficiency in swimming. It joins the third division, or the genuine *Anates*, by means of a group of which *Anas arborea*, Linn., is the representative. This third and most typical group of the family, which accords with M. Temminck's first section of '*Canards proprement dits*,' still approaches more closely to the land birds than the birds which follow: the species swim with ease, and even dive, but the latter faculty they seldom exercise unless when pursued. Their food is also less exclusively marine than that of the succeeding groups, being composed of vegetables, grains, and insects, in addition to fish. This division, consisting of many prominent forms, of which *Anas arborea* before mentioned, *A. tadorna*, *boschas*, *clypeata*, *penelope*, and *querquedula*, may be considered types, is distinguished from the remainder of the 'Canards proprements dits' of M. Temminck by the hind toe being entire, or free from the lobated membrane which is attached to the hind toe of these last. Mr. Vigors proceeds to state that this character of the lobated membrane, which is of considerable importance as pointing out the approach of the birds in which it is found to the more typical oceanic families, prevails in all the remaining groups of the present family. It is strongly conspicuous in *Mergus*, Linn., the next division that appears to follow: and we consequently find that the species of that genus carry the powers of swimming and diving to the greatest extent, making use of their wings also in their progress through the water; and at the same time exhibiting a constrained and embarassed mode of walking, in consequence of the backward position of the legs. It thus forms the passage to the succeeding family of *Colymbidæ*. In the shape of its bill, which is slender and partially compressed, it exhibits a distinct form in its own family: but still, by means of the bill of an intervening species, *M. albellus*, Linn., which is intermediate in its breadth and depression, it preserves its connexion with the *Anates*. 'We hence,' continues Mr. Vigors, 'pass to the fifth and last group of the family which, with the bill of the *Anates*, retains most of the characters conspicuous in *Mergus*. The forms most prominent in it, represented by the different Linnæan species *A. ferina*, *clangula*, *histrionica*, and *mollissima*, possess a strongly lobated hind toe; they frequent the ocean for the most part, where they dive with the greatest facility and for a length of time; and they live chiefly on marine animals. Their legs are also thrown behind the equilibrium of their body; and thus also they evince their contiguity to the typical *Natatores*. By means of the group which contains *A. mollissima*, our well known *Eider Duck* and its congeners, where the bill, with an elevated protuberance at the base, approaches that of the *Anas olor*, Linn., we find ourselves brought round to the *Cygnus* of the present day, which forms part of the first division. That genus in like manner deviates partially from the conterminous genus *Anser*, in its legs being thrown more backward, and its consequently greater awkwardness in walking. Here then the affinities are evident which thus establish the perfect return of the series of the *Anatidæ* into itself. Before we leave the family, I must indulge myself in observing a most conspicuous peculiarity which marks the series of affinities among these groups. The long and slender neck observable in the *Grallatores* is preserved in such groups of the *Anatidæ* as are most conterminous to that order, such as *Cygnus*, *Anser*, *Bernicla* and *Cereopsis*, until it is superseded by the short necks of the more oceanic *Anatidæ*, which exhibit all the expansion and capaciousness of throat observable in the typical *Natatores*.'

M. Latreille, in his Method (1825), makes the *Palmipèdes* his seventh and last order; and the *Lamellirostres*, the first of its four families, consist of the genera *Cygne*, *Oie*, *Anatique*, *Canard*, *Harle*.

The method proposed by M. de Blainville in 1815 and 1821, and developed by M. Lherminier in 1827, places the ducks (*Canards*, *Anas*) between *Pelecanus* and *Podiceps*, in the first sub-class, or that of the *Normal Birds*.

In the Zoological Journal (vol. ii., p. 404, 1825-6), Mr. Vigors gives a disposition of the Anatidæ which, as he says, exhibits a slight deviation from that drawn out in his paper on 'the Affinities of Birds,' and adopted by Mr. Stephens in the 'General Zoology.' Mr. Vigors states, in making this second disposition, that he does not think, upon consideration, that the two sub-families of the '*Canards proprement dits*' of M. Temminck can be said to be so far separated from each other as by the intervention of another sub-family: while *Cygnus* appears to hold a separate station of equal rank with the other sub-families. The series of affinity, however, according to Mr. Vigors, remains unaltered: a partial change only taking place in the mode of selecting the types of each sub-family. *Mergus* seems to belong to the fourth sub-family, in his opinion, but to be at the extremity of it; in fact to be osculant between the families of *Anatidæ* and *Colymbidæ*. The following is the arrangement proposed by Mr. Vigors in the Zoological Journal.

ORDO V. NATATORES, Ill. (Anseres, Linn.)

1. FAM. ANATIDÆ, Leach. (Gen. *Anas Mergus*, Linn.)

*

Sub-fam. Anserina.

Anser. Briss.; *Bernicla*, Steph.; *Cheniscus*, Brookes's M.M.S.; *Chenoplex*, Steph.; *Plectropterus*, Leach.

* *

Sub-fam. Cereopsina.

Cereopsis, Lath.

* * *

Sub-fam. Anatina.

Tadorna, Leach; *Cairina*, Flem.; *Anas*, Auct.; *Dafila* Leach; *Mareca*, Steph.; *Querquedula*, Ray; *Rhynchaspis*, Leach.

* * * *

Sub-fam. ?

Clangula, Flem.; *Harelda*, Ray; *Mergus*, Linn. (*Merganser*, Briss.); *Somateria*, Leach; *Oidemia*, Flem.; *Biziura*, Leach.

* * * * *

Sub-fam. Cygnina.

Cygnus, Meyer.

The other four families are—2. Colymbidæ, *Leach*; 3 Alcadæ; 4. Pelecanidæ, *Leach*; 5. Laridæ, *Leach*.

Mr. Yarrell in his 'Observations on the Tracheæ of Birds,' read before the Linnean Society, February 6, 1827 (*Linn. Trans.*, vol. xv., p. 378), after speaking of the form of the windpipe, among others of the black swan of New Holland, *Anas atrata*, Linn., and of that of the semipalmated goose, *Anas semipalmata* of Dr. Latham, goes on to remark that the different species of geese considered British present nothing remarkable in their tracheæ, the Egyptian goose alone excepted, the male of which species possesses a bony enlargement at the bottom of its windpipe; and he notices the circumstance that systematic authors seem to agree in placing this bird at the bottom of the list of the geese, where it appears to occupy its proper situation; and observes that, combining as it does some of the characters common to those birds and the true ducks, it becomes a very natural link between them, and he closes his interesting paper with an arrangement of the British species of the latter portion of this family *founded upon internal as well as external conformation*.

'The first division of true ducks,' says Mr. Yarrell, 'will contain the Shieldduck, Muscovy, Wild Duck, Gadwall, Shoveler, Pintail, Wigeon, Bimaculated Duck, Garganey, and Teal, all of which will be found to have the following characters in common. Externally they exhibit considerable length of neck: the wings are also long, reaching to the end of the tail; the tarsi somewhat round; the hind toe free or having no pendent lobe. In habits they may be stated generally as frequenting fresh water, but passing much of their time on land, feeding in ditches and about the shallow edges of pools on aquatic plants, insects, worms, and occasionally fish, taking their food at or near the surface; possessing great powers of flight, but seldom diving unless pursued. Of their internal soft parts, the stomach is in the greatest degree muscular, forming a true gizzard; the intestines long, the cæcal appendages from six to nine inches in length in the larger birds, and decreasing only in proportion to the size of the species. Of the bones it may be observed that the ribs are short, extending but little beyond the line of the posterior edge of the sternum; the keel of the breast-bone deep, affording great extent of surface for the insertion of large and powerful pectoral muscles; the enlargement at the bottom of the trachea in all of them is of bone only. The wild duck may be considered the type of this division.'

Mr. Yarrell then proceeds to state that the Eider Duck, King Duck, Velvet Duck, and Scoter, possessing some characters common to the preceding class, and others belonging to that next in succession, appear to supply the link between these two divisions; and he regrets that the extreme rarity of the last-named species had prevented him from making any examination beyond that afforded by the external parts of preserved specimens in collections.

The next division of true ducks, according to Mr. Yarrell, includes in the following order the Red-crested, the Pochard, Ferruginous, Scaup, Tufted, Harlequin, Long-tailed, and Golden-eye; and their general distinctions, he remarks, internal as well as external, compared with those of the birds of the first division, will be found of an opposite character. Externally, they exhibit the neck and wings short, the latter only reaching to the origin of the tail-feathers; the tarsi short and compressed; the hind toe lobated, and an extended web to the inner toe. They frequent the sea, or the deep parts of the fresh-water lakes, and have been called oceanic ducks; they are seldom seen on land, their walk is embarrassed from the backward position of their legs, but they dive constantly and with great facility, taking their prey at various depths below the surface; their food consists of finned and shell-fish, and marine insects, but of little or no vegetable production; and their powers of flight are moderate. With regard to their soft parts, Mr. Yarrell states that the œsophagus is capable of great dilatation, that the stomach is a muscular gizzard, but that the internal cavity increases in size, the stomachs of the long-tailed duck and golden-eye most resembling the stomach of the mergansers, whilst the intestines and cæcal appendages are shorter, the latter diminishing from six inches in the first to four and a half in the tufted duck, three inches in the long-tailed, and but two in the golden-eye. The ribs of the birds of this division, according to the same author, are elongated; the keel of the breast-bone gradually decreases in depth; the position of the wings is more forward, and the legs are placed further back. The tracheæ of these ducks, moreover, are particularly distinguished from those of the others by the enlargement at the bottom of the tube being covered with a delicate membrane, supported by slender portions of bone; the trachea of the red-crested duck is an example of this form, and Mr. Yarrell is of opinion that it may be considered the type of this division.

As the Egyptian goose, continues Mr. Yarrell, has in this arrangement been considered the link between the geese and the first division of the true ducks, from its possessing, with the characters of the former, the bony enlargement of the trachea common to the latter; and the velvet duck, for similar reasons, supplying the link between the two divisions of true ducks, possessing, among other characters, an altered form of the bony enlargement of the trachea of the one, with the lobated toe of the other; so the golden-eye, the last of the series, appears to complete the arrangement by exhibiting some of the characters found in the Mergansers, which are next in succession. The first point of similarity is found by Mr. Yarrell in the elongated feathers of the top of the head, forming a crest; they agree also, he adds, in the shape of the sternum, and a particular extension of its posterior edge, becoming an ensiform process; and this extension of the edge of the breast-bone prevails in the genera colymbus, alca, and uria; and, with the elongation of the ribs observable in all good salt-water divers, seems intended as a protection to the important viscera of the abdomen, and enables them to resist pressure when below the surface. The golden-eye, in the opinion of the same author, is also intermediate in its stomach, intestines, and cœcal appendages, the latter being only two inches in length. In the goosander indeed Mr. Yarrell found that these appendages reached three inches; but, as he well observes, the size of the bird being considered, they are reduced on a comparative estimate to less than two; in the red-breasted merganser he found them to measure but one inch, and the swan he states is without any. In the form of its trachea, the golden-eye, it seems, more closely resembles the mergansers than that of any other duck, by the enlargement in the tube, and in the shape of the labyrinth. 'Thus the whole of the numerous species of the *Anatidæ* appear to descend to the more perfect water birds by gradations, but with well-marked divisions throughout.'

C. L. Bonaparte, in his 'Tabella Analitica dei Generi,' (Specchio Comparativo, 1827) makes his 'Ordine' *Anseres* consist of five families: the *Longipennes;* the *Lamellosodentati;* the *Steganopodes;* the *Lobipedes;* and the *Pygopodes.* His 'Famiglia' *Lamelloso-dentati* comprises the two genera *Anas* and *Mergus*, the first of which he characterizes thus—'Becco depresso, ottuso, con denti lamelliformi;' and it comprehends the swans, geese, and ducks in the large meaning of the term.

M. Lesson, in his 'Manual' (1828), makes the *Anatidæ* (*Lamellirostres* of Cuvier) the fifth and last family of the sixth order, *Les Palmipèdes, Natatores* of Illiger and Vieillot. Under the *Anatidæ* he arranges the genera *Cygnus*, Meyer; *Anser*, Brisson, with its subgenera; *Cereopsis*, Latham; *Anas*, Linnæus; and *Mergus*, Linnæus. The genus *Anas* he divides into two sections.

The *first section* embraces those ducks which have the hind toe (pouce) bordered with a membrane (*Hydrobates* of Temminck), and contains the following subgenera:—1st. *Macreuse*, Cuv., *Maceranas* (*Anas fusca*, Linn., *A. nigra*, Linn.) 2nd. *Macroramphe*, *Macroramphus* (*Anas perspicillata*, Linn.) 3rd. *Hydrobate*, *Hydrobates*, Temm. (*Anas lobata*, Shaw.) 4th. *Garrot*, Cuv., *Histrionicus* (*Anas histrionica*, Linn.) 5th. *Eider*, Cuv., *Platypus*, Brehm, (*Anas mollissima*, Linn.) 6th. *Millouin*, Cuv., *Fuligula*, Ray, (*Anas fuligula*, Linn.) 7th. *Microptère*, *Micropterus* (*Anas brachyptera*, Latham.)

The *second section* includes those ducks whose hind toe is not bordered by a membrane, and the following subgenera are arranged under it:—8th. *Souchet*, Cuv. *Clypeata* (*Anas clypeata*, Linn.) 9th. *Tadorne*, Cuv., *Tadorna*, Leach, (*Anas tadorna*, Linn.) 10th. *Musqué*, *Moschatus* (*Anas moschata*, Linn.)

The 11th subgenus is formed of the *Canard proprement dit*, *Anas*, and is separated into two subdivisions. 1st. *Les Pilets*, which have the tail pointed or surpassed by the two largest quills; Type: *Le Pilet (Anas acuta*, Linn.) 2nd. The *true ducks*, distinguished by the curled feathers on the upper tail-coverts; Type: (*Anas boschas.*)

The 12th subgenus is the *Canaroie*, *Anseranas* (*Anas melanoleuca*, Latham, Cuv.); and the 13th the *Sarcelle*, *Teals*, *Querquedula*, Brisson (*Anas querquedula*, Linn., *Anas crecca*, Linn., &c.)

Mr. Swainson, in his paper 'On those Birds which exhibit the Typical Perfection of the Family of Anatidæ' (*Journal of the Royal Institution of Great Britain*, August, 1831), remarks, that the most superficial observer, on looking to the family of the *Anatidæ*, or ducks, under which he will include the geese and swans, must be struck by the remarkable shape and structure of the bill, totally different from that of all other birds. This, in fact, he adds, is the only group in the aquatic order wherein the bill is very considerably dilated in its breadth, and of a texture unusually soft. In addition to these, a third and a very important character is discerned; the cutting margins of the bill are provided with numerous transverse lamellar plaits, so much developed in some species as to project beyond the bill: thus assuming an analogy to the teeth of quadrupeds. This analogy, however, is more imaginary than real, since these appendages are destined for a very different purpose. The feet, although in general short, are adapted to more than one purpose, since they are not only used for swimming and diving, but for walking.

Mr. Swainson proceeds to state that 'the gulls feed indiscriminately upon marine animals, whether living or dead: they are the purifiers of the waters as the vultures are of the land. The pelicans and the penguins derive their support from those large fish which the more feeble gulls can neither capture nor swallow, while the terns skim the ocean in search of small fish which rise to the surface. But the inconceivable multitudes of minute animals which swarm, as voyagers assert, in the northern seas, and the equally numerous profusion inhabiting the sides of rivers and fresh waters, would be without any effectual check upon their increase, but for a family of birds destined more particularly for that purpose. In the structure, accordingly, of the ducks, we see all these qualifications in the utmost perfection. By means of their broad bill, as they feed upon very small and soft substances, they capture at one effort considerable numbers. Strength of substance in this member is unnecessary: the bill is therefore comparatively weak, but great breadth is obviously essential to the nature of their food. As these small insects also which constitute the chief food of the *anatidæ* live principally beneath the surface of the mud, it is clear that the bill should be so formed that the bird should have the power of separating its nourishment from that which would be detrimental to the stomach. The use of the laminæ thus becomes apparent: the offensive matter is ejected between their interstices, which, however, are not sufficiently wide to admit the passage of the insect food at the same time. The mouthful of stuff brought from the bottom is, as it were, sifted most effectually by this curiously-shaped bill; the refuse is expelled, but the food is retained. It is probable also that the tongue is materially employed on this process; for unlike that of all other birds, it is remarkably large, thick, and fleshy. From being so highly developed, it must be endowed with an unusual degree of sensation; and indeed, a very exquisite sense of taste must belong to any animal which has to separate its food from extraneous substances, without deriving any assistance in the process from its powers of sight. against this deficiency nature has wisely provided, by heightening and increasing the senses of taste and touch.'

In the physiological series of the Museum of the Royal College of Surgeons in London—Gallery (317)—is the head of a Muscovy duck, *Anas Moschata*, Lynn., showing the serrated character of the margins of the mandibles, and the peculiar tuberosity at the base of the beak; and a good opportunity of studying the structure of the tongue is afforded by the preparations numbered 1468 and 1469 In the former are seen the bones of the tongue and upper larynx of a swan (*Cygnus Olor*, Brisson). The glosso-hyal part is broader and longer than it is in the land-birds, corresponding to the greater development of the tongue in the lamellirostral swimming birds, but is devoid of the cartilaginous processes to its posterior angles in the gallinaceous tribe. In the larynx may be distinguished the thyroid, cricoid, and arytenoid cartilages, which in most birds are more or less bony: the thyroid cartilage is the largest, and covers the whole anterior part of the larynx like a shield: the posterior broad part of the cricoid (which is not in this class developed in the form of a ring) supports as usual the arytenoid cartilages which form the *rima glottidis*; they have muscles for opening and closing that fissure, and the larynx is defended by the latter action alone from the entrance of food or fluid. No. 1469 exhibits the lower jaw, with the tongue and larynx of the same bird, and it will be seen that the tongue is so far developed as to correspond with the form of the lower jaw. It is a thick and fleshy organ, beset with four longitudinal rows of horny tooth-like processes, two at the sides, and two on the dorsum, separated by a mesial furrow: the base of the tongue is also armed with retroverted spines arranged in a chevron figure; similar spines again occur behind the larynx. The apo- and cerato-hyal bones are dissected on one side, but covered by the muscles on the other.

Mr. Swainson, in the paper above quoted, divides the genus *Anas* (which he thus characterizes 'Bill longer than the head, depressed nearly its whole length. The base not enlarged, the tip very obtuse; the laminæ of the upper mandible generally projecting. Hinder toe not dilated, short: claws short, thick') into the following sub-genera:

1. *Typical Group.*	*Sub-genera.*
Bill spatulate, simple; laminæ considerably projecting. . .	Anas, Lin.
2. *Sub-typical Group.*	
Bill spatulate, furnished with a lobed membrane; laminæ considerably projecting. . . .	Malacorhynchus, Sw.
3. *Aberrant Group.*	
Bill of equal breadth, projecting laminæ short, slender, acute, crowded.	Chauliodus, Sw.
Bill more cylindrical, lengthened; tail long.	Dafila, Leach.
Bill depressed, of equal breadth; laminæ distant, obtuse, and generally concealed; tail short. .	Boschas, Antiq.

The type of the genus Anas is considered by Mr. Swainson to be the shoveler duck; and he thus speaks of the arrangement above set forth: 'In regard to the tabular disposition of the five sub-genera, or types of form, it will be expected that I should say a few words, since it is at variance with the mode of exhibiting circular affinities adopted by that distinguished writer who first detected this arrangement. On this point I must refer the reader to the ornithological volume of the 'Northern Zoology,' now about to appear, where he will find our peculiar views explained and illustrated. I have, indeed, chosen to enumerate, in both instances, the subordinate divisions of the aberrant group, but they are always viewed by me as forming a distinct circle of their own, ***the primary divisions of every natural group being considered as*** **Three** and not **Five**. In the present instance, the three sub-genera of *Chauliodus*, *Dafila*, and *Boschas*, possess one common character, in not having the bill conspicuously dilated at its extremity; while their circular succession can hardly be questioned, when we find the greatest modern reformers[*] leave the *Gadwall and the Mallard in the same group*; these writers having overlooked the modifications of the laminæ, and passed over the difference in the habits of these birds, as not bearing upon the question. The theory that the mallard is the typical representation of this family has now, I trust, been thoroughly investigated, and demonstrated to be erroneous;[†] nor can I consider the two circular arrangements[‡] that have been made of the whole family, each apparently perfect, but essentially different, in any other light. They appear to me to be the result of abstract theory, and of a theory misapplied. On the other hand, I deem it but justice to the great merits of another ornithologist of our own country to acknowledge the assistance I have derived from his highly valuable paper on the trachæa (tracheæ) of birds,[*] and, at the same time, to declare that if there is any truth in his own inferences, drawn from internal structure, or in mine, resulting from attention to external form and habits, he has himself marked out the true circle of the anatidæ, so far as the British species are concerned, *totally unconscious of having done so*. There is, and there cannot be, but one plan of creation. In our efforts to develop this plan we must, as Mr. Yarrell justly observes, "combine ascertained habits, external characters, and anatomical structure;" and in proportion as we can do this so may we assume that our arrangement is "*natural*."'

We entirely agree with the author above quoted in the praise awarded to Mr. Yarrell; but we hesitate to join in the conclusion that he has 'marked out the true circle of the anatidæ, so far as the British species are concerned, *totally unconscious of having done so*,' an expression repeated also in italics in the second volume of 'Fauna Boreali-Americana.' Mr. Yarrell proposed his method on the combined principles of 'ascertained habits, external characters, and anatomical structure;' and his paper, though it is marked with his usual modesty, shows that he well knew all those principles and their value as elements of arrangement. In addition to this, we have the best authority for stating that Mr. Yarrell had not the want of consciousness attributed to him.

Dr. Richardson ('Fauna Boreali-Americana') observes that the *Anatidæ* are 'of great importance in the fur-countries, as they furnish at certain season in the year, in many extensive districts, almost the only article of food that can be procured. The arrival of the water-fowl marks the commencement of spring, and diffuses as much joy among the wandering hunters of the arctic regions as the harvest or vintage excites in more genial climes. The period of their migration southwards again, in large flocks at the close of summer, is another season of plenty, bountifully granted to the natives, and fitting them for encountering the rigour and privations of a northern winter. The *Anatidæ* have therefore very naturally been observed more attentively than any other family of birds, both by the Indians and white residents of the fur-countries; and as they form the bulk of the specimens that have been transmitted to England, they are also better known to ornithologists.'

Sub-family, Anatinæ, Swainson. (The true Ducks.)

Geographical Distribution. Dr. Richardson, in the work last quoted, states, that *Anas clypeata* and *A.* (*Dafila*) *acuta* frequent chiefly the clear lakes of the northern districts, and breed in the barren grounds, being found in numbers in the more southern woody districts in spring and autumn only. *A.* (*Boschas*) *domestica*, *A.* (*Chauliodus*) *strepera*, and *Mareca Americana*, breed in the woody districts up to their most northern limits, in latitude 68°. *A.* (*Boschas*) *crecca* is abundant to the extremity of the continent, both in the woody and barren districts. *A.* (*Boschas*) *discors*, though very plentiful on the Saskatchewan, was not observed farther north than the fifty-eighth parallel; while *Dendronessa sponsa* seldom goes to the northward of the fifty fourth degree of latitude, and is rare even to the southward of that parallel.

It appears also from Dr. Richardson's tables that *Anas Clypeata* was observed in 70° lat. N. migratory across the continent; numerous: that it was observed on the Saskatchewan, in 53° to 54° N. lat., and from 600 to 1000 miles distant from the sea coast, very common as a bird of passage in spring and autumn; that it frequents the vicinity of Philadelphia, rather common in winter (Bonaparte), and that its winter quarters are in the United States and Mexico. *A.* (*Chauliodus*) *strepera* has been noticed in 68° N. lat. east of the Rocky Mountains, migratory; and on the Saskatchewan (same range of lat. and same distance from the sea coast) common in summer; rare in the vicinity of Philadelphia in winter (Bonaparte): its winter quarters are the Mexican lakes (Swainson):—*A.* (*Dafila*) *caudacuta* in lat. 70° east of the Rocky Mountains, migratory; very common; and on the Saskatchewan, as above, in spring and autumn, but not rare; common in the vicinity of Philadelphia in winter (Bonaparte); and having its winter quarters in the Mexican lakes (Swainson). *A.* (*Boschas*) *domestica* in lat. 68°; migratory across the continent: common on the Saskatchewan, as above, in the summer; common in the vicinity of Philadelphia in the winter (Bonaparte); and having its winter quarters in the Middle and Southern States, Columbia R. and California. *A.* (*Boschas*) *crecca*, in lat. 70°, migratory across the continent; very abundant; on the Saskatchewan, as above, abundant in summer; very common near Philadelphia in the winter (Bonaparte); and with its winter quarters in the Middle and Southern States towards the tropics. *A.* (*Boschas*) *discors*, in lat. 58°, migratory across the continent; very abundant; and on the Saskatchewan, as above, abundant in summer; very common near Philadelphia, in summer (Bonaparte); and with the Mexican States, Columbia R. and California for its winter quarters. *Mareca Americana*, in lat. 68°, migratory; rather common on the Saskatchewan, as above, in summer; common near Philadelphia in the winter (Bonaparte); wintering in the Middle and Southern States and the West Indies. *Dendronessa sponsa*, in lat. 54°, migratory; rare on the Saskatchewan, as above, in summer; common in the vicinity of Philadelphia, in summer (Bonaparte); wintering in the Southern States, Mexico? West Indies.

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[*] Dr. Leach, Dr. Fleming, Stevens (Stephens?), Vigors.

[†] For the demonstration, see the paper quoted.

[‡] Linn. Trans. xiv., p. 499; Zool. Jour. iii. (ii.) p. 404.

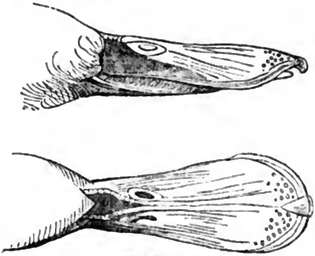
[*] Linn. Trans. xv., p. 378.

In the same work we find in the list of species which merely winter in Pennsylvania, and migrate in summer to rear their young in the fur-countries, *Anas clypeata*, *A.* (*Chauliodus*) *strepera*, *A.* (*Dafila*) *caudacuta*, *A.* (*Boschas*) *domestica*, *A.* (*Boschas*) *crecca*, and *Mareca Americana*;—in the list of species which summer (or breed) in the fur-countries and in Pennsylvania, but winter farther to the southward, *Anas* (*Boschas*) *discors* and *Dendronessa sponsa*;—and in the list of species common to the Old World and the fur-countries, *Anas clypeata*, *A.* (*Chauliodus*) *strepera*, *A.* (*Dafila*) *acuta*, *A.* (*Boschas*) *domestica*, and *A* (*Boschas*) *crecca*.*

Food, Habits, &c.—The *Anatinæ* feed on soft substances, such as fresh-water insects and tender aquatic plants, which they procure near the surface, or, aided by the length of their necks, at the bottom, in shallow muddy places, and worms and slugs, which they search for among the grass. By day they resort to small lakes and rivers, and in the night retire to the fields. They are strong and swift on the wing, and are watchful birds, that seldom dive to escape pursuit, unless when moulting; but when disturbed fly away, making at the outset a circle in the air to survey the cause of their alarm. ('Fauna Boreali-Americana.') Dr. Richardson gives in a note the following interesting information derived from an intelligent keeper of a decoy in the neighbourhood of the Rev. W. Booth of Friskney, in Lincolnshire, to whom Dr. Richardson expresses his obligation for the statement:—'Skelton is unacquainted with the habits of the Gadwall; but he tells me that the widgeon and pintail do not willingly dive: of course, if driven to it, they can, but they do not dive for their food; and though in play they sometimes splash under water, they never remain beneath the surface like the pochard. With respect to *food*· the mallard, pintail, and teal frequent rich flooded lands, "*swittering with their nebs in the soil, and sucking out its strength*;" but the widgeon feeds quite differently, being "*an amazing fowl to graze, a strange eater of grass.*" It is especially fond of 'flutter-grass' (*Glyceria aquatica vel fluitans?*) which it crops on the surface, but it likewise eats many other herbs. When the decoy has been so full of widgeons that they have devoured every blade on the landings, Skelton has taken advantage of their absence in the night, when they resort to the green salt marshes on the sea coast, and laid down sods pared from the fields, on which they readily graze. In common, however, with the mallard, teal, and pintail, they are fond of willow-weed, seeds (*Epilobium?*) with which he feeds all the fowl in the decoy, as they prefer it to oats and every other kind of grain.' Mr. Waterton states that 'the widgeon feeds by day, eating grass like a goose; whilst its congener the mallard invariably refuses this food and seeks for its sustenance by night.'

Sub-genera. Anas.

Example. *Anas clypeata* (Linn.) *The Shoveler.*—This is the *Souchet* of the French, *Cucchiarone* of the Italians, *die Schild-Ente*, and *Löffel-Ente* of the Dutch, *Mimenick* of the Cree Indians, *Hwyad lydanbig* of the antient British, *Rhynchaspis clypeata* of Shaw's Zoology (Leach MSS.), *Spathulea clypeata* of Fleming. The *Anas rubens* of Gmelin is said to be the young male, or a variety of the young male. It is provincially termed *Blue-winged Shoveler*, *Kertlutock*, and *Broad-bill*.



Bill of Shoveler.

Description of a male killed at Fort Franklin, May, 1826. *Colour.*—Head, adjoining half of the neck, medial stripe to the interscapulars, the whole back, interior scapulars, and primaries, umber-brown; sides of the head, the neck, and crest, glossed with duck-green; rump and tail coverts above and below, with blackish green. Lower half of the neck, the breast, shoulders, shorter scapulars, ends of the greater coverts, and sides of the rump, white; longer scapulars striped with berlin-blue, white and blackish brown. Lesser coverts berlin-blue. *Speculum* brilliant grass-green, broadly bordered above, and narrowly edged below with white; bounded interiorly with greenish black. Belly and flanks deep orange-brown, the latter undulated posteriorly with black. *Bill* black. *Legs* orange.

Form.—*Bill* a little higher than wide at the base, much depressed, dilated and rounded at the end. Mandibles furnished with long, slender, crowded laminæ, the upper ones acute and projecting, forming an apparatus admirably fitted for sifting small insects from the water. Surface of the upper mandible pitted near its oblong *unguis*. *Wings* scarcely an inch longer than the tail, which is graduated, moderately acute, and consists of 14 acute feathers. Tarsus scarcely compressed. Hind-toe not lobed, and the outer-toe shorter than the middle one, as in the rest of the *Anatinæ*.

The female is liver-brown above, with broad borders of pale wood-brown; underneath pale wood-brown with obscure liver-brown marks. She wants the dark-brown and green colours of the head, rump, and tail coverts, the white of the neck, breast, sides of the rump, and scapulars, and also the orange-brown of the belly. The lesser coverts are slightly glossed with berlin-blue, and the speculum is less vivid than in the male. Length 21 inches 6 lines, &c. (Richardson.) The weight is about 22 ounces.

Temminck states that the young males in autumn, and the old males during their moult, have some of the feathers proper to the winter plumage of the male, and others peculiar to the female, or to the young male before the moult, and that these feathers are indistinctly mingled. Young and old males in the summer change are supposed to be the origin of *The Red-breasted Shoveler*.

The trachea of the male is of equal diameter, excepting towards the lower larynx, where it is very slightly enlarged. It forms a slight bony protuberance on the left side, which is dilated a little below. The bronchiæ are very long (Temminck.)

Localities.—Marshes, lakes, and rivers: in Russia, and a great part of Asia. Very abundant in Holland. In France, Germany, and England, it is a bird of passage, arriving in the British islands generally about October, and departing about March. In England the principal resorts of the species are the fens of Lincolnshire and Cambridge. Bonaparte (Specchio Comparativo) notes it as one of those birds common to the neighbourhoods of Rome and of Philadelphia, and as being rather common in both places in winter. For its American distribution see *Geographical Distribution.*—According to Latham it inhabits the Coromandel coast and parts of India. The form occurs in Australia (New Holland Shoveler); and Swainson says that the geographical distribution of the true Shovelers may be deemed universal.

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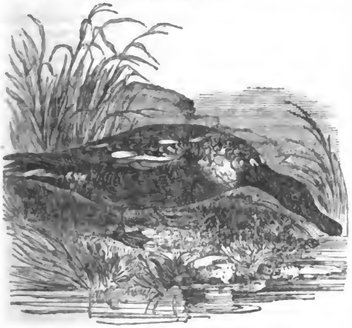
* See also '*Localities*' under each genus, and the lists of Col. Sykes and Mr. Keith Abbott, towards the end of the article.

Food.—Fishes and insects, rarely plants and seeds. (Temminck.)

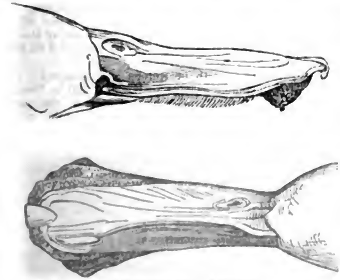
Propagation.—Nest upon the borders of lakes covered with reeds or coppice. Eggs, twelve to fourteen, of a bright greenish yellow, or oil-green. It is said to have bred in France, and has been known to breed in the marshes of Norfolk, and in the neighbourhood of the Tweed. But these may be deemed exceptions to the general place of nidification, which is far north.

Utility to man.—The flesh is highly esteemed for the table, and is considered by many to excel that of the mallard, or common wild-duck, in flavour.


Shoveler. Anas clypeata.

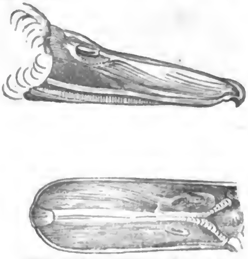
Malacorhynchus (Swainson).

Mr. Swainson ('Journal of the Royal Institution,' loc. cit.) observes that among the broad-billed ducks of the southern hemisphere there is a very remarkable modification of form. The breadth of the bill and the length of the laminæ are nearly the same; but the edge of the upper mandible, instead of being smooth, as in the European species, is furnished with a thin membranaceous skin, which projects considerably, and hangs down somewhat like a wattle on each side. Mr. Swainson proposes for this form the sub-generic name above given, remarking that the bill of the European Shoveler is flexible, but that in this group it is much more so. One species, he adds, described by authors under the name of the Soft-billed Shovele , can scarcely exhibit this debility more than another before him when he wrote his paper: it came, according to him, from the same country (Australia?) and seems to be undescribed.


Bill of Malacorhynchus. (Swainson.)

Chauliodus (Swainson).

Mr. Swainson states that the Gadwall certainly makes as near an approach to the Shovelers as any other yet known. 'The form of the bill, indeed, is no longer spatulate, or perceptibly broader towards the end; but the laminæ of the upper mandible are still very fine, distinct, and more numerous than those of any other form subsequently mentioned, for they project a full tenth of an inch beyond the margin. The tail now begins to be lengthened, and, in a new species from Africa (*C. Capensis*), which I have recently received, is so much attenuated, as to evince an evident affinity to the Pintail Duck forming the sub-genus *Dafila* of Dr. Leach.'


Bill of Chauliodus (Gadwall). (Swainson.)

Example. *Chauliodus strepera* (Swainson). *The Gadwall*, or *Gray*. This is the *Chipeau*, or *Ridenne*, of the French, *Anitra montanara* and *Anatra canapiglia* of the Italians, *Schwatterente* and *grave Mittel-ente* of the Germans, and *Y gors Hwyad lwyd* of the antient British.

Description of a *male* killed on the Saskatchewan, May 22, 1827. *Colour.*—Top of the head and nape liver-brown, edged with grey: head beneath and neck, grey, with small brown specks. Base of the neck above and below, anterior part of the back, exterior scapulars, flanks, and sides of the vent, clove-brown, marked with concentric horse-shoe-shaped white lines. Interior scapulars, lesser coverts, primaries, tertiaries, and tail, hair-brown; intermediate coverts chestnut-brown; greater coverts, rump, and upper and under tail-coverts, bluish-black; *speculum* white, its anterior border black. Lower part of the breast, middle of the belly, and under surface of the wings, white. *Bill*, brownish-black, pale beneath. *Legs* orange-coloured.

Form.—*Bill* as long as the head, of equal breadth and height at the rictus; depressed, but not widening anteriorly. Laminæ of the mandibles rather stronger and much shorter than those of the Shoveler, but finer and more numerous than those of any northern species. The upper ones project a full tenth of an inch beyond the margin. *Wings* nearly equal to the tail; first and second quills equal and largest. *Tail* consisting of sixteen feathers, the lateral ones graduated. Total length twenty-three inches, &c. (Richardson). Size rather less than that of the wigeon. Temminck makes the length eighteen or nineteen inches. The *female* has the feathers of the back of a blackish-brown, bordered by bright ruddy (*roux*); the breast reddish-brown, marked with black spots; no zigzags on the flanks; rump and lower coverts of the tail greyish.

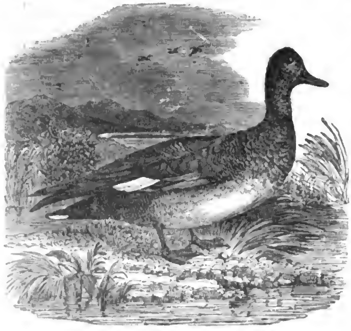
Localities.—The marshes, &c., of the north and east of Europe; very abundant in Holland. Rarely seen in the British islands except at the period of its vernal migration, and then generally in the marshes of Norfolk. Common in winter on the maritime coasts of France; rare in the interior. Bonaparte (*Specchio Comparativo*) notes it as rather common in the neighbourhood of Rome in the winter. For its American range see the general *Geographical Distribution.*

Food.—Fishes, molluscs (coquillages), insects, and aquatic plants (Temminck). Insects and their larvæ, aquatic plants, and seeds (Selby).

Propagation.—Nest in the most covered part of marshes or rushy meads. Eggs eight or nine, of a greenish ash (Temminck); ten to twelve, of a pale oil-green (Selby).

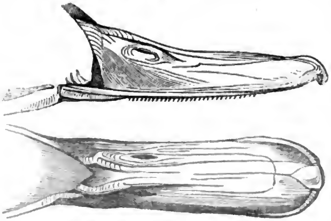
Utility to man.—Flesh excellent.

N. B. The trachea of the male is slightly enlarged in its diameter at about two-thirds of its length, but becomes narrower as it approaches the lower larynx: this consists of a large bony arch, with a globular, or rather pyriform, bladder attached to the left side, being in shape much like that of the common mallard, but smaller.



Gadwall. Chauliodus strepera.

Dafila (Leach).



Bill of Pintail Duck. (Swainson.)

Mr. Swainson observes that nature has now so far receded from the typical form that one of the chief peculiarities of that structure is nearly lost, and another considerably modified. The laminæ of the upper mandible, which, in *Chauliodus strepera*, are so much shorter than those of the true Shovelers, and are so much abbreviated in *C. Capensis*, become almost concealed by the margin of the bill in *Dafila*. 'The most striking characteristic therefore of the genus we are now considering,' continues Mr. Swainson, 'has nearly disappeared, precisely in that form which is furthest removed from the type. But the shape of the bill, although essentially modified, has not undergone a total alteration: its breadth towards the tip is not only as great as at the base, but is even more dilated; so that in this respect it resembles the Shovelers more than the Gadwalls, while it differs from both in being higher at its base, considerably more lengthened in proportion, and much more convex throughout. It assumes, in short, a semi-cylindrical form, the end being particularly obtuse and slightly dilated; the precise point of junction between the Pintails and that group which was known to the antients by the name of *Boschas*.'

Example. *Dafila caudacuta. The Pintail Duck.* This is *Le Canard à long Queue* ou *Pilet* of the French; *Anitra codilanza* and *Anatra di coda lunga* of the Italians; *Spiessente* and *Fasan Ente* of the Germans; *Aler, Ahlvogel* of the Fauna Suecica; Sea Pheasant, or Cracker, of Willughby; *Keeneego yaway-sheep* of the Chippeway Indians; *Hwyad gynffonfain* of the antient British; *Anas caudacuta* of Ray; *Anas longicauda* of Brisson; *Anas acuta* of Linnæus; *Querquedula acuta* of Selby.

Description of a male killed on the Saskatchewan, May, 1827. *Colour.—Head* and adjoining part of the *neck* anteriorly umber-brown, with paler edges; neck above blackish-brown; the whole of the back, shorter scapulars, sides of the breast, and flanks, marked with fine waved transverse lines of brownish white and black, most regular and broadest on the long feathers lying over the thighs: long scapulars and tertiaries black, the borders of the former and outer webs of the latter white; wing coverts and primaries hair-brown; the primary shafts white, and the interior coverts mottled with the same; *speculum* dark-green, with purple reflections, bounded above by a ferruginous bar and interiorly and below by white. *Tail*, and most of its upper coverts, dark-brown with pale borders. Two long central upper coverts, vent, and under coverts, black; the latter bordered with white. A lateral streak on the upper part of the neck, the sides and front of its lower part, the breast, and belly, white. The posterior part of the abdomen minutely marked with grey. *Bill* black; sides of the upper mandible bluish-grey. *Feet* blackish-grey.

Form.—Bill much lengthened, fully as long as the head, considerably higher than wide at the base; the upper mandible of equal breadth to the point; the *laminæ* not projecting beyond the margin. *Wings* two inches shorter than the tail. Scapulars, tertiaries, tail-feathers and their coverts, tapering and acute; the middle pair of tail coverts having long slender points that project two inches and a half beyond the tail. *Tail* graduated. *Tracheal dilatation*, a small osseous sac, the size of a hazel-nut. Total length 26 inches 6 lines (Richardson). Selby observes that the labyrinth of this species consists of a round long bladder, situated on the left side of the arch of the lower larynx; its upper surface being nearly even with the top of the arch, but its lower one reaching much below it. Its texture very fine, and, in young birds, may be indented by slight pressure; but becomes brittle in adults. The weight of the bird is about 24 ounces.

The *female* is smaller. Forehead and crown pale chestnut-brown, streaked with black. Cheeks and neck pale ochreous yellow, speckled with black. Chin and throat pale cream-yellow. Sides of the breast hair-brown, barred and tipt with white. Mantle and scapulars amber-brown, barred and varied with pale buff-orange and white. Tertials hair-brown, margined with white. Lesser and greater wing-coverts pale broccoli-brown, edged and tipped with white. Speculum hair-brown, glossed with green, the feathers having white tips. Quills hair-brown. Tail deep hair-brown, with imperfect bars of white and pale buff-orange; the two middle feathers exceeding the rest in length about half an inch. Belly and abdomen yellowish-white, indistinctly marbled with broccoli-brown. Under tail-coverts white, speckled with chestnut-brown of different shades. Bill greyish-black. Legs and toes grey, tinged with brown. (Selby.)

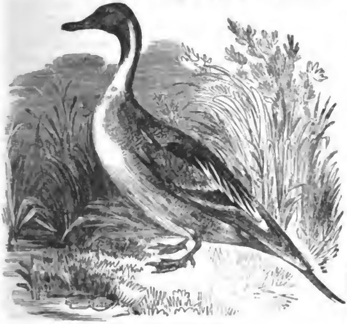
Young Males.—Head red-brown, spotted with black; belly yellowish, and the speculum of a green, inclining to olive, without reflections.

Selby remarks, that like many other of the *Anatidæ* (particularly of the species belonging to this group), the plumage of the male Pintail, towards the end of summer, or after the sexual intercourse is completed, undergoes a remarkable change, and becomes very like that of the female. This appears to be an actual change of the colour in the feathers rather than a renewal of them; and the same change, he adds, is observable in the mallard, and the males of the Teal, Wigeon, &c. It also prevails, if not in all, at least in some species of the genus *Mergus*, as he noticed it in *Mergus serrator.*

Localities.—The north of Europe and America; very numerous at its double passage in Holland and in France: equally abundant in Germany: in winter in the south (Temminck). Selby says 'it is with us a regular winter visitant; and considerable numbers are annually taken in the decoys of Lincolnshire, Norfolk, &c. Montagu says that it is most abundant in the north of England and Scotland, and especially in the Orkney Islands. This assertion, however, I must in part contradict, as the result of long observation tells me it is of *rare occurrence* in the *northern counties* of England; and the same may be said of the southern districts of Scotland, which Dr. Fleming confirms in his history of British animals. With respect to the Orkneys, I cannot speak so confidently, although it appears probable that what had been represented to him as the present species was in fact the Long-tailed Duck (*Harelda glacialis*), which is found in great numbers during the winter in the bays of this group of islands. The Pintail has a wide geographical range, being met with in all the northern parts of Europe, Asia, and America, and retires in the summer to breed in high latitudes. Its equatorial migration extends as far as Italy; and during its periodical flight to the southward it occurs abundantly in Holland, France, Germany, and other continental states. The marshes of the interior part of the country, and fresh-water lakes are its usual places of resort.' Pennant states that Mr. Hartlib, in the appendix to his 'Legacy,' tells us that these birds are found in great abundance in Connaught in Ireland, in the month of February only, and that they are much esteemed for their delicacy. C. L. Bonaparte (*Specchio Comparativo*) notes it as not very rare in the winter near Rome. See above, *Geographical Distribution.*

Food.—Similar to that of the Gadwall (Temminck). Selby says that its food consists of insects and their larvæ, the seeds of aquatic plants, particularly of some species of *Epilobium*, and vegetables.

Propagation.—The season of courtship is indicated in the male by suddenly raising himself upright in the water, bringing his bill close to his breast, and uttering at the same time a low soft note. This gesticulation is often followed by a jerk of the hinder part of the body, which is then also thrown above the water. *Nest*, in rushes and the thick herbage of marshes. Eggs, from eight to ten, bluish-white (Selby); eight or nine, greenish-blue (Temminck).

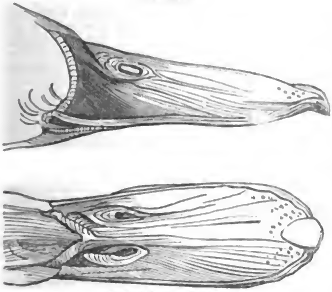


Pintailed Duck. Dafila caudacuta.

Hybrids, &c.

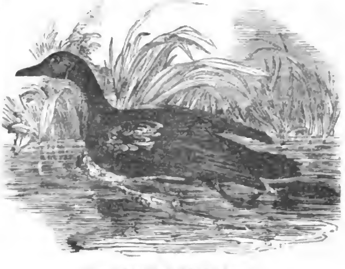
Selby observes that the Pintail is easily domesticated, but rarely breeds in confinement. A hybrid progeny has been produced between it and the Wigeon; and, to such an extent do the sexual propensities seem to be affected in this state, by difference of food and other causes, that Montagu mentions a male Pintail in his menagerie which, for want of the other sex, showed an inclination to pair with a female Scaup, and even with a Bernicle Goose. He further adds, that one of them did pair with a tame duck, but that none of the eggs (upwards of twenty in number) proved to be fecundated.

Boschas.

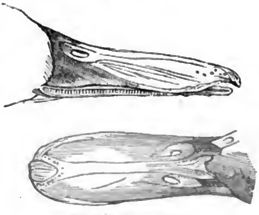


Bill of Mallard. (Swainson.)

Mr. Swainson (*Journal of the Royal Institution*) comprehends under this sub-genus all those ducks usually denominated Teals, together with the mallard, long domesticated in our poultry-yards. 'As this,' continues Mr. Swainson, 'is by far the most numerous group, so it exhibits a greater diversity of form among the species. They are all however characterized by a bill *longer than the head*, whose breadth is equal throughout; it is sometimes indeed a little dilated, but never contracted at its tip, while the laminæ of the upper mandible are entirely concealed by the margin of the bill. The neck and the tail, which in *Dafila* are both considerably lengthened, are much shorter in this group, which is further distinguished by the brightness and beauty of plumage observed in nearly all the species. On comparing the bill of the common Teal with that of the Pintail, we see a close affinity between the two forms. But as the tail of the first is so much developed in comparison to that of the Teal, it becomes essential to discover, if these sub-genera actually followed each other in nature, what species united them more closely. By the uniform liberality of the zoologists attached to the British Museum, and more particularly J. E. Gray, Esq., I am now enabled to do this. The beautiful *Anas* (*Boschas*) *formosa*, Sw., or Baikal Teal of methodists, is precisely a bird which intervenes between these two sub-genera. Essentially a Teal, it differs from all others I have yet seen in the superior length of its tail, the feathers of which are a full inch longer than the under-covers;[*] while the convexity of the bill, from being greater than in the common Teal, establishes its close approximation to *Dafila*. Proceeding thus by analysis, we find several foreign species which may be either called Teal or Ducks. The *Boschas Javensis*, Sw., is more especially a bird of this description. It is closer allied to the mallard than to any other of the group: this is indicated by the more depressed form of the bill, and the white collar round the neck; the nape also is very conspicuously crested, a peculiarity found in no other group of the genus. To this and to the curled tail of the tame duck we shall presently advert. Having now reached what appears to be the typical form of *Boschas*, we see that nature as usual again departs from it. The bill of the mallard is throughout more depressed than that of the common Teal. This depression in fact, from being



Blue-winged Teal. Boschas discors.



Bill of Blue-winged Teal.

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[*] In *Anas* (*Boschas*) *Crecca* the tail is so short, that the under-covers reach almost to the middle of the tip of the middle tail feathers.

greater than that of the Gadwall, or of the Pintail, obviously assimilates more to the Shoveler. The affinity however appears remote, since the laminæ of the mallard are concealed, while those of the Shovelers are conspicuously projecting. If therefore the affinity was immediate, it could only be demonstrated by a species having the bill of the common duck, but with the laminæ projecting. Now such a species is actually the blue-winged Teal of North America, in which these laminæ project nearly as much as in the Gadwall, while the upper mandible exhibits that peculiar sinuosity towards the base which is seen in no other ducks besides the Shovelers. If this affinity required any further support, it is placed beyond doubt by the fact mentioned in the 'General History of Birds,' that the plumage of the New Holland Shoveler, excepting the white facial crescent, is precisely the same as that of the blue-winged Teal,—the very bird which thus unites the sub-genus *Boschas* to that of *Anas*, and completes the circle of the whole group.'

Of the sub-genus *Boschas*, the common mallard or wild duck, *Boschas domestica*, may be selected as an example. Both sexes of this beautiful bird are so well known that either description or figure would be superfluous. It is the *Canard sauvage* of the French; *Capo verde* (the male), *Anitra* (the female), *Germano*, and *Paperone* of the Italians; *Wilde Ente* and *Gemeine Ente* of the Germans; *Ethinneesen sheesheep* of the Cree Indians; Stock-Duck of the Hudson's Bay residents; and *Cors Hwyad*, *Garan Hwyad*, and *Hydnwy* of the antient British.

The weight of the wild mallard is usually about two pounds and a half. The abundance of the bird at one time in Britain may be judged of from the following passage in Pennant:—'Amazing numbers of ducks, wigeons, and teals are taken: by an account sent us of the number caught, a few winters past, in one season, and in only ten decoys, in the neighbourhood of Wainfleet, it appeared to amount to 31,200, in which are included several other species of ducks; it is also to be observed, that, in the above particular, wigeon and teal are reckoned but as one, and consequently sell but at half the price of ducks. . . . The account of the numbers here mentioned relates only to those that were sent to the capital. It was customary formerly to have in the fens an annual *driving* of the young ducks before they took wing. Numbers of people assembled, who beat a vast tract, and forced the birds into a net placed at the spot where the sport was to terminate. A hundred and fifty dozens have been taken at once; but this practice being supposed to be detrimental, has been abolished by act of parliament.' Selby observes upon this that the same district at the present time does not produce perhaps a dozen broods in the year.

Mr. Waterton has pointed out that the duck and the drake are clothed in the same plumage only for a very short time in the summer. Mr. Selby's observations on the change of plumage are referred to under the account of the Pintail.

The trachea of the mallard has at its lower extremity a labyrinth much larger than that of the gadwall, but not unlike it; the tube does not differ much in diameter throughout its length. In the museum of the Royal College of Surgeons, in London (Physiological series, gallery, No. 1124), are the termination of the trachea, inferior larynx, bronchiæ, and lungs of a drake. (*Anas Boschas*, Linn.)

Localities.—The wild duck is widely spread over a considerable portion of the globe. Few of the temperate and arctic regions are without it. Temminck places its habitation in the northern countries, and observes that it is known as a bird of passage nearly throughout Europe, haunting rivers, lakes, and marshes. C. L. Bonaparte (Specchio Comparativo) mentions it as very common near Rome in winter. For its American range, see *Geographical distribution* above.

Food.—Fishes, fry or spawn, slugs, water insects, aquatic plants, their seeds, and all sorts of grain (Temminck)—insects, worms, slugs, and all kinds of grain, &c. (Selby.)

Propagation.—'In a natural state,' says Selby, 'wild ducks always pair, though in a state of domestication they are observed to be polygamous. The pairing takes place towards the end of February or beginning of March, and they continue associated till the female begins to sit, when the male deserts her, joining others of his own sex similarly situated; so that it is usual to see the mallards, after May, in small flocks by themselves. About this time also they begin to undergo the changes of colour that assimilate them in a great degree to the female, and which is retained till the period of the autumnal or general moult. The care of the young thus devolves entirely upon the duck, and is not partaken by the male, as Wilson and others appear to think; and this fact I have had frequent opportunities of verifying, as many wild ducks annually breed upon the edges of our Northumbrian moors, and the young broods are of course frequently under inspection as they descend the rivulets to the lower marshy parts of the country. The nest of the wild duck is generally made in some dry spot of the marshes, and not far from water, to which she can lead her progeny as soon as hatched. It is composed of withered grass and other dry vegetable matter, and usually concealed from view by a thick bush or some very rank herbage, though other and very dissimilar situations are occasionally chosen, as several instances have been recorded where they have deposited their eggs on the fork of a large tree, or in some deserted nest. Such an instance once occurred within my knowledge, and near my own residence, where a wild duck laid her eggs in the old nest of a crow, at least thirty feet from the ground. At this elevation she hatched her young; and as none of them were found dead beneath the tree, it is presumed she carried them safely to the ground in her bill, a mode of conveyance known to be frequently adopted by the Eider Duck.' Montagu (*Ornith. Dict., Suppl.*) says, 'we have been assured by a person of undoubted veracity that a half domesticated duck made a nest in Rumford Tower, hatched her young, and brought them down in safety to a piece of water at a considerable distance. Others have been known to breed in trees; and we recollect the nest of this bird being found in the head of an old pollard willow, impending the water, from whence the young might readily drop unhurt into their natural element. Mr. Tunstall mentions one, at Etchingham, in Sussex, which was found sitting upon nine eggs, on an oak-tree, twenty-five feet from the ground: and the author of the 'Rural Sports' records an instance of one taking possession of the nest of a hawk in a large oak. To these we can add, upon the testimony of a gentleman of the strictest veracity, that out of a large flock of half-domesticated ducks, one deposited her eggs in the principal fork of a large tree near his house.' Eggs, ten to fourteen, of a bluish-white; the female, when she quits the nest for food, covers them with down and other substances.

Our limits will not allow us to detail the different methods of taking the wild duck, and we must refer the reader to the works of Willughby, Pennant, and Bewick, for descriptions of the decoy, the latter furnished by Mr. Bonfellow; to those of Wilson and others, for various modes of capture; and to Col. Hawker's well-known book, for the modes of hut-shooting, &c., and some particulars relating to decoys.

In a domesticated state it is most widely distributed. All the varieties that the fancy of the breeder can produce are to be seen in the various poultry-yards. To say nothing of the Aylesbury and other breeds, where size and delicacy of flesh have been principally considered, we find penguin ducks standing nearly erect, hook-billed ducks, and even a variety where the caprice of man has succeeded in nearly obliterating the webs of the feet and curtailing the bill till it has lost its spatulate shape and is become a deformity, bearing some resemblance to the bill of a common fowl. Some of these birds have been shown as the offspring of a cock and a duck, we need hardly say, without the slightest foundation for the monstrous assertion. Selby observes, that in the domesticated varieties the peculiar specific distinction of the curled feathers of the tail is still retained. In China and the other countries of the East, numbers of ducks are hatched by artificial means.

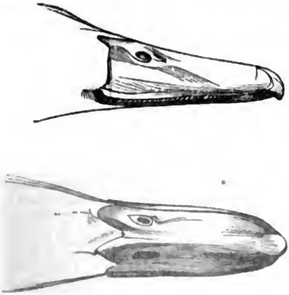
Hybrids.

Latham states that the male Muscovy duck and common duck will breed together. The young bear a greater resemblance to the common duck than to the Muscovy duck.

In 'Fauna Boreali Americana' Mr. Swainson places the genera *Mareca* and *Dendronessa* in his sub-family *Anatinæ*

Mareca. (Stephens.)

Selby says that the wigeons are distinguished from the teals by a much shorter and less cylindrical bill; and from the ducks, by that member becoming more contracted and narrow, instead of widening towards its tip. The laminæ of the bill are also broader and set wider apart, approaching in form nearer to those of the sub-family *Anserina.* These birds, he adds, also vary in their habits, for instead of searching and sifting the mud with their bills for insects, seeds, &c., upon which food most of the other genera live, they subsist principally on grasses and vegetable diet, which they pluck in the same manner as geese. Their flight is strong and swift, and they have a peculiar shrill whistling call note. In the shape of the tracheal labyrinth they resemble the Pintail more than any other species: the middle feathers of the tail are also acute, and considerably longer than the rest.



Bill of Wigeon.

Example, *Mareca Americana* (Stephens), *American Wigeon.* This is the *Anas Americana* of Gmelin and of Sabine, in Franklin's Journal, and *Atheekemow-weeshep* of the Cree Indians.

Description of a *male* killed on the Saskatchewan, May, 1827 (Richardson). *Colour.*—A white band from the forehead to the nape, bounded behind the eye by a broad dark-green patch, which ends in the nuchal crest. Upper part and sides of the breast brownish-red, glossed with grey. Base of the neck above, interscapulars, scapulars, and flanks, minutely undulated with brownish-red and black; hind part of the back undulated in a similar manner with clove-brown and white, the latter colour prevailing on the tail-coverts. Lesser wing-coverts, primaries, and tail, clove-brown; intermediate and greater coverts, sides of the rump, breast, and belly, pure white. *Speculum,* velvet-black below, duck-green above, bounded superiorly with black and posteriorly with white. Exterior webs of the tertiaries, and lateral and inferior tail-coverts, greenish-black, the first bordered with white. *Bill,* bluish-grey, bordered and tipped with black.

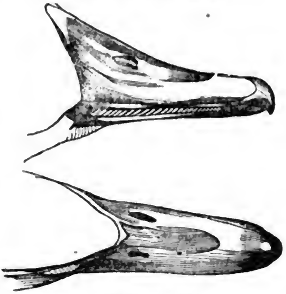
Mareca Americana.

Form.—Bill particularly short, being not so long as the head, armed with *laminæ* resembling those of the mallard. Plumage of the *nape* somewhat lengthened. *Wings,* above an inch shorter than the acutely-pointed tail, which consists of fourteen feathers. Total length, 23 inches.

The *female* has the upper plumage dark liver-brown, edged and remotely barred with pale-brown and white. The intermediate wing-coverts are merely edged with white, and there is no green on the head. *Tail,* shorter and not so tapering. Total length about two inches less than the male.

Localities, Propagation, Habits, &c.—Wilson says that it is very common in winter along the whole coast from Florida to Rhode Island; but most abundant in Carolina, where it frequents the rice plantations. In Martinico great flocks take short flights from one rice-field to another during the rainy season, and are much complained of by the planters. They are said to be in great plenty at St. Domingo and Guiana, where they are called vingeon or gingeon. Are said sometimes to perch on trees. Feed in company (but little in the day), and have a centinel on the watch. Come out from their hiding-places in the evening. Are not known to breed in any part of the United States. Are common in the winter months along the bays of Egg Harbour and Cape May, and also those of the Delaware. They leave their places in April, and appear upon the coast of Hudson's Bay in May, as soon as the thaws come on, chiefly in pairs; lay there only from six to eight eggs, and feed on flies and worms in the swamps; depart in flocks in autumn. (Wilson here quotes Hutchins.) Wilson further states, that the wigeon is extremely fond of the tender roots of that particular species of aquatic plant on which the Canvass-back duck, so abundant in Chesapeak Bay, feeds. The wigeon is its constant companion; and the wigeon, which never dives, watches the moment of the Canvass-back's rising with the morsel for which the latter bird has dived, and before he has his eyes well opened, snatches it and makes off. On this account the Canvass-backs and wigeons, or, as they are called round the bay, *Bald Pates,* live in a state of perpetual contention.

Dendronessa (Swainson).



Bill of Summer Duck.

Head crested. *Bill* as high at the base as it is broad; towards the tip narrow and contracted. *Nostrils* placed towards the middle of the bill. *Tertial feathers* ornamented. *Feet* as in *Anas.* Type *Dendronessa galericulata, Chinese Teal.* Edwards, pl. 102.

Mr. Swainson, who thus characterizes the genus, observes ('Fauna Boreali Americana') that 'this is obviously the rasorial type of the *Anatinæ.* The *D. Sponsa,* by the lateral advancement of the bill towards the eye, is a more aberrant species, and shows the connection of the group to *Somateria.*'

Example. *Dendronessa Sponsa* (Swainson), *the Summer Duck.* This is the *Wood Duck* of Audubon, *Ansee-aumo* of the Chippeways, *Anas Sponsa* of Linnæus.

Description of a *male,* killed at Cumberland House, lat. 54°; June, 1827. *Colour.*—Head above and space between the eye and bill glossy dark-green; cheeks and a large patch on the sides of the throat purple, with blue reflections; pendent occipital crest of green and auricula purple, marked with two narrow white lines, one of them terminating behind the eye, the other extending over the eye to the bill; sides of the neck purplish-red, changing on the front of the neck and sides of the breast to brown, and there spotted with white. Scapulars, wings, and tail exhibiting a play of duck-green, purple, blue, and velvet-black colours; interscapulars, posterior part of the back, rump, and upper tail-coverts blackish green and purple; several of the lateral coverts reddish-orange; a hair-like, splendent, reddish-purple tuft on each side of the rump; the under coverts brown. Chin, throat, a collar round the neck, a crescentic bar on the ears, the middle of the breast, and whole of the abdomen, white. Flanks yellowish-grey, finely undulated with black; the tips of the long feathers, and also those on the shoulder, broadly barred with white and black. Inner wing-coverts white, barred with brown. Almost all the coloured plumage shows a play of colours with metallic lustre. *Bill* red; a space between the nostrils, its tip, margins, and lower mandible, black. *Legs* orange-coloured.

Summer Duck. Dendronessa Sponsa. Male

Form.—Bill shorter than the head; considerably narrowed towards the tip, like that of the Eider; its height at the rictus greater than its width; its frontal angles prolonged. *Mandibles* strongly toothed. *Unguis* strong, arched or hooked. *Nostrils* large, pervious, lateral. *Forehead* sloping. *Occipital crest* long and pendent. *Wings* shorter than the tail, which consists of sixteen wide rounded feathers. Total length 21 inches.

The *female* wants the fine lines on the flanks and the hair-like tufts on the sides of the rump. She has a shorter crest; and the plumage is less vivid, especially about the head, where it is mostly brown. (Richardson.)

Localities.—Audubon states that this species ranges over the whole extent of the United States, and that he saw it in all parts, from Louisiana to the confines of Maine, and from the vicinity of the Atlantic coasts as far inland as his travels extended. It also occurs sparingly during the breeding season in Nova Scotia; but farther north he did not observe it. Everywhere in this immense tract he found it an almost constant resident; for some spend the winter even in Massachusetts, and far up the warm spring waters of brooks on the Missouri. It confines itself, however, entirely to fresh water, preferring at all times the secluded retreats of the ponds, bayous, or creeks, that occur so profusely in the woods. Well acquainted with man, they carefully avoid him, unless during the breeding season, when, if a convenient spot is found by them, they will even locate themselves about the miller's dam.

Habits, &c.—Our limits will not permit us to insert Audubon's interesting account of the general habits, food, &c. of the Summer Duck. (See *Ornithological Biography*, vol. iii., p. 52, &c.)

Chase.—See the same work.

Propagation.—Catesby says that the Summer Ducks breed in Virginia and Carolina, and make their nests in the holes of tall trees (made by woodpeckers) growing in water, particularly cypress trees. 'While they are young and unable to fly, the old ones carry them on their backs from their nests into the water; and at the approach of danger, they fix with their bills on the backs of the old ones, which fly away with them.' Audubon's evidence, which we here give, differs from that of Catesby in some particulars. 'The Wood Duck breeds in the Middle States about the beginning of April, in Massachusetts a month later, and in Nova Scotia or on our Northern Lakes seldom before the first days of June. In Louisiana and Kentucky, where I have had better opportunities of studying their habits in this respect, they generally pair about the 1st of March, sometimes a fortnight earlier. I never knew one of these birds to form a nest on the ground or on the branches of a tree They appear at all times to prefer the hollow broken portion of some large branch, the hole of our largest woodpecker (*Picus principalis*), or the deserted retreat of the fox squirrel; and I have been frequently surprised to see them go in and out of a hole of any one of these, when their bodies while on wing seemed to be nearly half as large again as the aperture within which they had deposited their eggs. Once only I found a nest (with ten eggs) in the fissure of a rock on the Kentucky River, a few miles below Frankfort. Generally, however, the holes to which they betake themselves are either over deep swamps, above cane-brakes, or broken branches of high sycamores, seldom more than 40 or 50 feet from the water. They are much attached to their breeding places, and for three successive years I found a pair near Henderson, in Kentucky, with eggs in the beginning of April, in the abandoned nest of an ivory-billed woodpecker. The eggs, which are from six to fifteen, according to the age of the bird, are placed on dry plants, feathers, and a scanty portion of down, which I believe is mostly plucked from the breast of the female. They are perfectly smooth, nearly elliptical, of a light colour between buff and pale green, two inches in length by one and a half in diameter; the shell is about equal in firmness to that of the mallard's egg, and quite smooth. No sooner has the female completed her set of eggs than she is abandoned by her mate, who now joins others, which form themselves into considerable flocks, and thus remain apart until the young are able to fly, when old and young of both sexes come together, and so remain until the commencement of the next breeding season. In all the nests which I have examined, I have been rather surprised to find a quantity of feathers belonging to birds of other species, even those of the domestic fowl, and particularly of the wild goose and wild turkey. On coming upon a nest with eggs when the bird was absent in search of food, I have always found the eggs covered over with feathers and down, although quite out of sight in the depth of a woodpecker's or squirrel's hole. On the contrary, when the nest was placed in the broken branch of a tree, it could easily be observed from the ground, on account of the feathers, dead sticks, and withered grasses about it. If the nest is placed immediately over the water, the young, the moment they are hatched, scramble to the mouth of the hole, launch into the air with their little wings and feet spread out, and drop into their favourite element; but whenever their birth-place is at some distance from it, the mother carries them to it one by one in her bill, holding them so as not to injure their yet tender frame. On several occasions, however, when the hole was thirty, forty, or more yards from a bayou or other piece of water, I observed that the mother suffered the young to fall on the grasses and dried leaves beneath the tree, and afterwards led them directly to the nearest edge of the next pool or creek.'

Dendronessa galericulata and *D. sponsa* breed freely in captivity. Both species have produced several broods in the gardens of the Zoological Society in the Regent's Park, where most of the Anatinæ here enumerated may be seen. Our limits not allowing us to describe more than one species of a genus, we must refer the reader to Edwards and others for the description of *D. galericulata*, which he will find stuffed in most of our museums, and, generally, alive in the gardens at the Regent's Park, where he will have an opportunity of studying the oriental and occidental forms of *Dendronessa*, and their habits in a half-domesticated state.

Mr. Yarrell (*Zool. Proc.*, 1830-31) stated to the society that the *Summer Duck, D. sponsa*, male and female, had been shot recently near Dorking.

Lieutenant-Colonel Sykes, in his 'Catalogue of Birds observed in the Dukhun' (Deccan), enumerates the following British *Anatinæ*—*Anas strepera*, Linn., males identical with specimens in the British Museum, from Kent; no

Mandarin Duck. Dendronessa galericulata. Male.

females for comparison; numerous in Dukhun; *Rhynchaspis virescens*, Leach, MSS., *Anas clypeata*, Linn.; identical with British specimens of the *common Shoveler*, but differing from the description of that bird in Shaw; *Mareca fistularis*, Steph., *Anas Penelope*, Linn., *Wigeon*, absolutely identical with specimens from Devonshire; *Querquedula Circia*, Steph.; *Anas Circia*, Linn., *Garganey*, identical with British specimens; *Querquedula Crecca*, *Anas Crecca*, Linn., *Common Teal*, identical with male and female British specimens. (*Zool. Proc.*)

Mr. Keith Abbott (*Zool. Proc.*, 1834), in his 'List of Trebizond Birds,' enumerates *Anas Boschas*, Linn., *the Mallard*, as almost universal; and *Anas Querquedula*, Linn., which is noted as inhabiting India as well as Europe, and as common in the Himalayan range.

Fossil Anatinæ.

Dr. Buckland (*Bridgewater Treatise*) mentions and figures the duck *Anas*, (the figure represents the common wild duck), among the land mammifers and birds of the third period of the tertiary series, and he observes that many of the genera there enumerated occur both in the second, third, and fourth formations of the tertiary series, and also in caverns, fissures, and diluvium. Thus, among the remains found in the Kirkdale Cave (*Reliquiæ Diluvianæ*), he enumerates and figures the right coracoid process of the scapula of a small species of duck or wigeon. Dr. Buckland also observes that the eggs of aquatic birds have been preserved in the lacustrine formations of Cournon, in Auvergne. (See Croizet and Jobert, *Recherches sur les Oss. Foss. du Départ. du Puy de Dome, &c.*)

For the rest of the families or subfamilies of the great genus *Anas*, see Fuligulinæ, Geese, Merganinæ, Swans.

DUCLOS, CHARLES PINEAU, was born in the year 1704, at Dinant, in Bretagne, whence he was sent to Paris to prosecute his studies. He soon formed a connection with the wits of the age, and published a Romance called 'Acajon et Zirphile.' This work attained only moderate celebrity; but a subsequent romance, entitled 'Confessions du Comte de * * *,' was more successful. His reputation however depends on a collection of moral essays, published under the title of 'Considérations sur les Mœurs de ce Siècle,' which have been greatly extolled by many writers, and which Louis XV. characterized as 'the work of an honest man.' In 1739 Duclos was admitted into the Academy of Inscriptions, and in 1747 into the Académie Française, of which he became perpetual secretary. The citizens of his native town, to testify their respect for him, made him their mayor in 1744, but he continued to reside at Paris, where he died in 1772.

The romances of Duclos, though less indecent than the works of Crebillon the younger, are sufficiently indelicate to offend persons of refined taste, while they lack the bitter satire and deep knowledge of human nature which characterize that acute though obscene author. With all deference to the opinions of his distinguished contemporaries, we cannot help thinking that his 'Considérations' is but an indifferent performance. They are a series of essays on the opinions which regulate society, and though free from the misanthropic ill-nature which appears in Rochefoucauld and occasionally in La Bruyère, they are deficient in the real depth which those writers exhibit, and want that charm of novelty and originality which is necessary to make mere moral essays palatable. The romances and essays have been collected into four vols., 8vo., under the title of 'Œuvres Morales et Galantes.' Duclos also wrote a history of Louis XI., and a secret history of Louis XIV. and XV., which have acquired some reputation.

DUCTILITY is the property of bodies, and more especially of the metals, which admits of their being drawn out in length, while their diameter is diminished without any actual fracture or separation of their parts; in other words, it is upon this property that the wire-drawing of metals depends. The following is nearly the order of ductility of the metals which possess the property in the highest degree; that of the first-mentioned being the greatest:—gold, silver, platinum, iron, copper, zinc, tin, lead, nickel, palladium, cadmium.

Though the malleability and ductility of metals are connected, they are not always in the same proportion; iron, for example, though extremely ductile, cannot be beaten into very thin laminæ The difference between ductility and malleability has been ascribed to the figure and arrangement of their particles; the malleable metals may be conceived to consist of small plates, and the ductile metals of minute fibres placed beside or over each other; the one slide by their flat surfaces, the other lengthen and exert an adhesion from one extremity to the other.

According to Muschenbroek, a workman of Augsburg drew a grain of gold into a wire 500 feet long; its diameter must have been only 1-4600th of an inch. In the Philosophical Transactions for 1813, Dr. Woollaston has described a method by which he succeeded in obtaining a wire only 1-30,000th of an inch in diameter.

Of a silkworm's thread 300 feet weigh one grain; the same length of a spider's web weighs only 1-35th as much, and consequently 10,500 feet weigh only a grain.

DUDLEY, originally written DUDELEI, a market-town and parish in the lower division of the hundred of Halfshire, in the county of Worcester (though locally in the hundred of Offlow, in Staffordshire), 26 miles north-north-east from Worcester, 9 north-west by north from Birmingham, and 127 north-west by north from London.

Dudley owes its origin to Dodo, a Saxon prince, who built here a strong castle, situated on a considerable eminence, about the year 700. In the reign of Henry II. it belonged to Gervase Paganell, and was demolished by that king in consequence of Gervase's taking part in the rebellion of his son, prince Henry. In 1644 the castle was gallantly defended by Colonel Beaumont against the parliament forces for three weeks, when it was relieved by a party of the royal army from Worcester. The remains, consisting of a gateway, the keep, part of the tower, the offices, &c., form a highly interesting ruin.

About half a mile from the town are the ruins of an antient priory of Benedictine monks of the order of Cluny, founded by Gervase Paganell. A mayor and other officers are annually appointed by the lord of the manor, but the town is within the jurisdiction of the county magistrates. The houses are generally neat and well-built, and the streets clean and well paved, and lighted with gas. An extensive subscription library was established in 1805.

The principal trade of Dudley consists in the smelting and working of iron ore, with which the whole neighbourhood abounds, as well as with coal. The articles manufactured are various iron utensils, nails, and glass. In 1831 the coal-mines in the parish employed 500 men; 570 were employed as nailers, and a large number in the iron-works There are extensive quarries of limestone in the neighbourhood. A tunnel, one mile and three-quarters in length and thirteen feet high, has been cut through the hill on which the castle stands for conveying the limestone under the castle-hill to the kilns. Fairs are held on the 8th of May and 2nd of October, for cattle, cheese, and wool; and on the 5th of August for lambs. Saturday is the market-day.

The population consists of 23,000 persons, the major part of whom are engaged in mining, manufacturing nails, and smelting iron ore. Dudley sends one member to the House of Commons, under the Reform Act.

The living is a vicarage in the diocese of Worcester. There are two churches, St Thomas and St. Edmund, and a chapel of ease, recently erected. St. Thomas is a handsome building in the modern style of English architecture, with a lofty spire. There are places of worship for Methodists, Baptists, Independents, Unitarians, and the Society of Friends. The free grammar-school was founded by Thomas Wattewood, clothier, of Stafford, and Mark Bysmor, stillworker, of London, and endowed with land by queen Elizabeth, the annual value of which is now above 300*l*. The master receives 200*l*. a year, and the number of scholars averages about 30 or 40. A charity-school for clothing and educating 40 girls, and another charity for clothing seven poor men was established in 1819, by Mrs. Cartwright, in consequence of a legacy left for that purpose by the Rev. Henry Antrobus. A school for clothing and educating 50 boys was founded 1732, and endowed with land by Robert, Samuel, and Ann Baylis. About 200 boys are educated here, exclusively of those on the foundation. There is a blue school, where 230 boys, and a school of industry, where 220 girls are educated. The Unitarians have also a school for girls.

A fossil called the Dudley Locust is found in great quantities and variety of sizes in the limestone quarries in the neighbourhood; it is supposed to be an extinct species of Monoculus. Nash, in his 'History of Worcestershire,' mentions one four inches five-eighths in length, and three inches three-fourths in width.

In the vicinity of Dudley there are several chalybeate springs, as well as a spa well, held in high estimation for its efficacy in cutaneous disorders.

DUEL, a hostile meeting between two persons in consequence of an affront given by one of them to the other, and for the purpose (as is said) of *satisfaction* from the person affronting to the person affronted. Such is a general description of the duel, as now existing in England and other European nations, and in America.

The rise of the present duel, or practice of duelling, is to be referred to the trial by battle which obtained in early ages, jointly with the single combat or tournament of the age of chivalry, which again most probably owed its own existence to the early trial by battle. This trial by battle, or duel (as it was also called), was resorted to, in accordance with the superstitious notions of the time, as a sure means of determining the guilt or innocence of a person charged with a crime, or of adjudicating a disputed right. It was thought that God took care to superintend, and to see that, in every case, innocence was vindicated and justice observed. The trial by battle, or duel, thus viewed, was introduced into England by William the Conqueror, and established in three cases; viz., in the court-martial or court of chivalry, in appeals of felony, and in civil cases upon issue joined in a writ of right. Once established as a mode of trial, the duel was retained after the superstition which had given rise to it had died away, and was resorted to for the purpose of wreaking vengeance, or gaining reputation by the display of courage. Then came the age of chivalry, with its worship of punctilio and personal prowess, its tilts and tournaments; and the duel, originally a mode of trial established by law, became in time (what it now is) a practice dependent on certain conventional rules of honour, or on fashion.

We shall confine ourselves to a consideration of the duel in its present character. This duel takes place, as we have already said, in consequence of an *affront*. In order then to have a complete notion of the present practice of duelling, we must understand what an affront is, and the best way of explaining this word *affront* is the way of enumeration; for were we to content ourselves with saying that an affront is anything which (in the common phrase) hurts a man's feelings, or again, which wounds his honour, we should only be using words which themselves require to be explained as much as the word *affront*. We might as well say at once, forgetting that it is our object to explain the grounds or reasons of a duel, that an affront is anything which is at any time the ground or reason of a duel; for we should give as much and as correct information by this as by either of the preceding explanations.

An affront is considered to be given when one man charges or insinuates against another that he is guilty of a lie, of dishonesty in pecuniary transactions, of cowardice, of hypocrisy, of being actuated by one motive or set of motives when he professes to be actuated by others; when (in the common phrase, which is sufficiently vague and comprehensive), one man imputes motives to another; when he indulges in expressions of contempt, or what is styled personal and virulent abuse; and also when one man impugns or disparages, in any of the above-mentioned ways, the character of some relative or intimate friend of another man. An insult or injury to a female relative in particular, or to a female companion, such as a partner in a ball-room, is always accounted a great affront. Sometimes even the simple fact of success in an amatory affair is construed by the unsuccessful rival as an affront, and he who has succeeded is called upon for satisfaction. Such are the principal affronts which, according to custom or fashion or (as it is also called) the law of honour, are, at different times, reasons or grounds for fighting a duel.

When any one of these affronts has been given by one man to another, it is the custom or fashion for this last to call on the affronter to retract, explain, or apologize for (as the case may be) that which constituted the affront, or else (in significant phrase) to give the usual satisfaction,—that satisfaction (as it is also sometimes circumloquized) which one gentleman expects from another. He at the same time usually names some friend, in whose keeping (to use the fashionable phrase) he places his honour, and to whom his affronter is to address any communication. This call or challenge having reached its destination, and the affronter being unable or unwilling to retract, explain, or apologize, he too singles out a friend to whom he likewise entrusts his honour; the two friends or seconds (as they are called) then make arrangements for a meeting between the affronter and the person affronted, or (varying the expression) the challenger; they fix the time and place, and get ready the weapons; the meeting takes place; the word *fire* is uttered, according to a previous agreement between the seconds; the hostilities commence, and they proceed until one of the parties either fires in the air, or is killed or wounded, or until the seconds interfere to stop them. The parties, or rather so many of them as are alive, then leave the ground, satisfied; the principals (if both are alive) sometimes shaking hands with one another, to denote either the return or the commencement of friendship. Such are most of the circumstances of a duel.

It is professed that this duel takes place for the purpose of *satisfaction*. The affronter professes to have satisfied the man whom he has affronted, and the challenger professes to have been satisfied by the man whom he has challenged, after they have fired, or have had an opportunity of firing, pistols at one another. That this satisfaction, which the one professes to give and the other to receive, is of that sort which is also expressed by the word *reparation*, is of course out of the question. Satisfaction in this its most obvious sense, or reparation for an injury, cannot be effected by the injured man firing at his injurer, and (what is more) being fired at in return.

The satisfaction furnished by a duel is of a different sort, and of a sort which, were it distinctly comprehended, would at once show the absurdity of the practice; it is a satisfaction occasioned by the knowledge that, by standing fire, the challenger has shown his courage, and that the world cannot call him coward. Now it is clear that there would be no reason for dissatisfaction on this point, previous to the fighting of the duel, and therefore no reason for seeking satisfaction of this sort, were it not that the practice of duelling existed. Were men not in the habit of fighting duels, and therefore not expected to expose themselves to fire after having received an affront, there would be no ground for calling their courage into question, and therefore no necessity for satisfying themselves that the world thinks them courageous. The practice of duelling then itself causes the evil which it is called in to remedy,—the injury for which it is required to administer satisfaction. Such being the case, we call the practice absurd. And every one who saw this would immediately see its absurdity. But the word *satisfaction* is conveniently ambiguous. When one speaks of it, or hears it spoken of, one thinks of that satisfaction which means reparation for an injury, and which is not the satisfaction furnished by the duel; and it is fancied that the practice has some reason in it. Thus are men the dupes of words.

The real object then of the duel is, in most cases, to satisfy the person who provokes it, or who sends the challenge, that the world does not suspect him of a want of courage; and it will be useful to observe, in passing, that the duel furnishes this sort of satisfaction as well to the man who gave the affront, as to him who was affronted. Its object also, in certain cases, is doubtless to gratify the vengeance of the man who has received an affront. But in all cases that object which is professed, or which is generally understood to be professed, of satisfaction in the sense of reparation for the affront, is no more than a pretence.

Though the practice of duelling, however, cannot and does not effect the good of repairing an injury, it may very possibly effect other sorts of good. It is a question then worthy of consideration, whether this practice is, on the whole, productive of good or of evil? If it be, on the whole, productive of evil, another question arises, how is it to be got rid of?

The advantage of the practice of duelling is generally said to consist in its tendency to increase courtesy and refinement of manners. So far as this tendency exists or is supposed to exist, the manner in which it operates, or is supposed to operate, is obvious. It is, or is supposed to be, a reason for a man to abstain from giving an affront, that he will be subjected in consequence to the fire of a pistol.

Now it is clear, in the first place, that all the affronts which are constituted reasons or grounds of duels by fashion, or the law of honour, or (which is the same thing) public opinion, are so constituted because they are judged by public opinion deserving of disapprobation. If then the practice of duelling did not exist, public opinion, which now constitutes these affronts grounds of a duel, as being deserving of disapprobation, would still condemn them, and, condemning them, provide men with a reason to abstain from them. Thus there would still exist a reason to abstain, in all cases in which the practice of duelling now provides a reason. But, in the second place, the practice of duelling itself depends on public opinion alone. A man fights because public opinion judges that he who, in certain cases, refuses to challenge or to accept a challenge is deserving of disapprobation; he fights from fear of public opinion. If he abstain from giving an affront on account of the existence of the practice of duelling, it is because the fear of public opinion would oblige him to fight; he abstains then from fear of public opinion. Now we have seen that there would be the fear of public opinion to deter him from the affronts which now lead to duels, if the practice of duelling did not exist. Thus the practice of duelling does not in any case provide a reason to abstain, which public opinion would not provide without its aid. As a means then of increasing courtesy and refinement of manners, the practice of duelling is unnecessary; and inasmuch as its tendency to polish manners is the only advantage which can, with any show of probability, be ascribed to it, there will be no good effects whatever to set against the evil effects which we now proceed to enumerate. There will be no difficulty in striking the balance between good and evil.

First, the practice of duelling is disadvantageous, inasmuch as it often diminishes the motives to abstain from an affront. We have seen that the existence of this practice leads public opinion to employ itself concerning the courage of the two persons, who (the one having affronted and the other having been affronted) are in a situation in which, according to custom or fashion, a duel takes place. Public opinion then is diverted by the practice of duelling from the affront to the extraneous consideration of the courage of the two parties. It censures the man who has given the affront only if he shrinks from a duel; and even goes so far as to censure the man who has received the affront for the same reason. Thus in a case where a man, reckless of exposing his life, is disposed to give affronts, he is certain that he can avert censure for an affront by being ready to fight a duel; and in a case where a bold or reckless man is disposed to affront one who is timid, or a man expert with the pistol one who is a bad shot, he can reckon on the man whom he affronts refusing to fight, and on censure being thus diverted from himself who has given an affront to him who has shown want of courage. It is well observed in a clever article in the Westminster Review:—'It is difficult to conceive how the character of a bully, in all its shades and degrees, would be an object of ambition to any one, in a country where the law is too strong to suffer actual assaults to be committed with impunity, where public opinion is powerful, and duelling not permitted; but where duelling is in full vigour, it is very easy to understand that the bully may not only enjoy the delight of vulgar applause, but the advantages of real power.' (vol. iv., p. 28.)

Secondly, the practice of duelling is disadvantageous, as increasing the amount of injury which one man can do to another by an affront. There is not only the injury to his feelings occasioned by the affront, but also the fear excited by the danger to which the existence of the practice of duelling subjects him, after receiving the affront.

Thirdly, the practice of duelling affords means for the gratification of vengeance; and thus tends to hurt the characters of individuals, by the encouragement both of that feeling, and of hypocrisy in those who, thirsting for vengeance, and daring not to own it, profess (in the common ambiguous phrase) to be seeking for satisfaction.

Fourthly (which is the most important consideration), there are the evils entailed by the deaths which the practice of duelling brings about,—evils entailed both on the persons dying, and on their surviving relatives and friends. It is an evil that a man should be cut off from life, 'unhouseled, disappointed, unaneled.' It is an evil, that he should be taken from relatives and friends to whom his life is, in different ways and degrees, a source of happiness; from the parents who have centered in him their hopes, and to whom, in their declining years, he might be a comfort, or from the wife and children who look to him for support.

Such are the evil effects of the practice of duelling; and there being no list of good effects to set against them, it follows immediately that the tendency of the practice is, on the whole, evil. There arises then the question, how is it to be got rid of?

A mild and judicious legislation, one which takes into account, and does not set itself violently against, public opinion, may do much. The punishment assigned to the crime of duelling should (in Mr. Bentham's phrase) be *popular*. It should be a punishment which does not tend to excite sympathy for the criminal, and thus defeat its own object; for where an opinion prevails that a punishment is too severe, or where (in other words) a punishment is unpopular, witnesses, jurors, judges are provided by the punishment itself with motives to shield the criminal. It is clear that the punishment of death, which the law of England now assigns, is not popular; and it is clear further that, in consequence of this, it is almost entirely nugatory. Public opinion, which favours duelling, sets itself against the punishment of death, and renders legislation vain.

Were a man who had killed his antagonist in a duel compelled by the law to support, or assist in supporting, some of his surviving relatives, this, so far as it would go, would be a punishment popular and efficacious. Public opinion would then infallibly be against the man who, having incurred the penalty, should endeavour to avoid it. And such a punishment as this would furthermore be superior to the punishment of death, as being susceptible of graduation, as furnishing reparation to a portion of those who have been most injured, and as preserving the offender, that he may have all those opportunities, which his natural life will afford him, of improving himself and of benefiting others.

A mild and judicious legislation would tend to guide and improve public opinion; whereas such a legislation as the present tends only to confirm it in its evil ways.

And as legislation may and should assist the formation of a right public opinion, so is it possible and desirable to operate independently on public opinion, either that the absence of good legislation may, as far as is possible, be compensated for, or that the good legislation, when present, may in turn be assisted. Now this operation on public opinion must be brought about by the endeavours of individuals. It is the duty of each man to oppose this practice to the utmost extent of his power, both by precept and example; or (changing the phrase) each man will effect the greatest amount of good for himself and for his fellow men by adopting this course. It is his duty to abstain from challenging when he has received an affront, and to refuse a challenge when he is considered to have given one, making public in both cases, so far as his situation allows, his reasons for the course which he takes, and thus producing an impression against the practice as widely as he can. In the second of these two cases he must either be able to defend, or he must apologize for, that which was considered an affront. If he can defend it, or show that the evil to the person insulted was overbalanced by the good accruing to others, he refuses rightly to be fired at for having been the author of a benefit; or, if unable to defend the affront, he apologizes for it, he performs a manly and a rational part in refusing to fire at a man whose feelings he has wantonly injured.

This duty is peculiarly incumbent on public men, whose sphere of influence is larger, and whose means of producing good effects by example are therefore greater, than those of others. A public man who should at all times refuse to challenge or to accept a challenge, resting his refusal on the ground of the evil tendency of duelling, not of the infraction of some other duty which an accident has in his case connected with it (as the violation of an oath), and who should at the same time preserve himself from suspicion or reproach by circumspection in speech, by a manly defence, where it is possible, and, where it is not, by a manly apology, would be a mighty aid for the extirpation of this practice.

We have said nothing as to the objections to duelling on religious grounds, it being never denied, so far as we are aware, that the practice is incompatible with the profession of Christianity.

DUET (*Duetto*, Ital. from *Duo*), a musical composition for either two voices or two instruments. According to the Padre Martini, the *duo* is a vocal composition in the severe ecclesiastical style, without any kind of accompaniment; the *duetto*, or diminutive of *duo*, one written more freely, in a lighter manner, and admitting accompaniment. The older word is now, however, become obsolete.

DUFRESNE. [CANGE, DU.]

DUGDALE, SIR WILLIAM, was the only son of John Dugdale, Esq., of Shustoke, in the county of Warwick, where he was born September 12th, 1605. His mother was Elizabeth, daughter of Arthur Swynfen, Esq., of Staffordshire. He was in part educated in the free-school at Coventry, and subsequently with his father, with whom he also read 'Littleton's Tenures,' some other law-books, and history. In 1622 he married Margery, the second daughter of John Huntbach, Esq., of Seawall, in Staffordshire. Upon his father's death in 1624, he succeeded to a small estate in Shustoke, to which he added by purchase the manor of Blythe, in that parish, in 1625. This latter estate is still in the possession of his descendants.

Dugdale's natural inclination, which was chiefly the study of antiquities, brought him acquainted with the most eminent antiquaries of his day. Sir Symon Archer, of Tamworth, introduced him to Sir Christopher Hatton and Sir Henry Spelman, by whose joint interest with the earl of Arundel, then Earl Marshal, he was created a pursuivant-at-arms extraordinary, by the name of Blanche Lyon, in September, 1638. Afterwards he was made Rouge Croix pursuivant in ordinary, by letters patent dated March 18th, 1639-40; by which means, having lodging in the Heralds' College, and convenient opportunities, he made large collections from the Records in the Tower of London, as well as from other places.

In 1641, by Sir Christopher Hatton's encouragement, he superintended the making of exact drafts of all the monuments in Westminster Abbey, St. Paul's Cathedral, and in many other cathedral and parochial churches of England; particularly those at Peterborough, Ely, Norwich, Lincoln, Newark-upon-Trent, Beverley, Southwark, Kingston-upon-Hull, York, Selby, Chester, Lichfield, Tamworth, Warwick, &c. The drawings were made by one William Sedgewick, an arms-painter, then a servant of Sir Christopher Hatton; the inscriptions were copied by Dugdale. Both were deposited in Sir Christopher Hatton's library, that the memory of these monuments might at least be preserved; the state of the times threatening imminent destruction to the originals.

In June, 1642, the king, who had retired to York, summoned Mr. Dugdale to attend upon him, according to the duty of his office. Dugdale accordingly repaired to York, and was afterwards commanded to attend the earl of Northampton, who was marching into Worcestershire to oppose the forces raised by lord Brooke for the service of the Parliament. He attended upon the king at the battle of Edgehill, and afterwards at Oxford, where he continued with his Majesty till the surrender of the garrison there to the Parliament, June 22nd, 1646. He was created M.A. November 1st, 1642; and April 16th, 1644, was promoted to the office of Chester-herald. During his long residence at Oxford, he applied himself to such researches in the Bodleian, and the different college libraries, as he thought might conduce toward the furtherance of the 'Monasticon,' then designed by Roger Dodsworth and himself; as well as to the history of the antient nobility of the realm, and of which he afterwards made much use in his 'Baronage.'

After the surrender of Oxford upon Articles, Dugdale, having the benefit of them, and having compounded for his estate, went to London; where he and Dodsworth proceeded vigorously in completing their collections from the Tower Records and Cottonian library. A short absence from England in 1648, when he attended lord and lady Hatton to Paris, enabled him to improve his and Dodsworth's collections with notices and charters relating to the Alien Priories of England, from the papers of Andrew Du Chesne. When their collections were ready, the booksellers, declining to venture upon so large and hazardous a work, Dodsworth and Dugdale printed the first volume at their own charge, which was published in 1655, in folio, under the tile of 'Monasticon Anglicanum,' adorned with the views of abbeys, churches, &c. The second volume was published in folio, in 1661. These two volumes were collected, and chiefly written by Dodsworth; but Dugdale took great pains in methodizing and disposing the materials, in making several indexes to them, and in correcting the press. Dodsworth died in August, 1654, before the tenth part of the first volume was printed off. A third volume was published in 1673.

From an entry in his diary, as early as 1658, Dugdale appears to have feared that a translation of the 'Monasticon' would have been published by Mr. King, probably Gregory King, at that time his clerk. That such a one was prepared, as far as the first volume was concerned, is evident, since Dugdale describes it as 'erroneously Englished in a multitude of places.' The translation, however, or rather the epitome, which was subsequently printed, did not appear till 1692, six years after Sir William Dugdale's death. The dedication to William Bromley, Esq., is signed J. W. It is ascribed to James Wright, who, in 1684, published the 'History and Antiquities of the County of Rutland.' Another epitome, by an anonymous writer, was published in 1718: but believed to have been by Captain John Stevens, who, in 1722 and 1723, published two additional volumes to the 'Monasticon,' which, besides an abundance of additional information in English, contained a very large collection of new charters, together with the History of the Friaries, to which no place had been assigned in the volumes published by Dugdale. The Rev. Samuel Peck, in 1735, promised a fourth volume of the 'Monasticon,' which was never completed. His collections for it are in the British Museum.

An improved edition of the 'Monasticon' was undertaken in 1812 by the Rev. Bulkeley Bandinel, D.D., keeper of the Bodleian library at Oxford, who soon relinquished his task to two other gentlemen who had been called in as coadjutors, John Caley, Esq., of the Augmentation Office, and Henry Ellis, Esq., keeper of the MSS. in the British Museum. An account of each religious house, in English, was prefixed to its respective series of Latin charters, and many new materials from leiger-books, rolls, and other documents were added, including all that was valuable in Stevens's volumes, with the history of several hundred religious foundations which were unknown to Dugdale. The chief of the prints, by Hollar, which ornamented the original edition, were re-engraved, and above 200 plates of churches and monasteries added, from drawings made exclusively for the work. This new edition was completed in 1830, in six volumes folio, the last volume divided into three parts.

In 1656 Dugdale published, at his own charge, 'The Antiquities of Warwickshire, illustrated from Records, Leiger-books, Manuscripts, Charters, Evidences, Tombes, and Armes, beautified with Maps, Prospects, and Portraictures,' folio, Lond.: this is one of the very best of our county histories. A second edition was published, in two volumes folio, in 1730, revised and augmented by William Thomas, D.D.; and a third was contemplated a few years ago, and large preparations made for it, by the late William Hamper, Esq., of Birmingham. While this work was printing, Dugdale remained in London, during which time he had an opportunity of collecting materials for another work, which he published in 1658, 'The History of St. Paul's Cathedral, in London,' folio. A second edition of this work, enlarged, was published in 1716, in folio, by Edward Maynard, D.D., rector of Boddington in Northamptonshire; and a third, in 1818, by Henry Ellis, Esq. The plates of the original editions, both of the Warwickshire and the St. Paul's, were by Hollar. To the two last editions of the St. Paul's a life of Dugdale was prefixed.

Upon the restoration of King Charles II., through Lord

Chancellor Hyde's recommendation, Dugdale was advanced to the office of Norroy King of Arms. In 1662 he published 'The History of Imbanking and Drayning of divers Fenns and Marshes, both in Foreign Parts and in this Kingdom, and of the Improvements thereby,' fol. Lond. 1662: a second edition of which, revised and corrected by Chas. Nalson Cole, Esq., appeared in fol. Lond. 1772. This work was written at the desire of the Lord Gorges, Sir John Marsham, and others, who were adventurers in draining the great level which extends itself into a considerable part of the counties of Cambridge, Huntingdon, Northampton, Norfolk, and Suffolk. [Bedford Level.] About the same time Dugdale completed the second volume of Sir Henry Spelman's 'Councils,' which was published in 1664 under the title of 'Concilia, Decreta, Leges, Constitutiones in Re Ecclesiarum Orbis Britannici, &c., ab Introitu Normannorum, A.D. 1066, ad Exutum Papam, A.D. 1531. Accesserunt etiam alia ad Rem Ecclesiasticam spectantia,' fol. Archbishop Sheldon and Lord Clarendon, who were the great encouragers of this labour, likewise employed Dugdale to publish the second part of Sir Henry Spelman's 'Glossary.' Having revised the first part, which had been published in 1626, and arranged the materials of the second, both were printed together in 1664 under the title of 'Glossarium Archaiologicum, continens Latino-barbara, Peregrina, Obsoleta, et Novæ Significationis Vocabula.' The second part, digested by Dugdale, began with the letter M. There was another edition of this work in 1687.

In 1666 he published, in folio, 'Origines Juridiciales; or, Historical Memoirs of the English Laws, Courts of Justice, Forms of Trial, Punishment in Cases Criminal, Law Writers,' &c. &c., with portraits of several of the judges, and some other plates. A second edition was published in 1671, and a third in 1680. The first volume of 'The Baronage of England' appeared in 1675, and the second and third in 1676, folio. Upon this work he had spent thirty years of labour; and though the corrections to be made in it are numerous, it still remains one of the best works which exist as a foundation of English history. [Baronage.]

In May, 1677, Dugdale was created Garter King of Arms, and the day after received from his Majesty the honour of knighthood, much against his will, on account of the smallness of his estate. In 1681 he published 'A short View of the late Troubles in England, briefly setting forth their Rise, Growth, and Tragical Conclusion,' folio. This is the least valued of his publications. He published also, at the same time, 'The Antient Usage in bearing of such Ensigns of Honour as are commonly called Arms,' &c., 8vo., a second edition of which, with large additions, was published in the beginning of the year following; and a third edition, edited by T. C. Banks, Esq., folio, London, 1811.

The last work which Dugdale published was 'A perfect Copy of all Summons of the Nobility to the Great Councils and Parliaments of this Realm, from the 49th of king Henry III. until these present times,' folio, London, 1685. A facsimile, with the original date of this work, was printed at Birmingham between forty and fifty years ago.

This industrious man died at Blythe Hall, February 10th, 1686, in his eighty-first year, in consequence of a cold; and was interred at Shustoke. His epitaph in Latin, written by himself, is inscribed upon a tablet near the spot of his interment.

An account of Dugdale's manuscript collections remaining in the Ashmolean Museum at Oxford, and in the possession of his descendant, the late Dugdale Stratford Dugdale, Esq., at Merevale in Warwickshire, will be found appended to his *Life, Diary, and Correspondence*, edited by William Hamper, Esq., 4to., London, 1827, whence the principal particulars of the present life have been obtained. (See also the life prefixed to the last edition of the *History of St. Paul's*; and Chalmers's *Biogr. Dict.*, vol. xii., pp. 420-427.)

DUGONG. [Whales.]

DUIKERBOK. [Antelope, vol. ii., p. 81, species 30.]

DUISBURG, a circle in the northern part of the great administrative circle of Düsseldorf in Rhenish Prussia, about 252 square miles in area, and containing 8 towns, 1 market-town, 14 villages, and 3 hamlets, with a population of about 76,500 inhabitants: an increase of 17,150 since 1817. The Rhine is the western and the Lippe the northern boundary. It possesses rich coal-mines, and has 108,859 acres of fine arable land, and 27,720 of meadows and pastures: grain, tobacco, rapeseed, flax, hemp, hops, linseed, &c. are raised.

DUISBURG, the chief town, lies on the Ruhr and Angerbach, not far from the right bank of the Rhine, which once washed its walls; in 51° 26′ N. lat., and 6° 46′ E. long. It is said to have received its name from the Tuisconi or Teutones, who had a camp on this spot: in the time of the Romans it was denominated the Castrum Deusonis. The town is surrounded by walls and decayed towers on one side, and by a rampart and ditches on the other, and is situated in a fertile and agreeable country. The number of houses is about 700, and of inhabitants about 5500: in 1784 the number of the one was 682, and of the other 3531; the population has therefore increased about 1969 during the last fifty-two years, or upwards of one per cent. yearly on the average. Duisburg contains a gymnasium founded in 1599, an orphan asylum and hospital, endowed almshouses, a monastery of Minorites, and five churches, of which that of John the Baptist dates from the year 1187, and that of St. Salvator, on the tower of which once stood an observatory, from 1415; two of them are Roman Catholic, and the others Protestant. It was the site of a Protestant university, founded in 1655 and abolished in 1802. There are considerable manufactures in the town, particularly of woollen-cloth, cottons, stockings, hats, woollen coverlids, velvet, soap, starch, and leather; and an extensive traffic with the Westphalian provinces in wine and colonial produce, grain, and cattle. In the neighbourhood there are two iron-works, where large quantities of cast-iron are made. The Duisburg forest, mentioned by Tacitus (*Annal.* i. 60), under the name of the Saltus Teutoburgensis, is in the vicinity.

DUKE. The title given to those who are in the highest rank of nobility in England. The order is not older in England than the reign of king Edward III. Previously to that reign those whom we now call the nobility consisted of the barons, a few of whom were earls. Neither baron nor earl was in those days, as now, merely a title of honour; the barons were the great tenants in chief, the earls important officers in the community. It does not appear that in England there was ever any office or particular trust united with the other titles of nobility, viscount, marquis, and duke. They seem to have been from the beginning merely honorary distinctions. They were introduced into England in imitation of our neighbours on the continent. Abroad however the titles of duke and marquis had been used to designate persons who held no small political power, and even independent sovereignty. The czar was duke of Russia or Muscovy. There were the dukes of Saxony, Burgundy, and Aquitaine: persons with whom the earls of this country would have ranked, had they been able to maintain as much independence on the sovereign as did the dukes on the continent of the Germanic or the Gallic confederacy. An important officer during the lower empire had the title of dux, which is probably the origin of the modern duke or doge in every country of Europe. [Doge.]

The first person created a duke in England was Edward Prince of Wales, commonly called the Black Prince. He was created duke of Cornwall in parliament, in 1335, the eleventh year of king Edward III. In 1350, Henry, the king's cousin, was created duke of Lancaster, and when he died in 1361, his daughter and heir having married John of Gaunt, the king's son, he was created duke of Lancaster, his elder brother Lionel being made at the same time duke of Clarence. The two younger sons of king Edward III. were not admitted to this high dignity in the reign of their father: but in the reign of Richard II., their nephew Edmund was made duke of York, and Thomas duke of Gloucester.

The dignity was thus at the beginning kept within the circle of those who were by blood very nearly allied to the king, and we know not whether the creation of the great favourite of king Richard II., Robert Vere earl of Oxford, duke of Ireland, and marquis of Dublin, is to be regarded as an exception. Whether, properly speaking, an English dignity or an Irish, it had but a short endurance, the earl being so created in 1385 and attainted in 1388.

The persons who were next admitted to this high dignity were of the families of Holland and Mowbray. The former of these was half-brother to king Richard II.; and the latter was the heir of Margaret, the daughter and heir of Thomas de Brotherton, a younger son of king Edward I., which Margaret was created duchess of Norfolk in 1358. This was the beginning of the dignity of duke of Norfolk, which is still existing, though there have been several forfeitures and temporary extinctions. Next to them, not to mention sons or brothers of the reigning sovereign, the title was conferred on one of the Beauforts, an illegitimate son of John of Gaunt, who was created by king Henry V. duke of Exeter. John Beaufort, another of this family, was made duke of Somerset by king Henry VI.

In the reign of Henry VI. the title was granted more widely. There were at one time ten duchesses in his court. The families to whom the dignity was granted in this reign were the Staffords, Beauchamps, and De la Poles. In 1470, under the reign of Edward IV., George Nevil was made duke of Bedford, but he was soon deprived of the title, and Jasper Tudor was made duke of Bedford by his nephew king Henry VII. in the year of his accession.

King Henry VIII. created only two dukes, and both were persons nearly connected with himself; one being his own illegitimate son, whom he made duke of Richmond, and the other Charles Brandon, who had married the French queen, his sister, and who was made by him duke of Suffolk. King Edward VI. created three: viz., his uncle, Edward Seymour, the Protector, duke of Somerset (from whom the present duke of Somerset derives his descent, and, by reversal of an attainder, his dignity), Henry Grey, duke of Suffolk, and John Dudley, duke of Northumberland. The struggles of these three great peers proved the ruin of all and the extinction of their dignities.

Queen Elizabeth found on her accession only one duke, Thomas Howard, duke of Norfolk, attainder or failure of male issue having extinguished the others. He was an ambitious nobleman, and aspiring to marry the queen of Scotland, Elizabeth became jealous of him: he was convicted of treason, beheaded, and his dignity extinguished in 1572; and from that time there was no duke in the English peerage except the sons of king James I., till 1623, when Ludovick Stuart, the king's near relative, was made duke of Richmond, which honour soon expired. In 1627 George Villiers was created duke of Buckingham, and he and his son were the only dukes in England till the civil wars, when another of the Stuarts was made duke of Richmond, and the king's nephew, best known by the name of prince Rupert, duke of Cumberland.

We see how choice this dignity was regarded down to the reign of king Charles II. In the first year after his return from exile, that prince restored the Seymours to their rank of dukes of Somerset, and created Monk, the great instrument of his return, duke of Albemarle. In 1663 he began to introduce his illegitimate issue into the peerage under the title of duke, his son James being made in that year duke of Monmouth. In 1664 he restored to the Howards the title of duke of Norfolk, and in 1665 created a Cavendish, who had held a high military command in the civil war, duke of Newcastle. In 1682 he created the marquis of Worcester duke of Beaufort. As for the rest the dignity was granted only to issue of the king or to their mothers. The only duke created by king James II. was the duke of Berwick, his natural son.

Of the families now existing, beside those who descend of king Charles II., only the Howards, the Seymours, and the Somersets date their dukedoms from before the Revolution. The existing dukedoms originally given by Charles II. to his sons are Grafton, Richmond, and St. Albans. Under king William and queen Anne several families which had previously enjoyed the title of earls were advanced to dukedoms, as Paulet duke of Bolton, Talbot duke of Shrewsbury, Osborne duke of Leeds, Russell duke of Bedford, Cavendish duke of Devonshire, Holles duke of Newcastle, Churchill duke of Marlborough, Sheffield duke of Buckinghamshire, Manners duke of Rutland, Montagu duke of Montagu, Douglas duke of Dover, Gray duke of Kent, Hamilton duke of Brandon; besides members of the royal family and Marshal Schomberg, who was made an English peer as duke of Schomberg. This great accession gave an entirely new character to the dignity. King George I. followed in the same policy, giving us, besides the dukedoms in his own family, Bertie duke of Ancaster, Pierrepoint duke of Kingston, Pelham duke of Newcastle, Bentinck duke of Portland, Wharton duke of Wharton, Brydges duke of Chandos, Campbell duke of Greenwich, Montagu duke of Manchester, Sackville duke of Dorset, and Egerton duke of Bridgewater. George II. adopted a different policy: he created no duke out of his own family, and the only addition he can be said to have made to this branch of the peerage was by enlarging the limitation of the Pelham dukedom of Newcastle so as to comprehend the Clintons, by whom the dukedom is now possessed. From 1720 to 1766 there was no creation of an English duke except in the royal house. In that year the representative of the antient house of Percy was made duke of Northumberland, and the title of duke of Montagu, which had become extinct, was revived in the Brudenels, the heirs. The same forbearance to confer this dignity existed during the remainder of the reign, and during the reign of George IV., no dukedom being created out of the royal house, till the eminent services of the duke of Wellington marked him out as deserving the honour of the highest rank which the king has it in his power to confer. His dukedom was created in 1814, forty-seven years after the creation of a duke of Northumberland. The marquis of Buckingham was advanced to the rank of duke of Buckingham and Chandos in 1822, so that for a hundred years, namely from 1720 to 1822 only four families were admitted to this honour.

During the reign of William IV. two dukedoms have been created, Gower duke of Sutherland, and Vane duke of Cleveland.

The whole number of dukes in the English peerage is at present twenty-one, exclusive of the blood royal. There are seven Scottish dukes, two of whom are also English dukes. The only Irish duke is the duke of Leinster.

All the dukes of England have been created by letters patent in which the course of succession has been plainly pointed out. Generally the limitation is to the male heirs of the body.

DUKER, CHARLES ANDREW, a distinguished scholar, born at Unna in La Marck, in the year 1670. He studied first at Hammon, and afterwards, under Perizonius, at Franeker. About the year 1700 he became professor of history and eloquence at Herborn, in Nassau, which he exchanged, four or five years afterwards, for the place of under-master in the school at the Hague. On the death of Perizonius, in 1716, the Greek chair in the university of Leyden became vacant, and was offered to Burmann, who accepted it, and thereby vacated the professorship of history and eloquence which he held at Utrecht, and which was divided between Duker and Drakenborch, Burmann's pupil and friend. In 1734 Duker gave up his professorship and retired to the country. He died at Meyderic on the 5th of November, 1752. Duker is best known by his edition of Thucydides, published at Amsterdam 1731 (fol.), which was, till Bekker's appeared in 1821, by far the best edition of that author. The great care and labour which he bestowed upon this work made Schröder call him *Varilectionarius Thucydideus (Præf. ad Senec. Tragœdias)*. Duker also edited Florus in 1722, and contributed to the edition of Livy published by his colleague Drakenborch, to the 'Origines Babylonicæ et Ægyptiacæ' of his friend Perizonius, and to other works. All his notes are sensible and accurate; but it has been remarked that in his Thucydides in particular he has been rather capricious in choosing passages for illustration, and has omitted explanations in the very places where they were most necessary.

DULCIMER, a very antient musical instrument, and not yet entirely fallen into disuse. There seems to be little doubt of this being the psaltery, psalterium, or nebel, of the Hebrews. In shape it was sometimes a triangle, sometimes a trapezium, as appears from Luscinius, Kircher, and Blanchinus, a fact overlooked by Sir John Hawkins, who argues, in opposition to Kircher, that the instrument took different names according to its different forms. The Dulcimer, as now used by street-musicians, to whom it is confined, is a trapezium in shape, has many strings, two to each note, and is struck by a pair of sticks with wooden or metallic knobs. The tone much resembles that of the old spinnet, and in skilful hands the instrument is of rather an agreeable kind. [CITOLE.]

DULVERTON. [SOMERSETSHIRE.]

DULWICH. [ALLEN; BOURGEOIS.]

DUMBARTON, or DUNBARTON, the chief town of Dumbartonshire, in Scotland, is an antient royal burgh, and was in very early times the head town of the earldom of Lennox. It is situated at the confluence of the Leven with the Clyde, about 14 miles west-north-west from Glasgow and 52 west from Edinburgh.

The first charter granted to Dumbarton was that of Alexander II., in the beginning of the thirteenth century; this charter, as well as those of several succeeding monarchs, was confirmed by James VI. in 1609, and ratified by Parliament in 1612. The revenue of the burgh is about 1,030*l* per annum, but the expenditure generally exceeds that sum. Two burgh courts are held weekly. Dumbarton is in schedule (E) of the Scotch Reform Act (2 & 3 Will. IV. c. 65), and returns one member to Parliament, jointly with Renfrew, Rutherglen, Kilmarnock, and Port-Glasgow. The population in 1831 was 3623. There is a school, under the patronage of the magistrates, superintended by two teachers.

The castle stands on a steep rock, rising up in two points, and inaccessible on every side, except by a very narrow passage, fortified with a strong wall or rampart. Within this wall is the guard-house, with lodgings for the officers, and from hence a long flight of stone steps leads to the upper part of the castle, where there are several batteries mounted with cannon, the wall being continued almost round the rock. There are the remains of a high gateway and wall, the top of which has a bridge of communication from one summit of the rock to the other. There is also an excellent well constantly supplied with water. The rock on which the castle stands is nearly surrounded with water, and forms a highly interesting view from the Clyde, whose waters wash its base. Considered as the key to the Western Islands, this castle was always a great object of contention, and has sustained many memorable sieges. It is now garrisoned by some invalids, under the command of a governor and some subaltern officers. In the upper part, where the rock divides, convenient barracks have been erected, as well as a small arsenal, containing Wallace's gigantic sword and many other curiosities.

DUMBARTONSHIRE, a small maritime county in the west of Scotland, between 55° 53′ and 56° 20′ N. lat., and 3° 50′ and 4° 50′ of W. long. It consists of two separate parts, having an intervening distance of six miles between their nearest approaching points. The larger and western part is bounded on the west by Loch Long, by which it is separated from the county of Argyle; the southern boundary is formed by the river Clyde, the eastern by the county of Stirling, and the northern by Perthshire. The antient name of the county was Levenach, that is, county of the Leven, which subsequently became Levenax, and finally Lennox. It is about 36 miles in length from north-west to south-east, in a straight line, and in the middle about 15 miles in breadth from east to west. Loch Lomond is not wholly included within the county. The small detached eastern part is half enclosed by Stirlingshire on the north, and by Lanarkshire on the south, and measures 12 miles from east to west, and about 4 miles from north to south. The whole area of the county is 165,760 acres, or 259 square miles, of which 19,840 acres are water. In the western part the parishes are ten in number, namely, Dumbarton, Cardross, Roseneath, which is a peninsula formed by Loch Long and Gare Loch, Row, Arroquhar, Luss, Bonhill, Kilmaronoch, and West and East Kilpatrick. The eastern part is composed of two parishes, Kirkintilloch, and Cumbernauld. Two-thirds of the surface consist of mountains, partially presenting woods, mosses, and moors, and incapable of cultivation. The most remarkable are Ben Voirlich, Arrochar, Benequirach, Luss, Row, and Roseneath; the rugged and precipitous summits of which are frequently covered with snow and clouds. Ben Voirlich, in the northern extremity of the county, and near the northern extremity of Loch Lomond, is 3330 feet above the level of the sea, that is, above 100 feet higher than the adjacent Ben Lomond. There are many highly picturesque situations in this county. The contrast of sterile mountains and verdant glens is very striking Loch Lomond, which covers about 20,000 acres, presents the richest description of lake and highland scenery. Its length is 22 miles; its surface is studded with many beautiful little islands, and its finely wooded shores are adorned with elegant villas. The climate is in general mild and very moist. Yet the lateness of the spring, the frequency of showers and cloudy weather during harvest, with blighting mountain winds in the spring and autumn, and the early commencement of winter, are insuperable disadvantages to agriculture; but for pasturage, and especially for the growth of timber, the climate is remarkably well adapted; nor is it unfavourable to health and longevity. The natural copse woods and plantations cover several thousand acres, and consist of oak, ash, yew, holly, mountain-ash, birch, hazel, aspen, alder, crab, thorn, and willow. The comparative extent of arable land is very small; it is chiefly clay, and lies mostly on the south of Loch Lomond, and along the Clyde. The prevalent soils are clay, gravel, black loam, and a small portion of bog. Potatoes, oats, and wheat are the principal crops. The cattle are chiefly of the West Highland breed. From 12,000 to 17,000 are annually sold at the market on Carman Moor. Cows of the Ayrshire breed have been introduced into most of the dairy farms. The sheep are of the small black-faced mountain breeds. In 1811, at the time of the agricultural survey, the number was 28,000, but the general improvements in farming which have since been made in the county have greatly increased all kinds of stock and produce. Property is in few hands, and farms are of very various extent, but chiefly small. The principal mineral production is coal, of which there is a large field, but of inferior quality. About 11,000 tons are dug annually at Langfauld, in the southern extremity of the county (West division). Pyrites is procured in small quantities at the same place. In the Eastern division of the county about 3000 tons of ironstone are dug and conveyed on the Clyde and Forth canal to the great iron-foundry at Carron. Some large quarries of limestone are worked, and of white and red freestone. There are several slate quarries yielding annually about 80,000 slates, of which the greater portion is taken to Glasgow, along the rivers Leven and Clyde, and the Glasgow canal.

On the banks of the Leven are numerous and very extensive works for cotton-printing, and bleaching-fields; the pureness of the Leven water being peculiarly adapted for this process. This stream, which, with the exception of numerous mountain torrents, is the only one worthy of notice, runs rapidly a distance of about five miles from Loch Lomond to the Clyde at Dumbarton Castle, and is navigable for lighters. The value of salmon annually taken in the Clyde and Leven, and sent chiefly to Glasgow, is stated at 1000*l*. Fifty boats are employed in the herring fishery, which produces annually about 4500*l*. Some large iron works are established at Dalnotter; there are also extensive and prosperous manufactories of glass and paper. Dumbarton is the chief town, and the principal road is from thence to Glasgow. The valued rental of the county is 33,328*l*. Scotch. The population in 1831 was 33,211. The county sends one representative to parliament. (*Agricultural Survey*, by Whyte and Macfarlan, 1811; Mac Culloch's *Statistics of the British Empire*, 1837, &c.)

DUMBNESS. [DEAF AND DUMB.]

DUMFRIES, the capital of the county of Dumfries, and the seat of a presbytery and synod, is beautifully situated upon a rising ground on the east side of the river Nith, about nine miles from its influx into the Solway Frith. The river is navigable for ten or twelve miles, and vessels of 120 tons' burden can approach the town. Two bridges cross the river; one on a very antient structure, supposed to have been begun by Devorgilla Douglas, mother of John Baliol, king of Scotland; the other was built in 1795. The town is 34 miles from Carlisle, 79 from Glasgow, and 71 from Edinburgh. The principal street is about three quarters of a mile in length, and, on an average, about 60 feet in breadth. Many of the other streets communicate with it at right angles. The public buildings and houses are chiefly of red freestone, and have a handsome appearance. The streets and shops are well lighted by gas. There are two parish churches, and eight chapels for dissenters. The ministers of the two churches have each a stipend of about 300*l*. a year. The stipends of the dissenting ministers amount to from about 100*l*. to 150*l*. each: 1000 families attend the two established churches, and about 700 the dissenting places of worship. Neither the churches nor chapels have any free sittings. A third church is about to be erected. St. Michael's church-yard contains a great number of interesting monuments; among which is an elegant mausoleum, erected by subscription to the memory of the poet Burns, whose remains are deposited in a vault beneath. A handsome piece of marble sculpture, executed by Turnerelli, representing the genius of Scotland finding the poet at the plough, and throwing her inspiring mantle over him, adorns the monument.

In the middle of High Street is Mid Steeple, where the meetings of the town-council are held; and opposite to it is the Trades' Hall, for the meeting of the seven incorporated trades. In 1706 a town-house was built. In 1807 a county gaol and court-house were erected, the latter of which is now converted into a bridewell. The present court-house is an elegant and commodious building, having a communication with the prison by a vaulted passage under the street. An academy stands in a large and spacious area. The theatre and assembly-rooms are neat and convenient buildings. On the south-east side of the town is an infirmary and lunatic asylum for this and the neighbouring county, founded in 1787: the annual expenditure is about 1200*l.*; the average number of patients about 30. There is also an hospital for aged persons and orphans, and a dispensary. A large and handsome lunatic asylum is now building by the widow of the late Dr. Crichton, of Friar's Carse. In Queensberry Square, which is in the centre of the town, a handsome Doric column was erected in 1780 to commemorate the virtues of Charles duke of Queensberry.

The prosperity of the town depends very much on the neighbouring country, there being no extensive manufactures. Hosiery, tanning, and basket-making, and also the manufacture of hats, clogs, and shoes, are carried on to a considerable extent. The only trade of importance is that of pork, of which many thousand carcases are sold annually during the season. The principal exports are wool, freestone, grain, potatoes, and live stock, particularly sheep. The imports are wood, wine, slate, lime, coals, and iron. The number of vessels belonging to the port of Dumfries, including the creek of Annan, amounts to about 84, the total burden of which is 5783 tons. About 16 or 18 of them are foreign vessels, chiefly employed in bringing timber from America. The others are coasters, plying to Liverpool and the ports of Cumberland. A steam-vessel plies weekly between this port and Liverpool. A market is held weekly on Wednesday. The town is governed by a provost, three baillies, dean and treasurer, 12 councillors, and seven deacons of trades, in all 25. The revenue of the town is about 2000*l.* annually.

Dumfries is a royal burgh, and unites with Annan, Lochmaben, Sanquhar, and Kirkcudbright, in returning a member to parliament. Besides the quarter-sessions, the circuit courts for the southern districts of Scotland are held here twice a year. The population of the burgh and parish in 1821 was 11,152; and in the census of 1831 there was an increase of 554. Since then the population is supposed to have decreased. The spasmodic cholera was very fatal here in 1832: 837 cases were officially reported, and of these 422 died. Maxwelltown, which is situated on the opposite side of the river, may very properly be said to form a part of Dumfries: together they contain about 13,000 inhabitants. The number of families in the parish of Dumfries is 2599, of which 248 are chiefly engaged in agriculture, and 1170 in trade, manufactures, and handicraft. The number of electors for the burgh in 1831 was 468. The poor are relieved on the plan recommended by the Rev. Dr. Chalmers. The funds are raised by voluntary contribution, and not by assessment. Visitors make advances to the poor, and meet once a week to receive back their advances from the treasurer and to deliberate as to applicants. In this way about 1500*l.* is expended annually. The name of Dumfries, it is supposed, was derived from the Gaelic words *dun*, a fortified hill, and *preas*, shrubs or brushwood. Although it is a town of great antiquity, there is no authentic record of an earlier date than the beginning of the thirteenth century, when a monastery was erected for Franciscan friars. In this monastery the Comyns were slain by Bruce, aided by Roger Kirkpatrick and James Lindsay, in 1305. For the convenience of this religious house, a bridge of thirteen arches was erected across the Nith: of these only seven now remain. A strong castle is said to have been founded here in the twelfth century, of which there is now not a vestige. Like most other towns, it was entered and guarded by four ports, independent of inferior gates. Some of these were constructed in the form of a portcullis, surmounted with a tower. Dumfries was twice burnt by the English; once in the middle of the thirteenth century, and again in 1536. Queen Mary and her privy council came here to ratify a peace with England in 1563. About two years afterwards, some disaffected noblemen raised a force, against which Mary advanced an army of 18,000 men. These nobles fled to England, and the castle soon surrendered.

In 1570 the town was taken and ransacked by the English under the Earl of Essex and Lord Scrope. James VI., in passing through the town in 1617, presented the trades of the burgh with a small silver gun, to be awarded from time to time to the best marksman. In 1706 the articles of union were burnt at the market cross by a party of Cameronians, who entered the town for this purpose, and were joined by many of the inhabitants. In 1745 the town suffered much from Prince Charles's army on its return from England. The view up the Nith is varied and beautiful, and the town has in its vicinity several neat villas and venerable buildings, among which Terregles, Dalswinton, Castle Dykes, Caerlaverock Castle, Lincluden Abbey, and Newabbey deserve particular mention. (*Picture of Dumfries and its Environs*, by John M‘Diarmid, Esq.; *The New Statistical Account of Scotland; Communications from Dumfries.*)

DUMFRIESSHIRE is a southern county of Scotland, lying between 55° 2′ and 55° 31′ N. lat. and between 2° 39′ and 3° 53′ W. long. from London. It is bounded on the south by the Solway Frith and Cumberland, on the north by the counties of Lanark, Peebles, and Selkirk, on the east by Roxburgh, and on the west by Kirkcudbright and Ayr. Its form is irregularly ellipsoidal: the greater diameter, from Liddel Mount to Corsoncone Hill, measures about 50 miles; the lesser diameter, from the Solway to Loch Craig, about 32 miles. The circuit of the county, exclusive of the æstuaries of the Nith, Lochar, Annan, and Sark, is about 174 miles. The superficial area measures 1263 square miles, or 808,320 English statute acres. The county was formerly divided into three districts, viz., Annandale, Eskdale, and Nithsdale, each comprehending a portion of territory which fell within the basins of the three rivers after which they are named; Esk on the east, Nith on the west, and Annan in the centre of the county. In 1831 the population was 73,770. Considerable numbers emigrate to America and other places.

Surface, Hydrography, and Communications.—The surface of the county is very irregular. About half of it is mountainous, a small part is on the sea-coast, and one-third midland, consisting of low hills, ridges, and vales.

Hartfell, the highest mountain in the county, is 3300 feet above the level of the sea; Lowther, near Leadhills, 3130; Black Larg, bordering on Ayrshire, 2890; Ettrick Pen, in Eskdale Moor, 2220; Queensberry Hill, 2140; Cairn Kinnow, near Drumlanrig, 2180; Wisp Hill, in Ewes, 1836; Holehouse Hill, 1500; Knockcraig, 1400; Langholm Hill, 1200; and Burnswark, 740 feet.

In the vicinity of Lochmaben are nine lakes or lochs five of which are of considerable size. The antient royal castle of that name stands upon a very narrow peninsula on the south-east side of the castle-loch, which is three miles in circumference. Some years ago a canal was projected between this lake and the Solway Frith, which, if executed, would be attended with incalculable advantages to the whole district of Annandale. It is asserted that sixteen different kinds of fish fit for the table are found in the lakes of Lochmaben, and that the Vendace, a very delicious fish, which in appearance bears some resemblance to the herring, is peculiar to the large lake. The mountain lake called Loch Skeen, situated near the head of Moffat Water, is 1300 ft. above the level of the sea, and about 2 miles in circumference. This lake feeds the well-known cascade called the Gray Mare's Tail, and is well stocked with delicate trout of a large size. There are several other lochs or lakes of less extent.

The principal rivers in the county are the Nith, Annan, and Esk. The Nith enters the county from Ayrshire, and runs in a south-east direction, in a very winding course above 40 miles, passing Sanquhar, Thornhill, and Dumfries. About nine miles below the last-mentioned place it falls into the Solway Frith. The surrounding mountains and ridges approach near each other above Drumlanrig castle, and also near Blackwood, and divide the vale of the river into three portions, which have been named the vale of Sanquhar, the vale of Closeburn, and the vale of Dumfries. The tributary streams that join the Nith are the Clouden, Scarr, Shinnel, Cample, Carron, Menoch, Euchan, Crawick, and Killoe. Its banks are almost everywhere beautified with gentlemen's seats and pleasure-grounds.

The Annan takes its rise near the sources of the Clyde and Tweed, among the mountains near the junction of

Lanarkshire and Peeblesshire with this county, and runs a course nearly south of about 30 miles, in which it passes Moffat, Lochmaben, and Bridekirk. It enters the Solway a little below the royal burgh of Annan, the second town in the county. The tributary streams that flow into the Annan are the Mein, Wamphray, Evan, Milk, Dryfe, Kinnel, Ae, and Moffat. A beautiful ridge crosses the vale of this river from Kirkwood by Murraythwaite to Mount Annan. In the bed of the Kinnel is a rock called Wallace's Leap, near which place Wallace concealed himself after the battle of Falkirk. In the other tributary streams are several cascades, well known for the grandeur of the scenery which surrounds them.

The Esk rises in the mountains on the borders of Selkirkshire, runs in a southern direction above 30 miles in the county, passes Langholm and Canobie, and forms near the latter place for one mile the boundary with England; after which it enters Cumberland, and turns westward through an open country by Longtown into the Solway Frith. This river receives in its course the Liddel, Tarras, Wauchope, Ewes, Meggot, and Black Esk. In the vale of Esk is some romantic and picturesque scenery, especially between Langholm and Longtown, where there is one of the most beautiful carriage-drives in the kingdom. The Kirtle is a romantic little river that enters the Solway Frith a little distance from the Sark, which is a border stream, and forms the boundary between England and Scotland for some distance before it enters the Solway. Both these rivers rise from the hills in the neighbourhood of Langholm, and pursue a southern course of about 20 miles.

The Lochar is a moss rivulet, which rises in Tinwald parish, near a small village called Jericho, runs about 13 miles in a very serpentine course, and discharges itself direct into the Solway, a few miles east of the mouth of the Nith.

The larger rivers contain salmon, herlings, parr or samlet, and sea-trout. These, and also flounders and cod, and occasionally turbot, soles, and herrings, are taken in the Solway Frith. Along the shore considerable quantities of cockles and mussels are gathered by the poor people. The smaller rivers contain pike, perch, trout, and eels. Fishing for salmon, gilse, and sea-trout, whiting or herling, commences in the Annan and Nith on the 10th of March, and closes on the 25th of September, both of which times are generally considered a month too early. The fisheries of all the rivers of Dumfriesshire are much injured by stake-nets in the Solway, and by salmon being killed in the spawning season.

Game-birds of various kinds are very plentiful, particularly pheasants, black game, grouse, and partridges. The woodcock, curlew, plover, lapwing, and snipe are also abundant. Moor-fowl and ptarmigan shooting commences August 12th; heath-fowl August 20th; both terminate December 10th. Partridge-shooting commences September 1st, and that of pheasants October 1st; both end February 1st Hares are numerous in many places, nor is the fox a stranger to the county; but neither the red deer nor the capercailie, both of which were met with at one time in Dumfriesshire, are now in existence. In some of the mosses are found the remains of the roe, or forest-deer, which formerly abounded in the county; but none had been seen for many years until lately, when two or three were discovered at Rachills, and having been protected, they are now established in considerable numbers. They are supposed to have strayed from the hills of Lanarkshire.

Roads.—There are no public railroads or canals; but the county is intersected in almost every direction with turnpike and other roads. The Carlisle and Glasgow turnpike enters the county at Sark Bridge, passes through Gretna, Dornock, Annan, Dumfries, Thornhill, and Sanquhar. Another turnpike to Glasgow passes through Gretna, Ecclefechan, Lockerby, Dinwoodie Green, and Beattock Bridge. A line of road leads from Carlisle towards Portpatrick by Annan and Castle Douglas. A turnpike-road extends from the town of Dumfries to Edinburgh by Moffat. The roads in general have of late been much improved, and are kept in excellent order. Safe and easy communications have been opened through several parts of the mountainous districts. A continuation of the projected railway from Manchester to Lancaster through Cumberland and Dumfriesshire to Glasgow would be an immense advantage and accommodation to the populous and manufacturing towns as well as to the agricultural districts on the line.

Geological Character.—The southern and lower part of the county consists of reddish-coloured sandstone, which becomes of a lighter colour and harder quality towards the north. This may be considered a continuation of the red marl formation of Cumberland. Proceeding farther northward, a reddish-coloured limestone, succeeded by a coarse white sandstone and blue limestone appears, and after these mandlestone rock and primitive mountains containing metallic ores. Limestone is worked in each of the three dales of the county, particularly at Kelhead in Annandale, and Closeburn in Nithsdale. A very remarkable appearance, and one that has excited considerable interest and speculation among geologists, was observed in a sandstone quarry in the parish of Lochmaben: distinct foot-marks of animals of various sizes were discovered, some of them 45 feet below the surface. The coal-field in the west of Cumberland is supposed to stretch through the Solway Frith towards the shores of Galloway and Dumfries, and to be buried at a great depth under the red strata of the shores and valleys of Nithsdale and Annandale. The coal-metals appear forced out near Ecclefechan, Kirtle-town, and Canobie. Several unsuccessful trials by boring have been made in the low country, but never to a satisfactory depth, and coals are wrought only at the two extremities of the county, Sanquhar and Canobie. The former has probably no connexion with the coals of Cumberland, but is a part of the Ayrshire coal. A great portion of the county is supplied with coal from Cumberland, and from Lanarkshire and Ayrshire. The old red sand-stone appears in the bed of the Annan, near Jardine-hall.

At Wanlockhead, near Leadhills, are extensive lead-mines. During the last fifty years, 47,420 tons of lead have been raised. From this lead silver is extracted in the proportion of six to twelve ounces in the ton. Some pieces of lead ore have been met with in the parishes of Langholm, Johnstone, Penpont, and St. Mungo, but no mines are wrought there. Gold is occasionally found in the mountains at Wanlockhead, in veins of quartz, or washed down into the sand of the rivulets. In the reign of queen Elizabeth, 300 men were employed by Sir Bevis Bulmer, for several summers, and collected gold to the value of 100,000*l.* Within the last four years two pieces have been found which weighed respectively ninety and sixty grains. The largest piece ever found there is in the British Museum, and weighs four or five ounces. An antimony mine, discovered at Glendinning in 1760, was regularly wrought in 1793. The ore was a sulphuret, which yielded about 50 per cent. The vein seldom exceeded twenty inches in thickness, and contained blende, calcareous spar, and quartz. Copper ore and manganese have been met with in small quantities; the former in the parish of Middlebie. Ironstone exists in some places in spheroidal masses, and in beds and bogs, but no iron is worked from ores in the county. Gypsum occurs in thin veins. The rocks of many of the hills consist of greenstone and of greywacke, and greywacke slate. Floetz-trap is found on the summit of some of the mountains, and generally in the shape of mountain caps. Boulders of granite and sienite are found in various places, the latter most frequently in the low part of the county. There are several basaltic or whinstone rocks, the finest of which are met with in the mountains in the vicinity of Moffat. About a mile from the last mentioned place is a celebrated mineral water similar to the sulphureous water of Harrowgate, and about five miles distant, in a deep ravine on the side of Hartfell, is a chalybeate spring. There are also mineral waters in the neighbourhood of Langholm, Annan, and Lochmaben, and in some other parts of the county.

Climate.—That part of the county which adjoins the Solway Frith is low and warm. The mountainous district is cold and bleak, but seldom remains long covered with snow. The whole is supposed to be moist, and in general mild and salubrious. In summer and autumn the prevailing winds are from the west and south, and in the winter and spring from the east and north. In winter the cold is sometimes moderate, at other times severe. The spring is generally late. In summer the thermometer often stands above 70° of Fahrenheit, and has been observed as high as 92° in the shade. About 45° is considered the average annual temperature. The most dreadful snow storm on record occurred in 1794, on the 25th January; upwards of 4000 sheep, besides a number of black cattle, were destroyed by it. As much of the land is wet and destitute of shelter, the climate would be greatly improved by draining and planting. Wood is much wanted in the county, particularly on the higher ridges, both for use and ornament; and draining would be a most important improvement. At a moderate expense not only Lochar moss, but several other extensive tracts of wet and mossy ground might be drained and converted into valuable meadows and cornfields. There are a few belts and clumps of trees, and young plantations which are thriving well, but their extent is very limited.

Agriculture.—The soil in the lower parts of the county is generally light and sandy. Along the margins of the great rivers are considerable tracts of rich alluvial soil. Between Tinwald and Torthorwald, and from the Hook to Lockerby are fine fields of loam; peat-moss prevails on many of the hills, and in some of the vales: the most extensive moss is that of Lochar, near Dumfries, which is eleven or twelve miles long, and between two and three broad. Clay is found extensively as a sub-soil, and in a few places as a soil mixed with other substances. In Annandale and Nithsdale the dry soil prevails. On many of the hills the soil is naturally wet. Many of the estates are freehold, and are held immediately of the crown. A considerable number are held of a subject superior. Lands of both tenures may be laid under entail for an unlimited period, and in favour of heirs yet unborn. As the right of superiority may be conveyed without property, some gentlemen hold superiorities who have no property in the county. In the vicinity of the castle of Lochmaben small parcels of rich and fertile land called Four Towns are held by a very antient and peculiar mode of kindly tenure, and are transferred simply by possession. The proprietors pay a small fixed sum annually to the earl of Mansfield. Feu-holding, which enables the owner to alienate at pleasure, and subjects him to an annual payment equal and sometimes superior to rack-rent, is mostly confined to houses and gardens. Near the royal burghs certain tracts of land are held under burgage tenure. The owners of these pay every year a certain sum as rent or duty to the magistrates of the burghs. Tithes, or teinds, as they are called, are very light. By an act of the Scottish parliament, dated 1663, a fifth part of the rent was directed to be returned as the tithe, and fixed as a money payment; the valuations to be made at the request of the landowners. In consequence of the depreciation of money and the increase of the value of land, the tithes are considered exceedingly moderate. The rental of a great portion of land has been more than doubled within the last forty years. Though several landlords have lately made considerable reductions, many farms, on account of the reduced price of produce, are over-rented, and for want of capital the farmers are unable to make improvements. Long leases of small portions of land for building are very common in villages. Farms of arable land are generally let on leases of 15, 19, or 21 years. On sheep farms the ordinary leases are from 9 to 13 years. Various forms of leases are in use. Some landowners have printed conditions, which are seldom read or attended to by the tenants, except so far as regards the rent and term of the lease. There is a kind of rule that not more than one third part of the arable land shall be under white crops, yet some adopt the four-field and others the six-field course of husbandry. A variety of crops are now cultivated, and the practice of farmers with respect to rotation is various. Some very judiciously endeavour to suit their rotation and course of management to the different soils; others, by altering the rotation or by varying the genera or species of the crops, adopt a double rotation. The following is a frequent order of husbandry: 1st year, oats; 2nd, potatoes and turnips, the latter fed off by sheep; 3rd, wheat or barley, and sown with grass seeds; 4th, hay; 5th, grass. Oats and potatoes are cultivated more extensively than any other crop, both for home consumption and for exportation. Potatoes are much used in fattening cattle and pigs. A great quantity of hams and bacon of the very best quality are cured in this county, and sent off to the Liverpool, London, and Newcastle markets. The very general adoption of the culture of turnips has lately been one of the greatest improvements in agriculture. Bone manure is used with advantage upon high ground of difficult access. The farm implements in use are very similar to those in Cumberland, with the exception of the sickle, the use of which is in some places much laid aside, and the scythe substituted for it. The horses in general are of a middle size, and are the result of many crossings of different breeds. The quality of the cattle and sheep stocks has been lately much improved. The Galloway breed of cattle mostly prevails, except for the dairy, for which business many intelligent farmers prefer cows of the Ayrshire breed. The sheep are of the Cheviot and black-faced breeds, but there are not many of them perfectly pure and unmixed. Latterly they have been crossed by the Leicesters, and where the land has been drained, which is usually by open cuts, the offspring are found to answer exceedingly well, and make more profitable returns to the farmer. The native breed of dun-faced small sheep does not now appear in the county. A great number of pigs are kept by the farmers and cottars, and bacon may be considered a staple commodity of the county. Grass lands are generally entered upon at Whitsuntide; and corn lands in August, after the removal of the crop. The rent is payable at Whitsuntide and Martinmas in equal portions. Sheep farms vary in size from 300 to 3000 acres, and two sheep for three acres may be considered an average number of stock. The management of these is by far the least expensive branch of farming, though a good deal more is necessary than the shepherd and his dog. Arable farms extend from 50 to 600 acres; many are about 100 or 150 acres. Some farms contain both sheep-walk and arable lands, and these are considered the most convenient and productive. Arable farms, and those of small size, prevail on the low grounds and near the market towns and villages. Those of larger extent, where pasture greatly preponderates, are more distant, and more highly situated. The rent of land varies according to quality and situation. Arable land in a good situation lets from 2*l.* to 5*l.* per acre, but about 1*l.* per acre may be considered an average of the county for arable lands, and 4*s* for sheep-walk. The annual value of real property, as assessed in 1815, was 295,621*l.*

Most of the modern farm buildings are commodious and well arranged; they are constructed of stone and lime, and generally covered with slate. Very few are now thatched with straw or built of clay as formerly. Great improvements have been also made in the churches, schools, roads and fences. There are two or three district farming societies, but no general agricultural association for the county. These societies have been very useful by stimulating attention to the improvement of stock. The present depressed state of agriculture bears hard on the peasantry, who are intelligent, frugal, and industrious people. A remarkable difference exists in the food provided by the farmers in England and in Dumfriesshire for their labourers. In Dumfriesshire the haymakers, reapers, &c. have oatmeal porridge, milk, potatoes, and broth, but no meat except a piece of bacon boiled in the broth to give it a relish. The gray plaid thrown round the body is very common. The popular games are curling in winter, and quoits in summer. Married servants generally reside in a cottage near the farmer's house, and are furnished with a quantity of oatmeal, potatoes, and peats. They have also a cow's grass each, and supplies of money, the whole supposed to be worth about 35*l.* a year. House servants are engaged at hiring fairs at a fixed wage, for six months, for which period men have about 6*l.*, and women 3*l.* The people are very sensible of the benefits of education, and can almost all read and write. In the country parishes, as well as in burghs and larger villages, there are parish schools, in which not only the ordinary branches of education, but also the classics and French are generally taught. A few of them are well endowed, but the emoluments on an average do not perhaps exceed 50*l.* each. The poor in the country are relieved by the ministers and elders from funds collected in alms at the church doors, voluntary donations, and small fines. In many parishes sums of money have been bequeathed, or mortified, as it is termed, for the use of the poor. The great evil of this system is constant and uninterrupted public begging, the only remedy for which would be to enforce residence in the parishes where the poor are known. In a few parishes on the border a rate is levied, and paid in equal proportions by the landlords and tenants. The independent disposition which induced the poor to refrain from seeking parochial relief, it is feared, is fast wearing out. The practice of making salt by filtering the sea-sand, or sleetch, for which the inhabitants had a right of exemption, has altogether ceased along the coast since the removal of the salt duty.

Fairs.—The county town has three annually, for horses and black cattle, February 13th and September 25th, if these days fall on Wednesday; if not, the Wednesday after; and Martinmas Wednesday. The last is chiefly for fat cattle, and for hiring servants. There are markets here also for cattle on Wednesdays, from the beginning of April to the end of December. For lambs: Langholm, July 26th; Lockerbie, August 16th and October 16th, excepting Saturday, Sunday, or Monday, and in that case on the Tuesday following. For sheep: Langholm, September 18th. For tups, sheep, lambs and wool: Sanquhar, July 17th, if Friday; if not, on Friday after. For tups: at Moffat in the latter end of June; at Annan in May and October; at Moffat in March and October; and at Lockerbie in April; and fourteen days after Michaelmas are fairs for hiring servants.

Formerly a very singular custom was observed at a fair held at the meeting of the White and Black Esks. At that fair, it was the custom for unmarried persons of both sexes to choose a companion according to their liking, with whom they were to live till that time next year: this was called *hand-fasting*. If they were pleased with each other at that time, they continued together for life; if not, they separated, and were free to make another choice as at first.

Divisions, Towns, &c.—There is no division of the county for political purposes, but within its limits are four royal burghs, Dumfries, Annan, Lochmaben, and Sanquhar. The natural division is into the districts or dales of the three principal rivers; Nithsdale, Annandale, and Eskdale.

Langholm is a well built town delightfully situated in the bosom of some picturesque woodland and mountain scenery on the banks of the Esk. It consists of one principal street, in which is a town-hall and jail in the market-place; and the village of New Langholm on the opposite side of the river. The castle, which is now in ruins, has only been a square tower. There is an old church, two dissenting meeting-houses, an endowed school, and a savings'-bank. The late Mr. Telford, civil engineer, left 1000*l.* to the Langholm library, and as there are two libraries, the legacy is in dispute between them. There are also two woollen manufactories and a small whiskey distillery. Wednesday is the market day. Parish population 2676. A handsome monument has lately been erected by subscription on Langholm Hill to the memory of the late Sir John Malcolm. The principal mansion-houses in the vicinity are Langholm-lodge, Broomholm, Burnfoot, and Westerhall. Near the old castle is a place where several reputed witches were burnt in the last century, some of whom, it is said, acted as midwives, and had the power of transferring the pains of labour from the mother to the father.

Moffat, a celebrated watering-place, stands on very dry and gravelly ground, which gently declines towards the south, near the river Annan, 20 miles north by east of Dumfries. It is protected on the north-east by a noble screen of lofty mountains. Here are elegant baths, assembly-rooms, a church and burgher meeting-house, a subscription and a circulating library. Parish population in 1831, 2221. A weekly market is held on Friday. The seat of Rae-hills is about eight miles distant. Among the places in the vicinity noted for fine scenery, and much visited by strangers for the purpose of recreation, are the old caves at Newton; Earl Randolph's tower; Craigie wood; Bellcraig rock and lin, and Gray Mare's Tail. The sulphureous water of Moffat, according to the analysis of Dr. Garnet, contains 4 cubic inches of nitrogen gas in the wine gallon, 5 cubic inches of carbonic acid gas; 10 cubic inches of sulphureted hydrogen gas; and 36 grains of sulphate of soda. The chalybeate water of Hartfell, according to the analysis of the same chemist, contains 5 cubic inches of azotic gas in a wine gallon; 84 grains of sulphate of soda, 12 grains of sulphate of alumina, and 15 grains of oxide of iron. The sulphureous water is found of great service in scrofula, cutaneous eruptions, and bilious complaints; the chalybeate in disorders of the stomach and bowels, and in those connected with local and general debility.

Lochmaben is a very antient burgh and market town seated on the west side of the Annan. It was several times plundered and burnt by the English. It consists chiefly of one broad street, and is governed by a provost, three bailies, a dean of guild, a treasurer, and nine ordinary councillors. The revenues are very small. The town-hall, under which is the jail and lockup-house, was built in 1745. A handsome and substantial new church was erected in 1819. It possesses also a burgher chapel, a subscription library, and an endowed school. Population 1000; 39 of whom are electors under the Reform Act. During the winter there is a weekly market for pork, in which business is done to a large amount. The castle, now in ruins, has been a place of great strength, the fortification covering nearly 16 acres.

Lockerbie is a market-town situated between the rivers Annan and Milk, 12 miles east of Dumfries. The number of inhabitants is 1414. There is a good parish church, and also an antiburgher meeting-house, a library, and a public reading-room. The old tower was lately converted into a temporary lockup-house. Thursday is the market day. The winter weekly markets are principally for pork.

Sanquhar, a royal burgh, is seated on the Nith, 27 miles south-west of Dumfries. It has a handsome church, erected in 1820, and three dissenting places of worship; a prison, savings'-bank, and a subscription library. The castle is a very picturesque ruin. The town is governed by a provost, three bailies, a dean of guild, a treasurer, and eleven ordinary councillors. Revenue about 40*l.* yearly. The only manufacture, except weaving and sewing of muslin to a certain extent, is a carpet manufactory at Crawick-mill. Parish population in 1831, 3268. The town about 1400. The number of electors of the burgh was 50. At Eliock-house, in this parish, was born the Admirable Crichton.

Ecclefechan is a neat village on the Glasgow and London road, on which a market is held every month on a Friday, and a pork market weekly. In its vicinity are Hoddam castle, and the Tower of Repentance.

Graitney or Gretna Green, a neat small village long celebrated for the clandestine marriages of fugitive lovers, is situated within a mile of the English border; on which border is also Solway-moss, remarkable for a disastrous battle in the time of Henry VIII., and for a sudden and overwhelming eruption that took place in 1771.

Divisions for Ecclesiastical and Legal purposes. The synod of Dumfries extends over the whole county, and also over a part of some other counties. It comprehends fifty-three parishes, forty-two of which are in this county. The next court in authority is a provincial synod, which consists of all the clergy of the established church, and one elder from each parish. The synod of Dumfries comprehends five presbyteries, viz. Dumfries, Lochmaben, Annan, Penpont, and Langholm. The number of clergymen within its limits is fifty-four, and of these forty-three are in this county. Prior to the year 1756, there were three jurisdictions in the county, viz. the sheriffship of Nithsdale, the stewartry of Annandale, and the regality of Eskdale. Since then one sheriff, whose authority extends over the whole county, has been deputed by the crown. He appoints a deputy, and holds office during life and good conduct. The sheriff-court for the county and the commissary court are held every Tuesday during the session; the sheriff small debt court every second Thursday throughout the year; and the justice of peace small debt court every second Monday.

The county sends one member to parliament, and the burghs of Dumfries, Annan, Lochmaben, and Sanquhar join with Kirkcudbright in electing another representative. Three newspapers are published weekly at Dumfries, the county town.

Antiquities, History, &c. The remains of Druidical temples exist in the parishes of Holywood, Graitney, Eskdalemuir, and Wamphray. Near Moffat are vestiges of a British encampment and also of a Druidical temple. A Roman way has extended from Carlisle by Graitney through the procestrium of the station at Burnswark. This way afterwards divided into two branches; one of which took the route of Nithsdale, and the other of Annandale. They united again at or near Crawford castle. Another Roman way led from Carlisle by the station at Netherby and Liddel-strength through Canobie into Teviotdale. Several fortifications, both of a circular and square form, and some large Roman encampments can be distinctly traced in various parts of the county. At Castleo'er or Overby is a very complete encampment of an oval form supposed to be of Saxon origin, and at Raeburn-foot is a Roman camp which probably communicated with those of Middlebie and Netherby. There are ruins of many old towers, vestiges of forts, and a great number of cairns or burians in different places. The most remarkable towers are at Achincass, Lag, Amisfield, Robgill, and Lochwood. At Dryfesdale is the most entire British fort, and at Burnswark-hill near Ecclefechan are very distinct remains of Roman encampments. There are many moats or artificial mounts on which the people are supposed to have met to make laws and administer justice. Of these Rockhall moat near Lochmaben is one of the largest and most beautiful. Among the antiquities, the cross of Markland, which is an octagon of solid stone, and a very curious antient obelisk, supposed to be of Anglo-Saxon origin, found in the churchyard of Ruthwell, are deserving of notice. The latter is ornamented with figures in relievo descriptive of sacred history, and inscribed partly with Runic and partly with Roman characters. The antient buildings in Nithsdale are the castles of Caerlaverock, Morton, Closeburn, Torthorwold, and Sanquhar. In Annandale are the castles of Comlongan, Hoddam, Lochwood, and Achincass. In Eskdale there are some remains and vestiges of the castles of Langholm and Wauchope. Gilnochie in the parish of Canobie was the residence of Johnny Armstrong, a celebrated and powerful border-chieftain. In this parish there are also some vestiges of a monastery, which was pillaged, and laid in ruins by the English soldiers after the battle of Solway-moss in 1542. Vast quantities of antique pieces of armour, medals, and coins have been found in the county.

The Selgovæ were the most antient inhabitants of this county. In the time of the Romans, Dumfriesshire formed a part of the Roman province of Valentia [BRITANNIA]; and after the Romans had relinquished Britain it constituted a portion of a new kingdom founded by Ida and the Angles. In the eighth century it was under the dominion of the Picts, who dismembered Galloway and Dumfriesshire from the Northumbrian monarchy. Until the reign of James VI. this county was the scene of many battles and of many a feud and foray, which were often occasioned by the jealousies of the rival chieftains. Being seated on the borders it was also liable to the incursions of the English and to frequent predatory warfare. It was likewise the birth-place and residence as well as the scene of the heroic actions of many warriors distinguished in Scottish history. For a long time many of the inhabitants subsisted entirely by spoil and pillage, and the rapine of those freebooters was as intolerable to their own countrymen as to the English. This life of predatory warfare was afterwards exchanged for vicious idleness and lawless independence. The contraband trade with the Isle of Man prevailed to a great extent, and the borders were for a considerable time infested with daring bands of smugglers. In the rebellions of 1715 and 1745, but particularly in the latter, the country districts endured various outrages, and the county town sustained damage to the amount of 4000*l.*, but in 1750 the crown granted a dividend of 2800*l.* on the above sum out of the forfeited estate of Lord Elcho.

(Dr. Singer's *General View of the Agriculture, &c. of the County of Dumfries*; *New Statistical Account of Scotland*; Jameson's *Mineralogical Survey of Dumfriesshire*; Chalmers's *Caledonia*; *Beauties of Scotland*; *Communications from Dumfriesshire*.)

DUMONT, ETIENNE, was born at Geneva in July, 1759. His father died when he was very young, leaving a widow, three daughters, and a son (the subject of the present article), with very small means of support. The mother, however, was a woman of strong mind, and struggled against the difficulties arising from her straightened circumstances, that she might give her son a good education. At college Dumont assisted to support himself by giving private lessons. In his twenty-second year he was ordained minister of the Protestant church in Geneva; and we are told by M. Sismondi that his preaching was greatly admired. He left Geneva in the spring of 1783, owing to the triumph then achieved by the aristocratical party in that state through foreign interference; and he betook himself, a voluntary exile, to St. Petersburg, where he assumed the charge of the French Protestant church. He stayed in that city eighteen months, acquiring fame by his preaching; when he was invited to London by Lord Shelburne, afterwards the Marquis of Lansdowne, to undertake the education of his sons. In Lord Shelburne's house he made the acquaintance of Fox, of Sir Samuel Romilly, of Lord Holland, and most of the other distinguished members of the Whig party; and with Sir Samuel Romilly in particular he formed a strong friendship. In 1788, Dumont and Sir Samuel Romilly visited Paris together, and it was on the occasion of this visit, which lasted only two months, that Dumont first became acquainted with Mirabeau.

In 1789 Dumont made a second visit to Paris, accompanied by M. Duroverai, in order to negociate with M. Necker, who was then minister, for the liberty of Geneva and the return of her exiles. He stayed in Paris until the beginning of 1791, and during this second visit the acquaintance previously formed with Mirabeau ripened into intimacy. We learn from Dumont's posthumous work, entitled 'Souvenirs sur Mirabeau,' (a work which has thrown great light on Mirabeau's character, and which is further interesting as giving Dumont's views concerning the French Revolution,) that Mirabeau frequently during this period availed himself of the assistance of Dumont and Duroverai especially the former, in the preparation of speeches and reports. These three also set on foot conjointly a paper called the 'Courier de Provence;' though Mirabeau's share in the composition of it was not very great.

It was not until Dumont's return to England in 1791 that his intimacy and co-operation with Mr. Bentham commenced. [BENTHAM]. Admiring Mr. Bentham's talents, and impressed with the importance of his pursuits, he craved leave to arrange and edit those writings on legislation which their author would not himself publish. The task was one comparatively humble, yet useful. Further, it was a task of some difficulty. 'I have had,' says Dumont himself, in his preface to the 'Traités de Legislation,' 'to select from among a large number of various readings, to suppress repetitions, to clear up obscurities, and to fill up *lacunæ* which the author had left that he might not slacken in his work. I have had to do much more in the way of curtailment than of addition, of abridgment than of extension. The mass of manuscripts which has passed through my hands, and which I have had to decipher and compare, is considerable. I have had to do much to attain uniformity of style, and in the way of correction; nothing or next to nothing as regards the fundamental ideas. The profuseness of their wealth was such as to need only the care of an economist, and being appointed steward of this large fortune, I have neglected nothing which could improve its value or help to put it into circulation.' (p. 2.)

The following are those of Mr. Bentham's works which were edited by Dumont. 1. The 'Traités de Legislation,' 3 vols., published in 1802. 2. The 'Théorie des Peines et des Recompenses,' 2 vols., in 1811. 3. The 'Tactique des Assemblées Legislatives,' in 1815. 4. The 'Preuves Judiciaires,' 2 vols., in 1823. The 'Organisation Judiciaire et Codification,' in 1828.

In 1814 Dumont had returned to Geneva, his native state having then recovered her independence. He was elected a member of the representative council of Geneva, and, having been appointed on a committee that was to draw up laws and regulations for the council, he was the author of the plan that was ultimately adopted. He afterwards directed his efforts to a reform of the penal system and the prison system existing at Geneva. Under his auspices, a penitentiary establishment was erected at Geneva in 1824, on the Panopticon plan of Mr. Bentham. Dividing his time between his senatorial duties and the publication of those of Mr. Bentham's works which have been named, he lived a useful and a happy life to the age of sixty. He died suddenly in the autumn of 1825, while travelling in the north of Italy

There is a brief memoir of Dumont by M. de Sismond in the Revue Encyclopédique, tom. 44, p. 258; and another by M. de Candolle in the Bibliothèque Universelle for November 1829. M. Duroverai has also prefixed a short notice o his life to the 'Souvenirs sur Mirabeau.'

DUMOURIEZ, CHARLES FRANCOIS, was born at Cambrai in 1739. His father was commissary in the army, and was also an author and a poet. Dumouriez entered the army at an early age, and served in Germany during the seven years' war. After the peace of Paris, 1763, he travelled about Europe, offering his services to several states: he visited Corsica, and afterwards Spain and Portugal, and wrote an essay on the military situation and resources of the latter kingdom. Having returned to France, he was appointed quarter-master-general to the French expedition for the conquest of Corsica, 1768-9. He was afterwards sent to Poland on a mission to the confederates of Bar, with whom he made the campaign of 1771 against Russia. He was afterwards sent by Louis XV. on a confidential mission to Sweden, in the same manner as the Chevalier D'Eon, count Broglie, and others, who were sent to England and other countries, and who corresponded directly with the king without the intervention of his ministers. The ministers however became jealous of Dumouriez, and found means to arrest him at Hamburg whence he was brought back to Paris under a lettre de câchet, and lodged in the Bastile.

He was released by Louis XVI. on his coming to the throne, and restored to his rank of colonel. In 1778 he was sent to Cherbourg to form there a great naval establishment connected with the proposed invasion of England, and he furnished the ministry with plans for the conquest of the islands of Jersey, Guernsey, and Wight. At the beginning of the revolution he took the popular side, and became connected with the Girondins, by whose interest he was appointed minister of foreign affairs, in which capacity he prevailed upon the king to declare war against Austria in April, 1792. Soon after he left office, upon the dismissal of the other Girondin ministers, Roland, Servan, Claviere, &c. Dumouriez had now become afraid of the violence of the revolutionary movement, the Jacobins hated him, and even the Girondins grew cool towards him. Like La Fayette, he professed his attachment to the constitutional monarchy of 1791, which the others had given up. He withdrew himself however from internal politics and went to serve under General Luckner on the northern frontiers. After the 10th of August he was appointed to replace La Fayette in the command of the army which was opposed to the Duke of Brunswick. The army was disorganised, but Dumouriez soon re-established order and confidence; he obtained a series of partial but brilliant successes, which checked the advance of the Prussians; and, lastly, he made a determined stand in the forest of Argonne, which he styled the Thermopylæ of France, by which means he gave time to Kellerman and other generals to come up with fresh divisions, and give battle to the Prussians at Valmy, 20th September, 1792, an engagement which was won by Kellerman. It is generally allowed that Dumouriez' stand at Argonne was the means of saving France from a successful invasion.

At the end of October Dumouriez began his campaign of Flanders; gained the battle of Jemmapes against the Austrians, 5th and 6th November; took Liege, Antwerp, and a great part of Flanders, but, on account of some disagreement with Pache the minister at war, he was obliged to return to Paris during the trial of Louis XVI. After the execution of the king, Dumouriez returned to his head-quarters, determined to support, on the first opportunity, the re-establishment of the constitutional monarchy under the son of Louis. Meantime he pushed on with his army, entered Holland, and took Breda and other places, but being obliged, by the advance of Prince Cobourg, to retire, he experienced a partial defeat at Neerwinde, and again at Louvain. Meantime he had displeased the convention by opposing its oppressive decrees concerning the Belgians, and he wrote a strong letter on the subject to that assembly on the 12th of March, which, however, was not publicly read. Danton, Lacroix, and other commissioners of the convention came successively to his head-quarters to watch and remonstrate with him, but he openly told them that a republic in France was only another name for anarchy, and that the only means of saving the country was to re-establish the constitutional monarchy of 1791. Dumouriez entered into secret negotiations with Prince Cobourg, by which he was allowed to withdraw his army unmolested to the frontiers of France, and also his garrisons and artillery which he had left in Holland, and which were cut off by the advance of the enemy. These favourable conditions were granted by Cobourg on the understanding that Dumouriez should exert himself to re-establish the constitutional monarchy in France. Dumouriez retired quietly to Tournay, and evacuating Belgium withdrew within the French frontiers, where he placed his head-quarters at St. Amand, 30th March, 1793. He was now accused of treason at Paris: the convention passed a decree summoning him to their bar, and four commissioners, with Camus at their head, came to St. Amand to announce to him the summons. Dumouriez replied that he was ready to resign the command, if the troops consented, but he would not go to Paris to be butchered. After a violent altercation he gave the commissioners in charge to some hussars, and sent them over to the Austrian general Clairfait, at Tournay, to be detained as hostages.

His design was now to march upon Paris, but his troops, and especially the volunteers, refusing, he was obliged to take refuge himself, with a few officers, at the Austrian head-quarters, April, 1793. He there found out that his plan of a constitutional monarchy was disavowed by the allies, and in consequence he refused to serve in the Austrian army against his country. He wandered about various towns of Germany, treated with suspicion, and annoyed by the royalist emigrants, who hated him as a constitutionalist while in France the Convention offered a reward of 300,000 francs for his head. Having crossed over to England, he was obliged to depart under the alien act, and took refuge at Hamburgh, where he remained for several years, and wrote his memoirs and several political pamphlets. In 1804 or 1805 he obtained permission to come to England, where he afterwards chiefly resided. He is said to have furnished plans to the British and Portuguese governments for the operations of the peninsular war; and he received a pension from the British government, upon which he lived to a very advanced age. It is remarkable that after the restoration he was not recalled to France by Louis XVIII. In 1821 he wrote a plan of defence for the Neapolitan constitutionalists. He died in March, 1823, at Turville Park, near Henley-upon-Thames, at the age of eighty-four. (*Mémoires du Général Dumouriez*, written by himself; and an article in the Supplement to the 6th volume of the *Biographie des Contemporains*, which seems fairly and soberly written.)

DUN-LE-ROI. [CHER.]

DÜNA, the, or in Livonian the **DA-UGAVA**, and in Russian the **ZAPADULA**, a considerable river in Western Russia, rises from several springs not far from the source of the Volga, which flow out of marshy ground in the neighbourhood of the Volkonsky forest, near the south-western confines of the government of Tver. It winds in a west-south-westerly direction, nearly parallel with the Dnieper, until it has passed Vitepsk, having become navigable for flat-bottomed craft at Valisch, or Velige, above Vitepsk. Thence, forming the boundary between the governments of Polotsk and Minsk, as well as those of Livonia and Vilna, it turns to the north-west, and near Dünsburg flows almost due north until it reaches the point where it begins to constitute the frontier between Livonia and Courland; from that point it continues its course west-north-west to Dünamünde, below Riga, where it falls into that arm of the Baltic called the Gulf of Riga, in 57° N. lat. The entire course of the Düna, inclusive of its windings, is about 655 miles; its length in a straight line from the source to the mouth is about 325 miles. Güldenstädt states that the fall of its waters is, in the upper part of its course, one foot in every 2000 fathoms, and in its passage through the lower part, where the land is more level, six inches in every 2000 fathoms, its average fall being six inches in every four versts (about 2⅔ miles). The navigable portion of the Düna, namely, from Velige to Dünamünde is about 405 miles in length, but the navigation, owing to the variableness of its depth, which ranges from two to four fathoms, to its shallows, and to a stratum of rock, which runs across its bed just above Riga, and the sandbanks at its mouth, is extremely difficult, and even dangerous, for vessels of any size. Its course above Riga, indeed, is not practicable for any but the flat-bottomed craft called Strusen. At Riga its breadth is about 3000 feet. In the spring the surface is covered with rafts, logs, and planks, which are thus floated down from the forests of Livonia, Lithuania, and Semigallia, as well as the more westerly provinces which it passes through. It contains several islands, and abounds in fish. The tributaries of the Düna greatly augment its waters, though they are not of any great length: the chief of these are the Toroptsa, which is navigable from Toropecz to its mouth, a distance of about 60 miles; the Ulla, which flows out of lake Belove, and is navigable for about 56 miles; the Kasplia, which is navigable from Poritsch, about 110 miles from its mouth; the Ewst, Meshna, and Disna, the last of which rises in the government of Vilna; and the Bolder-Aa, which flows past Mittau, then skirts the southern shore of the gulf of Riga, and ultimately falls into the Düna just above its mouth. The Narofna, which joins the Düna on its right bank, can be regarded only as an outlet for lake Peipus, and is from 37 to 42 miles in length. The basin of the Düna comprehends an area of about 28,350 square miles.

DÜNABURG, the chief town of a circle in the north-western part of the government of Witepsk in Western Russia, and formerly the capital of Polish Livonia. It lies on the right bank of the Düna, and on both sides of the Shunitzee, which flows into it; in 55° 53′ N. lat., and 26° 24′ E. long. It was founded in 1277 by the Knights of the Sword, and while attached to the Polish crown was the residence of a bishop, voyvode, and castellan. At the pre sent day it is become of great military importance, from the strength which has been given to its fortifications. Dünaburg contains a Greek and two Roman Catholic churches, and a synagogue, a suppressed Jesuits' college, and a population of about 4200. It has three fairs in the course of the year, and carries on considerable trade.

DUNBAR. [HADDINGTON.]

DUNBAR, WILLIAM, is supposed to have been a grandson of Sir Patrick Dunbar, of Beil, in the shire of Haddington. This Sir Patrick Dunbar was a younger son of George, tenth earl of March. He was thus also a younger brother of George, eleventh earl, who was attainted in an arbitrary manner, and had his possessions forfeited by King James I. in the parliament held at Perth on the 10th of January, 1434-5; and it appears that Dunbar, being involved in the common ruin of the house, lived in a state of great dependence without any patrimonial inheritance.

The path of ambition in those days, and the road to wealth and honours, was the church, to which Dunbar was destined from his earliest years. In 1475 he was sent to the university of St. Andrews, where he passed bachelor of arts, in St. Salvator's college there, in 1477; and in 1479 master of arts.

He afterwards entered the monastic order of St. Francis; and in the habit of a friar travelled not only throughout the south of Scotland, but also into England and on the continent. From his writings we learn that he was frequently employed abroad in the king's service, but in what capacity does not precisely appear. It was in all likelihood as a *clerk* in some of the numerous missions despatched by King James IV. to foreign courts. Of his own fidelity to his royal master on these occasions he entertained a tolerably high opinion; and few opportunities escaped of his reminding the king of the nature and extent of his services, with not merely distant hints, but direct intimations of the propriety of a recompense. It was no doubt with a view to this, but partly also, and perhaps mainly, to remunerate his higher labours of the intellect and fancy, to reward his literary merit, and to attach him to the person of the king, that, on the 15th of August, 1500, he had a grant from his majesty of an annual provision of 10*l.* during his life, or until he should be promoted to a benefice of the value of 40*l.* or more yearly.

In the year 1501 he was again in England, probably in the train of the ambassadors who were sent thither to conclude the negotiations for the king's marriage. The preparations for this marriage began on the 4th of May, 1503; and upon the 9th of that month Dunbar composed his poem of 'The Thistle and the Rose,' a rich and elegant allegory in celebration of the union. On the 7th of March following he said mass for the first time in the royal presence, and received a liberal gift as the king's offering on the occasion. In the year 1505 he also received a sum from the king in addition to his stated pension; and both that year and the next a sum equal each time to his half-yearly allowance in lieu of his 'yule-gown.' In 1507 his pension was doubled; and besides occasional marks of the royal bounty, he had a letter under the privy seal in August, 1510, increasing the sum to fourscore pounds a year, and until he should be promoted to a benefice of 100*l.* or upwards. This allowance he continued to receive, with other gifts, till the time of the king's death at Flodden in September, 1513, after which we find no farther mention of Dunbar's name in the treasurer's account, or other like records. He is supposed to have died about the year 1520.

Whether he at last obtained the great object of his desires does not appear. His remaining works do not show that he ever did. On the contrary, they contain many supplications for a benefice, and many lamentations for the want of one; and the various forms and character of these pieces display not a little of that fertility of invention by which Dunbar is distinguished. He seizes every occasion and seems to exhaust every expedient to rouse the king to bestow upon him the long-cherished wish of his heart. A singular one is the poetical address to the king by Dunbar in the person of 'an auld grey horse' worn out in the royal service, and to the petition is appended the king's reply, written, as it seems, by Dunbar himself, in the hope, no doubt, that the king would adopt it as his own. In modern orthography the reply runs thus:—

> 'After our writings, treasurer,
> Take in this grey horse, old Dunbar,
> Which in my *aucht* with service true
> To lyart changed is his hue.
> *Gar* house him now against this yule,
> And busk him like a bishop's mule;
> For with my hand I have indost
> To pay whate'er his trappings cost.'

Dunbar's writings now extant are not numerous, but they exhibit an amazing versatility of genius, from grave to gay, from witty to severe. At one time we find him the sober moralist supporting the weak, instructing the ignorant, warning the rash; at another, indulging in all the immodesty of licentiousness. But it is in description that he shows his various powers most conspicuously. Thus, in his 'Golden Terge,' as in 'The Thistle and the Rose,' we have imagery brilliant and dazzling. In the 'Dance of the Deadly Sins in Hell,' the same creative hand appears. 'The Feigned Friar of Tungland' and 'The Justs between the Taylor and the Souter' display the same power of vividly portraying character, mingled with bitter sarcasm and biting satire. And in the doggerel lines 'On James Doig' we see the burly wardrobe-keeper pass before us, and feel

> 'His gang gars all the chalmer schog.'

The existence of Dunbar's works is a signal proof of the immortality of real merit. We know not at what precise time he was born, nor when he died; his very name, it has been remarked, is, with one solitary exception, not to be met with in the whole compass of our literature for 200 years, and it is only after the lapse of three centuries that his poems have been collected and published; and yet he now once more stands forth as one of the very greatest of Scotland's poets.

DUNBLANE. [PERTHSHIRE.]

DUNCAN, ADAM, was born July 1, 1731, at Dundee, of which his father was provost in 1745. By the mother's side he was descended, through the Haldanes of Gleneagles, from the earls of Lennox and Menteith. He entered the navy in 1746, was made post-captain in 1761, and distinguished himself in several actions, especially at that of Cape St. Vincent. In 1787 he became a rear-admiral, and seven years afterwards was appointed to command in the North Seas. In this service he watched the mouth of the Texel, where a large Dutch fleet lay at the time of the mutiny at the Nore. By skilful manœuvring, although deserted by every ship except one (Adamant, 50), he detained them until he was joined by the rest of the fleet, and, on their leaving port, cut off their retreat and brought them to action at Camperdown, where he captured nine sail of the line and two frigates. For this service Admiral Duncan was created a viscount and received the thanks of parliament. He died suddenly, August 4th, 1804. By his lady, the daughter of Lord President Dundas, he left two sons and several daughters. His eldest son was created earl of Camperdown, at the coronation of William IV. His youngest, Sir Henry Duncan, was principal storekeeper to the Board of Ordnance, and died in 1835.

DUNDALK. [LOUTH.]

DUNDEE, a large seaport town and parish of Scotland, on the north shore of the Frith of Tay, in the shire of Forfar. The parish extends 6 miles along the shore, and is from 1 to 4 miles in breadth. The town is in 56° 27′ N. lat. and 3° 3′ W. long., 42 miles north-north-west from Edinburgh. It stands on a gentle acclivity rising from the water-edge towards a high hill at the back, called the Law.

The antient Gaelic name, still used by the Highlanders, is *Ail-lec* (beautiful). In the Latin annals of Hector Boethius it is Alectum. Buchanan names it Taodunum (hill of the Tay), and in several antient records it is variously called Dondé, Dondie, and Donum Dei. The place, from a fishing village, became a fortress with walls, gates, and castle, and was the residence of several kings of Scotland. In various civil wars it suffered severely, and was repeatedly plundered and burned: however, it always speedily recovered from these disasters, and has long been noted as a place of commercial opulence and prosperity. When, in 1645, it was sacked and burned, it was one of the richest towns in Scotland; and when, after a siege of six weeks, it was taken by Cromwell's officer, General Monk, sixty vessels in the harbour were laden with the spoil, and each soldier's share was 60*l.* The commerce of Dundee has been remarkable for its successive adoption of different speculations. About forty years ago leather was a principal article, and 7000*l.* worth of shoes were annually exported. This trade is now extinct. At one time seven companies successfully prosecuted the cotton manufacture, which was succeeded by woollens; but the permanently prosperous commerce and trade of this town have been produced by the importation and manufacture of Russian hemp and flax. Of late years the business in this branch of trade has greatly increased. The fabrics are chiefly of a coarse description, as sacking, sail-cloth, &c., of which large quantities are made for exportation; but finer and bleached linens are also extensively manufactured. Thirty large spinning-mills are driven by steam, and employ a great number of persons, principally children. There is an iron-foundry, machine-factories, several sugar-refineries, candle-manufactories, and much rope-making and ship-building. In 1830, the total tonnage of vessels which entered the harbour amounted to 182,512; and the exports of linen and hempen goods were to the amount of 464,752 tons. In 1832 the tonnage of vessels belonging to the port was 32,868, and the number of seamen employed, 3500. Nine vessels are employed in the whale-fishery of Greenland.

Dundee is the chief seat of the Scotch and indeed of the British linen manufacture. The business commenced about the middle of the last century. In 1745 the importation of flax was only 74 tons. From that period to the present the amount of imports and exports has annually increased in a most astonishing ratio. The increase is mainly attributed to the introduction of spinning machinery, by which the whole price of the thread is now reduced to less than the mere cost of spinning by the old hand-wheel.

In 1831 the number of spinning-mills worked by steam in the town was 31, exclusive of many in the suburbs. The present number exceeds 50. In the last census of the county of Forfar, the number of males of the age of 20 and upwards engaged in the linen manufacture in Dundee is stated to have been 3300. In 1835 there were 25,159 tons of hemp and flax imported, and the number of pieces of sheetings, bagging, sailcloth, sacking, and dowlas exported was 618,707, containing about 70,000,000 yards, and worth about 1,600,000*l.*, being considerably greater than the entire exports from Ireland. To show the amazing progress of the trade of Dundee, it may be mentioned that persons now living once farmed the harbour dues at 400*l.* a-year, which now bring about 10,500*l.* (MacCulloch's *Statistics of the British Empire*, vol. ii. p. 90.) The Frith, opposite the town, is two miles in width, and is crossed every half hour by an enormous double steam-boat of a peculiar and very commodious construction. The dangerous and numerous sand-banks in the æstuary are avoided by excellent charts of the soundings, two lighthouses, and several beacons. The present docks and quays have cost 200,000*l.*, and further improvements are suggested. Besides a number of smacks, steamers sail regularly to London, two of which have engines each of 125 horse power.

A railway communicates with Newtyle, in Strathmore, and passes through the Law by a tunnel.

The town consists of a spacious market-place and six principal streets diverging from it. In the older parts the houses are closely packed together, but many, especially in the western extremity, are large airy mansions with ornamental gardens. Numerous improvements are going on in the appearance and conveniences of this highly prosperous place. It is lighted with gas, is well paved, is abundantly supplied with spring-water, and has several well attended markets. The finest public buildings are the Exchange, the Trades' Hall, and the Town House.

Besides a good parochial school, there is a public academy conducted by superior masters, a royal infirmary, a dispensary, lunatic asylum, and several incorporated benevolent institutions. The lofty square Gothic tower of the spacious old church is a conspicuous object at a great distance. There are three other churches, or chapels of ease, a Gaelic church, and several dissenting chapels.

Dundee has produced many eminent ministers. At the Reformation it was distinguished for its Protestant enthusiasm; though before that event, when the population was comparatively very small, there were ten Catholic churches, four monasteries of friars, gray, black, and red, and a nunnery. Among the distinguished persons born and educated here may be named, Hector Boethius, Fletcher of Saltoun, Dempster, Admiral Duncan, Sir William Wallace, the Earl of Mar, and the poet Ferguson.

Dundee was made a royal burgh by William I., in 1165. It returns one member to parliament. Population in 1831, 45,355; at present it is probably 50,000.

DUNFERMLINE (pronounced Dumferline, and signifying fort of the crooked river), a town and parish of Scotland, in the shire of Fife, 15 miles north-west of Edinburgh, and 2½ miles north of the Frith of Forth. It is 3 miles from the sea, and 270 feet above its level, commanding magnificent and extensive views of the windings of the Forth and of the principal hills of the south of Scotland. It is a place of great antiquity. King Malcolm Canmore founded here a very spacious and superb Benedictine monastery, of which the extant ruins, with those of his palace and castle, are objects of much interest to the antiquarian. After the celebrated Iona, or Icolmkill, the abbey church of Dunfermline was the common cemetery of the kings of Scotland. In 1818 the skeleton of King Robert Bruce, measuring above six feet in length, was disinterred, and a cast was taken of the cranium. This Abbey was the most eminent in Scotland, and was very richly endowed, and possessed of peculiar privileges. The Fratery with its fine Gothic window still indicates the grandeur of the original buildings. (Grose's 'Antiquities of Scotland,' fol., vol. ii.) The Guildhall is a fine building with a lofty spire.

The town was made a royal burgh by James VI. An extensive business is carried on in the manufacture of diaper and fine table-linen; the value of the quantity annually manufactured is about 200,000*l.* The parish contains a large coal-field and collieries, the property of the Earl of Elgin, and in the town are several breweries, an iron-foundry, and candle and tobacco manufactories.

Dunfermline is the principal seat of the manufacture of the finer sorts of linen fabrics, as shirting, damasks, and table-linen. The thread is spun by machinery. Of late years the beauty of the patterns and the fineness of the goods have been much improved, and the manufacture has greatly increased. In the census of 1831 it is stated that 2700 males of the age of 20 and upwards were then employed in the linen manufacture in this town.

The situation is picturesque, and the houses are intermingled with luxuriant trees, over which the spire of the Abbey church rises to the height of 155 feet. The western suburb is composed of superior houses. An enormous meeting-house, built for the celebrated minister, Ralph Erskine, is a conspicuous object in approaching the town. There are several beneficent institutions and schools, and two public subscription libraries. The streets are paved and lighted with gas. Population in 1831, 27,692

DUNG. [MANURE.]

DUNGANNON. [TYRONE.]

DUNGARVAN. [WATERFORD.]

DUNKELD. [PERTHSHIRE.]

DUNKERQUE, or as it is not unfrequently written by the English, **DUNKIRK**, a town in France, capital of an arrondissement in the department of Nord. It is on the sea, about 150 miles in a straight line north of Paris, or 165 miles by the road through Clermont, Amiens, Doulens, St. Pol, Aire, Hazebrouck, Cassel, and Bergues: in 51° 3′ N. lat. and 2° 22′ E. long.

This place is said to owe its origin to a chapel founded by St. Eloi, which, from its situation among the sandy downs of the coast, took the name of Dun-kirk, *i.e.* the church of the downs. In the 10th century, by the favour of Baudouin or Baldwin III., called Le Jeune, Count of Flanders, it was raised from a mere village to the rank of a town. In the records of the 12th century it is mentioned by the names Dunkerca, Dunekerca, and Dunikerca. In the 14th century a castle was built here by Robert count of Flanders, but it was demolished in a revolt of the Flemings, or perhaps by their supporters the English, who burnt the town in 1388. Another castle, built in 1538, to defend the port, by Charles V., to whom it had come with the rest of Flanders by inheritance, has also been demolished. In 1558 the English, who had rendered themselves masters of the town, were driven from it by the French under the Marshal de Thermes but in the following year it was given up to the Spaniards by the treaty of Le Château-Cambresis. In 1646 it was taken after a short siege by the French under the duke of Enghien (better known by his subsequent designation of the Great Condé), in spite of the vigorous defence of the Marquis de Leede, the Spanish governor; but it fell again shortly after into the hands of the Spaniards. In 1658 Turenne, having defeated the Spaniards at the battle of the Downs (bataille des Dunes), took Dunkerque, which, according to a treaty previously concluded with Cromwell, was put into the hands of the English: four years afterwards (in 1662) Charles II. restored it to France on condition of receiving for it a considerable sum of money. Louis XIV., then king of France, made extraordinary exertions to fortify it, and to repair the harbour; in 1671 thirty thousand men were employed on the works, and its strength enabled the town to repel an attempt made by the English to bombard it 1695. By virtue of the peace of Utrecht, the fortifications were rased and the port filled up. The maritime activity of the people of Dunkerque, and the number of privateers and ships of war which they sent out were probably the inducement to the English and Dutch to require these hard conditions. By the peace of Aix-la-Chapelle the port and fortifications, which had been partially restored in the previous war, were again demolished; but by the peace of 1783 they were allowed to be restored. In 1793 the town was besieged by the allies under the Duke of York; but the victory obtained by the French under General Houchard at Hondscotte obliged the duke to raise the siege and retire, with the loss of 52 pieces of cannon and a large quantity of ammunition.

Dunkerque is separated from the sea by a range of downs: on the land side the town is surrounded by canals. The canal of Bourbourg runs westward to the river Aa: the canal of Furnes runs eastward to Furnes, and so to Nieuport and Bruges, uniting with several of the canals which intersect Belgium. The town of Dunkerque is nearly three miles in circuit. The streets are generally broad, and the houses well built of brick, and whitened or coloured. The place du Champ de Mars is a large and fine square: the place Dauphine is an oblong square planted with trees and adorned with a bust of Jean Bart. [BART.] The fortifications consist of the ramparts, surrounded by ditches, of Fort Louis, and the Citadel.

The principal building is the church of St. Eloi, which has been ornamented by a fine portico of ten Corinthian columns. The great tower which belonged to the church has been separated from it by continuing the line of the Rue de l'Eglise through the church, which is consequently much smaller than it once was: the new front is formed by the portico just mentioned. The hôtel de ville (town-hall) is an insignificant building. There is a range of barracks and naval storehouses.

The population of Dunkerque in 1832 was 24,937. The inhabitants are engaged in the manufacture of soap, starch, beet-root sugar, cordage, and leather: there are metal foundries, gin distilleries, and salt-works. Snuff was formerly manufactured to a great extent. There are two fairs in the year for linens, woollen cloth, jewellery, hardware, and pottery. The trade by sea is very considerable, especially since it was declared in 1816 a free port. The harbour is large and convenient; but there is a dangerous bar at its mouth. The Newfoundland and Iceland cod fishery, and the herring fishery, are prosecuted with considerable spirit; and the town has a considerable trade in Bordeaux wines and brandies.

Dunkerque has a *tribunal de première instance*, or subordinate law court, and a *tribunal de commerce* for the decision of commercial disputes. There are a high school, schools of navigation, drawing, and architecture, an agricultural society, a learned society under the designation of 'conseil polytechnique,' and a public library of 4000 volumes. There are also a theatre, an hospital, a foundling hospital, and two prisons, one of them military.

The language commonly spoken by the poorer inhabitants is Flemish, but most of them are also acquainted with French, which is the ordinary language of the place.

The arrondissement of Dunkerque is divided into seven cantons, and comprehends sixty communes. It had in 1832 a population of 95,571.

DUNMOW BACON. A custom prevailed at Dunmow, in Essex, and was observed there even as late as the middle of the last century, of giving a flitch of bacon to any married man or woman who would swear that neither of them, in a year and a day, either sleeping or waking, repented of their marriage. Brand, in his 'Popular Antiquities,' vol. ii. pp. 98, 99, has given the rhyming oath which was administered to them upon the occasion. The parties were to take it before the prior and convent of Dunmow and the whole town, kneeling in the churchyard upon two hard pointed stones. They were afterwards carried in procession through the town upon men's shoulders, with the bacon borne before them. The register of Dunmow priory attributes the institution of this ceremony to Robert Fitzwalter, a descendant from Juga, the foundress of the priory, some time in the reign of Henry III., and preserves memoranda of three claims made for the bacon prior to the dissolution of religious houses; namely, in the 7th Edw. IV., in the 23rd Hen. VI., and in 1510, 2nd Hen. VIII. This ceremony is alluded to in the 'Visions of Piers Plowman,' and also by Chaucer in the 'Wife of Bath's Prologue.' (See Brand, ut supr.; Morant's *Hist. of Essex*, vol. ii. p. 429; Blount's *Jocular Tenures*, 8vo., York, 1784, p. 276; Dugdale's *Monasticon*, last edit., vol. vi. p. 149.) The Dunmow Bacon was claimed in 1701, and again in 1751, when a large print was engraved of the ceremonial which took place on the occasion.

DUNN, SAMUEL, was a native of Crediton, Devonshire, where he kept a mathematical school for several years; but he afterwards removed to Chelsea, and occupied himself in the same manner. He was well skilled in nautical astronomy, and was a good practical observer, which led to his being appointed mathematical examiner of the candidates for the East India Company's service.

He was the author of several useful and ingenious papers in the 'Philosophical Transactions,' as well as of some separate works on the practical branches of science. He also published a folio Atlas, which has been held in some estimation.

Mr. Dunn bequeathed an estate of about 30*l.* a year to found a mathematical school in his native town, the first master to which was appointed in 1793.

DUNNING, JOHN, Lord Ashburton, the son of an attorney at Ashburton in Devonshire, was born 18th October, 1731. He was removed from the free-school at Ashburton, and articled to his father as a clerk in the thirteenth year of his age. Sir Thomas Clarke, the then master of the rolls, who employed old Mr. Dunning as his attorney, having observed the young man's capabilities for active business, induced him to study for the bar. He entered of the Middle Temple, May 8th, 1752, and was called to the bar, according to the Temple books, July 2, 1756.

Dunning travelled the western circuit for some years without any success; but in 1761, through the good offices of Mr. Hussey, a king's counsel, being appointed to draw up the reply of the East India Company to the Dutch memorial, he acquired some connexions, which were considerably increased by his argument in the case of Combe v. Pitt (Trin. Term, 1763), which he was called upon to make in consequence of the illness of his leader. In the course of the same year the question as to the legality of general warrants arose, in consequence of the arrest of the publishers of the North Briton. Dunning throughout the whole litigation was employed as the advocate of his friend Wilkes; and the argument on the Bill of Exceptions (June, 1765) afforded him an opportunity of establishing his reputation. After this his business rapidly increased: he was shortly chosen recorder of Bristol, and in December, 1767, appointed solicitor-general.

In the following year he entered parliament as one of the nominees of Lord Shelburne for the borough of Calne. A Whig in his politics, and an accomplished constitutional lawyer, Dunning throughout his parliamentary career unflinchingly opposed the Tories. He laboured strenuously to reduce the pension list, but unfortunately for his own fame, himself became a pensioner to the amount of 4000*l.* a year, when, in the spring of 1782, he was raised to the peerage by the title of Baron Ashburton, of Ashburton in the county of Devon. Possessing the most lucrative practice of the day, which had already enabled him to purchase considerable landed property, and to save a sum little short of 180,000*l.*, and having besides within a week after this promotion possessed himself of a lucrative sinecure, the chancellorship of the duchy of Lancaster, Dunning had not even the poor excuse of poverty for this political profligacy. This venality and want of principle, which so often unfortunately obscure the fair fame of individuals, are not wholly without profit to the public; they afford an example which acts as a warning to them against placing implicit confidence in the unbounded professions of ambitious and unprincipled men; for however popular, however distinguished may be the name of such a man in his own day, a few short years are sure to consign him to well merited neglect, if not contempt. Such, as a politician, has been the lot of Dunning. As a lawyer none of his contemporaries enjoyed a higher reputation, or more lucrative practice: his wit appears to have been of that brilliant nature which defies description. In person Dunning was small, and singularly weak and awkward; his action in speaking clumsy and uncouth, but the awkwardness of his gesticulation was soon lost sight of in the interest aroused by his eloquence. Notwithstanding his disadvantages, he was himself extremely vain of his personal appearance, and wished to encourage the belief that his face and figure had irresistible charms in the eyes of the fair sex.

Dunning married in 1780 Miss Elizabeth Baring, the daughter of a retail tradesman at Exeter, by whom he had two sons. The death of the eldest in April, 1783, is supposed to have given so great a shock to the already enervated frame of Lord Ashburton as to have hastened his death, which took place at Exmouth in the August following. When on his journey to Exmouth he is said to have met Wallace, the attorney-general, at Bagshot, who was proceeding to London for medical advice, where he died in the following November. These equally celebrated lawyers, who had been competitors in Westminster Hall, and opponents in parliament, having expressed a strong wish to have a last interview, passed some time in conversation, resting on two sofas, and parted to meet no more.

The title of Baron Ashburton having become extinct, was revived in the year 1834, in the person of the present lord (formerly Mr. Baring), who is a descendant of the Miss Elizabeth Baring mentioned above.

There are notices of Dunning in the 7th vol. of the *Law Mag.*; and in Roscoe's *Lives of Eminent Lawyers*, from which this account is taken.

DUNOIS, a district of Orléanois, in the old territorial division of France. It was bounded on the north by Perche and Chartrain, on the east by Orléanois Proper, on the south by Blaisois, and on the west by Vendômois. Its capital was Châteaudun, which had in 1832 a population of 6461. It is now comprehended in the departments of Eure et Loir, Loir et Cher, and Loiret. In the middle ages this district was a county united with that of Blois, without giving to its owner any separate title; but about the commencement of the fourteenth century Hugues, count of Blois, added to his title that of count of Dunois. Guy, count of Blois and Dunois, sold his counties to Louis, duke of Orléans (brother of Charles VI. of France), whose son Charles bestowed the county of Dunois upon his natural brother Jean, who took so eminent a part in the expulsion of the English from France, under the designation of the Bastard of Orléans, and through whom alone any historical interest attaches to the district.

DUNS SCOTUS, JOHN, was born most probably about the year 1265. The English, the Scotch, and the Irish, have all claimed him as a countryman. According to one of the Irish accounts, he was born at Thathmon or Taghmon in Wexford; according to another, in the town of Down or Downpatrick. The Scotch say he was a native of Dunse in Berwickshire, and in that village they still pretend to show the house where he was born. The English story is, that he was born at a hamlet called Dunston or Dunstance, in the parish of Emilden or Embleton, not far from Alnwick in Northumberland. Camden (*Britannia*, 1096, Gibson's translation, 2nd edit.) affirms this on the authority of an inscription at the end of a manuscript copy of the works of Duns in the library of Merton College, Oxford. But Lord Hailes remarks (*Annals of Scotland*, ii. 324, edit. of 1819), 'This testimony is not sufficient to confute the received opinion; for, in its utmost latitude, it only implies, that an unknown and illiterate transcriber of the works of John Duns chose to make him a native of a place in Emilden in Northumberland called Dunstan, and by a fanciful abbreviation Duns.' In an English translation of one of his treatises ('Idiota's, or Duns' Contemplations of Divine Love,' 12mo., Paris, 1662), the translator, W. B., in a dedication 'to the Right Worshipful Edmund Duns, Esq.,' whom he affirms to be a descendant of the same family that produced Scotus, contends that Duns Scot is merely Dunscot, formed from cot, a cottage, in the same manner with Westcot, Southcot, &c. Mackenzie (*Lives of Scottish Writers*, i. 215) says that he was descended from the family of the Dunses in the Merse. Camden conceives he was called Scotus because descended from Scottish parents. Those who have written of Duns have delighted in allusions to this controversy about the place of his nativity. One of his biographers (Wadding) conceives that it places him above Homer, for the honour of having given birth to whom only cities contended, whereas kingdoms put in their several claims to Scotus. He observes also that the subtlety of the great Doctor may be said to have commenced even before his birth, since no one has yet been able to track him to his first appearance in our world.

It seems, however, to be agreed on all hands that he was chiefly educated in England. He is said to have been found when a boy tending his father's cows by two Franciscans who were greatly struck with his intelligence; and by the monks of this order he was first instructed in the elements of learning, and then sent to Merton College, Oxford, of which in due course he became a fellow. Passing over various stories that are told of him of a legendary cast, we may enumerate in a few lines the authentic events of his life. While yet a student, he is said to have become greatly distinguished for his proficiency in theology, in logic and metaphysics, in civil and canon-law, in mathematics, in natural philosophy, and in astronomy. In 1301, on the removal of William Varron to Paris, he was appointed to the theological chair. His prelections were attended by crowds of auditors, the number of students at Oxford at this time, it is affirmed, exceeding 30,000; 'but among these,' says Anthony Wood, 'a company of varlets, who pretended to be scholars, shuffled themselves in, and did act much villainy in the university by thieving, whoring, quarrelling, &c. They lived under no discipline, neither had any tutors; but only for fashion sake would sometimes thrust themselves into the schools at ordinary lectures; and when they went to perform any mischief, then would they be accounted scholars, that so they might free themselves from the jurisdiction of the burghers.' In 1307 Duns removed from Oxford to Paris, in which city he had on a visit some time before distinguished himself in an extraordinary manner by his defence, in a public disputation, of the doctrine of the immaculate conception of the Virgin Mary. He began, we are told, by demolishing two hundred objections to the doctrine, and concluded by establishing it with a cloud of arguments. A writer who was present, Pelbartus à Temeswar, says that he resolved the knottiest syllogisms of his adversaries as Samson did the bands of Dalilah. The result was the conversion of the whole university to the doctrine thus demonstrated, and the passing of a regulation that no person should afterwards be admitted to a degree without swearing to defend the immaculate conception. On this occasion, it is said, there was formally conferred on Scotus the title of the Subtle Doctor (Doctor vel Magister Subtilis), by which he is commonly distinguished among the schoolmen. He taught in his new chair with as much applause as at Oxford; but he was not allowed to remain long at Paris. In 1308 he was ordered by the general of his order to remove to Cologne to found a new university there. On reaching Cologne he was met by nearly the whole body of the citizens, and drawn into the city in a triumphal car. But his splendid career was now near its close. On the 8th of November, in this same year, he was carried off by a fit of apoplexy. Some accounts make him to have died in his 43rd, others in his 34th year. Paulus Jovius relates that he was buried before he was dead, and that it was afterwards found, upon inspection of the grave, that in his misery he had knocked out his brains against his coffin. Another version of the story is, that he was found to have gnawed the flesh from his arms. This termination of his life has furnished a point for several epigrammatic epitaphs. One by Jacobus Latomus has been thus translated by Dr. Kennet, in Gibson's Camden:

'What sacred writings or profane can show,
All truths were, Scotus, call'd in doubt by you.
Your fate was doubtful too: Death boasts to be
The first that choused you with a fallacy;
Who, lest your subtle arts your life should save,
Before he struck, secured you in the grave.'

Various separate treatises of Duns Scotus were sent to the press soon after the invention of printing, and several of them have been repeatedly printed. At length, in 1639, his collected works appeared at Lyon, in 12 volumes folio, under the title of 'R. P. F. Joannis Duns Scoti, Doctoris Subtilis, Ordinis Minorum, Opera omnia quæ hucusque reperiri potuerunt, collecta, recognita, notis, scholiis, et commentariis illustrata; à PP. Hibernis Collegii Romani S. Isidori Professoribus, Jussu et Auspiciis Rmi. T. F. Joannis Baptistæ à Campanea, Ministri Generalis.' A complete copy of this collection is exceedingly rare. It is dedicated to Philip IV. of Spain, and the editor is Luke Wadding, an Irishman by birth. It does not however, as has been often stated, contain all the works of Scotus, but only those designated his 'Opera Speculativa,' the 'Positiva,' if they should be completely recovered, having been intended to form a future publication. The principal pieces of which it is composed are Questions or Commentaries on the Sentences of Peter Lombard, and on the physical, logical, and metaphysical writings of Aristotle. There are also a treatise on Grammar; four books (forming a volume) entitled 'Reportatorum Parisiensium;' and a volume of 'Quæstiones Quodlibitales,' the authenticity of which, however, is doubted by Wadding. The following are enumerated by Wadding as the 'Opera Positiva' of Scotus: 'Tractatus de Perfectione Statuum' (of doubtful authenticity): 'Lectura in Genesim;' 'Commentarii in Evangelia;' 'Commentarii in Epistolas Pauli;' 'Sermones de Tempore;' and 'Sermones de Sanctis.' We are not aware that any of these treatises have ever been printed.

The admirers of Scotus extol his acuteness and subtlety as unrivalled, and he has always been accounted the chief glory of the Franciscans, as Thomas Aquinas has been of their rivals the Dominicans. If in his short life he actually wrote all the works that are commonly attributed to him, his industry at least must have been prodigious. His fame during his lifetime, and long after his death, was not exceeded by that of any other of the scholastic doctors. From him and Aquinas two opposing sects in theology took the names of Scotists and Thomists, and divided the schools down almost to the last age. The leading tenet of the Scotists was the immaculate conception of the Virgin; and they also differed from the Thomists on the subjects of free will and the efficacy of divine grace. In philosophy the Scotists are opposed to the Occamists, or followers of William Occam, who was himself a pupil of Scotus, but differed from his master on the subject of Universals or general terms, which the Scotists maintained to be expressive of real existences, while the Occamists held them to be nothing more than names. Hence the Scotists are called Realists, the Occamists Nominalists. It is a favourite opinion of Bayle's, that this doctrine of the Scotists was nothing less than an undeveloped Spinozism. (*Dict. Crit.*, art. 'Abelard,' note C, and 'André Cisalpin,' note B.) It may be added that the English term *dunce* has been commonly considered to be derived from the name of the subtle doctor;—'perhaps,' says Johnson, 'a word of reproach first used by the Thomists, from *Duns* Scotus, their antagonist.' It is worth noting however that a dolt or blockhead appears to be a very modern meaning of the word Dunce or Duns. It does not seem to have been known in this sense, for instance, to Richard Stanihurst, the compiler of the Description of Ireland in Holinshed, who speaks of the name of Scotus being a term 'so trivial and common in all schools, that whoso surpasseth others either in cavilling sophistry or subtile philosophy is forthwith nicknamed a Duns.' This was no doubt the kind of reproach originally intended to be conveyed by the epithet.

Wadding has prefixed to his edition of the works of Scotus an elaborate Life of the author, which was reprinted at Mons in 12mo. in 1644. There is also a 'Tractatus de Joannis Scoti Vita, &c. Auctore R. F. Joanne Colgano, ordinis Fratrum Minorum Hibernorum Padum,' 12mo. Antwerp, 1655. Both these works, the latter especially, are full of legendary matter, detailed with the most confiding gravity.

DUNSTABLE, or DUNSTAPLE, a market town in the hundred of Manshead in the county of Bedford, eighteen miles south-by-west from Bedford, and thirty-three miles north-west-by-north from London, situated at the point of contact of the Iknield and Watling Streets. It was in very early times a place of considerable importance. Its modern name is supposed by many etymologists to be derived from Dun or Dunning, a famous robber in the time of Henry I., who with his band became so formidable in the neighbourhood that Henry cut down a large forest in order to destroy their haunts, and built a royal mansion called Kingsbury on part of its site. He also founded a priory of black canons, on whom he bestowed the town of Dunstable and all its privileges in 1131. The priors had a gaol, possessed power of life and death, and sat as judges with the king's justices in Eyre. In 1290 the corpse of Queen Eleanor rested at the market-place, and a handsome cross was erected to commemorate the event; but it was pulled down in the reign of Charles I. as a relic of popery.

Dunstable is situated at the southern extremity of the county, in the centre of the Dunstable chalk downs. It is chiefly celebrated for the manufacture of straw hats, called 'Dunstable hats,' and for its whiting manufactory. The market is on Wednesday, and fairs are held on Ash Wednesday, May 22nd, August 12th, and November 12th. The king is lord of the manor, and the duke of Bedford, as his lessee, holds courts leet and baron. The living is a rectory in the archdeaconry of Bedford and diocese of Lincoln. The parish church is now all that remains of the antient priory; the inside is chiefly Norman, and richly ornamented: over the altar is a large painting of the Lord's Supper, by Sir James Thornhill. There are two places of worship for Baptists, and one for Wesleyan Methodists.

A charity school was founded by Mr. William Chew in 1727, and has since been endowed by various benefactors; forty boys and fifteen girls are clothed, educated, and apprenticed: the boys are admitted at seven, and apprenticed at fourteen. Six almshouses were founded by Mrs. Cart for the residence of six poor widows; and six others were subsequently founded and endowed by Mrs. Ashton for a similar purpose. Near the church are six houses called the 'Maidens' Lodge,' founded in 1713 by Mrs. Blandina Marsh for six unmarried gentlewomen; their income now amounts to 120*l*. per annum. A number of coins of Antoninus and Constantine, as well as other Roman antiquities, have been dug up in the downs in the vicinity of Dunstable.

DUNSTAN, SAINT, was born of noble parents at or near Glastonbury in Somersetshire, in the first year of the reign of Athelstan, A.D. 925. His father's name was Heorstan, his mother's Cynedryda. His earliest instruction in the learning of his time was received in the neighbouring monastery; but afterwards, under the patronage of his uncle, Aldhelm, archbishop of Canterbury, he was introduced at Athelstan's court, where he passed some years. Upon some disgust, he returned to Glastonbury, and having in early youth received the tonsure there, he built for himself a sort of cell or hermitage, with an oratory, employing his time partly in devotional austerities, and partly in the exercise of such manual arts as were useful to the service of the church, in the formation of crosses, vials, censers, vestments, &c. He is also reputed to have painted, and to have copied manuscripts.

Glastonbury having by the successive incursions of the Danes been reduced nearly to ruin, Edmund, the successor of Athelstan, appointed Dunstan to be the abbot of that house, with full power to draw funds from the royal treasury for its restoration. This was in 942, and from a charter granted in 944 the work appears to have been soon accomplished.

In his retreat at Glastonbury, Chalmers supposes that Dunstan's mind was somewhat deranged, and that he indulged chimæras, which being believed by himself and announced to the credulous multitude, established a universal character of sanctity for him among the people. He is said to have fancied that the devil, among frequent visits which he paid him, was one day more earnest than usual in his temptations; till Dunstan, provoked by his importunity, seized him by the nose with a pair of red-hot pincers, as he put his head into the cell, and held him there till the malignant spirit made the whole neighbourhood resound with his bellowings. The people credited and extolled this great exploit, which gained Dunstan so great a degree of reputation that he was called again into the world. Edred, the successor of Edmund, in 948, surrendered his conscience, his treasures, and his authority into the hands of Dunstan. Taking advantage of the implicit confidence reposed in him by the king, Dunstan imported into England a new order of monks, the Benedictines, who, by changing the state of ecclesiastical affairs, excited, on their first establishment, the most violent commotions. Finding also that his advancement had been owing to the opinion of his austerity, he professed himself a partisan of the rigid monastic rules; and he introduced that reformation into the monasteries of Glastonbury and Abingdon. This conduct, however, incurred the resentment of the secular clergy, who, joining with such of the courtiers as had become indignant at the haughty demeanor of Dunstan, formed a powerful party against him. Upon the death of Edred, and succession of Edwy, Dunstan was accused of malversation in his office, was deprived of his abbacy, and banished the kingdom in 955. Edgar, however, who succeeded in the following year, restored him to Glastonbury, having promoted him first to the see of Worcester; he then made him bishop of London; and in 959 advanced him to the archiepiscopal see of Canterbury. Dunstan repaired to Rome to receive the papal sanction to his appointment, and not only obtained that, but the pope's own appointment of him to be the papal legate in England. Upon his return, so absolute did his influence over the king become that he was enabled to give the Romish see an authority and jurisdiction of which the English clergy had been before, in a considerable degree, independent. In order more effectually and completely to accomplish this object, the secular clergy were excluded from their livings and disgraced; and the monks were appointed to supply their places. The scandalous lives of the secular clergy furnished one plea for this measure, and it was not altogether groundless; but the principal motive was that of rendering the papal power absolute in the English church; for at this period the English clergy had not yielded implicit submission to the pretended successors of St. Peter, as they refused to comply with the decrees of the popes which enjoined celibacy on them. Dunstan, supported by Edgar's authority, overpowered the resistance which the country had long maintained against papal dominion, and gave to the monks an influence, the baneful effects of which were experienced in England till the Reformation. Dunstan has accordingly been highly extolled by the monks and partisans of the Romish church. During the whole reign of Edgar, Dunstan maintained his interest at court; and upon Edgar's death in 975 his influence served to raise Edward, Edgar's eldest son, to the throne, though the succession of Ethelred, the younger son, was much pressed by Elfrida. Whilst Edward was in his minority Dunstan ruled with absolute sway both in church and state; but upon the murder of that prince in 979, and the accession of Ethelred, his credit and influence declined; and the contempt with which his threatenings of divine vengeance were regarded by the king is said to have mortified him to such a degree, that, on his return to his archbishopric, he died of grief and vexation, May 19th, 988. A volume of St. Dunstan's works was published at Douay in 1626. His ambition has given him a considerable place in ecclesiastical and civil history; and he appears to have been a man of extraordinary talents. (William of Malmsbury's *History;* Henry's *Hist. of Britain*, edit. 8vo., vols. iii. and iv.; the Lives of St. Dunstan in the *Acta Sanctorum* of the Bollandists, month of May, tom. iv., p. 344 to 384; and Chalmers's *Biogr. Dict.*, vol. xii., p. 487-490.) Dunstan's Concord of Monastic Rules is printed at large in Reyner's Apostolatus Benedictinorum in Anglia, fol. Duac. 1626, at the beginning of the third part of the Appendix, p. 77.

DUNWICH. [SUFFOLK.]

DUODECIMALS, a term applied to an arithmetical method of ascertaining the number of square feet and square inches in a rectangular space whose sides are given in feet and inches. For instance, to find the content of 6 feet 7 inches by 2 feet 5 inches, proceed as follows:—

Feet.	Inches.	
6	7	
2	5	
13	2	
2	8	11
15	10	11

In the answer, 15 means 15 square feet; 10 means 10 strips of one foot by one inch, or 10-twelfths of a square foot; 11 means 11 square inches, or 11-144ths of a square foot. This result is obtained as follows:—

2 feet by 6 feet gives 12 square feet.
2 feet by 7 inches gives 1 ,, foot, 2-twelfths, or 14-12ths of a square foot.

13 square feet, 2-twelfths.
6 feet by 5 inches gives 2 square feet, 6-twelfths, or 30-12ths of a square foot.
7 inches by 5 inches gives 2-12ths, 11 sq. in. or 35 square inches.

2 sq. ft. 8-12ths, 11 sq. in.

The following instances are perfectly similar:—

Feet	Inches.	
11	10	
12	7	
142	0	
6	10	10
148	10	10

Feet	Inches.
3	4
8	6
26	8
1	8
28	4

DUODE'NUM (from a Latin word signifying twelve, because it is twelve inches in length), the first of the small intestines in immediate connexion with the stomach. It commences at the pyloric end of the stomach, and terminates at the distance of twelve inches in the second portion of the small intestines called the jejunum. Though it is the straightest of the small intestines, yet the duodenum describes in its course various turns. From the pylorus it turns backwards and upwards by the neck of the gall-bladder, with which it is in contact; it then passes obliquely downwards on the right side, immediately before the great vessels which enter the liver. Opposite to the under part of the kidney it makes a turn to the left side, across the lumbar vertebræ, and is lodged in the common root of the mesocolon and mesentery, below the pancreas, and behind the superior mesenteric vessels; it now makes a turn forwards and obtains the name of jejunum.

The duodenum is much more capacious than the jejunum or ilium, and is indeed so larget hat it has been regarded as a second stomach, and obtained the name of ventriculus succenturiatus. It is fixed much more closely to the spinal column than the other intestines, and does not, like them, float loosely in the abdomen. It is of a redder colour than the rest, has a thicker muscular coat, and a greater number of valvulæ conniventes.

At the distance of from three to four fingers breadth from the pylorus, the duodenum is perforated by the biliary and pancreatic ducts, by which tubes the bile and the pancreatic juice flow into the intestine.

The duodenum is probably an organ accessary to the stomach. There is evidence that it carries on the digestion commenced in the stomach. It is certain that alimentary substances which have escaped solution in the stomach are dissolved in the duodenum.

The chyme formed from the food in the stomach and received by the duodenum, retains the name of chyme until it reaches that portion of the duodenum where the biliary and pancreatic ducts pierce the intestine. At this point, and by the admixture of the biliary and pancreatic juices, the chyme is changed into two portions, into a nutritive portion, which receives the name of chyle, and which flows into the blood [CHYLE], and into an excrementitious portion, which is carried along the small into the large intestines, where it receives the name of fæces, and is expelled from the body.

On the surface of the duodenum the lacteal vessels begin to make their appearance for the absorption of the chyle. [LACTEALS.] The duodenum is likewise provided with a great number of mucous glands, which more especially abound near the pylorus. (*Philosophy of Health.*)

DUPLEX QUERE'LA (double querele or complaint), a process in ecclesiastical causes, in the nature of an appeal from the ordinary to his next immediate superior, as from a bishop to an archbishop, or from the archbishop to the king in council. [DELEGATES, COURT OF.] It seems to have been called double querele because in its form it is a complaint both against the judge and against the party at whose suit justice is delayed. (Burn, *Eccles. Law.*)

DUPLICATE RATIO (λόγος διπλασίων), a term used by Euclid, and defined as follows: If A be to B in the same proportion as B to C, then the ratio of A to C is called the duplicate ratio of A to B. When A, B, and C are lines the duplicate ratio of A to B is that of the square on A to the square on B: when numbers, that of A times A to B times B. [RATIO, EXPONENT.]

DUPLICATION OF THE CUBE, the solution of the following problem: to find the side of a cube which shall be double that of another cube. This question, which is insoluble with perfect exactness by the methods of ordinary geometry, attained such a degree of notoriety among the Greek geometers that its origin was the subject of a mythologic fable. Eutocius, in his commentary on the sphere and cylinder of Archimedes, has preserved a letter of Eratosthenes to Ptolemy (Euergetes) in which it is said that one of the tragedians (Euripides, according to Valckenaer, cited by Montucla's editor) had introduced Minos erecting a sepulchre to Glaucus. The architect proposed one hundred palms every way, on which Minos declared that such a size would be too small for a royal sepulchre, and required that it should be doubled in size; and thereupon arose the difficulty. Eratosthenes also states another fable, namely, that the Delians, during a pestilence, had been ordered by the oracle to produce a cubical altar double of one which then existed. They applied to the school of Plato at Athens, who found that the problem eluded all their efforts. Other writers make mention of the latter story, and Valerius Maximus, in particular, adds that Plato referred the querists to Euclid; which must be an anachronism. However this may be, the problem continued to furnish an unceasing object of research; and such was the importance of its solution in the eyes of Eratosthenes, that he hung up his own solution in a temple as an offering, and composed an epigram, of which the principal value now is the proof which it affords that he considered Menæchmus as the first inventor of the conic sections.

Hippocrates of Chios (known as the first who could find the area of a curvilinear figure) perceived, according to Eratosthenes, that this problem could be solved as soon as two mean proportionals could be found between the side of the given cube and twice its length: that is, A being the length of the given cube, and X and Y two lines such that

$$A : X :: X . Y \text{ and } X : Y :: Y : 2\,A,$$

this geometer saw that X was the side of the cube double of that on A. But the new problem presented exactly the same difficulty as before: various mechanical curves (as they were called) were invented for the purpose it was found that the conic sections were sufficient, but no solution appeared consistent with the restrictions implied in the postulates of Euclid.

Eutocius has mentioned the solution of Eudoxus, and has preserved those of Plato, Hero, Philo, Apollonius, Diocles, Pappus, Sporus, Menæchmus, Archytas, Eratosthenes, and Nicomedes. Pappus himself (in the third book, the first of those which remain entire) has preserved the solutions of Eratosthenes, Nicomedes, and Hero. In several instances these notices are the only clue which we have to the dates of the investigators, as there is strong presumption that those who are named by Eutocius and not by Pappus lived between the two.

The trisection of the angle [TRISECTION] offered difficulties of a similar kind, and engaged the attention of several of the individuals above mentioned. That of the quadrature of the circle is altogether of another kind. For the various solutions of the problem of the duplication, see Montucla, *Histoire des Recherches sur la Quadrature du Cercle*, 2nd edition, Paris, 1831; or Reimer, *Historia Problematis de Cubi Duplicatione*, Göttingen, 1798; or the works of Eutocius and Pappus already cited.

The importance of this problem declined with the rise of the decimal arithmetic. Many different attempts were made, some avowedly mechanical (as opposed to geometrical), others by those who imagined they could overcome the original difficulty. Any process for the solution was called *mesolabum* (a term as old as Vitruvius). One of the last was that of the celebrated Vieta, containing an error, which is the more remarkable, that little, if any, notice has ever been taken of it. (See his works, Schooten's edition, page 273.)

DUPUIS, THOMAS SAUNDERS, Mus. D., the composer of much good music for the chapels-royal, and a very distinguished organist, was born in London in 1733, and received his education in the royal chapel, of which he became organist and composer on the death of Dr. Boyce in 1779. In 1790 he was admitted to the degree of doctor in music by the university of Oxford, and died in 1796. After his death a selection from his works was published in two volumes, by his pupil, John Spencer, Esq., nephew and son-in-law of the late duke of Marlborough; but many of his best productions still continue in manuscript, and remain buried in the books of the king's chapel, among several other compositions of the most undisputed merit.

DUPUIS, CHARLES-FRANÇOIS, was born of poor parents, at Frye-Château, between Gisors and Chaumont, on the 26th of October, 1742. His early instructions were due to his father, who, though in very humble circumstances, appears to have been a man of some learning and considerable intelligence; and the early turn of mind in young Dupuis was very decidedly to mathematics and astronomy. It was his good fortune to become known while yet a boy to the Duc de Rochefoucault, who procured him an exhibition to the college of Harcourt. His studies here took a new direction, and he made such rapid progress in them as to secure the highest opinion of the professors of the college, and give promise of distinction in future life. Before the age of twenty-four, he was appointed professor of rhetoric in the college of Lisieux; and having sufficient leisure allowed him by his duties, he completed his course of law studies, and in 1770 was admitted an advocate of the parliament. Being directed by the rector of his university to pronounce the discourse on the distribution of the prizes, this led also to his being nominated to deliver the funeral oration, in the name of the university, on the queen Marie-Thérèse. With these his literary reputation commenced, and they are considered good specimens of purity and elegance in Latin composition.

The nature of his literary pursuits again led him into contact with the subjects of his early study; and profiting by the lessons and the friendship of Lalande, he entered upon the study of astronomical history with a zeal which never abated to the close of his life. His attention was especially directed in the first place to the probable signification of the astronomical symbols which constituted the signs of the zodiac; and thence to all the other antient constellations. His active mind, however, even in the midst of these deeply interesting speculations, was alive to other objects; and among his amusements was the construction of a telegraph, founded on the suggestions of Amontons, by means of which, from 1778 to the commencement of the Revolution, he carried on a correspondence with his friend M. Fortin, who was resident at Bagneux, he himself being located at Belleville. This mode of correspondence he however very prudently laid aside, lest it should lay him open to suspicion from the factions that then governed France.

In 1777 and 1778 he published in the 'Journal des Savans' the first sketches of the theory at which he had arrived; and shortly after, both in the astronomy of his friend Lalande, and in a separate 4to. volume under the title of 'Mémoire sur l'Origine des Constellations et sur l'explication de la Fable par l'Astronomie,' 1781. The sceptical tendency of the views entertained by Dupuis led Condorcet to recommend him to Frederick the Great, as professor of literature in the College of Berlin, and successor to Thiébault; and the offer was accepted by Dupuis. The death of Frederick, however, prevented the arrangement from being carried into effect; but the chair of Latin eloquence in the College of France becoming then vacant by the death of Bejot, he was appointed to fill it. In the same year (1778) he was named a member of the Academy of Inscriptions, and was appointed one of the four commissioners of public instruction for the department of Paris. The danger of his residence in the capital now induced him to seek a retreat at Evreux. He was, notwithstanding his retirement, named member of the Convention for the department of Seine-et-Oise; and was remarkable for the moderation of his views. Caution was the characteristic of his political career. In the year II. he was elected secretary of the Assembly; and in the following year a member of the Council of Five Hundred. He was elected one of the forty-eight members of the French Institute, though after much determined and discreditable opposition from the ultra-revolution party. On the 18th Brumaire, year IV., he was elected by the department of Seine-et-Oise their member of the legislative body, and soon after president of that assembly, and ultimately was nominated a candidate for the senate. Hopeless of the regeneration of France, he retired at once from public life, and devoted the remainder of his days to the investigations of the questions which arose out of his early speculations. We have hence to trace his progress only as a man of letters and a man of science, and to give some general idea of the views which are contained in his several works.

On the publication of the 'Mémoire sur les Constellations' a new course of erudite inquiry was opened; and though the arguments and conclusions were contested by Bailly, he gave Dupuis full credit for the ability and learning displayed in the work. He afterwards renewed his researches, and made them the subject of a course of lectures delivered from his chair in the college of Lisieux. In 1794 he published his great work entitled 'Origine de tous les Cultes, ou la Religion Universelle,' 3 vols. 4to. with an Atlas; and also, slightly abridged in one of its parts (the 'Justification'), in 12 vols. 8vo. This work gave rise to much discussion, often conducted with a sectarian bitterness little creditable to philosophical or theological investigation. In 1798 he published an abridgment of the 'Origine' in one vol. 8vo., or rather a series of extracts from his large work, under the same title; but a much more methodical abridgment was shortly after given to the world by Destutt-de-Tracy.

The wildly-displayed hatred towards Christianity which so strongly developed itself during the eventful period of the French revolution was well calculated to create deep interest in the work of Dupuis. He had been led to conclude that the earliest traces of the general mythology of the southern climates would be found in Upper Egypt, if indeed they had not their origin there. In this celebrated work, therefore, originated the 'Commission' to explore the ruins of that country, which was undertaken by Napoleon after his return from Italy. Nothing indeed can show so clearly the influence which this work had exercised over the 'regenerated nation,' as that the most ambitious of all the men of his time should leave the scene of the most glittering hopes to a daring spirit like his, to lead an expedition such as this. Out of that expedition what new and unexpected results have arisen! The very phraseology of history has been changed; and the sacred rites and domestic manners of antient Egypt are now scarcely, if at all, less understood than those of Greece and Rome.

The Zodiac of Tentyra (or Denderah) engaged much of the attention of Dupuis, upon which he published a *mémoire* and an *explication*, in the 'Revue Philosophique' for May 1806, which he afterwards published in an enlarged and separate form in one volume 4to, under the title of 'Mémoire explicatif du Zodiaque Chronologique et Mythologique.' In this curious dissertation he compares the Greek and Egyptian Zodiacs with those of the Chinese, the Persians, the Arabs, and all the others of which he could obtain any distinct notices. He afterwards read to his class of the Institute a 'Mémoire sur le Phénix,' which, as he contended, signified the reproduction of the cycle of 1461 common (vague) Egyptian years. In the 'Nouvel Almanach des Muses' for 1805 he also published a fragment of the poem of Nonnius; it is indeed said that his astronomical system was suggested by this poem originally, and it is certain that his 'Origine des Cultes' is but a voluminous commentary on the ideas contained in that poem.

Dupuis died at Is-sur-Tille, on September 29, 1809, aged 67. He was a member of the Legion of Honour. He was a man of strict probity, and much esteemed by his friends for his personal qualities. He amassed no fortune, being satisfied to expend his income upon the materials for his researches.

He left in MS. a work on cosmogonies and theogonies, intended as a defence and illustration of the doctrines of the *Origine des Cultes*. In this work Leblond considered that Dupuis had at last discovered the interpretation of the Egyptian hieroglyphics—a conclusion that few, since the researches of Dr. Young and Champollion, will feel disposed to admit, even though they may not adopt the views of Champollion to any great extent. There is also reason to believe that it was in consequence of conversations with Dupuis that Volney composed his celebrated work on the Ruins of Empires.

Dupuis has been often stigmatized as a paradoxical writer. Bold and speculative he was, but there is certainly little cause to call him paradoxical. His conjectures are often plausible, though his deductions from them are frequently inconsequential. Whatever might have been the immediate effect of his scepticism, there can be little doubt that the ultimate effect has been alike favourable to early history and to the Christian religion. He was a sincere and candid man, and always appeared to be fully impressed with the truth of the conclusions at which he had arrived. It was indeed that earnestness of character that gave so much weight to his opinions and so much influence to his suggestions. Had this feature been wanting in the character of Dupuis, the expedition to Egypt had never been undertaken, nor, consequently, would the brilliant discoveries to which it finally led have been made.

DURA MATER. [BRAIN.]

DURA'MEN, the name given by physiologists to the central wood or heart-wood in the trunk of an exogenous tree. It is the oldest part of the wood, and is filled by the secretions of the tree, so that fluid can no longer ascend through its tubes, which are choked up by the deposition of solid matter; otherwise it is of the same nature as the alburnum. It is only where plants form solid hard secretions that heart-wood is distinguishable from sap-wood: in the poplar, willow, lime, &c., no secretions of this kind are formed; the two parts of the wood are both nearly alike, and consequently the timber of such trees is uniformly perishable. Ship carpenters call the duramen the spine: it is always distinguishable from sap-wood by its deeper colour, and sometimes, as in the yew, the sandarach, and certain kinds of deal, the limits of the two are clearly defined. But in most cases the heart-wood and sap-wood gradually pass into each other, so that no certain line can be drawn between them.

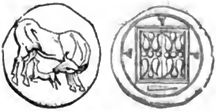
DURANCE, a river in the south of France, belonging to the basin of the Rhône. The source of the Durance is marked in the maps near Briançon; but the sources of the Guisane and the Claret, which flow from the ridge of the Alps that separates the department of Hautes Alpes from Savoy, have each a better title to be considered the true head of the Durance. These streams unite at Briançon, about 20 miles from their respective sources, and just after their junction receive the Servières, another small stream. From Briançon the Durance flows south-south-west above 25 miles to Embrun, receiving by the way the Gyronde (which receives the Gy and the Boude) and the Guil (which receives the Aigue-blanche, the Melesen, and the Rioube), and several small mountain streams, as the Crevoux, the Vachere, &c. The Ubaye, from Barcelonette (which receives the Ubayete, and the Bachelard), joins the Durance 10 miles below Embrun. From the junction of the Ubaye the Durance flows first south-west, then south, and then west by north 135 miles, into the Rhône below Avignon, receiving a great number of tributaries, of which the principal are the Buech (which joins it at Sisteron), the united streams of the Bes and the Bleone from Digne, the Asse, the Verdon from Castellane, and the Calavon from Apt. In the lower part of its course the bed of the Durance is full of islands. The stream is very rapid, and its inundations frequent. It is not navigable, but is used for floating timber. Many of its tributaries are used for floating. It was known to the Romans by the name Druentia.

DURANGO, a town in the Mexican United States, the capital of the state of the same name, is situated in about 24° 28′ N. lat. and near 105° W. long. in a wide plain, 6848 feet above the sea, and at no great distance from the Sierra Madre, which rises to the west of the town. Its population amounts to upwards of 22,000 souls, and it carries on a considerable commerce in the agricultural produce of the country lying about it, and in that of the numerous and rich mines, partly situated in the Sierra Madre and partly east of the town. Iron ore is found within a quarter of a league from the town, but the attempts to turn it to advantage have, so far as we know, not succeeded to any extent. Not far from Durango is the Breña, a tract more than 30 miles in length and about half that width, which is occupied by hills composed of basalt and covered with scoria; among them is a crater of considerable dimensions. (Humboldt; Ward.)

DURANTE, FRANCESCO, a celebrated Italian composer, was born in Naples, in 1693, and educated under Alessandro Scarlatti. His works are not numerous, and chiefly of the sacred kind. The duets, on which his reputation now mainly rests, are, Dr. Burney states, the cantatas of his master, arranged for two voices! Hence the fame of this much-vaunted composer will hereafter depend on that of his disciples, Pergolesi, Piccini, Sacchini, Paisiello, &c., who received instruction from him at the Neapolitan Conservatorios of *St. Onofrio*, and the *Poveri di Gesu Cristo*, of both of which Durante was the principal.

DURA'ZZO, DURA'S, the antient Epidamnus, afterwards called Dyrrachium, is a town on the coast of Albania, in 41° 22′ N. lat., and 19° 27′ E. long., situated on the south coast of a peninsula which projects into the Adriatic, and forms the south boundary of the gulf of Drin. Epidamnus was a colony of Corcyra [COLONY], but it afterwards changed its name into Dyrrachium. It fell under the Romans at the time of the conquest of Macedonia, and its harbour became the principal means of communication between Italy and the north parts of Greece, Macedonia, and Thrace. The Romans embarking at Brundisium, which is nearly opposite, landed at Dyrrachium, and thence by the Via Egnatia they reached Thessalonica, on the Ægean sea. Pompey defended Dyrrachium with success against Cæsar before the battle of Pharsalia. After the fall of the Roman empire Dyrrachium came successively into the hands of the Goths, Bulgarians, and the Normans from Sicily, who made it their stronghold in their wars with the Byzantine emperors. It afterwards fell into the hands of the Venetians, from whom it was taken by sultan Bayazid II. Durazzo is now included in the pachalik of Skutari, near the borders of that of Berat. It carries on some trade by sea, and exports the surplus corn which grows abundantly in the neighbouring plains. Its population is reckoned at between 4000 and 5000, and it has a Greek bishop. It is a place little visited by travellers: the scanty remains of Apollonia, which are two short days' journey to the south of it, near the banks of the Apsus, have been described by Colonel Leake and Dr. Holland. (Leake's *Travels through Northern Greece.*) Leake was prevented by illness from proceeding to Durazzo.

John, the eighth son of Charles II. of Anjou, king of Naples, assumed, with the consent of the Byzantine emperor, the title of duke of Durazzo and lord of Albania; and from him sprung the Durazzo branch of the Anjous, who reigned a while over Naples and Hungary. Charles III., king of Naples, was a grandson of John; he died in Hungary, and left two children, Ladislaus and Joanna, who reigned in succession at Naples, but died both without issue.



Coin of Dyrrachium.
British Museum. Actual size. Silver. Weight, 469 grains.

DÜREN, a minor circle of the administrative circle of Achen (Aix la Chapelle), in the Prussian province of the Rhine. Its area is about 215 square miles, and it contains 1 town, 1 market village, 106 villages, and 16 hamlets, with a population of about 46,600 (1816, 37,186). The Roer traverses it from south to north-west: it is hilly in parts, and has about 128,000 acres of arable land, 18,330 of meadows and pastures, and 51,700 of woods and forests. It produces much grain and fruit, rears cattle, contains iron, lead, alum, and coal mines, and manufactures woollens, ironware, paper, vegetable oil, &c.

DÜREN, the chief town, called by the Romans Marcodurum, whence its former name of Mark-Düren, lies near the banks of the Roer, 50° 46′ N. lat., and 6° 36′ E. long. It is a walled town, the seat of a public mining-direction, possesses a Roman Catholic gymnasium or high school, three nunneries, five Catholic and two Protestant churches, and a synagogue, and contains about 6800 inhabitants: in 1818 their numbers were 4909; and in 1825, 5610. Düren has considerable manufactures of fine and ordinary woollen cloths, stuffs, and coverlids, which employ between 1200 and 1300 hands, as well as of screws and nails. There are also manufactures of iron and steel ware, paper, coarse cottons, soap, leather, oil, trinkets, &c. It has an extensive trade in grain, a horse market, and three large fairs in the course of the year. On this spot several cohorts of the Ubii, who had assumed the Roman name of Agrippinenses, were surprized and cut to pieces by Civilis, the Batavian leader, in the year 70 A.D. (Tacit. *Hist.* iv. 28.)

DÜRER, ALBRECHT, or ALBERT, born at Nürnberg the 20th of May, 1441, was the son of a skilful goldsmith, and received that sound education which the wealthy burghers of the free towns of Germany were accustomed to give to their children. In all branches of instruction Albrecht made great progress, and showed also much ingenuity in the profession for which he was intended; but his genius being bent towards a nobler art, he gave up at once, to the great vexation of his father, the working of gold, and placed himself under the most able painter of his native country, Michael Wohlgemuth (1486). After finishing his apprenticeship he set out on his travels, and in 1490 went through Germany. On his journey he painted portraits and other pictures which were highly admired. Improved by experience and with increased reputation, he returned home in 1494, and soon after executed his master-piece, a drawing of Orpheus. It was the custom of those times for a painter, in order to be received and acknowledged as a master, to exhibit a piece which merited the approbation of his teacher and of the other masters of his craft. When this was accomplished, the candidate received a kind of diploma, and was entitled to the honours and rights of a master

After obtaining the mastership Dürer visited Holland and Italy, where he executed some of his best pictures such as the Martyrdom of St. Bartholomew for the church of St. Mark, and Adam and Eve for the German church in Venice, which was afterwards bought for the Gallery of Prague. In Bologna he became acquainted with Raphael, who esteemed him highly. In token of their friendship, each presented the other with his portrait. He returned home in 1507, with the reputation of being the first painter of his country.

'Certainly,' says Vasari (Vite de' Pittori), 'if this diligent, industrious, universal man had been a native of Tuscany, and if he could have studied as we have done in Rome, he would have been the best painter in *our* country, as he was the most celebrated that Germany ever had.'

His productions were so highly valued as to attract the notice of the most powerful sovereigns of his time, Maximilian the First and Charles the Fifth, who appointed him their painter, and bestowed upon him riches and honours.

To please his father Dürer had married, against his inclination, the daughter of a wealthy neighbour; but the match turned out so unfortunate that it embittered his life, and his countrymen attributed his premature death to his domestic misfortune. It is said that his wife was not deficient in personal attractions, but peevish and jealous to the utmost degree. He died broken-hearted in 1528, in the 58th year of his age. The senate of Nürnberg, to honour the memory of their illustrious citizen, decreed him a public funeral, which was celebrated with great pomp and solemnity. This circumstance has led some of his biographers to suppose that Dürer died in poverty, which however was not the case. In spite of his liberality, he left a tolerably good fortune to his surviving Xantippe.

Dürer's paintings are admired for the vivid and fertile imagination, the sublime conception, and the wonderful union of boldness and correctness of design which they display. He was the first man in Germany who taught the rules of perspective and the proportions of the human body according to mathematical and anatomical principles. In fact, his works were in this respect so classical, that even his prints and wood-cuts were purchased by the Italian painters for their improvement in those branches.

Some critics have found fault with the unnecessary correctness of drawing and the exuberance of his imagination; but the only fault that can be really objected to him is his total neglect of costume. Yet this fault is more conventional than real. His pictures, in spite of this violation of the rules of taste, produce lasting impressions of the sublime and beautiful; and impartial judges must always honour in him the greatest master of the German school.

Besides his great historical paintings, the best of which are in the collections of Vienna, Prague, Munich, and Dresden. Dürer has left some landscapes that are highly valued. Some of his paintings were in England in the collection of Lord Arundel. Dürer was also an excellent engraver in copper and wood; his woodcuts are masterpieces of the art, and considered equal to those of Hugo da Carpi.

The best among his woodcuts, both in respect of invention and execution, are his greater Passion and his Revelation of St. John. So much were they sought after, even during his lifetime, that a Venetian artist was induced to counterfeit them. When Dürer heard of this forgery, he went to Venice, and commenced a suit against the man, whose name was Marc Antonio Franci. The senate of Venice would have punished the offender severely, if Dürer had not obtained his pardon. There is a volume containing more than 200 original drawings by Albert Dürer in the print-room of the British Museum, which formerly belonged to the collection of Sir Hans Sloane, and was probably part of the celebrated collection of Dürer's friend W. Pirkhamer. In the same room is preserved an exquisite carving by him, in hone-stone, of the Birth of St. John, bequeathed to the Museum by Mr. R. P. Knight, who had purchased it at the price of 500*l*. It is dated 1510.

An extensive collection of Albert Dürer's engravings was bequeathed to the British Museum by the late Mr. Nollekens.

Dürer's portraits were also highly esteemed: it was said of him that he not only possessed the talent of catching the exact expression of the features, but also of delineating the different characters and passions.

Two inventions are attributed to him; that of printing woodcuts in two colours, and that of etching. Some, however, dispute his claim to the invention of the art of etching, though it is not denied that he was the first who excelled in it

In his private life he was amiable, upright, and benevolent. He was a strong supporter of the Protestant religion, without making any pretensions to superior piety.

Dürer wrote several valuable works on geometry, perspective, and fortification. He bestowed such labour on the purity of his native tongue, that his writings even now are well worth the study of the German scholar.

While the French corruption of taste was exercising a baneful influence over the fine arts, Dürer was looked upon as a barbarian; but opinion is now changed, and the modern school of German painters and critics view him as one of their great masters, and as a model by following which the art of painting may be brought back to its former dignity.

His life has been written by Arend and Roth, and lately by Heller, who has given the most critical and complete catalogue of all his works. Goëthe, Tieck, Wackenrode, and other distinguished writers have vindicated his claims.

D'URFEY, THOMAS, was born in Devonshire, but the exact time of his birth is uncertain. He was designed for the law, but quitted that profession for poetry. His dramas had remarkable success in the days of Charles II., but were soon afterwards banished from the stage on account of their outrageous indecency, and at present scarcely their names are known, except to the students of English dramatic history. Much of his fame was owing to his songs and satirical odes, which he is said to have himself sung in a lively and agreeable manner. He is represented in the 'Guardian' as being on such terms of intimacy with Charles II., that the king would sometimes lean on his shoulder and hum tunes with him: he was also a favourite at most convivial parties, and was so much celebrated for his qualities as a good companion, that it was considered a kind of honour to have been in his company. He was reduced to great distress in the latter part of his life, and applied to the managers of the theatre, who performed for his benefit one of his comedies. The profits which were acquired seem to have been sufficient to render his last days comparatively easy, if any judgment is to be founded on his poems of this period, which are written with liveliness. He died in 1723, and was buried at St. James's, Westminster.

A collection of D'Urfey's poems, entitled 'Pills to purge Melancholy,' is extremely rare, and sells for a high price. It is much esteemed by those bibliographers who think licentious works valuable if they are but scarce.

DURHAM, an English county, consisting of the main part, between the rivers Tyne and Tees, and of three detached portions, which are separated from the main portion by the intervening county of Northumberland, or by that of York. 1. The main portion is bounded on the north and north-west by Northumberland, from which it is for the most part separated by the river Tyne and its tributaries, the Stanley Burn and the river Derwent; on the west it is bounded by Cumberland and Westmoreland, from the former of which it is partly separated by the Crook Burn, a feeder of the Tees, and from the latter by the Tees itself; on the south it is bounded by Yorkshire, from which it is separated throughout by the river Tees; and on the east it is bounded by the German Ocean. Its greatest length is from east to west, from Seaton Snook, a headland at the mouth of the Tees, to the junction of the Crook Burn and the Tees, on the boundary of the three counties of Cumberland, Westmoreland, and Durham, 48 miles; its greatest breadth, at right angles to the length, is from the fort at the mouth of the Tyne, at South Shields, to Stockburn, or Sockburn, on the Tees, 39 miles. 2. The principal detached part, consisting of Norhamshire and Islandshire, which latter includes Holy Island and the Farne Isles, is bounded on the north by Berwick bounds, from which it is separated by the Tweed; on the north-west and west by Berwickshire in Scotland, from which also it is separated by the Tweed; on the south by Northumberland, and on the east and north-east by the German Ocean. The form of this portion of the county approaches that of a triangle, of which one side faces the north and north-west, and is nearly 11 miles long in a straight line; another, the north-east, and is 14 miles long in a straight line; and the third, the south, and is 17 miles long in a straight line. 3. The second detached portion, comprehending the parish of Bedlington, sometimes called Bedlingtonshire, is bounded on the north, west, and south by Northumberland, from which it is separated on the north by the river Wensbeck, on the south by the river Blyth, and on the east by the German Ocean. It is 7 miles long from east to west, and 4½ miles broad from north to south. 4. The third detached portion, the parish of Craike, is near Easingwould, in Yorkshire, and is surrounded by that county: it is 3 miles long from north to south, and about 2½ miles broad. The areas of the several portions, as found by taking the areas of the several parishes, are as follows:—

	Statute Acres.
Main portion	621,690
Norhamshire and Islandshire .	45,630
Bedlington parish . . .	8,910
Craiko parish . . .	3,300
	679 530

The area of the whole is about 1097 square miles. The population in 1831 was 253,910, giving 231 to a square mile in size and in absolute and relative population Durham is below the average of the English counties. Durham, the capital of the county, is on the Wear, 235 miles in a straight line north by west of London; 259 miles by the road through Baldock, Stamford, Doncaster, Boroughbridge, and Bishop Auckland; or by that through Boroughbridge, Northallerton, and Darlington; or 263 miles by the road used by the Thurso, Edinburgh, and York mail, through Ware, Huntingdon, Stamford, Doncaster, York, Easingwould, Thirsk, Northallerton, and Darlington. The main portion of the county is comprehended between 54° 27′ and 55° 1′ N. latitude, and 1° 8′ and 2° 21′ of W. longitude.

Coast, Islands, &c.—The coast of the county of Durham is for the most part low, especially in the detached portions of the county. Islandshire has no cliffs, neither has Bedlingtonshire. From Islandshire sand banks (Fenham flats) run out and connect Holy Island with the main land, so as to render the island accessible at low water to vehicles of all kinds; though the sands are dangerous to persons not acquainted with them. In the main portion of the county there are several ranges of cliffs, as at Suter Point, between the Tyne and the Wear; along the coast from the Wear southward to Hawthorn Dean; again along the coast for three miles south from Horden Point, at the headland on which Hartlepool stands; and again at Seaton Bents All these cliffs are of magnesian limestone, except those at Seaton Bents, which are formed by rocks of the red marl or new red sandstone formation.

Holy Island is of an irregular form, nearly 4 miles long from east by south to west by north, and nearly 2 broad from north to south. It contains 3320 acres, and had in 1831 a population of 836 persons. This island was called by the Britons Inis Medicante, and was afterwards known by the name of Lindisfarne: its name of Holy Island was given to it from its having been the residence of several of the fathers of the Saxon church. It was antiently the seat of a bishoprick, and had a monastery under the government of the bishops, which was subsequently reduced to be a cell of the Benedictine monastery of Durham. The church of the monastery is now in ruins. The soil of the island is rich, but before the inclosure of the common in 1792 there were only forty acres under tillage, and that portion was subject to intercommonage as soon as the crops were reaped. There is a small village or town on the west side, formerly much more extensive: the inhabitants are chiefly engaged in fishing. There is a small harbour and an old castle, which during the last war was occupied by a garrison sent from Berwick. This castle is upon a lofty rock of whinstone, in the south-east corner of the isle. On the north-east side of the island is a projecting tongue of land a mile long, and in some parts only sixty yards broad, occupied by rabbits; on one side of this tongue the tide may be seen ebbing while it is flowing on the other.

The Farne Islands lie to the south-east of Holy Island. The group consists of several small islets or rocks, some of which are visible only at low water. They produce kelp, and some of them a little grass. There are two lighthouses on two islets of the group.

Surface, Hydrography, Communications.—Durham may be characterized as a hilly county. The western part is overspread by the branches of the great Penine Chain, from the eastern slope of which the chief rivers of the county flow. The two principal branches of this chain, which belong to Durham, are separated from each other by Weardale, the valley of the Wear; from the Yorkshire hills by Teesdale, or Teasdale, the valley of the Tees; and from those of Northumberland by the valley in which the Derwent, a feeder of the Tyne, flows. Large portions of the mountain district consist of moor-lands covered with heath, or, as it is here termed, 'ling.' The hills north of Weardale have the name of Weardale Forest, and those north of Teasdale are called Teasdale Forest: but they are bare of wood.

The principal elevations in the county are Kilhope Law (2196 ft.), Cross Ridge, Bolts Law, Baron Hope, Collier Law (1678 ft.), and Fatherly Fell, in Weardale Forest; Pike Law, West Pike, Manner Gill Fells, and Eglestone Bank, in Teasdale Forest; Pontop Pike, on Lanchester Common, south-east of the valley of the Derwent (1018 ft.); Down Hill, Lizard, Fulwell Hill, and Boldon Hill, near the sea, between the Tyne and the Wear; Maiden's Paps, Warden Law, or Wordeslow (632 ft.), Low Hills, Hare Hill, and Hartmoor, near the sea, between the Wear and Hartlepool; Wheatley Hill, north-east of Durham; and Brandon Mount, south-west of the same city, but on the north side of the valley of the Wear (875 ft.)

The moors are chiefly occupied as pasturage for sheep of the black-faced or heath kind, and for a few young cattle and horses. The best wooded part of the county is the vale of Derwent, which is especially adapted to the growth of oak; but it produces also ash, elm, birch, and alder, and a quantity of underwood, especially hazels.

The chief rivers are the Tyne, the Wear, and the Tees, with their tributaries. The Tyne drains the northern parts, the Wear the middle, and the Tees the southern.

The Tyne [Northumberland] forms the northern boundary of the county for about 18 miles, from the junction of the Stanley Burn at Wylam to the sea, and its navigation extends from above Newcastle to the sea, a distance of about 15 miles. Its Durham affluents are the Derwent and Team rivers and the Stanley and Hedworth Burns.

The Derwent rises in Northumberland, and flowing east, reaches, about 3 miles from its source, the border of Durham, along which it flows, first east and then north-east, then south-east, and then north-east again for 16 or 17 miles, receiving on its right (or Durham) bank the Nuckton, Boltshope, Baronhope, Hysop, and Herselop Burns, or Becks (*i. e.* small streams; the last two unite before entering the Derwent); and on its left (or Northumberland) bank many others. At the junction of the Milk or Milch Burn it leaves the border (which here turns off to the north), and flows through the county for about 9 miles north-east, till it again meets the border, and falls into the Tyne 3 miles above Newcastle. Its whole course is 28 to 30 miles.

The river Team rises on the side of Pontop Pike, and flows first east-by-north and then north-by-west about 13 miles into the Tyne, about a mile above Newcastle. The Stanley Burn and the Hedworth Burn are only four or five miles long.

The Wear rises near Kilhope Law, and flows east and south-east above 4 miles to Burtree or Bowertree Ford. In this part of its course it is known as the Kilhope Burn, and is joined by the Welhope and Burnhope, and some other burns. From Bowertree Ford the Wear flows east-by-south 18 miles to the junction of the Bedburn river, passing the towns of Stanhope and Wolsingham, and receiving on the right bank the Irshope, Harthope, Dadree, Swinhope, Westenhope, Snowhope, and Bollihope Burns (the last of which receives the Harehope); and on the left bank the Middlehope, Rookhope, Stanhope, Shittlehope, Wescrow, Houslip, and Eals Burns, all of which are small. The Wescrow receives the Tunstall and the Thornhope. The Bedburn river is formed by the junction of the Euden and Sharnberry Becks, and subsequently of the North Grain Beck, and another to which the maps give no name. This upper part of the course of the Wear is through the wild and romantic district of Weardale, bounded on each side by high hills. From the junction of the Bedburn the Wear flows still east-by-south 6 miles to Bishop Auckland. In its way it is joined on the right by the Lin Burn, on the left by the Bitch Burn, and at Bishop Auckland by the Gaunless, which rises on Eglestone Common, and has a course of 15 miles. The Gaunless, near its source, is called the Hyndon Beck: it is joined in its course by the Humber Beck. From Bishop Auckland the Wear turns to the north-east, and flows in a very winding course about 36 or 37 miles past Durham and Chester-le-Street into the German Ocean at Sunderland. Between Bishop Auckland and Durham it receives the Croxdale Beck and the Shinkly river on the right bank, and the Stockley Beck and the Browney river on the left. The Browney river is the largest of these; it rises on Satley Common, and flows first east and then south-by-east 17 miles, receiving the Pan, the Smallhope, and the Derness (which is joined by the Hedley) Becks. Below Durham the Wear receives the Stanley Burn, united with the Cock Burn on the left bank, and the Lumley Burn on the right bank, all at or near Chester-le-Street. The whole course of the Wear may be estimated at about 65 miles, for about 18 or 20 of which, viz. up to the city of Durham, it is navigable. It is crossed at Sunderland, near its mouth, by an iron bridge of one arch, of 236 feet span and 100 feet above high water-mark. The importance of its navigation arises from the export of coals from the neighbouring mines, for the produce of which it furnishes an outlet. London and many towns upon the Thames and on the eastern coast receive a considerable portion of their supply of coals from the Wear.

The Tees rises in Cumberland, on the slope of Cross Fell (2901 feet high), and for the first few miles of its course forms the boundary between Cumberland and Westmoreland. It is joined by the Trout and Crook Becks, and upon its junction with the latter forms the boundary of the county of Durham, separating it for a very few miles from Westmoreland, and throughout the remainder of its course from Yorkshire. The general direction of the Tees till it reaches Sockburn, nearly 55 miles from its source, is east-south-east; from thence it flows nearly 30 miles north-east into the German ocean, its total course being between 80 and 90 miles. The first part of the course of the Tees to Barnard Castle is pretty direct; it flows through a narrow valley in a hilly country, and is swelled on the right or Westmoreland and Yorkshire bank by several becks, or small rivers, of which the chief are the Maize or Marys, the Lune, and the Balder or Baulder: on the left or Durham bank it receives the Harwood joined with the Langdon Beck, the Ettersgill, the Bowles, the Hadshope or Hudshope, the Eglestone, and one or two others. The valleys watered by these several affluents of the Tees open laterally into the valley of the Tees, and are many of them remarkable for picturesque beauty. A ridge of trap rocks across which the river flows at Caldron Snout, at the junction of the Maize or Marys Beck, forms a series of falls in a distance of 596 yards which offer a fine contrast to the still water of The Wheel, a pool or lake into which the river expands just above. At High Force, or Mickle Force, a few miles lower down, another ridge of course-grained grey columnar basalt crosses the river, and causes another fall of 56 feet. A few miles below this fall and three above the village of Middleton in Teasdale, basaltic rocks form the bank of the river, and serve to support Winch Bridge, which consists of a plank two feet wide, with low handrails, suspended by iron chains across the river, here 63 feet wide, at an elevation of 56 feet above the water. Below Barnard Castle the course of the river is still tolerably direct till it reaches the neighbourhood of Darlington. It receives in this part of its course, on the right bank, the Greta from Yorkshire, and on its left bank, the Grand River, or Staindrop Beck, 10 or 12 miles long, which flows through Raby Park and past the town of Staindrop, receiving the Forth or Sut Beck. From the neighbourhood of Darlington the channel winds very much. At Croft near Darlington it receives a considerable stream on its right bank, and on the left the river Skerne, which, rising between Durham and Hartlepool, has a very winding course to the south-south-west, of more than 25 miles, receiving several streams by the way, and passing the town of Darlington just before its junction with the Tees. The Tees does not receive any considerable affluent after the Skerne, except the Leven from Yorkshire. It passes the town of Stockton, below which it receives the Hartburn and Billingham Becks, and at Greatham Fleet, near its mouth, the Elmeldon Beck united with another from Greatham. The wide æstuary of the Tees is navigable for colliers and other large vessels up to Stockton, and for small craft several miles higher up, above Yarm in Yorkshire: the navigation has been shortened by a cut, by which a considerable bend in the river is avoided.

There are several small streams which flow into the sea between the Wear and the Tees. They are called Deans, as Ryhope Dean, Seaham Dean, Dalton Dean, Hawthorn Dean, Castle Eden Dean, and Hasledon Dean.

The river navigation of Durham, comprehending only the lower waters of the Wear and of the border rivers Tyne and Tees, is confined to the eastern side of the county. There are no canals or artificial cuts, except one, already noticed, made to shorten the winding course of the Tees.

The mail-road to Edinburgh, Aberdeen, Inverness, and the north of Scotland, crosses this county from south into north. It enters it at Croft Bridge over the Tees, and passes through Darlington, 241 miles from town, Durham (259 miles), Chester-le-Street (265 miles), and Gateshead (272 miles), where it quits the county, crossing the Tyne to Northumberland. There are two other roads from London to Durham city: they branch off from the Glasgow and Carlisle mail-road at Scotch Corner in Yorkshire, and enter the county by Pierce Bridge over the Tees (239 miles from London). Here they divide, the right-hand road passing through the villages of Heighington and Eldon, and the left-hand road through Bishop Auckland (248½ miles from London). They reunite a few miles beyond Bishop Auckland and fall in with the Edinburgh mail-road near Sunderland Bridge, over the Wear, about four miles before reaching Durham (259 miles).

The road from London to Sunderland branches off from the Edinburgh mail-road at Thirsk in Yorkshire, and proceeding by Yarm, upon leaving that town crosses the Tees into the county of Durham, and proceeds forward to Stockton (241½ miles from London), and from thence to Sunderland, 268½ miles. At Bishop Wearmouth, which is a suburb of Sunderland, where the road turns off to enter that town, a branch proceeding forward runs to South Shields at the mouth of the Tyne (275 miles). From this branch road another branch to the left leads to Gateshead, forming a communication (13 miles) between Sunderland and Newcastle.

From Durham roads lead to Sunderland (distant 13 miles), through Bishop Wearmouth; and by Bishop Auckland (distant 10 miles), and Staindrop (19 miles), to Barnard Castle (24 miles). From Barnard Castle (245 or 246 miles from London) a road leads along the valley of the Tees, by Middleton in Teasdale (distant 9½ miles) to Aldstone Moor in Cumberland; and from Darlington, one by West Auckland (distant 9 miles), Wolsingham (20 miles), and Stanhope (26 miles), along the valley of the Wear to the same town. From Wolsingham a road runs northward to Hexham in Northumberland and another to Gateshead. From Gateshead a road runs along the south side of the Tyne valley to Hexham. Other roads do not require notice.

Durham has numerous rail-roads, most of which have been constructed by the coal owners for the conveyance of coals from the pits to the rivers Tyne and Wear, where they are shipped. Acts of parliament have been obtained for two more extensive rail-ways; one, the Stockton and Darlington, extending from Wilton Park colliery, west of Bishop Auckland, by a circuitous line past Darlington to Stockton, and from thence across the Tees by a suspension bridge, and by the side of the navigable cut made in the Tees to Middlesburgh and Cleveland Port on that river; with various branches: the other, the Clarence rail-road, from the Stockton and Darlington rail-road, a few miles north of Darlington, by a more direct course to the northern bank of the Tees below Stockton, with a branch to the city of Durham, and some subordinate branches. The various acts for the Stockton and Darlington rail-road were obtained in 1821-1828; those for the Clarence rail-road in 1828-1829. The estimated length of the former, including its branches, is about 38 miles; of the latter, nearly 46.

Geological character.—The lower part of the valley of the Tees, from the junction of the Skerne, and the coast from the mouth of the Tees to Hartlepool, are occupied by the red marl or new red sandstone, the uppermost of the formations which are found in the county. Among the strata of the formation a fine-grained sandstone of a brick-red colour predominates. Some attempts have been made to find coal by boring through the red marl, but without success, though the pits were sunk to the depth of more than 700 feet. At Dinsdale, near Croft Bridge, where one of these attempts was made, the strata were found to be numerous, and to consist, as far as could be judged from the miners' language, of white, grey or red sandstone, with occasional partings of a more compact nature, red or blue shale, coaly matter in thin layers, and gypsum in nodules or in beds which in one case were three feet thick: the lowest bed in the two deepest workings was found to be a strong white rock of a calcareous nature. Sulphureted springs are found in this strata: one of them arose from a perforation made in boring for coal. (Mr. Winch, *Geol. Trans.*) The newer magnesian or conglomerate limestone crops out from beneath the north-western limit of the red marl: it extends along the coast to the mouth of the Tyne, and along the valley of the Tees to the junction of Staindrop Beck with the Tees, between Darlington and Barnard Castle: its inland boundary is a line drawn southward from the mouth of the Tyne, gradually diverging from the coast-line to the village of Coxhoe, between Durham and Stockton; and from thence south-west to the Tees. This limestone forms a range of round-topped hills along the coast, of small elevation, the highest (Painshaw, near the Wear) being estimated at only 400 feet. The upper stratum of the limestone here is a species of breccia, with which wide chasms or interruptions in the cliff are filled: the next strata are thin and slaty, of a white colour inclining to buff; but lower down the stratification becomes indistinct, the rock is of a crystalline and cellular texture, and of a light-brown colour. The brown variety is quarried near Sunderland: it partakes of the nature of limestone, and from containing some inflammable matter requires only a small quantity of coal to be reduced to lime. Some of it, which takes a tolerably good polish, is sold as marble. The thickness of the limestone formation varies. At Pallion, near Sunderland, it is only about seventy feet thick; but this is near the north-western or under boundary: near Hartlepool it has been bored to the depth of more than 300 feet without penetrating through it. Along the coast the strata dip to the south-east. Galena is the only ore that Mr Winch observed in this limestone, and few organic remains are found in it. Botryoidal masses (*i. e.* masses like a cluster of grapes) of fetid limestone, devoid of magnesia, in balls varying from the size of a pea to two feet in diameter, imbedded in a soft, marly, magnesian limestone, are found near Hartlepool. There are caverns and perforated rocks in this formation along the coast, which appear to have been formed by the action of the sea.

Under the article COAL-FIELDS the reader will find a general description of the coal-field of Northumberland and Durham. The following remarks apply more particularly to the county of Durham.

Of the dykes of basalt or greenstone which intersect the coal measures, one crosses the Tyne into Durham county, near the Walker colliery, and another crosses the bed of the Wear at Butterby, near Durham. In the south part of the county is a remarkable basaltic dyke, extending several miles from Cockfield to Bolam, where the coal measures dip beneath the newer magnesian limestone: a dyke of similar kind and in just the same line intersects the new red sandstone or red marl, and crosses the bed of the Tees near Yarm into Yorkshire. 'I have never been able,' says Mr. Winch, 'to trace any of these basaltic veins into the magnesian limestone, and am almost certain that, together with other members of the coal formation, they are covered by it.' In Mr. Greenough's Geological Map of England and Wales the Cockfield dyke and that which crosses the Tees are represented as parts of one vast dyke, extending from the upper valley of the Tees near Eglestone, through the millstone grit and limestone shale (or, as it is laid down in Mr. Winch's map, the mountain limestone), the coal measures, the newer conglomerate or magnesian limestone, the red sandstone, the lias, and the inferior oolite, in all sixty-five miles in an east-south-east direction, to the Yorkshire coast, between Scarborough and Whitby. The coal in contact with the dyke is charred and reduced to cinder; and the sulphur is sublimed from the pyrites near. A belt of trap rocks is marked in Mr. Greenough's map as extending across the coal measures in Bedlingtonshire. Besides the fissures filled with basalt, others of a different nature intersect the coal-field: these, if large, are also called dykes; but, if small, 'troubles,' 'slips,' or 'hitches,' and by some geologists 'faults:' by these 'faults' the strata are thrown, *i. e.* raised on one side or depressed on the other, many feet. Other irregularities are observed in the coal measures, such as the depression below their proper level of large wedge-shaped portions of the strata; fissures which divide the strata, but do not alter their level; basin-formed depressions in the floors of the seams, called 'swellies' by the miners, by which the coal is materially thickened, the roof of the seam preserving its regularity; and 'nips,' where the coal nearly disappears, the roof and the floor of the seam coming almost into contact. Mineral springs are found in various parts of the coal-field, and chalybeate springs occur in every part of it.

The coal-field of Durham is bounded on the west by the district occupied by the millstone grit. This district extends westward up the valley of the Tees to Eglestone, and is bounded by a line drawn from thence northward to Bollihope Beck, along that stream to the Wear above Wolsingham, and from thence north-west to the Derwent at Blanchland. The millstone grit extends northward into Northumberland, skirting the west side of the coal-field; and southward into Yorkshire, where it extends between the districts occupied by the newer magnesian or conglomerate limestone and the carboniferous or mountain limestone. The beds of this formation may be estimated at 900 feet thick; and this is probably short of the truth. 'The prevailing rock of this series is shale, known by the provincial name of "plate," with which various beds of sandstone, differing in hardness and texture, and, according to these differences, distinguished as freestone, hazle, whetstone, grindstone, and millstone, occur: of the latter only one bed is worked, the thickness of which is about thirty feet. This is one of the uppermost strata on the Derwent, where it crops out, and does not occur farther west.' (Phillips and Conybeare, *Outlines of the Geol. of England and Wales.*) The millstone bed is quarried on Muggleswick Fell, and between Wolsingham and Stanhope in Weardale. The grey millstones of Muggleswick are employed for grinding rye. Towards the lower part of this formation two thin beds of limestone occur, alternating with some occasional seams of coal. These coal measures are distinguished by their thus alternating with limestone from those of the principal coal formation.

The remainder of the county, west of the district occupied by the millstone grit, is occupied by the carboniferous or mountain limestone. The limestone beds in this formation repeatedly alternate with beds of siliceous grit and slate-clay, to which they bear not so great a proportion as one to three, so that it is not very easy to draw the line of demarcation between the beds of this formation and those of the millstone grit. Mr. Winch, from whose account we have largely borrowed, classes both formations under the common designation of the lead-mine measures. He estimates their joint thickness at from about 2700 ft. to 2750 ft., and the aggregate thickness of the limestone beds at 576 ft.: deducting the thickness of the millstone grit as given above, that of the mountain limestone will be about 1800 ft. or 1850 ft., of which the limestone beds amount to 570 ft.: this includes about 250 ft. of sandstone and slate-clay, lying immediately above the old red sandstone, which is the formation subjacent to the mountain limestone. The limestone beds are the most characteristic of this formation, and the most important to the miner. The bed called 'the great limestone' is from sixty to nearly seventy feet thick, and consists of three strata, divided by indurated clay. It is the uppermost bed in this formation, and crops out at Frosterly, in Weardale, between Wolsingham and Stanhope, where it is quarried in large quantities for agricultural uses and building cement, or for ornamental purposes: it is a brownish-black or dark bluish-grey marble, in which bivalve shells are imbedded. 'The scar limestone,' a lower bed, thirty feet thick, is divided into three strata like the great limestone, which it also resembles both in colour and organic remains. 'The Tyne-bottom limestone,' above twenty feet thick, is also divided into three strata: 'Robinson's great limestone' is above eighty feet thick. All the limestones of this formation appear to contain the encrinus, and most of them also bivalve shells: one of them (the cockleshell limestone) contains oyster shells of four or five inches diameter. They seem to agree in every essential character, as well as in their extraneous and native fossils. The beds of sandstone which occur in this formation are thicker than those in the millstone grit: they are thickest towards the bottom of the series. The beds of shale, or, as it is called, 'plate,' are very numerous: they are seldom so much as forty feet in thickness, but one bed is sixty feet. Iron pyrites, imbedded in shale, is found in abundance; but owing to the high price of fuel and the great distance from any seaport, cannot be manufactured into green vitriol with any advantage. Clay ironstone is found in Teasdale; but there are no iron works in this county.

The carboniferous limestone is the great depository of the metallic veins of the district which comprehends the great Northumberland and Durham coal-field. Lead mines abound in Weardale and in Teasdale Forest, and there are a few in the valley of the Derwent. Of the fissures which contain the lead ore, such as range from north to south are called 'cross veins,' or sometimes 'dykes;' they are generally of great magnitude, but yield very little ore: those fissures which run from south-east to north-west are most productive; they are from three to six feet wide. These cut through the cross veins, which are frequently rendered productive to some distance from the points of intersection. The hade of the veins is variable in direction and in degree where those in Weardale point east and west, they hade to the south: the strata are elevated on the side to which the veins dip. The same vein is productive in different degrees according to the bed which it traverses: the limestones are the chief depositories of ore, particularly 'the great limestone,' which is considered to contain as much as all the other beds put together: next to the limestones, the strata of sandstones called 'hazels' are to be ranked in point of productiveness, but the lead-bearing veins appear to be compressed between these hard beds. Galena is the only lead ore procured in abundance from this formation; but white and steel-grained ore are occasionally found: silver is contained in the ore in different proportions, varying from two to forty-two ounces in the fother of 21 cwts.: twelve ounces may be considered as the general average, and if eight can be obtained, the lead is worth refining. Newcastle and Stockton are the ports at which lead is shipped. (*Geological Transactions*, vol. iv.; Conybeare and Phillips, *Outlines of the Geol. of England and Wales.*)

Agriculture.—The climate of the county of Durham is mild for its northern situation. The sea, which bounds it on the east, moderates the cold in winter; and the surface, being hilly without any considerable mountains, presents many sheltered valleys, the climate of which nearly resembles that of the more southern parts of the island. The soil varies in different parts; its general nature is that of a rather strong loam. In the south-eastern part of the county northward from the mouth of the Tees, is a tract several miles in breadth, stretching along the coast towards Hartlepool, where the stiff loam is rich and productive. Next to this, to the east and north, to within a few miles of Sunderland, is a very poor thin clay, with a very hard and impervious subsoil, on which neither corn nor grass will thrive without great labour and expense. Westward of this lies a strip of excellent loam on a limestone rock, which affords the soundest pastures and the best grass, and is fit for any kind of crop. In the centre of the county there is a moist clay loam, of moderate quality, on an ochre subsoil, which gradually becomes peaty, and joins the western portion of the county towards Cumberland and Westmoreland, the whole of which last-mentioned part of the county is a poor peat or moor, chiefly covered with heath. From Barnard Castle to Darlington there is a strip bounded by the Tees on the south, which consists of a dry loam intermixed with clay. In this there are some good pastures and productive farms. In the valleys of the Tees, Skerne, Tyne, and their tributary streams, the soil is in general above the average of the district around, and consists of a good friable loam, which is cultivated at a small expense, and under good management is sufficiently profitable to the occupier.

A great part of the county lay at one time in open commons and common fields, most of which are now divided and enclosed. The moors and heaths that remain are chiefly in the poor district to the westward, and even there cultivation has spread very generally; and the wastes are profitable, in some degree, by rearing a hardy breed of sheep and cattle. The general state of cultivation throughout the county is above mediocrity; and improvements have been more readily adopted than in some more southern parts of the island. Fallows are found indispensable on the cold wet clays; but wherever turnips can be raised this useful root supersedes the old summer fallow. The fallows are usually dressed with lime, which is no doubt a proper application on cold clay soils; but the use of it has become so customary (being inserted as a condition in many leases), and is so erroneously considered as a substitute for dung, that it is often applied injudiciously, and with little or no advantage. In many old leases there was a clause to oblige the tenant to lay all his farm-yard manure on the old grass land, which effectually prevented the improvement of the arable part of the farm.

Lime being thought a sufficient manure for the arable land, the consequence was the gradual deterioration of the latter, without a proportional improvement of the meadows. But a better system has been introduced. The lime is now usually put on when old grass land is broken up or converted; and where arable land has been repeatedly limed, good rich dung is found to be more profitably employed, when ploughed in, than when used as a top-dressing for grass. There is little or no marl found in the county.

The rotation usually adopted on the better soils includes two or three years of grass, and begins invariably with turnips, well manured, and drilled according to the Northumberland method. [Drilling.] The convertible husbandry described in the account of the agriculture of Berwickshire is very generally adopted by the best farmers, and found most profitable in the end.

The occupations are not, in general, very large. There are some few extensive farms; but the average size is from 150 to 200 acres of inclosed land. There are many small occupations of 40 and 50 acres, which is as small a farm as can be cultivated with profit, unless the spade husbandry be adopted, which is not yet done to any extent in this county.

The implements of husbandry have nothing peculiar in them. The ploughs are chiefly of the improved kind: the old heavy clumsy ploughs are scarcely ever seen in use. Horses are almost exclusively used for agricultural purposes; and an ox team is a rarity. It is found that oxen are more profitable when fatted at a young age for the butcher, than when used to work on the farm. Threshing-mills are common, and there is not in the northern counties that foolish prejudice of the ignorant labourers, which made many of them rise to destroy threshing-machines in more southern counties, and which still prevents the use of them where they would be highly advantageous, not only to the farmer, but also to the labourer, who would then not so often suffer the pains of rheumatism in his old age, the consequence of the continued exertions of his limbs on the threshing-floor.

Corn is sown by the drilling-machine wherever the soil is sufficiently friable, or is made so by good tillage. In heavy soils the broadcast method of sowing still prevails.

There are many rich upland meadows and permanent pastures, where cattle and horses are bred to great advantage, and where oxen and sheep are fattened by grazing; but there are very few water-meadows, although there are many situations where they might very easily be established. The quantity of hay on the upland meadows is on an average 1½ tons per acre: 2 tons is considered a heavy crop. They have a method of drawing together the cocks of hay, when it is fit to be stacked, which saves the loading on waggons. This is done by means of a wooden frame drawn by two horses. This frame is held in an oblique position, and partly drawn under the cock so as to scrape the surface and force the hay upwards. It slides on the mown grass, and is drawn to the stack, which is made to contain ten or twenty tons. It is but slightly thatched when completed: several small stacks used formerly to be placed in various parts of a large piece of grass land, and in winter the cattle were left in the fields, and pulled the hay out of the stacks all around, sheltering themselves near them. This was a great waste of hay, and a very unequal distribution of the manure. A better system prevails now, and the cattle are kept in yards, where the dung is more carefully collected and increased with straw, and where the hay is brought as it is cut out of the stack, by which means none of it is wasted. The best meadows are mown every year, and manured every third or fourth year. Some prefer mowing and feeding alternately, which keeps the land in good heart and the herbage fine. Horses are generally considered as detrimental to the pasture; their manure is too hot, and brings coarse weeds forward. Sheep greatly improve the pastures, and are in consequence preferred.

When grass land is ploughed up and converted into arable, the practice of paring and burning the surface is very generally adopted. The first crop after this is generally turnips, which seldom fail when sown with fresh-burnt ashes. The next crop is wheat or oats; after which, if the soil is very stiff, a clean fallow succeeds; if it is lighter, another crop of turnips, which brings the land in a proper state for a regular course. This appears to be a most excellent practice, and far superior to the old Devonshire plan of taking as many crops of corn, after burning the sod, as can be made to grow. When the surface is not burnt, the usual course is to plough the grass up in autumn, and let it lie all the winter to rot: it is then ploughed again in spring, and sown with oats: the next year it is fallowed, and prepared for the course which is thought to suit the nature of the soil.

This county is not remarkable for its gardens or orchards. The soil and climate are not very favourable to fruit-trees, and, except in the gardens of gentlemen of fortune, they are not much attended to.

There are some good oak woods, and many new plantations, where the tenure is freehold. Where it is copyhold, under the bishop of Durham, one-third of the timber, above what is required for repairs of buildings, belongs to the bishop, which is an insurmountable obstacle to planting—and where the land is held on lease, renewable every seven years on an uncertain fine, every improvement increases the sum demanded. Many of these lands have been enfranchised by Act of Parliament, with the consent of the bishop; but many still remain on the old tenure.

The cattle bred in the county of Durham are in great repute all over England and Scotland, and a great number are annually purchased at the different fairs in this county, and driven northward and southward. The Teeswater or Holderness breed is the finest of the short-horns. The cows are remarkable for the quantity of milk which they give, as well as their aptitude to fatten. The oxen are considered as the most profitable breed for stall-feeding, as they become fit for the butcher at an earlier age than most other breeds. The milkmen near London and other large towns scarcely ever have any but Durham cows, some of which will give twenty-five to thirty quarts of milk per day for several months. When they become dry they increase so fast in flesh and fat, that they are soon very advantageously disposed of. They are of a quiet disposition, and bear to be kept continually tied up in stalls; and they accommodate themselves readily to every kind of food, whether it be grass or hay, roots, grains, or distillers' wash. This breed came originally from Holland, as is asserted, and this appears probable: but it has been much improved by a careful selection of bulls to breed with. This may be attributed to a few skilful and zealous breeders. The famous Durham ox at ten years old weighed alive 34 cwt. He was slaughtered at eleven years old, in consequence of an accident by which he dislocated his hip joint; and although wasted by being eight weeks in great pain, his carcase produced 165 stones 12 lbs. net meat (14 lbs. to the stone), and above 21 stones of hide and tallow. In June, 1801, when he was five years old, the proprietor refused 2000*l.* for him, and made a great deal of money by showing him all over the kingdom for six years. (Bailey's *Agricultural View of the County of Durham.*)

The milk of the Holderness cows, although abundant, is not so rich in cream as that of some of the smaller breeds. But quantity and quality are seldom united, and the dairymen who make butter or cheese prefer cows of different breeds, which give rich milk, but do not get fat so readily.

The horses bred in this county are of a superior description, both for draught and for the saddle. The Cleveland bays are preferred for their vigour and activity. For farming work and drawing loads of coal or lime few horses surpass them. A good horse will draw in a cart nearly a ton of coals from the distance of thirty, and even thirty-five miles, over hilly and rough roads; going and returning in the twenty-four hours, without any considerable rest, and often without being out of harness the whole time: he will do this three times in the week, and do light jobs the other days. Horses can take longer journeys in hilly countries than in flat, without being distressed, as is well known. Hunters of superior power are produced by crossing strong active mares with blood horses which have great bone as well as spirit; or better, by having a breed produced by selected half-bred stallions and mares. A good hunter is a more valuable horse for the breeder than a race-horse, which may prove a prize hereafter, but seldom remunerates the breeder for his risk and trouble.

The young stock are kept in rich and extensive pastures, where they have plenty of food and good water. The dry pastures on the limestone rock are peculiarly adapted to rear horses, the sound soil being very advantageous to the proper hardness of the hoof.

There was once a very large breed of sheep in the south-eastern part of the county, which bore heavy fleeces, and when killed often weighed from 50 lbs. to 60 lbs. the quarter. But the improved Leicester breed has nearly superseded them, as being more profitable, and fattening at an earlier age. There is a small and hardy species of sheep on the heaths and moors, which is similar to those found in other counties on the same description of land. They cost little to maintain, and produce little, but when fatted at four or five years old, the flesh is rich and delicate.

There are some very large fairs held in the county: the following are the chief:—

Durham fair, on the 21st of March; a great fair for horses, which continues a week; one of the principal horse-fairs in the north. On the Saturday before the 12th of May, cattle and horses, and hiring servants; Whitsun-eve, cattle, horses, sheep; 15th of September, horses and cattle; Darlington, first Monday in March, a great fair for cattle, horses, sheep; Whitsun Monday, ditto; Monday fortnight after Whit Sunday, cattle, sheep; Barnard Castle, Easter Monday, Whitsun Monday, Maudlin-day (2nd of August), cattle, horses; Bishop Auckland, Thursday before Ascension day; Corpus Christi day, Thursday before 10th of October; South Shields, 24th of June, 1st of September, holiday fair; Sunderland, May 13th, October 11th, ditto; Hartlepool, May 14th, November 27th; Stockton, July 18th, Monday after October 13th; Wolsingham, May 18th, September 21st.

There are weekly markets at Durham, Wolsingham, South Shields, Barnard Castle, Stockton, Bishop Auckland, Sunderland, and Staindrop.

Divisions, Towns, &c.—The county of Durham is a county palatine, *i. e.*, a county within which some lord had a jurisdiction 'as fully as the king had in his palace;' but a late Act of Parliament having transferred the palatinate jurisdiction from the bishop of Durham, by whom it was long held, to the crown, the distinction has been for most practical purposes abolished. Like the other three northern counties, Durham is divided, not into hundreds, but into wards: of these wards there are four, as follows:—

I. Chester ward, which occupies the northern part of the county: it is bounded on the north by the Tyne and Derwent rivers, on the east by the sea, on the south-east and south by the Wear, the Derness Beck, and a line drawn from the junction of the Hedley and Derness Becks to Shorngate Cross, on Cross Ridge. Above a fourth of the land in this ward is heath. II. Darlington ward, which extends from the boundary of Chester ward to the boundary of the county on the west and south: it is bounded on the east by an irregular line drawn from the junction of the Croxdale Beck with the Wear, to the junction of the Skerne and the Tees: a large proportion (four-ninths) of the land in this ward is heath. III. Easington ward, which is bounded on the north by Chester ward, on the west by Darlington ward, on the east by the sea, and on the south by a line drawn from Croxdale Beck eastward to the sea. IV. Stockton ward, which occupies the remaining portion of the county. Islandshire, Norhamshire, and Bedlingtonshire, which are usually termed 'the north bishopric,' are included in Chester ward: Craike is included in Stockton ward. Chester and Darlington wards are further subdivided into three divisions each, beside the outlying portions of the county which the former comprehends; Easington and Stockton into two divisions each. The area and population of these divisions are given in the population returns for 1831 as follows:—

		Statute, acres.	Inhabitants.
Chester ward.	Islandshire . .	26,820	8,183
,,	Norhamshire . .	18,810	3,744
,,	The remaining part .	158,060	88,878
		203,690	100,805
Darlington ward		282,480	55,904
Easington ward.	Durham city . .	10,260	10,135
,,	Sunderland town .	120	17,060
,,	The remaining part	77,120	47,321
		87,500	74,516
Stockton ward, including Craike .		105,860	22,685
Total of the county . .		679,530	253,910

The county includes one city, Durham on the Wear; seven borough towns, viz.—Auckland (Bishop), on the Wear in Darlington ward, pop. 2859: Barnard Castle, on the Tees, in Darlington ward, pop. 4430: Darlington on the Skerne, in Darlington ward, pop. 9417: Gateshead on the Tyne, in Chester ward, pop. 15177: Hartlepool on the Sea, in Stockton ward, pop. 1330: Stockton on the Tees, in Stockton ward, pop. 7763: and Sunderland, at the mouth of the Wear, in Easington ward. To these we may add the new parliamentary borough of South Shields on the Tyne, in Chester ward, pop. 18,756. Some of these are described elsewhere. [AUCKLAND, BARNARD CASTLE, DURHAM (CITY), GATESHEAD, SHIELDS (SOUTH), STOCKTON, and SUNDERLAND.] Of the remainder, as well as of the four market-towns of Sedgefield, Staindrop, Stanhope, and Wolsingham, an account is here subjoined.

Darlington is in a rich fertile country on the banks of the Skerne, 241 miles from London, and about 18 from Durham. The parish contains 7630 acres: it had, in 1831, 1347 inhabited houses and a population of 9417. The parish is subdivided into four townships, of which that of Darlington with Oxenhall, or Oxneyfield (3470 acres, 1192 inhabited houses and 8574 inhabitants) contains the town. Darlington is situated on the eastern slope of a hill, at the foot of which the river flows, and consists of a square market-place, of which the church forms the eastern side, and several streets, or as they are designated 'gates,' branching from it. A bridge of three arches over the Skerne, near the church, communicates with the Yarm and Stockton roads. The church, dedicated to St. Cuthbert, is a cross church with a central tower, surmounted by a light spire. It is very antient, except the east end of the chancel and the spire, which are modern: the interior also is so blocked up with modern screens and galleries that the shape of the church is very imperfectly seen. The general character of the architecture is early English, some portions so early as to appear almost of Norman character: the west end, where is the principal entrance, and the ends of the north and south transepts are fine compositions; the doors are plain but good. In the chancel are three stone stalls of a date considerably later than the walls of the chancel. The church was formerly collegiate; the principal clergyman was called dean. The college was dissolved in 1550, and the whole of the revenues vested in the crown, except a small stipend reserved for the officiating minister: the church lands, subject to some crown rents, are now vested in the duke of Cleveland, who is patron of the benefice, a perpetual curacy worth 274*l.* per annum. A former manor-house of the bishop of Durham is yet standing: after having been much neglected during the last century it was purchased of the see and converted into a parish work-house. The old toll-booth was removed and the present town-hall erected a few years ago. (Surtees's *Hist. of Durham.* London, 1823.) There are places of worship for Catholics, Methodists, and Protestant Dissenters.

The trade of Darlington is considerable: for a long period the principal manufactures were of camblets and other woollens: fifty years ago moreens and other like stuffs were made: the woollen manufacture was superseded in a great degree by that of linens, as huckabacks, diapers, sheetings, and checks; but this branch of industry has also experienced a declension, and the chief occupation of the inhabitants now is combing wool and making woollen yarn (which is applicable for imitation India shawls, Brussels carpets, &c.), spinning flax, grinding optical glasses, and founding iron. The market is on Monday for corn and provisions of all kinds; there is a great market for cattle every fortnight. The population of the town has increased considerably within the present century: in 1801 there were only 4670 inhabitants. The Darlington and Stockton railway has been already noticed. Darlington is a municipal borough by prescription: its privileges are at least as old as the 12th century: it is governed by a bailiff, who is appointed by the bishop: the limits of the borough comprehend only a part of the town.

The township of Darlington had, in 1833, one infant-school with 50 or 60 children; a well-endowed grammar-school, founded by Queen Elizabeth, containing 53 boys and 12 girls; a Lancasterian school of 148 boys with a lending library attached; two national schools with 266 boys and 240 girls, and a lending library attached; three day-schools, partly or wholly supported by charitable contributions, with 100 girls and 7 boys; eighteen other day-schools with 257 boys and 317 girls; five boarding and day-schools with [illegible]60 to 190 children of both sexes; a boarding-school for the sons of Catholic parents, with 43 scholars; and three Sunday-schools, one supported by Independents, with 70 boys and 50 girls, and two supported by Wesleyan Methodists for 282 boys and 306 girls. There are two sets of almshouses.

Between Darlington and the Tees are four round pools, popularly called 'Hell-kettles,' the three largest, which are near together, are nearly 120 feet in diameter and in depth 19½, 17 and 14 feet respectively: the fourth, which is some way from the others, is only 28 feet in diameter and 5 or 6 deep. In all of them the water stands to the brim, and is quite cold, but impregnated with sulphur, curdling with milk, and refusing to mix with soap. Leland mentions these pits, and says that it was conjectured that there was a subterraneous communication between them and the Tees; but as they are not affected by the floods or other variations of that river, the conjecture is now discredited.

Hartlepool is built on a small peninsula jutting out into the sea, a few miles from the Tees' mouth: the peninsula is partly formed by a pool, dry at low water, into which flows a small beck; this pool is called the Slake. In forming drains in it, human bones, trees, the wood of which was very perfect, stags' antlers, and teeth supposed to be deers' teeth, have been found. Hartlepool is in Stockton ward, 253 miles from London through Stockton. The parish comprehends an area of 840 acres, and had, in 1831, 275 inhabited houses and a population of 1330. The peninsula forms one of the most marked features of the eastern coast; the town, now much decayed, is on its south-western side near the entrance of the Slake. There appears to have been a monastery early founded here, of which St. Hilda was abbess: it is mentioned by Bede. It took its name from the island which Bede calls heoꞃꞇeu or heoꞃꞇea, Hart's Water or Pool. Henry of Huntingdon calls it Insula Cervi, 'Hart's Isle.' This monastery was destroyed in the invasion of the Northmen, or Danes. The Normans, when they came into possession of the place, called it Hart-le-pol, the pool or slake of Hart, whence the modern designation. It appears to have been early a harbour of some consequence, for in 1171 Hugh, earl of Bar, son or nephew to Hugh Pudsey, then bishop of Durham, brought his fleet with an armament of Flemings (forty knights with their retinues and five hundred foot soldiers), intended to assist William of Scotland in his invasion of England, into the bay of St. Hilda.

In the thirteenth century, the territory of Hartlepool seems to have been in the family of De Brus of Annandale, the Bruces of Scottish history. King John, by charter A.D. 1200, erected it into a borough, and granted to Robert de Brus a weekly market and a yearly fair. In the course of the thirteenth century the walls were erected, and a small haven of nearly twelve acres formed. The walls inclosed and defended the town and haven on every side, except where the abrupt cliffs on the eastern side of the peninsula rendered defence needless: fifty years ago, these walls exhibited an almost perfect and interesting specimen of the defences of former times: a considerable part of them still remains. The old haven is now quite disused: the present harbour is formed by a pier run out on the south side of the town: it is the only safe harbour between Sunderland and Bridlington, easily accessible in every wind to light vessels or to laden vessels under 100 tons, which ride secure from the storms most frequent and destructive on the eastern coast, and in moderate weather can sail out with all winds. The town rises from the edge of the old haven towards the town moor, which occupies a considerable part of the peninsula, and on which the burgesses have right of common. It consists of one principal and several smaller streets. Its general appearance, when the corporation commissioners visited it, was mean, and little trade was carried on; but they state in their report, 'Wet docks are now forming under the provisions of a local act, and railways are proposed to be made from the coal-fields in the neighbourhood of the town. The formation of docks will probably make this port a considerable one. The estimate of the cost of the works commenced is 220,000*l.* Within the last ten months 120 new houses have been built, and others are constantly being erected. Ground for building sells at from 10*s.* to 1*l.* per square yard.' From the demand for building-land the town moor is estimated to be worth 20,000*l.* There is a town-hall, a mean building, erected about the middle of the last century. The market is on Saturday. The inhabitants are chiefly engaged in fishing many tons of fish are salted for exportation. Hartlepool is a place of some resort for sea-bathing.

The church, dedicated to St. Hilda, is on an elevated site at the south-east end of the town. It is a large and curious building, chiefly in the early English style: the south door has some late Norman enrichments. The chancel has been shortened, and various modern alterations made. The tower on the west end is tolerably lofty, with an embattled parapet and crocketed pinnacles: it is supported by very large and bold flying buttresses. The benefice is a perpetual curacy, in the gift of the vicar of Hart (Hart is the mother church of Hartlepool), of the yearly value of 143*l.* There was formerly a monastery of Franciscan or Grey friars. What is now called the Friary is an old house built after the dissolution by those to whom the site was granted; but some traces of older masonry are visible in the fragments of walls which surround the friary. There are meeting-houses for Wesleyan Methodists and Ranters. The corporation is governed by a charter granted by Elizabeth. It is not enumerated in the schedules of the Municipal Reform Act.

There were, in 1833, two endowed day schools and three unendowed, containing in all about 230 children; and three Sunday-schools, with 380 or 390 children. One Sunday-school has a lending library attached.

The shore of the peninsula is marked by rocks or cliffs which do not exceed 40 feet in height, and by several caverns or excavations. One cavern may be explored for nearly 50 yards: there is a tradition that it communicated with the church. There are the remains of a breast-work on the town moor and of some batteries along the shore. There are two chalybeate springs near the town.

When De Brus declared his pretensions to the Scottish crown, his English possessions were forfeited, and the borough of Hartlepool was granted to the Clifford family, by which it was long held. It was plundered by the Scots in 1312, and again taken by them in 1315, a year after the battle of Bannockburn: on the latter occasion the inhabitants saved part of their property on board some vessels then in the harbour. Hartlepool furnished five ships and 145 seamen to the fleet of Edward III. before Calais. In the northern rebellion under the earls of Northumberland and Westmoreland, in the time of Elizabeth, Hartlepool was taken by the rebels. The Scottish army, which came to the aid of the parliamentarians in the civil war of Charles I., took Hartlepool in 1644: it was retained by them till 1647, when they evacuated it, and it was occupied by a garrison of parliamentarians. Mr. Romaine, a well-known theological writer, was born at Hartlepool.

Sedgefield is in Stockton ward, on the road from Stockton to Durham, 251 miles from London, 9 from Durham, and 9 from Stockton. The parish contains 17,480 acres: it is divided into seven townships. The township of Sedgefield, which comprehends the town with the hamlets of Layton, Sands, and Hardwick, has an area of 6220 acres: it had, in 1831, 309 inhabited houses, and a population of 1429; of which about half was agricultural. The population of the whole parish was 2178. Sedgefield is a small neat town, with the appearance rather of a handsome village, and stands on an eminence commanding an extensive prospect over the vale of Tees and the Yorkshire hills beyond. The church, dedicated to St. Edmund, is one of the handsomest in this part of the county: the date and style of the architecture are different in different parts: there are some curious early English piers with enriched capitals, and some Decorated windows. The tower is in the Perpendicular style, turreted, and with four pinnacles. The chancel is divided from the nave by a rich screen of old oak with three stalls on each side: the chancel is wainscoted with old oak, and stalled with seven seats on each side. The font is a handsome octagon of black marble. The churchyard is spacious and shaded with trees. The living is a rectory worth 1802*l.* per annum, with a glebe house, on the lawn in front of which are some fine evergreen oaks. The bishop of Durham is patron of the living. There is a range of almshouses near the church, founded in 1702 by Mr Thomas Cooper, for five poor men and as many poor women. The market is on Friday. There were in the township of Sedgefield, in 1833, one boarding and day-school, and seven day-schools, one endowed, containing in all about 270 children; and two Sunday-schools, with 150 children. The rest of the parish contained two day-schools (one endowed), with 36 children.

Staindrop is in Darlington ward, 247½ miles from London, about 7 miles to the right of the Glasgow and Carlisle mail-road, and about 19 miles from Durham. The parish contains 14,990 acres, and had, in 1831, 2395 inhabitants (besides some few who were included in the return from another parish); it comprehends six townships and part of a seventh. The township of Staindrop contains 1810 acres, and had in 1831 a population of 1478. Staindrop is an antient town situated in a beautiful vale, and was originally a royal demesne. Many of the houses are well built and chiefly form one wide street ranging east and west. Staindrop Beck runs at the east end of the town. The church, dedicated to St. Mary, is near the Beck; it is an antient fabric, consisting of a nave, side aisles, and chancel, with an embattled tower at the west end. The tower opens to the nave and south aisle; it is very plain. The church has some portions of early English character: the chancel has some good stone stalls and a fine monument in the Decorated English style: there is also in the church a rich monument of later date, to the memory of Ralph Nevill, earl of Westmoreland, and his wives. The church was formerly collegiate: the dwelling-place of the collegiate clergy and other beneficiaries was on the north side of the church. The revenues of the college were, at the dissolution, 170*l.* 4*s.* 6*d.* a year gross revenue, or 126*l.* 5*s.* 10*d.* clear. The market, which has been revived after long discontinuance, is on Saturday, for provisions: there is very little or no corn sold. The living is a vicarage united to the neighbouring rectory of Cockfield; their joint yearly value is 354*l.* with a glebe house; they are in the gift of the duke of Cleveland. There are congregations of Methodists and Independents at Staindrop. There were in the township of Staindrop in 1833 two infant or dame schools, with 40 children; seven day, or boarding and day-schools, with about 180 children, and three Sunday-schools with 230 children. The rest of the parish contained two day-schools (one partly supported by the duke of Bedford), containing nearly 60 children. Close to Staindrop is Raby Castle, the seat of the duke of Cleveland. The castle is on the east side of the park, which is very extensive. The principal part of the building was erected by John Nevill, earl of Westmoreland, in the fourteenth century; one part is even more antient. Many alterations have been made in the castle by subsequent possessors, but they have not materially affected its outward form, the general effect of which, from its extent, grandeur, and preservation, is very imposing. Its situation is fine: it occupies a rising ground, with a rocky foundation, and is inclosed with an embrasured wall and parapet. In this outer wall there is only one entrance, a gateway defended by two square towers. Several of the smaller apartments have been hollowed out in the walls, which are of great solidity and strength. This castle was the residence of the powerful family of the Nevills, earls of Westmoreland; but on the rebellion raised by the last of that family against Elizabeth his estates were forfeited. They afterwards came by purchase to Sir Harry Vane, from whom they have descended to the present owner. Many parts of the pleasure-grounds command extensive and beautiful views.

Stanhope is in Darlington ward, 262 miles from London, by a road which enters the county at Pierce Bridge, and runs through West Auckland and Wolsingham to Stanhope, and on to Aldstone Moor, in Cumberland. The parish, which comprehends 55,030 acres, is one of the largest in England: it had in 1831 a population of 9541. It is divided into four townships, of which Stanhope quarter township, in which is the town, comprehends an area of 13,010 acres, and had in 1831 233 inhabited houses and a population of 2080, chiefly engaged in the lead mines. The town is on the northern bank of the Wear. The church, dedicated to St. Thomas, is on a rising ground on the north side of the town; it is a plain and antient building. On the west side of the town is an eminence called the Castle Hill, rising to the height of 108 feet perpendicular from the bank of the Wear. The summit is of an oblong figure, thirty paces wide, divided by a ditch into two irregular parts; another ditch defends the acclivity on the north and east; the summit is supposed, from foundations discovered many years since, to have been once surrounded by a wall of ashler work strongly cemented. The tradition is that it was a fortress of remote origin demolished in an incursion of the Scots. At a short distance from the town on the west is a spacious old building called Stanhope Hall, once the manor-house of the Featherstonehaugh family. The market is on Friday: there were two annual fairs, but they are disused. The living is a rectory in the gift of the bishop of Durham, of the yearly value of 4848*l.*, with a glebe-house. There were in the whole parish in 1833 one endowed day-school, with nearly 40 children; one national school, partly endowed, with 60 children; two day-schools, partly supported by endowment and subscriptions, with 136 children; and two other day-schools unendowed, with 115 children; five day and Sunday-schools, with nearly 500 children; and four Sunday-schools with 282 children. Several of the schools had lending libraries attached. Near the town on the north side is a remarkable cavern, said to be a mile long, and to abound with stalactites.

Wolsingham is in Darlington ward, 256½ miles from London on the road to Stanhope and Aldstone Moor. The parish comprehends an area of 24,780 acres, and had in 1831 439 inhabited houses, and a population of 2239. The town is pleasantly situated on a point of land formed by the confluence of the Wear and the Wescrow, on the north side of the former river. The church, dedicated to St. Mary and St. Stephen, is on the north side of the town, but has nothing remarkable about it: near it are the remains of a considerable building, supposed by some to have been part of a monastery founded by Henry de Pudsey; by others to have been an antient manor-house of the bishops of Durham. The market is on Tuesday, for butcher's meat, butter, potatoes, and corn. The quantity of corn sold is not great, but the prices are commonly as high as any in the county. It is chiefly for the supply of the lead-mine district, which commences between this town and Stanhope. The district is easily recognized by the large parcels of lead lying near the sides of the road, and by the blue unwholesome vapours which proceed from the smelting-houses. The views down the Wear from the hill above Wolsingham are very extensive and much diversified. The living of Wolsingham is a rectory in the gift of the bishop of Durham, of the yearly value of 791*l.*, with a glebe-house.

There were in Wolsingham parish in 1833 one school, partly supported by endowment, with 52 children; another, partly supported by charitable contributions, with 28 children; a third supported by a private benefaction, with 48 children; these were all day-schools, and there were six other day-schools, with 144 children; there were also three Sunday-schools, with 130 children. There is a Baptist congregation in the parish. Wolsingham parish is divided into seven 'quarters,' or hamlets.

Beside the above market-towns, Hutchinson (*History of Durham*, 4to., Carlisle, 1794, vol. iii. p. 285) speaks of a market being held at the chapelry of St. John, in Weardale. The chapel of St. John is on the south side of the Wear, about seven miles from Stanhope, on the road to Aldstone Moor: it is a handsome building, rebuilt several years ago by Sir Walter Blacket. The benefice, which is a perpetual curacy, worth 186*l.* a year, is in the gift of the rector of Stanhope, or rather the inhabitants nominate and the rector approves. The market, which is on Saturday, was established for the benefit of the miners, of whom, when Hutchinson wrote, 800 were employed in the neighbourhood, and the number has probably increased since. The valley of the Wear is here deep and narrow; there is a stone bridge of one arch over the river.

Beside the market-towns, there are in the county several villages of sufficient importance, historical or commercial, to require notice.

Chester-le-Street is on the high north road between Durham and Newcastle-upon-Tyne, six miles from Durham, and eight and a half from Newcastle. The parish comprehends an area of 31,260 acres: it is mostly in Chester ward, to which it gives name, but extends into Easington ward: its population in 1831 was 15,478. It is divided into several chapelries or townships, of which the principal, with their areas and population in 1831, are as follows:—Chester-le Street (chapelry), 2940 acres, 1910 inhabitants; Tanfield (chapelry), including Beamish and Lintz Green (townships), 6760 acres, 2498 inhab.; Birtley (township), 1480 acres, 1520 inhab.; Harraton (township), 2090 acres, 2171 inhab.; Lamesley (chapelry), 3390 acres, 1910 inhab.; and Great Lumley (township), 1730 acres, 2301 inhab.; the last, with the two smaller townships of Lambton and Little Lumley, is in Easington ward; the others in Chester ward.

The name of Chester-le-Street gives this place a two-fold claim to be considered a Roman station; yet neither the name nor the exact site of the station (which some would remove as much as a mile from Chester) has been determined. The Saxons called Chester, from the name of the brook, Cone, which flows past it, Coneceastre, or Cuneceastre: it became A.D. 882 the seat of the bishopric, which was removed hither from Lindisfarne, and it retained its episcopal rank until 995, when a Danish invasion drove away the bishop and his clergy, who afterwards settled at Durham. The church, after losing its rank as a cathedral, became first rectorial, afterwards collegiate: the manor has been constantly vested in the see of Durham. The revenue of the college at the dissolution was 77*l.* 12*s.* 8*d.* The present village extends nearly a mile along the north road; another more irregular line of houses runs along the brook at right angles to the main street. The church consists of a nave with side aisles, a chancel, and a tower at the western end, surmounted with a lofty spire rising to the height of 156 feet from the ground. The lower part of the tower is of Early English, with a Perpendicular west door and window of later insertion, and with massy buttresses: the upper part of the tower, which is of later date, is octagonal; it has an embattled parapet and four pinnacles; the spire is also octagonal. The interior of the church and many of the windows have been modernized: there are some remains of painted glass: the north aisle contains the monuments of the Lumley family: there are fourteen altar tombs with as many stone effigies, mural tablets, &c. The living is a perpetual curacy, worth 377*l.* per annum. The deanery-house, so called as being built in place of the former residence of the dean of the collegiate church, is a handsome brick house; there are no vestiges of the antient buildings.

Lumley Castle, in the township of Great Lumley, is on a fine gradual elevation above the Wear. It is a quadrangle of yellow freestone, with an open court or area in the centre, with four uniform towers. It is an antient building, and the east front retains its former magnificence: a noble gate-house projects from the centre, with overhanging turrets: this front overhangs a ravine through which the Lumley Beck flows; on the west and south the ground slopes gradually down to the Wear. The castle was probably built in the latter part of the fourteenth century. The pictures are chiefly portraits of the antient family of the Lumleys. The village of Great Lumley is a mile and a half from Lumley Castle. It contains an almshouse or hospital for twelve poor women, founded in 1686 by John Duck, alderman of Durham.

Lambton Hall, the seat of the earl of Durham, was built in 1797 on the site of the old house of Harraton, the former seat of the Hedworths: the grounds are pleasant, but the building displays many incongruities. Ravensworth Castle, the seat of Lord Ravensworth, is a modern building: its style is varied, being a selection from the castle architecture of different periods, not too remote however to be brought into contact. The park includes a heronry. In a private road near the castle there is a cross with a plain shaft and pedestal.

Lamesley and Tanfield chapels are modern buildings. Besides the noblemen's seats already mentioned, the parish contains the residences of several of the gentry.

There were in the whole parish in 1833 seven day-schools with 243 children, wholly or in considerable part supported by endowments or other charitable contributions; forty-seven other day-schools with 1325 children; and fourteen Sunday-schools with 1220 children. Three of the endowed schools are Sunday-schools also, and are attended by more children on Sunday than in the week. Two schools have lending libraries attached. There are several congregations of Wesleyan Methodists in the parish.

Jarrow, or Yarrow, is between Newcastle and South Shields: the church is 8 miles from Newcastle, and 2½ from Shields; but when the tide is out a mile may be saved between Jarrow and Shields by crossing 'the Slake,' a recess in the south bank of the Tyne, dry at low water. The parochial chapelry of Jarrow is tolerably extensive, comprehending 8640 acres, and having in 1831 a population of 27,995. It is in Chester ward. It is divided into five chapelries or townships; two of which, the townships of South Shields and Westoe, constitute the parliamentary borough of South Shields. Of the remaining three divisions, Harton township contained in 1831 1000 acres and 217 inhabitants; Jarrow, with Monkton chapelry, 3690 acres and 3598 inhabitants; and Heworth chapelry 2190 acres and 5424 inhabitants. The parish of Jarrow antiently extended across the Tyne, and comprehended a portion of Northumberland; but all connection with this part has long ceased.

Jarrow was very early the seat of a monastic establishment of the Benedictine order. An inscription stone states that the original church was founded A.D. 685. The monastery was established A.D. 681, by Benedict, a noble Saxon, who had previously founded the monastery of Monk Wearmouth, and the fabric was completed four years afterwards. Jarrow derives its chief interest from its connection with the Venerable Bede [BEDA], whose birth is fixed by an antient and probable tradition at the hamlet of Monkton, which nearly adjoins Jarrow. In A.D. 870 the monastery was burned by the piratical Northmen, or Danes, but rising from its ruins, was again destroyed in the ravage of the country north of the Tyne by William the Conqueror, A.D. 1070. It again revived, but in A.D. 1083 William, bishop of Durham, removed the monks to Durham, and reduced Jarrow to the condition of a cell to the Benedictine monastery of St. Cuthbert there. Its yearly revenues at the dissolution were valued at 40*l.* 7*s.* 8*d.* gross, 38*l.* 14*s.* 4*d.* clear The site of the monastery is near the western side of 'the Slake,' not far from the bank of a small beck which flows into the Tyne. Many ruins of the monastery still remain, but they are so scattered and confused that it is difficult to form a conjecture as to the original appearance and the arrangements of the convent, or even to distinguish them from the remains of a lay mansion that was erected upon its ruins. The church adjoins the centre of the monastic buildings immediately on the north. The tower rises from the centre of the church, between the nave and the chancel. The church was rebuilt, with the exception of the tower and part of the church, in 1783. The tower retains some curious Norman features. It has round-headed double lights on every side. A rude oaken seat, which appears to have been hewn out with an axe, is exhibited in the vestry as Bede's chair: the boards which form the back are modern; the rest is doubtless very antient. Roman inscriptions and pavements have been dug up near Jarrow, and it is conjectured, from the appearance of some of the stones, that the church and monastery were partly constructed of the fragments of a Roman building. There are large coal works at Jarrow: a row of houses for the colliers extends nearly a mile to the west of the church. The living is a perpetual curacy of the annual value of 197*l.* The chapelry of Monkton and Jarrow contained in 1833 nine day-schools, with 289 children; and five Sunday-schools, with 505 children.

Heworth is a chapelry in the parochial chapelry of Jarrow: it contains an area of 2190 acres; and had, in 1831, a population of 5424: it is divided into Upper and Nether or Low Heworth. The chapel at Low Heworth is a modern building, but probably occupies the site of one not less antient than the church at Jarrow. Some very antient coins of the Saxon kingdom of Northumberland were some years since dug up in the chapel-yard. One corner of this chapel-yard contains a monument, a neat plain obelisk, nine feet high, fixed on a stone base, to the memory of ninety-one persons killed in the explosion of Felling colliery, 1812. There is a parish school-house, built by subscription in 1815; this school contained in 1833 131 children. There were at the same time eleven other day-schools, with 351 children, and five Sunday-schools, with 556 children. At Heworth Shore on the Tyne are manufactories of Prussian blue and other colours, one for coal tar, and an establishment for preparing alkali for soap boilers; also ship-building yards, a pottery, a glass-house, a lead refinery, wharfs for grindstones, a brown paper mill, an establishment for preparing fish oil from the blubber brought by the Greenland ships, &c. Freestone of an open porous character, called from its excellence in enduring a strong heat, firestone, is quarried at High Heworth.

Winlaton is a manufacturing village between the Tyne and the Derwent. The township of Winlaton in the parish of Ryton in Chester ward comprehends an area 4540 acres, and had in 1831 a population of 3951 persons. Sir Ambrose Crowley, an alderman of London, established here about 1690 the extensive iron works which still bear his name. Sir Ambrose seems to have been peculiarly anxious for the well-being of his workmen, establishing regulations for their guidance, appointing a court of arbitrators to settle disputes, establishing schools, providing medical attendance for the sick, and advancing money to them, pensioning the superannuated, and providing for the families of the dead. All his charities, however, ceased in 1816. A chapel was built at Winlaton in 1705, as it is said, on the foundation of one destroyed in the rebellion of the northern earls against Elizabeth. The chapel was abandoned by the company carrying on the iron works, and having gone to decay was pulled down in 1816, and a national school-room built in its place, in which the rector of Ryton or his curate voluntarily performs service. There were in 1833 two national schools with 190 children, seven other day-schools with 239 children, and two Sunday-schools with 100 children.

Middleton in Teasdale is in Darlington ward: it lies on the north bank of the Tees, on the road from London to Haltwhistle. The whole parish comprehends an area of 38,410 acres, of which the township of Middleton includes 9750 acres. The village is situated among hills, and extends in somewhat an oval form round a spacious green. Almost every house is used for the sale of liquors or of some kind of goods. The inhabitants (who, in 1831, were 1824 for the township, or 3714 for the whole parish) are chiefly engaged in the numerous lead mines near. The church is small, but antient: the living, a rectory in the gift of the crown, is said to be worth 1500*l.* per annum: it does not appear to have been included in the return laid before parliament of the revenue of the church. Some of our authorities assign to this place a weekly market held on Thursday: it is probably a customary market. The township contained, in 1831, one endowed day-school, with 50 children; two unendowed day-schools, with 45 children; one day and Sunday-school, with 150 day or 180 Sunday scholars, supported by the Lead Company, who oblige their work-people to send their children either to this school or to some other. There is a considerable library attached to this last school, containing a variety of useful works, which are lent gratuitously to those of the scholars or of the workmen who desire to have them.

Houghton-le-Spring is in Easington ward, on the road from Durham towards Sunderland, 7 miles from Durham. The whole parish, which is divided into 18 townships or chapelries, contained, by the returns of 1831, 14,560 acres, and 20,524 inhabitants; of which 1220 acres and 3917 inhabitants were in the township of Houghton-le-Spring; 1590 acres and 5887 inhabitants in that of Hetton-le-Hole; 1310 acres and 2539 inhabitants in the chapelry of Painshaw; and 1460 acres and 2198 inhabitants in the township of Newbottle.

The village of Houghton is irregular and nearly half a mile long, at the head of a fine vale, sheltered on the north and east by limestone hills. It contains several handsome buildings. Houghton Hall is a heavy mansion, built probably in the reign of Elizabeth or James I., in the later Gothic style. The church is large, in the form of a cross, with a square tower, springing from four arches at the intersection of the transepts and nave. Some portions of the church are in the Early English, and some in the Decorated style: the east and west windows have fine Decorated tracery. The church contains the monument of Bernard Gilpin, some time rector of Houghton, 'the Apostle of the North,' and one of the most pious of the English church reformers: it is an altar tomb with pannelled sides, and a good specimen of the mixture of Gothic and Italian forms. The living is a rectory, in the gift of the bishop of Durham, of the yearly value of 2157*l.*, with a glebe-house. On the north-east side of the churchyard, on a rising ground, is the grammar school founded by the exertions of Bernard Gilpin with the aid of some friends; and in the churchyard to the south of the school-house an almshouse for six poor people. Houghton had, in 1833, one boarding-school with 45 boys; nine day-schools, one a charity school with 38 girls; another a national school with 300 boys; the seven other day-schools had nearly 200 children; and three Sunday-schools with 656 children. The grammar school is not distinguished in the Parliamentary Returns from other schools.

Hetton-le-Hole is a mile or two south of Houghton-le-Spring. The increase of the population between 1821 and 1831, when it rose from under 1000 to nearly 6000, was owing to the extension of the collieries, which in 1831 gave employment to nearly 1800 men and boys, of whom above 1000 were upwards of twenty years old. There were at Hetton, in 1833, one day and Sunday-school with 68 day scholars and nearly 330 Sunday scholars; fourteen other day-schools with nearly 700 children, and two Sunday-schools with above 300 children.

Painshaw or Penshaw lies at some distance north of Houghton, on the banks of the Wear, at the western foot of a conical hill, Painshaw Hill: it is almost entirely occupied by persons connected with the collieries and stone quarries, the opening of which latter occasioned a considerable increase of population from 1821 to 1831. There is a chapel of ease, a plain convenient building, the minister of which is appointed by the rector of Houghton.

Newbottle is between Houghton and Painshaw. It is on a high exposed situation. A little to the north below the brow of the hill is Philadelphia Row, a group of houses entirely occupied by the colliers of the neighbouring pits. There is a considerable pottery at Newbottle. The population rather decreased from 1821 to 1831, from the decline of the collieries in the township.

Monk Wearmouth and Bishop Wearmouth are included in the parliamentary borough of Sunderland; and the parochial chapelry of Tweedmouth in Islandshire, which comprehends an area of 4520 acres, and had in 1831 a population of 4971 persons, may be considered as a suburb of Berwick-upon-Tweed in the parliamentary limits of which it is included. [BERWICK-UPON-TWEED, SUNDERLAND.]

Divisions for Civil and Ecclesiastical purposes. The county of Durham is in the diocese of Durham and in the ecclesiastical province of York. It constitutes an archdeaconry, which is subdivided into the deaneries of Chester-le-Street, Darlington, Easington, and Stockton. Of the outlying portions of the county, Islandshire, Norhamshire, and Bedlingtonshire are in the archdeaconry of Northumberland, except the parochial chapelry of Ancroft in Islandshire, which is in the archdeaconry of Durham. Craike is in the peculiar jurisdiction of the bishop of Durham. The number of parishes, as we gather from the population returns compared with the 'Clerical Guide,' is 60; of which 33 are rectories, 21 vicarages, and 6 perpetual curacies. The richer benefices are among the wealthiest in any part of England. Besides the 60 parishes, there are 15 parochial chapelries; and by the subdivision of these or the parishes, 24 district chapelries have been formed.

Some of the parishes and parochial chapelries are of great extent. Stanhope parish comprehends 55,030 acres or 86 square miles: Auckland, St. Andrew 45,470 acres or 71 square miles; Lanchester 41,890 acres or 65 square miles; Middleton in Teasdale 38,410 acres or 60 square miles; Chester-le-Street 31,260 acres or 49 square miles; Wolsingham 24,780 acres or 39 square miles; Gainsford 24,370 acres or 38 square miles; Brancepeth 21,850 acres or 34 square miles; besides eleven others, ranging from 10,000 to 20,000 acres, or from 15½ to 31 square miles, and several which approach 10,000 acres.

Durham is included in the northern circuit. The assizes and the quarter-sessions are held at Durham, where stands the county gaol and the house of correction.

Before the Reform Act there were four members returned to parliament from this county, two for the county itself and two for the city of Durham. By the Reform and Boundary Acts the county was formed into two divisions, each returning two members. The northern division includes Chester and Easington wards; the principal place of election is Durham, and the polling stations are Durham, Sunderland, Lanchester, Wickham (or Whickham), Chester-le-Street, and South Shields. The southern division comprehends Darlington and Stockton wards; the principal place of election is Darlington, and the polling stations are Darlington, Stockton, Bishop Auckland, Stanhope, Middleton in Teasdale, Barnard Castle, and Sedgefield. By the Reform Act two members were given to Sunderland, including part of the parishes of Monk Wearmouth and Bishop Wearmouth; and one member each to Gateshead (including part of the chapelry of Heworth in the parochial chapelry of Jarrow) and South Shields, including the townships of South Shields and Westoe in the parochial chapelry of Jarrow.

History and Antiquities. At the time of the Roman invasion the main part of the county of Durham was included in the territory of the Brigantes (Βριγαντες Ptolemy), a powerful tribe who occupied the northern part of the island from the Mersey to the Tyne; the outlying portions, Islandshire, Norhamshire, and Bedlingtonshire, were included in the territory of the Ottadini (Οταδηνοι Ptolemy), whose country extended from the Tyne to the Forth. The Brigantes were subdued by Cerealis and Agricola, and the Ottadini by Agricola; but no incidents have been recorded of their subjugation which are peculiarly connected with this county

The main part of the county remained in the possession of the Romans until they finally withdrew from the island, being defended by the wall of Hadrian or Severus, which extended from sea to sea across Northumberland and Cumberland; the outlying portions being beyond the wall, were occupied by the Romans or not, as circumstances, or the character of the emperor, or the commander in the island, dictated. The notices of the district by the antient geographers are scanty. We gather from the Itinerary of Richard of Cirencester that the Tees was known to the Romans as the Tisa, the Tyne as the Tina, and the Tweed (which borders Norhamshire) as the Tueda; and from Ptolemy, that the Wear (Horsley will have the Tyne) was known as the Vedra. The Romans had several stations within the county. Vindomora and Vinovium, mentioned in the first Iter of Antoninus are fixed by antiquarians at Ebchester on the Derwent, and Binchester, near Bishop Auckland.

In Jeffreys' large map of Durham the Epiacum of Richard (which is placed by most at Lanchester) is fixed at Ebchester, with which both the name and the distance from Vinovium in Richard's Itinerary seem best to agree: in the same map the Longovicum of the Notitia is fixed at Lanchester, where Horsley proposes to place the Glanoventa of Antoninus. Ad Tisam, mentioned by Richard, is fixed at Pierce Bridge on the Tees. Gateshead was considered by Camden to be the Gabrosentum of the Notitia, which others place at Drumburgh near Carlisle; and Bremenum had been fixed at Monk Wearmouth; but this position is not to be reconciled with Ptolemy's mention of it. Perhaps there are few parts of the island of which the Roman topography is more obscure. Roman antiquities have been found at Chester-le-Street (coins), from whence Roman roads may be traced leading northward towards Newcastle-upon-Tyne, and southward to Binchester near Auckland; at Coniscliff or Conscliffe, near Pierce Bridge (an altar); Old Durham, near Durham city (coins); at Lanchester (inscriptions, coins, and other antiquities); at Pierce Bridge (coins, the traces of an aqueduct, foundations of houses, and other marks of a station); at South Shields (an inscription indicating that a Roman town or station was fixed here in the time of Marcus Aurelius); at Stanhope (an altar); at Thornton, near Darlington (an urn with coins, chiefly of Constantine and his sons); at Monk Wearmouth (coins); at Whitborn Lizard (coins). Reynolds' *Iter Britanniarum*, Cambridge, 1799.

In the establishment of the Saxon Octarchy, Durham was probably included in the kingdom of Deira, the southernmost of the two which are frequently comprehended under the general name of Northumberland. When Oswald, who united the two kingdoms under one sceptre, wished to introduce or rather revive Christianity, Aidan, a monk of Iona or elsewhere in Scotland, who had come as a missionary (A.D. 634), fixed his residence at Lindisfarne, or Holy Island, and established a monastery and a bishopric there. The seat of the Northumbrian bishopric was afterwards (A.D. 664) removed to York; but when, in 678, Northumberland was divided into two dioceses, Lindisfarne recovered its episcopal rank; and its diocese was permanently severed from that of York. Shortly after this time the see of Hexham was created, the diocese being severed from that of Lindisfarne. As the ravages of the Danes, towards the close of the ninth century, rendered Lindisfarne an insecure abode, the bishop and clergy forsook it (about A.D. 875), and, after they had wandered about for seven years, the seat of the bishopric was fixed at Chester-le-Street, where the foundations of a cathedral were begun. In the reign of Ethelred II. the ravages of the Danes were renewed, and the bishop and clergy leaving Chester-le-Street (A.D. 995), as deeming it insecure, removed first to Ripon, in Yorkshire, and afterwards to Dunhelm, now Durham, where the see has been fixed ever since. Lindisfarne, deserted by the bishop, was afterwards bestowed upon the Benedictine monastery of Durham, to which it became a cell. Its yearly revenues at the dissolution were valued at 60*l.* 5*s.* gross, or 48*l.* 18*s.* 11*d.* clear. The ruins of the conventual church still remain: the north and south walls, and great part of the west wall, are still standing: the east wall has fallen in. It has been a very magnificent building, in the Norman style. The length of the body of the church is one hundred and thirty-eight feet, the breadth eighteen, and with the two aisles thirty-six; but it may be doubted whether there ever was a transept. The stones appear red with fire, and on the south side of the chancel are honeycombed by the weather.

Upon the invasion of England by William the Conqueror, Egelwin, bishop of Durham, took the oath of allegiance at York to William, who had advanced into the north to crush the threatened resistance of the earls Morcar and Edwin. Robert Comyn, a Norman noble, to whom William had committed the charge of the entire subjugation of the north, having entered the city of Durham with his troops (seven hundred men), in 1069 or 1070, was overpowered by the population of the surrounding country, and cut off with all his men: the cathedral narrowly escaped destruction in this tumult. William, enraged at the disaster, advanced in person with his army, and laid waste the country with the most savage ferocity.

For sixty miles between York and Durham he did not leave a house standing, reducing the whole district by fire and sword to a horrible desert, smoking with blood and in ashes. He did not spare even the churches and monasteries. The ecclesiastics fled from Durham at his approach, and retired to Lindisfarne. A dreadful famine ensued, and a mortality not equalled in the annals of the country; the inhabitants were reduced to eat the flesh of horses, dogs, and cats, and at last even human carcases. The lands lay untilled for nine years, infested by robbers and beasts of prey; and the poor remnant of the inhabitants spared from the sword died in the fields, overwhelmed with want and misery. The treasures of the church, except those which the bishop carried away in his flight, were plundered either by the Normans or by Gospatric, who had purchased of William the earldom of Northumberland. The ravages of the conquerors were carried forward from the Wear to the Tyne, and the monastery of Jarrow was burned. Soon after William withdrew, the Scots, under their king Malcolm, invaded the north of England, routed the men of Teasdale, who opposed them near Eglestone, and burned Wearmouth monastery and Hartlepool. Egelwin, bishop of Durham, was one of those who endeavoured to organize in the Isle of Ely an opposition to William; but being taken prisoner, was cast into prison, where he died from famine or a broken heart. He was succeeded in the see A.D. 1072 by Walcher, a native of Lorraine, who seems to have been the first bishop that possessed the palatine jurisdiction so long exercised by his successors. Walcher, or those who acted under him, having provoked the indignation of the people by their oppressive conduct, the bishop was surrounded by a tumultuous assembly at Gateshead, and taking refuge in the church, the building was fired, and the bishop attempting to escape, was put to death in 1080. The insurgents got possession of the city of Durham; but having in vain attempted to make themselves masters of the castle, were obliged to disperse in order to avoid punishment. To revenge this popular outbreak, the country was again laid waste by an army under Odo, bishop of Bayeux, half-brother of William. The next but one in succession to Walcher was Ralph Flambard, in whose episcopate the diocese suffered diminution by the erection of the see of Carlisle; and the diocese of Hexham, which on the failure of its own bishops had been annexed to Durham, was taken from that diocese and annexed to York. For some years following 1140 the diocese was thrown into disorder by the usurpation of the see by one Cumin, a priest, a native of Scotland, who attempted to hold it in opposition to the regularly-appointed bishop. After a desultory warfare Cumin submitted.

In the year 1312 the Scots invaded the county of Durham, burned the suburbs of Durham, and plundered Hartlepool. They again invaded the county after the battle of Bannockburn, and for a third and fourth time in 1316 and 1317. Famine and pestilence followed the ravages of war, and the country became more desolate than at any time since the great Norman devastation. Marauders infested the country; and Lewis Beaumont, bishop elect (A.D. 1317 or 1318), was carried off by a party as he was proceeding to Durham to be installed.

In the beginning of the reign of Edward III. the Scots invaded the country, and took possession of the mountainous tract of Weardale; but the approach of the king with an army prevented them from penetrating into the more level districts of the eastern coast. In the year 1342 there is reason to think that they again invaded the country; and in 1346, under the conduct of their king David, they crossed the Tyne and the Derwent, and encamped about three miles from the city of Durham. Edward was in France; but the northern nobles and prelates collected a powerful army, and the battle of Nevill's Cross terminated in the defeat of the Scots and the captivity of David.

Durham does not appear to have been the scene of any remarkable event in the war of the Roses. The Yorkists, under the Marquis of Montacute, marched across it to attack the Lancastrians before the battle of Hexham. In the invasion of England by James IV. of Scotland, who favoured the cause of Perkin Warbeck, Norham Castle was besieged by the king; but when reduced to the last extremity, was relieved by the approach of the earl of Surrey with an army.

At the time of the Reformation the see of Durham was held by Cuthbert Tunstall, a man honourably distinguished in that persecuting age by his mildness and forbearance. He was imprisoned and deprived of his bishopric under Edward VI., the ample endowments of the see forming probably a greater inducement to his persecutor (Dudley, earl of Northumberland) than his steady adherence to the Catholic discipline. He was restored under Mary, but finally deprived after the accession of Elizabeth. The inhabitants of the northern counties were much attached to the antient church, and afforded full exercise to the laborious zeal of Bernard Gilpin and other Reformers. The religious establishments were not however richly endowed, with the exception of the priory at Durham. Kypen and Sherburn hospitals, which were among the wealthiest, had each considerably less than 200*l.* a year gross revenue. In the rebellion of the earls of Northumberland and Westmoreland in support of the Catholic faith, they found little difficulty in raising a tumultuous force, with which they entered Durham, tore and trampled under foot the English Bibles and prayer-books, and celebrated mass in the cathedral; and while a detachment occupied Hartlepool, the main body marched southward into Yorkshire. On the advance of the royal army under the earl of Sussex the insurgents retreated to Raby, and after losing some time in besieging Barnard Castle, which they starved into a surrender, they were obliged to disperse, the two earls escaping into Scotland. Northumberland was afterwards delivered up to the English and beheaded; Westmoreland escaped over sea, and entered into the service of the king of Spain. In the latter part of Elizabeth's reign the northern counties were much afflicted by a pestilence which broke out every year in some part or other. In 1597 the city of Durham suffered very severely.

In 1633 Charles I. visited the county, and was entertained by the bishop at his castle of Durham: again in 1639, on occasion of his progress northward to oppose the Scots, he received similar hospitality. When the Scots invaded England, in 1640, they crossed the Tyne into this county, Lord Conway, who commanded the king's troops, retreating first to Durham and afterwards to North allerton, in Yorkshire. By a convention which followed, the county was for some time heavily taxed for the payment of the Scottish army. When the civil war broke out in 1642, the earl of Newcastle formed the four northern counties into an association for the king's service. This county was not the scene of any remarkable incident in that war. The Scotch army entered England in 1644, in order to support the Parliamentarians. They were opposed by the Royalists; but though several skirmishes were fought in the country, no serious encounter took place, and the marquis of Newcastle being obliged to march into Yorkshire to sustain the royal cause there, Durham came into the hands of the Parliamentarians.

During the Commonwealth the see was dissolved; but upon the restoration of Charles II. it was re-established, and bestowed on Bishop Cosins, who distinguished himself by the munificent use he made of his large revenues. The local history of the county since the Restoration is not marked by any interesting features.

STATISTICS.

Population.—Durham is one of the principal counties in which coal is raised: it does not rank very high as an agricultural county, being the thirty-ninth on the list in that respect. Of 59,045 males twenty years of age and upwards living in Durham in 1831, there were 11,329 engaged in agricultural pursuits, 2,547 in manufactures or in making manufacturing machinery, and 19,473 labourers employed in labour not agricultural. Of those engaged in manufactures, 550 were employed in stuff and carpet-making at Barnard Castle and in the city of Durham; about 500 were employed in the making of glass, especially glass bottles, at Gateshead, South Shields, Bishop's Wearmouth, Heworth, and Southwick; 350 in weaving linen and flax-dressing at Stockton and other places; 150 in iron works at Bedlington and at Bishop's Auckland; 150 in making engines, moulds, and patterns, chiefly at Birtley and Sunderland; 70 in woollen manufacture at Shildon and Walsingham; the remainder were employed in the manufacture of earthenware, sailcloth, &c., at various places.

The following exhibits a summary of the population, taken at the last census, 1831, showing the number of the inhabitants and their occupations in each ward of the county:—

WARDS, &c.	HOUSES.				OCCUPATIONS.			PERSONS.			Males twenty years of age.
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.	
Chester Ward, three divisions . .	14,186	19,884	129	621	1,963	6,414	11,507	42,284	46,594	88,878	19,779
Darlington Ward, three divisions .	9,203	11,189	50	350	2,759	4,057	4,373	27,978	27,926	55,904	14,077
Easington Ward, two divisions . .	8,011	9,894	130	285	1,214	3,393	5,287	23,279	24,042	47,321	11,265
Stockton Ward, two divisions . .	4,402	4,841	13	127	1,559	1,579	1,703	10,856	11,829	22,685	5,716
Islandshire . .	1,209	1,451	4	69	347	356	748	3,814	4,369	8,183	1,711
Norhamshire . .	697	728	10	39	355	150	223	1,811	1,933	3,744	885
Durham (city) .	1,288	2,271	5	30	203	1,180	888	4,547	5,588	10,135	2,375
Sunderland (town)	1,744	4,478	4	49	8	1,382	3,088	7,179	9,881	17,060	3,237
Totals . . .	40,740	54,736	345	1,570	8,408	18,511	27,817	121,748	132,162	253,910	59,045

The population of Durham, at each of the four enumerations, was—

	Males.	Females.	Total.	Inc. per cent.
1801	74,770	85,591	160,361	
1811	83,671	93,954	177,625	10·76
1821	99,100	108,573	207,673	16·91
1831	121,748	132,162	253,910	22·22

Showing an increase between the first and last periods of 93,539 persons, or 58⅓ per cent., which is 2⅓ per cent. beyond the general rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of—

1801	were £51,966,	which was	6*s.* 5*d.*	for each inhabitant.
1811	„ 81,752	„ „	9*s.* 2*d.*	
1821	„ 91,182	„ „	8*s.* 9*d.*	
1831	„ 81,862	„ „	6*s.* 5*d.*	

The sum expended for the same purpose in the year ending the 25th March, 1836, was 65,392*l.*; and if it be assumed that the population has increased at the same rate of increase since 1831 as in the ten preceding years, the above sum gives an average of not quite 4*s.* 8*d.* for each inhabitant. All these averages are below those for the whole of England and Wales.

The sum raised in Durham for poor's-rates, county-rate, and other local purposes, in the year ending 25th March, 1833, was 104,707*l.* 15*s.*, and was levied upon the various descriptions of property as follows:—

On land	£64,467	10
„ dwelling-houses . .	22,950	5
„ mills, factories, &c. . .	7,508	10
„ manorial profits, navigation, &c.	9,781	10

The amount expended was—		
For the relief of the poor . .	81,213	7
In suits of law, removal of paupers, &c.	4,350	1
For other purposes . . .	18,601	16
	£104,165	4

In the returns made up for the subsequent years the descriptions of property assessed for local purposes are not distinguished: the sums raised in the years ending 25th March, 1834, 1835, and 1836, were 107,648*l.* 4*s.*, 96,491*l.* 1*s.*, and 87,972*l.* 1*s.* respectively. The expenditure was as follows:—

	1834.		1835.		1836.	
	£.	s.	£.	s.	£.	s.
For the relief of the poor . . .	79,398	16	72,197	2	65,391	10
In suits of law, removals, &c. . .	5,245	3	4,221	4	3,735	0
Payment towards the county-rate	20,391	18	9,107	16	7,614	10
For all other purposes . . .			9,167	3	8,345	0
Total money expended . .	105,035	17	94,693	5	85,086	0

The saving effected in the whole sum expended in 1836, as compared with the expenditure of 1834, is therefore 19,949*l.* 17*s.*, or nearly 19 per cent.; and the saving in the cost for the relief of the poor is 14,007*l.* 6*s.*, or rather more than 17¼ per cent.

The county expenditure in 1834, exclusive of that for the relief for the poor, was 8,938*l.* 2*s.* 5*d.*, disbursed as follows:—

	£.	s.	d.
Bridges, buildings, and repairs, &c. .	1,646	4	6
Gaols, houses of correction, &c., and maintaining prisoners, &c. .	2,979	8	4
Lunatic asylums . . .	157	13	11
Prosecutions . . .	2,029	6	8
Clerk of the peace . . .	506	5	6
Conveyance of prisoners before trial .	683	1	3
„ of transports .	52	12	0
Constables—high and special .	5	6	6
Coroner	143	12	0
Miscellaneous	453	2	8¼

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 452, 688, and 1010 respectively; making an average of 64 annually in the first period, of 98 in the second, and of 144 in the third. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county-rates, were 63, 73, and 91. Among the persons charged with offences, there were committed for—

	1831.	1832.	1833.
Felonies . . .	50	50	78
Misdemeanors . .	13	23	13

The total number of committals in each of the same years was 124, 198, and 168, respectively; of whom

	1831.	1832.	1833.
The number convicted was .	91	119	92
„ acquitted	6	57	27
Discharged by proclamation	27	22	49

The number of persons charged with offences in 1836 was 164; of these 105 were convicted and 59 acquitted, or no bill found against them. Of the 105 convicted, 6 were sentenced to death, which sentence was commuted to transportation; besides these there were 16 transported; 7 were imprisoned for 1 year, and above 6 months; and 75 for 6 months and under; and 1 was fined. Of the offences committed, 28 were against the person, 11 of which were for common assaults; 12 were offences against property committed with violence; 107 offences against property committed without violence; 7 for malicious offences against property; and 10 for riot or misdemeanor. Of the offenders 134 were males and 30 females. Among the whole number only 3 had received superior instruction, 83 could read and write imperfectly, 64 could neither read nor write, and the degree of instruction of the remaining 14 could not be ascertained. The proportion of offenders to the population in 1836 was 1 in 1720.

The number of turnpike trusts in Durham, as ascertained in 1834, was 19; the number of miles of road under their charge was 249; the annual income arising from the tolls and parish composition was 38,199*l.* 11*s.* 10*d.*, and the annual expenditure 36,614*l.* 2*s.* 11*d.*

The number of persons qualified to vote for county members in Durham (in 1836) were 5208 in the northern division, and 4864 in the southern division, being 1 in 28 of the whole population, and 2 in 13 of the male population above 20 years of age. 'The expenses of the last election of county members to parliament were to the inhabitants of the county 259*l.* 9*s.* 4*d.*, and were paid out of the general county-rate.

There are 8 savings'-banks in this county. The number of depositors, and amount of deposits on the 20th November, were respectively in—

	1832.	1833.	1834.	1835
Number of depositors	3,356	3,584	3,691	4,013
Amount of deposits .	£109,352	114,436	115,678	122,109

The various sums placed in the savings'-banks in 1834 and 1835 were distributed as follows:—

		1834.		1835.	
		Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding	£20	1,844	£14,736	1,965	£15,557
„	50	1,163	35,750	1,324	40,065
„	100	457	31,796	492	33,031
„	150	135	16,237	147	17,509
„	200	71	11,862	68	11,325
Above	200	21	5,297	17	4,622
Total . .		3,691	£115,678	4,013	£122,109

Education.—The following summary is taken from the parliamentary inquiry on education made in 1835:—

	Schools.	Scholars.	Total.
Infant Schools	18		
Number of infants at such schools; ages from 2 to 7 years:—			
Males . . .		222	
Females . .		264	
Sex not specified		330	
			816
Daily Schools	769		
Number of children at such schools; ages from 4 to 14 years:—			
Males . . .		15,142	
Females . .		11,370	
Sex not specified		3,328	
			29,849
Schools . .	787		
Total of children under daily instruction .			30,656
Sunday Schools	260		
Number of children at such schools, ages from 4 to 15 and 16 years:—			
Males		11,095	
Females . . .		9,862	
Sex not specified		3,486	
			24,443

Assuming that there was the same rate of increase from 1831 in the population of the county as in the ten preceding years, and that the portion of it between the ages of two and 15 bore the same ratio to the whole as it did in 1821, there were living in Durham about 90,245 persons between those ages in 1834. Only two Sunday-schools are returned from places where no other schools exist: with this trifling exception, Sunday-school children have opportunity of resorting to daily schools also; but in what number or in what proportion duplicate entry is thus produced must remain uncertain. Forty-seven schools, containing 4145 children, which are both daily and Sunday-schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. Making allowances for these imperfect data, we may conclude that, perhaps, not half of the children between the ages of 2 and 15 were receiving the benefit of instruction at tho time the inquiry was made.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	3	214	10	232	5	370
Daily Schools	77	3151	25	1,649	690	20,482	47	4558
Sunday Schools	10	856	225	21,288	2	104	23	2195
Total...	87	4007	253	23,151	632	20,818	75	7123

The schools established by Dissenters, included in the above statement, are—

	Schools.	Scholars.
Infant schools	1	40
Daily "	11	510
Sunday "	83	10,312

The schools established since 1818 are—

Infant and other daily schools	365	14,841
Sunday-schools	184	17,208

Twenty-six boarding-schools are included in the number of daily schools as given above. No school in this county appears to be exclusively confined to any particular denomination of Christians, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents.

Lending libraries of books are attached to 52 schools in this county.

DURHAM, a city and borough, the capital of the county palatine of Durham, 67 miles east-south-east from Carlisle, 67 west-north-west from York, and 259 north-by-west from London.

We have no evidence of any town having existed where Durham now stands before the end of the tenth century, when the monks of Lindisfarne, or Holy Island, rested there with the remains of St. Cuthbert. According to the legend, when they arrived at Dunholme, the car, in which the saint's body was carried, by some miraculous interposition, became immovable, and the monks proceeded to build a sort of tabernacle wherein they deposited the relics; but soon after a stone church was built by Bishop Aldun, and dedicated to St. Cuthbert, whose remains were removed, and enshrined in it. The town of Dunholme, or Durham, was besieged by Duncan of Scotland in 1040; but was so well fortified and defended, that, after several fruitless assaults on the part of the assailants, the besieged made a successful sally and completely routed the enemy. By Leland it is called Duresme (the Norman name, whence Durham). 'The towne self of Duresme,' says Leland, 'stondith on a rocky hille; and stondith as men cum from the south cuntre on the ripe of Were, the which water so with his course naturall in a botom windeth about, that from Elvet, a great stone bridge of 14 arches, it crepeth about the towne to Trainegate bridge of 3 arches, also on Were, that betwixt theso two bridges, or a little lower at St. Nicholas, the towne, except the length of an arrowshot, is brought in insulam.'

In 1069, Robert Cumin was appointed governor by William the Conqueror; but, in consequence of the excesses committed by the Norman soldiers under his command, the inhabitants set fire to his house, and murdered the whole garrison, with the exception of one man who escaped. William, greedy of revenge, marched an army northward, and the terrified inhabitants fled from the city; the monks retired to Holy Island; but when tranquillity was restored, they again returned to Durham with their sacred relics, which they had carried with them. In 1072 a strong castle was built here, and Walcher, a Norman, was appointed to the bishoprick. This prelate purchased the earldom of Northumberland, and assumed tho title of Count Palatine. In 1093 the old church built by Aldun was pulled down, and the present magnificent edifice begun by King Malcolm, Carilepho the bishop, and Turgot the prior. Durham was often the head-quarters of Edward III., and of other monarchs and commanders on their excursions against Scotland. After the battle of Newburn, the city of Durham became almost depopulated.

By the 6th and 7th Will. IV., chap. 19, the whole of the palatine jurisdiction of the bishops of Durham is taken away, and is vested in the crown as a separate franchise and royalty. Before the passing of that act, the bishop of Durham, as count palatine and earl of Sadberg, was custos rotulorum of the county; he presided at the assizes, with his Majesty's judges, and the sheriff was accountable to him, and not to the king.

The city sends two members to parliament. The first charter was granted by Hugh Percy, and was confirmed by Pope Alexander; the governing charter is that of Bishop Egerton, dated 1780. The limits of the parliamentary borough have been extended by the Reform and Boundary Acts, and now include part of the township of Crossgate, part of the parish of St. Giles, part of the township of Elnet, the whole of St. Mary-le-Bow, and the whole of St. Mary-the-Less. There are now three wards, six aldermen, and eighteen councillors. The revenue of the corporation is small, but they have no debt.

The corporation hold a court-leet and a court-baron as lessees of the bishop, for the recovery of debts under 40*s*. The court of the county of Durham (not the ordinary county court) was abolished by the 6th and 7th Will. IV., c. 19. The assizes for the county are held here twice a-year by the judges going the northern circuit.

The city is nearly surrounded by the river Wear, and, as Leland remarks, forms a peninsula, the centre of which rises to a lofty eminence, partially enclosed by the antient walls, and skirted with hanging gardens descending to the river, on each side of which are delightful public walks called The Banks. The cathedral and castle crown the summit. [CHURCH.]

At the northern extremity of the city is Framwell-gat bridge, erected about the year 1120 by Bishop Flambard. Elvet bridge, which crosses the river opposite Framwellgate bridge, was originally built by Bishop Pudsey, in 1170, but it has lately been considerably widened and improved. A handsome bridge, consisting of three arches, was erected in the end of the last century at the extremity of the South Bailey.

The castle, which forms the occasional residence of the bishops of Durham, is supposed to have been built by William the Conqueror. The north gateway was till lately, when a new gaol, county courts, and house of correction were erected at an expense of nearly 120,000*l*., used as a county gaol. In the market-place is the guildhall, erected by Bishop Tunstall in 1555; and on the Palace Green is the exchequer, containing offices for the auditor, cursitor, prothonotary, treasurer, registrar, &c.

The town is lighted with gas, and well paved. A public fountain stands in the centre of the market-place; the water is conveyed to the reservoir through pipes from a spring granted to the city for ever in 1450, by Thomas Bellingham, Esq. There is a theatre, as well as a subscription library, news-room, and assembly-rooms. Races are held here in May. The population of Durham in 1831 was 9269. There were 806 voters registered in 1832, the first registration after the Reform Act.

The trade of Durham was formerly much more considerable than it is at present. There are manufactories of stuffs and carpets, for spinning and combing wool, and for making hats, a brass-foundry, and two iron-foundries. A market for corn and other provisions is held on Saturday. There are fairs for cattle and horses on the 29th, 30th, and 31st of March, on Whit Tuesday, on the Saturday before the 13th of May, on September 15th, and on the Saturday before the 23rd of November. The March fair is very celebrated for its horses.

The city comprises six parishes: St. Giles, St. Margaret, St. Mary-le-Bow, St. Mary (in South Bailey), St. Nicholas, and St. Oswald, the livings of which are respectively of the clear annual value of 99*l*., 409*l*., 111*l*., 119*l*., 87*l*., 272*l*. There are places of worship for Quakers, Independents, Primitive and Wesleyan Methodists, and Roman Catholics. A mechanics' institute was established in 1825. There is a grammar-school connected with tho cathedral which has four exhibitions for the sons of clergymen, of 25*l*. each at the school, and of 50*l*. each at either of the universities; it has also five scholarships of 10*l*. per annum each at Peter House, Cambridge, founded by Bishop Cosins, and one scholarship of 16*l*. per annum at Emanuel College, Cambridge, jointly with the school at Newcastle-upon-Tyne. There are about 60 boys educated at the school, exclusive of 18 on the foundation. There is a blue-coat and Sunday school, as well as infant schools and a charity-school in Gravel-lane. It is said that upwards of 1000 children are gratuitously educated in Durham and its suburbs. An infirmary, erected in 1791, is supported by voluntary contributions. On Palace Green are almshouses for four poor men and four poor women, who receive an annuity of 70*l*. In addition to the charitable institutions mentioned, there is a numerous list of benefactors to the poor of the city and its vicinity.

About three-quarters of a mile from Durham is the site of the Maiden Castle, a fortress ascribed to the Romans, as also some remains of the Iknield-street. Saline, chalybeate, and sulphureous springs are found in the neighbourhood.

DURHAM CATHEDRAL. A plan of the cathedral of Durham has been already given under CHURCH, with its general dimensions of length, breadth, and height. It was begun during the reign of William Rufus by Bishop William de Carilepho, and continued, if not quite finished, by his successor Ranulf Flambard, who had shown his talent for architecture, before his promotion to the see of Durham, by the erection of the collegiate church of Christ Church, in Hampshire.

The cathedral erected by these prelates was of the form universally adopted by the Norman architects: a long cross, with two turrets at the west end, and between them a large and richly-ornamented arched door of entrance. The eastern end probably terminated in a semicircular form, as the lines of union of the original work with the Chapel of the Nine Altars strongly indicate. The side aisles, both of the nave and choir, were vaulted with semicircular arches groined; but the nave and choir were open to the timber roof. Such was the form of the edifice as left by the first architects.

The first addition to the original church was the Galilee, or Western Chapel, built by Bishop Hugh de Pudsey, between 1153 and 1195. The nave was vaulted by Prior Thomas Melsonby, who acceded in 1233, to whom also some ascribe the projecting of the great or central tower and the beginning of the building of the Chapel of the Nine Altars. These great works were finished by Richard Hotoun, who became prior in 1290, and who is recorded to have vaulted the choir. The great west window was inserted by prior John Fossour about the year 1350. The altar-screen, erected chiefly at the expense of John Lord Neville, was finished in 1380 by prior Robert Berrington.

The successive additions to this cathedral have rendered the church, as it now stands, not only a perfect specimen of the Norman architecture, but a most instructive series of examples, illustrating the gradual changes of the English style to the beginning of the fifteenth century. (Hutchinson's and Surtees's *Histories of Durham*, with the *Account of the Cathedral* written for the Society of Antiquaries by Sir H. C. Englefield, fol. Lond. 1801.)

DURHAM UNIVERSITY. The first attempt to establish a university at Durham was made during the time of the Commonwealth and the Protectorate of Cromwell. It originated in 1649, after the passing of the act for the abolition of deans and chapters, but was not carried into effect till May 15th, 1657, when letters patent were granted, by which the houses late belonging to the dean and prebendaries were converted into a university to be called by the name of 'The Mentor, or Provost, Fellows, and Scholars of the College of Durham, of the foundation of Oliver, Lord Protector of the Commonwealth of England, Scotland, and Ireland,' &c. By the same letters patent rent-charges to the annual amount of 900*l*. were assigned for the support of the persons belonging to the foundation, and leave was given them to purchase and enjoy lands and revenues to the amount of 6000*l*. a year. They were also to take the manuscripts, library books, mathematical instruments, &c. late belonging to the dean and chapter. The college however was never completely settled: at the Restoration the dean and chapter resumed their lands, and this foundation totally disappeared. (Pennant's *Tour in Scotland and the Hebrides*, 1772, vol. ii., p. 336; Surtees's *Hist. of the County Palat. of Durham*, vol. i., p. 106.) Oxford and Cambridge petitioned Richard Cromwell when protector, against the power which his father had given to the university of Durham to grant degrees *pari passu* with them.

The following is the history of the university more recently established in this city.

The dean and chapter of Durham, by an act of chapter bearing date the 28th of April, 1831, have established an academical institution in that city in connexion with their cathedral church, which by an act of parliament passed in the 2nd and 3rd years of William IV., entituled 'An Act to enable the Dean and Chapter of Durham to appropriate part of the property of their Church to the establishment of a University in connexion therewith, for the advancement of learning,' became confirmed and endowed. By this act the government of the university was vested in the said dean and chapter for the time being, subject to the jurisdiction of the bishop of Durham for the time being as visitor, and the establishment was to consist of a warden or principal, of certain professors and readers, tutors, students, and other officers and persons. By this act also certain lands, tenements, and hereditaments comprised in the leases mentioned in the schedule to the said act annexed, and the inheritance thereof in fee simple (subject to the said leases for years, and saving to the dean and chapter of Durham and their successors all mines, &c. opened and to be opened within and under the said lands), are vested in the dean and chapter of Durham and their successors for ever, in trust to apply the rents, fines, and other profits and proceeds of the said lands, for the maintenance and establishment of a university in connexion with the cathedral church of Durham. The leases mentioned in the schedule (the great majority of which are of dwelling-houses) amount to 394. The act empowers the dean and chapter, with the consent of the bishop of Durham, to sell all the lands and tenements mentioned in the said schedule, and also all other lands and tenements which shall at any time be vested in the dean and chapter of Durham in trust for the university. The purchasers of any of the lands and tenements so sold are to pay the purchase-money into the bank of England, in the name and with the privity of the accountant-general of the court of chancery, to be placed to his account there, '*ex parte* the Dean and Chapter of Durham, the University of Durham account.' The fifth section of the act provides for the application of the said purchase-monies. The fifteenth section enacts 'That it shall be lawful for any person or persons whatsoever, having any power to make an absolute disposition thereof, to give, convey, or assure, by any deed or deeds, any messuages, lands, tenements, or other hereditaments, or any estate or interest therein or thereout, or any monies, chattels, or effects, to the said Dean and Chapter of Durham and their successors, in trust for such University as aforesaid, or for any Professor, Reader, or other person or persons holding office therein or connected therewith; any law, statute, or custom to the contrary in anywise notwithstanding.' By another act of chapter, dated April 4th, 1834, it was directed that under the bishop as visitor, and the dean and chapter as governors, the affairs of this university should be managed by the warden and a senate and convocation: the senate to transact the ordinary business of the university and be competent to originate regulations and other measures relating to it, but such regulations and other measures not to be in force until confirmed by the convocation; the convocation to confirm or reject what is submitted to it by the senate, but to have no power to originate or amend.

This university is allowed to grant degrees in the several faculties, which are conferred by the warden and convocation, but the grace for a degree must be allowed by the dean and chapter before it is proposed in convocation. The academical year at Durham consists of three terms, of not less than eight weeks each, called respectively Michaelmas, Epiphany, and Easter terms; Michaelmas term not commencing earlier than the 10th October, and Easter term not ending later than 30th June. For the degree of B.A. the petitioner must be a student of the standing of twelve terms from his admission, and have kept nine terms at least by residence. For the degree of M.A., he must be of the standing of nine terms at least from the taking of his B.A. degree. A petitioner for the degree of B.D. must be of the standing of twenty-one terms from his admission as M.A. and a D.D. of thirty-three terms from the same. A petitioner for the degree of B.C.L. must be of the standing of twenty-one terms at least from the date of his matriculation, and no grace for the degree of D.C.L. can be granted unless the petitioner is a B.C.L. of thirty-three terms' standing. No grace for M.D. is granted unless the petitioner is a Bachelor of Medicine of the standing of nine terms at least from the date of his admission to that degree. This university has also the power to grant Honorary Degrees. For the detail of the exercises requisite for proceeding to the different degrees the reader is referred to the *Statute enacted by the Dean and Chapter*, with the *Regulations passed under its authority by the Senate and Convocation of the University*, 8vo. Durham, 1836.

In addition to the existing college, and any other establishment which may hereafter be founded by statute, halls and houses may be opened for the reception of students by licence, and under regulations from the warden and senate.

During the present year (1837) a royal charter has been granted to the university of Durham, which was formally received by that body in the month of June, 1837, and at the same time various gentlemen were admitted to the degree of B.A. The terms of the charter are not yet (June, 1837) made public.

DU'RIO, a genus of which the name has been derived from *durion* or *doorean*, a well-known fruit of the Malayan Archipelago. The specific name of *zibethinus* has been applied to the tree which forms this genus, from the fondness of the Malayan Zibet (*Viverra Rasse*, Hors.) for this fruit.

The genus Durio belongs to the natural family of Bombaceæ, considered by some botanists to be only a tribe of Sterculiaceæ. It is characterized by having its five petals smaller than the five lobes of the calyx. The stamens, long and numerous, are arranged in five bundles, and have twisted anthers; the free germen is surmounted by a long filiform style and capitate stigma; the fruit, roundish and muricated, is divided internally into five cells, and easily separates when ripe into five parts; each cell contains from two to four or five seeds enveloped in soft pulp.

Durio zibethinus is a large and lofty tree, with alternate leaves, which are small in proportion to its size; in form they resemble those of the cherry, or are oblong-pointed, small and green above, like nutmeg-tree leaves, but on the under surface are covered with orbicular reddish-coloured scales, as some species of Capparis; the petioles are tumid, and furnished with a pit towards their base; the flowers are arranged in clusters on the trunk and older branches, where of course is also borne the fruit, as in the Jack and Cocoa trees.

The Durion is a favourite food of the natives during the time (May and June) when it is in season; but there is usually also a second crop in November. It is as remarkable for the delicacy combined with richness of its flavour, as for the intolerable offensiveness of its odour, which is compared by Rumph to that of onions in a state of putrefaction, on which account it is seldom relished by strangers, though highly esteemed by many European residents. In size it is equal to a melon, or a man's head, and sometimes compared to a rolled-up hedge-hog (hence it has been called *echinus arboreus*) in consequence of its hard and thick rind, which is yellow-coloured when ripe, being covered with firm and angular projections. From this appearance has likewise been derived its Malayan name, *dury* in that language signifying a thorn or prickle. (Rumph.)

The seed, with its edible enveloping pulp, is about the size of a hen's egg; the latter is as white as milk, and as delicate in taste as the finest cream, and should be eaten fresh, as it soon becomes discoloured, and undergoes decomposition. Excessive indulgence in this, as in other fruits, is apt to create sickness, and therefore to its abundance has been sometimes ascribed the unhealthiness of some years; but as the crop of fruit is most abundant when the rains are very heavy and follow great heats, the sickness is probably due as much to the peculiarities of the season as to the too free use of this fruit.

The seeds of the Durion are likewise eaten when roasted, and have something of the flavour of chestnuts. The wood of the tree is valued for many economical purposes, especially when protected from moisture. The rind of the fruit is likewise turned to account by the industrious Chinese, as its ashes, when burnt, from probably containing potash, are used by them in the preparation of some dyes.

Marsden, in his account of Sumatra, quotes a celebrated writer as saying that 'Nature seems to have taken a pleasure in assembling in the Malay islands her most favourite productions.' Among these may be enumerated the Mangosteen, the Jack and Bread-fruit trees, the Lanseh and Durion, with others which are common in other tropical parts. These it has not been possible to cultivate in the hot-houses of England, even with all the skill of its horticulturists; a circumstance which must be ascribed partly to the great size of the trees, and partly to the peculiarity in climate of 'India aquosa,' as this part of the world was called by old writers. But as it is only within a few years that moisture has been combined with heat in the present successful cultivation of Orchideous plants, it might perhaps be possible to make some of the above fruits grow in a similar artificial climate; and by grafting, to make them bear when only a few feet high, as has been done with the Mango in India.

DURLACH, a circle of the province of the Middle Rhine, in the northern part of the grand duchy of Baden. It contains one town, two market-villages, eight villages, four hamlets, and about 24,200 inhabitants, of whom about 18,500 are Protestants, 5200 Roman Catholics, and 500 Jews, &c.

DURLACH, the chief town, is situated on the Pfinz, at the foot of the Thurmberg, a richly-cultivated hill, about four miles south-east of Carlsruhe, the road to which is formed by a straight avenue of Lombardy poplars: in 48° 59′ N. lat., and 8° 25′ E. long. It is an old town, and was long the residence of the margraves of Baden-Durlach, one of whom, Charles William, built Carlsruhe, and removed the seat of government to that spot. The palace, called the Carlsburg, and its grounds, in the latter of which are four stone columns once set up on the road through the land of the Decumates, in the reigns of Caracalla, Heliogabalus, and Alexander Severus, as well as an altar to Hercules, and several stone tablets with Roman inscriptions upon them, are the chief attraction of the place. It has a church, a seminary for teachers, and a town-hall, eight main streets, about 510 houses, and a population of about 4600. Trade, agriculture, and horticulture, the manufacture of wine, and mechanical pursuits, form the chief occupations of the people. The environs are covered with orchards. There is a large manufactory of earthenware in the town; and it has one of the most extensive markets for grain in the grand duchy. The celebrated German mechanic, Von Reichenbach, was born here.

DURSLEY. [GLOUCESTERSHIRE.]

DUSSEK, JOHANN LUDWIG, a celebrated composer for and performer on the piano-forte, was born in Bohemia, in 1760. His education in the university of Prague was most liberal, and music forming a part of it, he adopted that art as a profession. Dussek came to London about the year 1790, immediately distinguished himself, and might have realized an ample fortune had his industry and discretion borne any proportion to his talents. In 1800 he quitted England, and two years after became part of the household, and also the intimate and confidential friend, of Prince Louis Ferdinand of Prussia, who died so bravely at Saalfield in 1806. He then entered into the service of Prince Talleyrand, in which he continued till his death in 1812. 'His compositions,' says the Harmonicon, 'which reach Op. 77, are unequal, because many of them were produced by contract, therefore adapted to the capacity and taste of the mob of players; but we know scarcely any composer of piano-forte music who has given to the world so many things that are both good and popular at the same time.'

DÜSSELDORF, a county or administrative circle in the Prussian Rhenish province of Juliers-Cleves-Berg, traversed from south to north by the Rhine, and bounded on the north by Holland, on the east by the circle of Münster and Arnsberg, on the south by Cologne, and on the west by Holland and the circle of Achen or Aix-la-Chapelle. It has an area of about 2106 square miles, contains 13 minor circles and 58 towns, among which are Düsseldorf, Cleves (about 7100 inhabitants), Wesel (9950), Duisburg (5500), Emmerich (5760), Mühlheim (7000), Geldern (3600), Kempen (3250), Krefeld (19,300), Ratingen (3950), Barmen (25,100), Elberfeld (24,100), Lennep (4700), Burscheid (9960), Höhescheid (5300), Dorp (4900), Solingen (4550), Neuss (8100), and Viersen (3750). The present number of the inhabitants of Düsseldorf is about 22,500; in 1816 it was 587,278; 1821, 613,811; and 1831, 694,727. It is the most densely peopled portion of the Prussian dominions. About two-thirds of the inhabitants are Roman Catholics, and one-third Protestants. The number of villages is 410, and of hamlets 805. The Rhine enters this county near Rheinfeld, divides it into two nearly equal portions, and after receiving a multitude of rivers and small streams, quits it near Schenkenschanz, where it is 2300 feet in width. During its passage through Düsseldorf it is joined on the left bank by the Erft and Mörs, or Meurs, and on the right bank by the Wipper, Dühne, Düssel, Schwarzbach, Angerbach, Ruhr, Emsche, and Lippe. The northern part of the county is level, and though it contains large tracts of sand, it has also a considerable extent of good arable land and pastures. The soil of the other parts is highly productive in general, but there are many tracts in the mountainous districts, on the right bank of the Rhine, which are sterile, particularly in the circle of Lennep; and there are considerable woods and forests in and near those districts, to the extent of about 303,000 acres. The quantity of arable land is computed at 680,000 acres, and of meadows and pastures at 155,000 acres. There are extensive manufactures of woollen yarns and woollens, silks, cotton yarns and cottons, thread, leather, steel, iron, ironware and cutlery, tobacco, soap, &c. Iron, coals, and potters' clay, are among the native products. Grazing and the rearing of horses and cattle are actively pursued; the stocks in 1831 consisted of 34,973 horses, 154,313 horned beasts, and 77,032 sheep and goats.

DÜSSELDORF, a minor circle in the south of the preceding county or administrative circle, containing about 160 square miles and 64,600 inhabitants, with 4 towns, 37 villages, and 41 hamlets: it is bordered on the west by the Rhine, along which runs a range of small sand-hills; and is partly level and partly hilly. Its products are corn, potatoes, peas and beans, and much fruit; horned cattle, sheep, and swine are reared in great numbers. It is divided into 10 'Bürgermeistereien,' or townships, at the head of which is that of Düsseldorf (village of the Düssel), the capital of the whole county, formerly that of the duchy of Berg.

DÜSSELDORF, the capital, is situated in the centre of a fertile country on the right bank of the Rhine, at the point where the Düssel joins that river, in 50° 13′ N. lat. and 6° 47′ E. long., at an elevation of about 100 feet above the level of the sea. It was raised from the rank of a village ('villa') to that of a municipal town by Adolphus V., duke of Berg, in 1288: it was first united to the Prussian dominions with the duchy of Berg in 1815. The flying bridge across the Rhine dates from the year 1680. Düsseldorf having been carefully fortified, acquired the character of a fortress in the middle of the last century; but it was never tenable against a serious assault, and the defences were razed by virtue of the treaty of Luneville in 1802. It is one of the best-built towns on the Rhine, is surrounded by extensive garden-grounds, and consists of three quarters; namely, the Old Town on the right bank of the Düssel, which was the whole extent of the town until the beginning of the 17th century; the New Town on the Rhine; and Charles's Town (Carlstadt), the handsomest part of Düsseldorf, south of the Old Town and on the left bank of the Düssel, which takes its name from Charles Theodore, the elector-palatine, who founded it in 1786. There are 43 streets, several of which are constructed on a regular plan, particularly Frederic William's street which is planted with rows of trees, and five squares or open spaces, on one of which, the old market-place, stands an equestrian statue in bronze of John William, elector-palatine, of colossal dimensions but heavy execution, the work of Crepello. Among the buildings of note are the old palace, or rather one of its wings, (the only portion that escaped entire destruction during the bombardment of the town by the French in 1794), which has latterly been restored for the use of the Academy of Arts and the Royal Mint, and in the court-yard of which is another statue of John William by Crepello, in marble; adjacent thereto is the Picture Gallery, founded by that elector in 1710; but the 358 paintings it then contained were removed to Munich in 1808, and it now consists of 65 paintings, 263 sketches, 14,241 original drawings, 23,445 engravings, and 155 copper-plates. The other buildings of consequence are the present palace, where the governor or president of the county resides; the government-house, once a college of Jesuits; the observatory, town-hall (erected in 1567), courts of law, new barracks, theatre, public school or gymnasium, with about 320 pupils, a mint, and public library of about 30,000 volumes. Düsseldorf has seven churches, including two Protestant the most remarkable are St. Lambert's, the high church, and the oldest in the town, which contains the sepultures of several dukes of Berg, &c., and the church of the Jesuits, a handsome structure with two steeples, but overloaded with ornaments, beneath the main altar of which other sovereigns of Düsseldorf lie entombed. Besides these, there are a synagogue, three nunneries, an orphan and a lunatic asylum, two hospitals, and an infirmary, a polytechnic school, and a Protestant seminary for teachers, ten elementary schools, and ten schools for poor children, supported by the directors of the poor, a house of correction, an obstetrical institution, &c. The number of houses is about 1430; in 1791 it was 852; and in 1825, 1103. The population amounted to 8208 in 1775; 9541 in 1791; 12,102 in 1801; 14,100 in 1816; 18,724 in 1827; and 20,578 in 1831. The present population is about 21,000; and that of the whole township in 1834 was 31,109, of whom 25,833 were Roman Catholics. In 1833, the number of births was 1187, and of deaths 876. The marriages were in that year 260.

Düsseldorf is the seat of the provincial government, offices of revenue and taxes, and tribunals of justice, and possesses an academy of the fine arts and design with about 150 pupils, an architectural institute, an observatory, and several private collections in the fine arts, &c.; societies for the promotion of the useful arts, the improvement of prisons, &c., and a bible society, besides a variety of philanthropic associations. It has manufactories of woollens, cottons, leather, hats, tobacco, jewellery, mirrors, stockings, &c., and carries on a considerable trade in cotton, wool, wines and spirits, colonial produce, coals, timber, slates, and other commodities. It is a free port, and has a harbour for fifty vessels. Adjoining the town are the royal gardens, and a botanic garden.

DUTE'NS, LOUIS, was born at Tours, of a Protestant family, in 1730. After receiving his education in France, he came to England, and travelled with several noblemen in succession over the Continent, and also acted for a time as secretary to the English minister at the court of Turin. On his return to England he was presented to the living of Elsdon in Northumberland. He was made member of the Royal Society of London, and of the Académie des Inscriptions et Belles Lettres of Paris. Being well versed in antient and modern philology, and in archæology and numismatics, he wrote many works, the principal of which are:—'1. Recherches sur l'Origine des Découvertes attribuées aux Modernes, où l'on démontre que nos plus célèbres Philosophes ont puisé la plupart de leurs Connoissances dans les Ouvrages des Anciens, et que plusieurs vérités importantes sur la Religion ont eté connues des Sages du Paganisme,' 8vo., Paris, 1766. This work went through several editions, revised by the author, to the last of which, 1812, he added his 'Recherches sur le tems le plus reculé de l'usage des Voûtes,' which he had previously published separately. In his zeal to vindicate the often-overlooked claims of the antients to several discoveries which have been reproduced in modern times, Dutens oversteps at times the boundaries of sound criticism, and seems to wish to attribute almost every invention to the nations of antiquity. 2. 'Explication de quelques Médailles Grèques et Phéniciennes, avec une Paléographie Numismatique,' 4to., 1776, to which are added several previously-written dissertations on numismatics. 3. 'Itinéraire des Routes les plus fréquentées de l'Europe,' a work often reprinted. 4. 'Guide Moral, Physique, et Politique des Étrangers qui voyagent en Angleterre.' 5. 'Appel au Bon Sens,' a defence of Christianity against Voltaire and the Encyclopédistes. 6. 'Des Pierres précieuses et des Pierres fines, avec les Moyens de les connoître et de les évaluer,' Paris, 1776. 7. 'Histoire de ce qui s'est passé pour l'établissement d'une Régence en Angleterre,' 8vo., 1789. 8. Nouveaux Intérêts de l'Europe depuis la Révolution Française,' 1798. 9. 'Considérations Théologiques sur les Moyens de réunir toutes les Eglises Chrétiennes,' 8vo., 1798, a well meaning speculation towards a hopeless object. 10. 'Mémoires d'un Voyageur qui se repose,' 3 vols., 8vo., Paris, 1806, which contain anecdotes of Dutens's life and travels. Dutens died in England in 1812.

DUU'MVIRI, the name given to any magistrates in the republic of Rome who were elected in pairs for the discharge of any class of duties. The first duumvirate on record was composed of the two judges of blood *(duumviri perduellionis)*, appointed by Tullus Hostilius for the trial of P. Horatius, a right of appeal to the people being allowed to the accused (Liv. i. 26). This office was exercised by Tarquinius Superbus alone, for tyrannical purposes (Liv. i. 49), and afterwards by the consuls (Liv. ii. 5), who were indeed a duumvirate. The *Quæsitores parricidii* were afterwards substituted for the consuls, and these were mentioned in the laws of the Twelve Tables (Pompon. l. ii. §. 23 D); but it seems that the duumviri were again entrusted with the administration of criminal law at the trial of Manlius Capitolinus (Gellius, xvii. 21); and they are mentioned as still existing even by Cicero (*Pro C. Rabirio*, c. iv. §. 12). The *duumviri sacrorum*, who took care of and interpreted the Sibylline Books, were also a very antient magistracy (Liv. iv. 21). Niebuhr thinks (*Hist. of Rome*, i., p. 298, Engl. Tr.) that the number was dictated by a wish to deal evenly with the first two tribes, the Ramnes and the Tities. The chief magistrates in the municipia were also called duumviri (*Lips. Elect.*, i. 23), or sometimes consuls. (Cicero, *in Pisonem*, c. xi.) Their lictors generally carried little staves (*bacilla*) before them; but they occasionally arrogated to themselves the fasces. (Cicero, *Agrar.* ii. 34.) The *duumviri navales* were two officers, first elected in the year 436 A.U.C. (Liv. *Epit.* lib. xii.; Niebuhr's, *Römische Geschichte*, th. iii. p. 282). Their duty was to collect, equip, man, and command the fleets of the republic (Liv. ix. 30; xl. 18 and 26). There were also other duumviri created for special occasions.

DWARF is a technical term employed by gardeners to distinguish fruit-trees whose branches proceed from close to the ground from *riders* or standards whose original stocks are several feet in height.

DWARFING TREES. Nature, in many respects, can be made to deviate from her ordinary course of procedure, in order to be subservient to the purposes of men. In nothing is this fact more apparent than in the various modes of dwarfing trees.

The trees of our orchards and forests, for example, which grow naturally to a considerable size, can be made to assume all the appearances of maturity and age while only a few feet high; a forest in miniature can thus be created, which has a very grotesque and curious appearance. There are various methods of producing this effect; such as selecting peculiar kinds of stocks and grafting upon them. For example, if the pear-tree be grafted upon the quince stock, or the peach upon the plum, their growth is very much retarded, and their ultimate size is comparatively small: the same effect is produced upon all other trees where there is a difference between the tissue of the stock and that of the scion which has been grafted upon it; or if dwarf varieties be grafted upon stocks of a similar constitution, though taller in growth, the former will still retain their original character. Again, if the branches be bent, and the flow of the sap in any way impeded, or if a quantity of the fibrous roots be cut away, and nourishment more sparingly supplied to the branches, we arrive at the same results.

Sometimes trees are dwarfed by very severe pruning, particularly if this operation be performed in summer, and, although they evidently try for a length of time to overcome this obstruction to their natural size, yet they eventually assume a dwarfed and stunted habit, which, with a little care, may be retained for many years. The Chinese in particular have carried this practice to a great extent, and they ornament their fanciful gardens with miniature forests of elms, junipers, and other timber trees.

The methods of dwarfing employed by the Chinese are the following:—young trees of various sorts are planted in flat porcelain vessels, and receive only so much water as is sufficient to keep them alive; in a very short time the pots are completely filled with roots, which, being hemmed in on all sides, cannot obtain a sufficient quantity of nutriment, and, as a matter of course, the growth of the stem and branches is thus impeded. The Chinese also pinch off the ends from the young shoots, mutilate the roots, lacerate the bark, tie down the branches, and break many of them half through; in short, by every means in their power they contrive to check growth, so that, stunted and deformed by these means the trees soon assume all the marks of age when only two or three feet high.

There is another method of producing dwarf trees, which may be termed accidental: namely, selecting dwarf individuals and obtaining seed from them. It is well known that when the young seed is fertilized by the influence of the pollen belonging to its own flower, or to the same plant upon which it grows, the future progeny so produced partakes generally in a large degree of the nature of the parent from which it originates. Now, if seed be carefully obtained from a variety rather more dwarf than usual some of the plants produced by that seed will be something dwarfer than their parents. The dwarfest individuals again selected for seed will originate a race yet dwarfer than themselves; and thus, with patience and by successive generations, a variety only a few inches high may be obtained from a species two or three feet high, or even higher. This is the origin of dwarf roses, sweet williams, dahlias, and other common cultivated flowers.

With the exception of this last-mentioned method, all the others, however different they may seem, proceed from the same principle; for whether we graft upon stocks whose tissue differs in organization from the scion, or whether we bend the branches, or cut or confine the roots, we prevent the full flow of the sap in all such cases, and thus advance the age of puberty and bring on a fruit-bearing state. When plants have arrived at this stage of existence, all their energies are directed to the formation of fruit; hence forcing a tree into an early state of fruit-bearing is almost synonymous with dwarfing it.

DWIGHT, TIMOTHY, an eminent American Presbyterian divine, was born at Northampton, in Massachusetts, May 14, 1752. From infancy he made rapid progress in general and scholastic learning; insomuch that, at the age of seventeen, very soon after taking the degree of B. A. at Yale College, Newhaven, he was appointed master of a grammar-school in that town, and, before he was twenty, one of the tutors of Yale College. He was licensed to preach in 1777, in which year, the sessions of the college having been stopped by the war of the Revolution, he offered his services as a chaplain in the American army. The death of his father in the following year rendered it desirable that he should return to Northampton, and the rest of his life was principally occupied in discharging the duties of tuition, first as master of a private seminary, next as president of Yale College, to which office he was appointed in 1795. He also held the professorship of theology. He died January 11, 1817.

His early life was extremely laborious: it is stated that while he kept school at Newhaven his time was regularly divided:—six hours of each day in school, eight hours in close and severe study, and the remaining ten hours in exercise and sleep. (Life, p. 20.) Over-exertion nearly brought on blindness: from the age of twenty-three he was continually subject to acute pain behind the eyes, and was unable, for the space of forty years, to read longer than fifteen minutes in the day. This makes the extent and variety of his knowledge, which was acquired almost entirely through the ear, the more remarkable; and the mastery which he acquired over his mental powers by discipline was so complete, that he could dictate two or three letters to different amanuenses at once, and he seldom forgot or found difficulty in producing any fact which was once stored in his memory. In 1774 he resorted to a severe system of abstinence in food and exercise, which had nearly proved fatal. He recovered a vigorous state of health, chiefly by returning to a daily course of strong exercise, and the benefit thus derived led him in after-life to devote his recreations regularly to a series of excursions, of which we have the fruits in his 'Travels in New England and New York,' 4 vols., 8vo., 1823. These contain a great quantity of information, statistical, topographical, and historical, which, considering Dr. Dwight's mental habits and opportunities, there is every reason to presume accurate: the statistics of course have long ceased to represent the present condition of the country. The historical parts, especially those relating to the Indian history, manners, and warfare, are of much interest. Dr. Dwight's chief work however is 'Theology explained and defended in a Series of Sermons,' 5 vols., 8vo. It is a course of 173 lectures, delivered by him as professor of divinity on the Sundays in term-time, so as to occupy about four years. His method of preaching was from very concise notes or heads, his eyes not permitting him to undergo the labour of writing; so that this voluminous body of divinity was not committed to paper till 1805, in which year he was provided with an amanuensis at the expense of the college.

Two more volumes of his sermons, fifty-nine in number, were published in 1827, and the editor intimates that he has more behind. These contain several addressed by him annually, according to college custom, as president, to the candidates for the degree of B.A., which will be read with interest. Dr. Dwight is said to have been eminently a useful and effective as well as a learned preacher, and his life bore witness to the efficacy of his own belief. (*Life, prefixed to his 'Theology Explained.'*)

DWINA, the largest river that falls into the White Sea, and the seventh with regard to length in the Russian dominions, originates in the confluence of two smaller rivers, the Sukhoria and Yug, near Veliki-Usstiug, in 60° 46′ N. lat., and 46° 30′ E. long. The Sukhoria, a considerable stream, which flows out of Lake Goubinskii or Kuban, and runs in a very tortuous direction through the south-western parts of the government of Vologda, describes a course, along the whole of which it is navigable, of about 285 miles between that lake and the junction with the Yug. The Yug, flowing down from a morass on the northern range of the Volga mountains, at the southernmost point of the same government, and in the early part of its course washing the walls of Nikolsk in its progress northwards to its confluence with the Sukhoria, has a length of about 248 miles. These two rivers unite below Veliki-Usstiug and the river is thenceforward denominated the Dwina. The Dwina pursues in general a north-westerly direction through the western districts of the government of Vologda, becomes navigable before it quits them, traverses the south-western part of the government of Archangel, and discharges its waters through five arms below the town of Archangel into the bay of Dwinskaya, in the White Sea. Its length in a straight line from its source to its mouth is about 312 miles, but, including its windings, it is estimated at about 736 miles. It is navigable from the close of April to the first week in November for a distance of about 240 miles. It generally flows between high banks, and is on an average from 500 to 600 feet in width; at Archangel this width is increased to four miles. Soon after it has received the Pinega on its right bank, it forms a number of islands, which extend to its mouth. Its chief tributaries are, on its right bank, the Vouitsheyda or Vitshayda, the source of which is on the declivity of the Vertshoturi range of the Ural mountains, not far from the sources of the Petshora: this river has numerous bends, and falls into the Dwina near Kershensko, in the centre of the government of Vologda, from which point the Dwina becomes navigable; and the Pinega, in the south-western part of the government of Archangel, which becomes navigable for a distance of about 70 miles from Pineg downwards, and after a course of about 190 miles, discharges its waters into the Dwina a little above the town of Kholmogory. On its left bank the Dwina receives the Vaga, which is navigable for about 75 miles, and joins the Dwina above Poinskoi, in the government of Archangel, and the Yamza, a river navigable for about 90 miles, which has its confluence with the Dwina about 36 miles above Vilsk in the same government. The tides of the Dwina are perceptible nearly 30 miles above Archangel. The basin of the river occupies an area of about 123,900 square miles; the bed is generally of clay, covered with a thin layer of sand. It abounds in fish.

DYEING is the art of staining textile substances with permanent colours. To cover their surfaces with colouring matters removable by abrasion would be to apply a pigment rather than to communicate a dye. Dye-stuffs can penetrate the minute pores of vegetable and animal fibres only when presented to them in a state of solution, and they can constitute fast colours only by passing afterwards into the state of insoluble compounds. Dyeing thus appears to be altogether a chemical process, and to require for its due explanation and practice an acquaintance with the properties of the elementary bodies, and the laws which regulate their combinations. It is true that many operations of this, as of other chemical arts, have been practised from the most antient times, long before any just views were entertained of the nature of the changes that took place. Mankind, equally in the rudest and most refined state, have always sought to gratify the love of distinction by staining their dress, sometimes even their skin, with gaudy colours. Moses speaks of raiment dyed blue, and purple, and scarlet, and of sheep-skins dyed red; circumstances which indicate no small degree of tinctorial skill. He enjoins purple stuffs for the works of the tabernacle and the vestments of the high priest.

In the article Calico Printing, we have shown from Pliny that the antient Egyptians cultivated that art with some degree of scientific precision, since they knew the use of mordants, or of those substances which, though they may impart no colour themselves, yet enable white robes (*candida vela*) to absorb colouring drugs (*colorem sorbentibus medicamentis*). Tyre, however, was the nation of antiquity which made dyeing its chief occupation and the staple of its commerce. There is little doubt that purple, the sacred symbol of royal and sacerdotal dignity, was a colour discovered in that city, and that it contributed to its opulence and grandeur. Homer marks the value as well as antiquity of this dye, by describing his heroes as arrayed in purple robes. Purple habits are mentioned among the presents made to Gideon by the Israelites from the spoils of the kings of Midian.

The juice employed for communicating this dye was obtained from two different kinds of shell-fish, described by Pliny under the names of *purpura* and *buccinum;* and was extracted from a small vessel, or sac, in their throats to the amount of only one drop from each animal. A darker and inferior colour was also procured by crushing the whole substance of the buccinum. A certain quantity of the juice collected from a vast number of shells being treated with sea-salt, was allowed to ripen for three days; after which it was diluted with five times its bulk of water, kept at a moderate heat for six days more, occasionally skimmed to separate the animal membranes, and when thus clarified was applied directly as a dye to white wool, previously prepared for this purpose by the action of lime-water, or of a species of lichen called fucus. Two operations were requisite to communicate the finest Tyrian purple: the first consisted in plunging the wool into the juice of the purpura; the second, into that of the buccinum. Fifty drachms of wool required one hundred of the former liquor, and two hundred of the latter. Sometimes a preliminary tint was given with coccus, the kermes of the present day, and the cloth received merely a finish from the precious animal juice. The colours, though probably not nearly so brilliant as those producible by our cochineal, seem to have been very durable, for Plutarch says, in his *Life of Alexander*, (chap. 36), that the Greeks found in the treasury of the king of Persia a large quantity of purple cloth, which was as beautiful as at first, though it was 190 years old.[*]

The difficulty of collecting the purple juice, and the tedious complication of the dyeing process, made the purple wool of Tyre so expensive at Rome that in the time of Augustus a pound of it cost nearly 30*l.* of our money.[†] Notwithstanding this enormous price, such was the wealth accumulated in that capital, that many of its leading citizens decorated themselves in purple attire, till the emperors arrogated to themselves the privilege of wearing purple, and prohibited its use to every other person. This prohibition operated so much to discourage this curious art as eventually to occasion its extinction, first in the western and then in the eastern empire, where, however, it existed in certain imperial manufactories till the eleventh century.

Dyeing was little cultivated in antient Greece; the people of Athens wore generally woollen dresses of the natural colour. But the Romans must have bestowed some pains upon this art. In the games of the circus parties were distinguished by colours. Four of these are described by Pliny, the green, the orange, the grey, and the white. The following ingredients were used by their dyers. A crude native alum mixed with copperas, copperas itself, blue vitriol, alkanet, lichen rocellus, or archil, broom, madder, woad, nut-galls, the seeds of pomegranate, and of an Egyptian acacia.

Gage, Cole, Plumier, Réaumur, and Duhamel have severally made researches concerning the colouring juices of shell-fish caught on various shores of the ocean, and have succeeded in forming a purple dye, but they found it much inferior to that furnished by other means. The juice of the buccinum is at first white; it becomes by exposure to air of a yellowish green bordering on blue; it afterwards reddens, and finally changes to a deep purple of considerable vivacity. These circumstances coincide with the minute description of the manner of catching the purple-dye shell-fish which we possess in the work of an eye-witness, Eudocia Macrembolitissa, daughter of the Emperor Constantine VIII., who lived in the eleventh century.

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[*] 'Among other things, there was purple of Hermione (?) to the amount of five thousand talents.' (Plutarch's Lives, translated by Langhorne, Wrangham's edition, vol. v., p. 240.) Horace celebrates the Laconian dye in the following lines:—

Nec Laconicas mihi
Trahunt honestæ purpuras clientæ.
(Carm., lib. ii., Ode 18.)

[†] Pliny says that a pound of the double-dipped Tyrian purple was sold at Rome for a hundred crowns.

The moderns have obtained from the New World several dye-drugs unknown to the antients; such as cochineal, quercitron, Brazil wood, logwood, annatto; and they have discovered the art of using indigo as a dye, which the Romans knew only as a pigment. But the vast superiority of our dyes over those of former times must be ascribed principally to the employment of pure alum and solution of tin as mordants, either alone or mixed with other bases; substances which give to our common dye-stuffs remarkable depth, durability, and lustre. Another improvement in dyeing of more recent date is the application to textile substances of metallic compounds, such as Prussian blue, chrome yellow, manganese brown, &c.

Indigo, the innoxious and beautiful product of an interesting tribe of tropical plants, which is adapted to form the most useful and substantial of all dyes, was actually denounced as a dangerous drug, and forbidden to be used, by our parliament in the reign of Queen Elizabeth. An act was passed authorizing searchers to burn both it and logwood in every dye-house where they could be found. This act remained in full force till the time of Charles II.; that is, for a great part of a century. A foreigner might have supposed that the legislators of England entertained such an affection for their native woad, with which their naked sires used to dye their skins in the old times, that they would allow no outlandish drug to come in competition with it. A most instructive book might be written illustrative of the evils inflicted upon arts, manufactures, and commerce, in consequence of the ignorance of the legislature.

Mr. Delaval made many ingenious experiments to prove that the particles of dye-stuffs possess no power of reflecting light, and that therefore when viewed upon a dark ground they all appear black, whatever colour they may exhibit when seen by light transmitted through them. He hence inferred that the difference of colour shown by dyed cloths is owing to the white light which is reflected from the textile fibres being decomposed in its passage through the superinduced colouring particles. We think it more than probable that this conclusion is in some respects incorrect, and that the aluminous, iron, and tin bases form combinations with dye-stuffs which are capable of reflecting light, independent of the reflection from the fibre itself. There can be no doubt however that this latter reflected light adds greatly to the brightness of the tints, and that the whiter the textile substance is the better dye it will, generally speaking, receive. It is for this reason that scouring or bleaching of the stuffs is usually prescribed as a process preliminary to dyeing.

Bergman appears to have been the first who referred to chemical affinities the phenomena of dyeing. Having plunged wool and silk into two separate vessels, containing solution of indigo in sulphuric acid diluted with a great deal of water, he observed that the wool abstracted much of the colouring matter, and took a deep blue tint, but that the silk was hardly changed. He ascribed this difference to the greater affinity subsisting between the particles of sulphate of indigo and wool, than between these and silk; and he showed that the affinity of the wool is sufficiently energetic to render the solution colourless by attracting the whole of the indigo, while that of the silk can separate only a little of it. He thence concluded that dyes owed both their permanence and their depth to the intensity of that attractive force.

We have therefore to consider in dyeing the play of affinities between the liquid medium in which the dye is dissolved and the fibrous substance to be dyed. When wool is plunged in a bath containing cochineal, tartar, and salt of tin, it readily assumes a beautiful scarlet hue, but when cotton is subjected to the same bath it receives only a feeble pink tinge. Dufay took a piece of cloth woven of woollen warp and cotton weft, and having exposed it to the fulling-mill in order that both kinds of fibres might receive the same treatment, he then subjected it to the scarlet dye; he found that the woollen threads became of a vivid red, while the cotton continued white. By studying these differences of affinity, and by varying the preparations and processes, with the same or different dye-stuffs, we may obtain an indefinite variety of colours of variable solidity and depth of shade.

Dye-stuffs, whether of vegetable or animal origin, though susceptible of solution in water, and, in this state, of penetrating the pores of fibrous bodies, seldom possess alone the power of fixing their particles so durably as to be capable of resisting the action of water, light, and air. For this purpose they require to be aided by another class of bodies, already alluded to, which bodies may not possess any colour in themselves, but serve in this case merely as a bond of union between the dye and the substance to be dyed. These bodies were supposed, in the infancy of the art, to seize the fibres by an agency analogous to that of the teeth of animals, and were hence called *mordants*, from the Latin verb *mordere*, to bite. However preposterous this comparison is now known to be, the term derived from it has gained such a footing in the language of the dyer that all writers upon his art are compelled to adopt it.

Mordants may be regarded, in general, as not only fixing but also occasionally modifying the dye, by forming with the colouring particles an insoluble compound, which is deposited within the textile fibres. Such dyes as are capable of passing from the soluble into the insoluble state, and of thus becoming permanent, without the addition of a mordant, have been called substantive, and all the others have been called adjective colours. Indigo and tannin are perhaps the only dyes of organic origin to which the title substantive can be applied, and even they probably are so altered by atmospheric oxygen, in their fixation upon stuffs, as to form no exception to the true theory of mordants.

Mordants are of primary importance in dyeing; they enable us to vary the colours almost indefinitely with the same dye, to increase their lustre, and to give them a durability which they otherwise could not possess. A mordant is not always a simple agent, but in the mixture of which it consists various compounds may be formed, so that the substances may not act directly, but through a series of transformations. The China blue process [CALICO PRINTING] affords a fine illustration of this truth. Sometimes the mordant is mixed with the colouring matters, sometimes it is applied by itself first of all to the stuff, and at others both these methods are conjoined. We may dye successively with liquors which contain different substances, which will act differently according to the different mordants successively employed. One solution will give up its base to the stuff only when aided by heat; another acts better and more uniformly when cold, though this is a rarer case.

When a mordant consists of a changeable metallic oxide, as of iron or tin, unless great nicety be used in its application, either no effect or an injurious one may be produced upon the dye. All these circumstances prove how necessary it is for the dyer to be thoroughly versed in chemical science. Each of the great dye-works in Alsace, celebrated for the beauty and fixity of their colours, is superintended in the laboratory department by a gentleman who has studied chemistry for two or more sessions in the universities of Paris or some other eminent schools. The numerous complaints which for some time back have been made in foreign markets of the fugitiveness of our calico, but especially of our cloth dyes, ought to rivet the attention of our great manufacturers and merchants on this important desideratum, and to lead them to supply it by consulting qualified persons as to the best means of improving this great branch of national industry.

The first principle of dyeing fast colours, we have seen, consists in causing the colouring matter to undergo such a change, when deposited upon the wool or other stuffs, as to become insoluble in the liquor of the dye-bath. The more powerfully it resists the action of other external agents, the more solid or durable is the dye. Generally speaking, a piece of well-dyed cloth should not be materially affected by hot water, by soap and water, by exposure to air and light, by dilute nitric acid, or even by very dilute aqueous chlorine.

In the following details concerning the art of dyeing we shall consider principally its application to wool and silk, having already treated, in the article CALICO PRINTING, of what is peculiar to cotton and linen.

The operations to which wool and silk are subjected preparatory to being dyed are intended, 1, to separate certain foreign matters from the animal fibre; 2, to render it more apt to unite with such colouring particles as the dyer wishes to fix upon it, as also to take therefrom a more lively and agreeable tint, as well as to be less liable to soil in use

The matters foreign to the fibre are either such as are naturally associated with it during its production by the animal, such as have been added to it in the spinning and weaving operations, or such as have been accidentally applied.

Silk is scoured by means of boiling in soap and water, whereby it is freed from a varnish improperly called gum. This consists of an azotized compound, which may be separated in a gelatinous form by cooling the hot water saturated with it. It constitutes about a fourth part of the weight of most raw silks, and contains a little colouring matter of an orange or yellow hue. When silk is required to be extremely white, either to be woven in that state, or to receive the brightest and purest dyes, it should be exposed to the action of humid sulphurous acid. [SULPHURATION.] For dark dyes, silk need not be scoured at all, in which case it preserves its whole weight. Wool is first washed in running water to separate its coarser impurities; it is then deprived of its *yolk* (a species of animal soap secreted from the skin of the sheep) either by the action of ammoniacal urine, by soap and water, or by a weak lye of carbonate of soda. Common wools lose in this way from 20 to 50 per cent. of their weight, and Merino wools still more. They receive their final bleaching by the fumes of burning sulphur, or by aqueous sulphurous acid.

Wools present remarkable differences in their aptitude of combining with dye-stuffs, which depend upon the different structure of the imbrications of the filaments. (Ure's *Philosophy of Manufactures*, p. 91.) The colouring particles seem to insinuate themselves at these pores with greater or less facility, and to be retained with greater or less force, according to the magnitude and form of the orifices. This difference in dyeing, therefore, is not due to the repulsive action of fatty matter, as has been commonly supposed, since it still exists in wool even when every particle of grease has been removed from it by alcohol and æther. A bran boil is often had recourse to, in order to make wool take the dye more readily and equally; but a hot lye containing one-half per cent. of crystallized carbonate of soda answers much better. When heated to the temperature of 140° or 150° Fahr., four parts of wool should be immersed in that liquor, and turned about for half an hour. The wool receives a faint yellowish tint from this bath, but it speedily becomes white on exposure to air, or it may be whitened at once by passing it through tepid water containing a very small quantity of muriatic acid. The yellow colour is most probably occasioned by the reaction of the sulphur and iron contained in the wool.

According to the experiments of Thenard and Roard, alum combines with wool in the state of a salt, without separation of its acid constituent. Wool boiled with a solution of tartar decomposes a portion of it completely; some of the acid and a little of the tartar combine with the wool, while a neutral tartrate of potash remains in the bath. This fact is interesting in reference to the scarlet dye, showing the important part which tartaric acid here performs.

Tinctorial colours are either simple or compound. The simple are black; brown, or dun; blue; yellow; and red; the compound are gray; purple; green; orange; and other numerous modifications, all producible by the mixture of simple colours. We shall treat here of only *black* and *brown*, to supply an omission in the previous part of the 'Cyclopædia.' The other dyes will be discussed in their alphabetical places.

Black.—If we apply to a white stuff blue, red, and yellow, in certain proportions, the resulting colour will be black. Proceeding on this principle, Father Castel asserted that 15 parts of blue, 5 of red, and 3 of yellow will produce a perfect black; but in making this statement he was influenced rather by theoretical than practical considerations. In fact he has afforded us no means of procuring these simple colours in an absolute state. It is undoubtedly true, however, that red, yellow, and blue, employed in adequate quantities, will produce black: because they will together absorb, or obstruct the passage of all coloured light, or, in other words, cause its total privation, whence blackness must result. If we suppose a piece of cloth, to which these three colours have been communicated, but not in such proportions as to produce a pure black, we shall have a tint corresponding to the colour that is in excess; as, for example, a blue, violet, red, or greenish *black;* and with paler tints we shall have a bluish, violet, red, or greenish *gray*.

Gall-nuts, and a salt of iron, so generally employed for the black dye, give merely a violet or greenish gray, and never a pure black. The pyrolignite of iron, which contains a brown empyreumatic matter, occasions a brown inclining to greenish yellow in light shades, and to chesnut brown in dark hues. By galling cotton and silk, after a bath of pyrolignite of iron, and reiterating the processes several times, a tolerably pure black may be procured. Galls, logwood, and a salt of iron (copperas) produce merely a very deep violet blue; but if they be applied to wool in a hot bath, with frequent exposure to air, the logwood induces a brownness which is favourable to the formation of black.

The black dye for hats is communicated by logwood, copperas, and verdigris mixed in certain proportions in the same bath; from that mixture there results a vast quantity of an ochreous muddy precipitate, amounting to twenty-five per cent. of the copperas employed. This mud forms a deposit upon the hats which not only corrodes the fine beaver filaments, but causes both them and the felt to turn speedily of a rusty brown. A well-dyed black hat should retain its original tint as long as it lasts. There is no process in dyeing so defective as that of hats, or which stands so much in need of scientific amelioration. The hatter tries to wash away this ochreous mud by dilute sulphuric acid, and then counteracts the acid by a weak alkaline bath, thus introducing two adventitious evils as remedies for the first and main evil, which a very little chemical science could obviate.

Since gall-nuts give a blue precipitate with the peroxide salts of iron, they are occasionally replaced by sumach, bablah, &c.; but account should be taken in this substitution of the proportions of red or yellow colouring matter in these substances, relatively to the tannin which alone forms the blue precipitate. When a black of the best possible shade is to be given, the wool should be first grounded with indigo, then passed through a bath of logwood, sumach, and protosulphate of iron (green copperas). Sumach and nutgalls may also be employed in the proportion of 6 to 2½; or the sumach may be replaced by nut-galls, if they be equal to one-third of the sumach prescribed. A good black may be dyed upon an indigo ground with 100 pounds of wool, by taking 200 pounds of logwood, 60 pounds of sumach, 2½ pounds of galls, and 20 pounds of green copperas; and giving three heats of two hours each to the wool, with airings between. A good black, without an indigo blue ground, may be given to 100 pounds of wool, by boiling it in a bath of 25 pounds of alum and 674 of tartar; grounding it with weld and madder; then passing it through a bath of 200 pounds of logwood, 60 of sumach, and 2½ of galls; taking it out, adding to the bath 20 pounds of copperas; lastly, giving it three heats of two hours each time.

The best French black, according to Hellot, may be given to wool by first dyeing it a dark blue in the indigo vat, washing and fulling it; then for every 50 pounds, putting into the copper 8 pounds of bruised galls, and as much logwood tied up in a coarse canvas bag, and boiling them for twelve hours. One-third of the bath thus prepared is to be transferred into another copper with one pound of verdigris, and the wool or stuff is to be worked in this solution without intermission for two hours, the bath being kept hot, but not boiling. After taking out the stuff, another third part of the first bath is to be added along with four pounds of green copperas; the fire must be lowered while this salt is being dissolved, and the bath being refreshed with a little cold water, the stuff is to be worked through it for half an hour, and then aired. Lastly, the residuary third of the first bath is to be now introduced, taking care to squeeze the contents of the bag. From eight to ten pounds of sumach are added, the liquor is just made to boil, then refreshed with some cold water, after which a pound of green copperas being dissolved in it, the stuff is again passed through it for an hour. It is now taken out, aired, washed, then returned to the copper, and worked in the bath for another hour. It is next washed at the river and fulled. A finish is prescribed in the madder-bath.

The ordinary proportions used by the English black dyers for 100 pounds of cloth, previously treated in the indigo vat, are about 5 pounds of copperas, as much nut-galls bruised, and 30 pounds of logwood. They first gall the cloth, and then pass it through the decoction of logwood in which the copperas has been dissolved. A finish of weld is often given after fulling; but this is of doubtful utility, especially when a little soap has been used in the fulling-mill.

Vitalis prefers the pyrolignite of iron to the sulphate for the black dye, and says it produces a softer and more velvety colour. We by no means join in this opinion, having found the pyrolignite apt to communicate a brown tint to the blue black, an effect producible also by using old copperas peroxidized by exposure to air.

The black dye vat, as it gets exhausted, is employed to dye greys of various shades.

Silk is dyed black in two methods, according to the market for which it is made. When sold by weight, as was formerly the practice at Tours, and is now with silk thread in this country, it is an object with the dyer to load it with as much colouring or other matter as possible. Sugar is at present much employed to falsify the weight of English silk thread, as any person may discover by applying a hank of it to his tongue. We have seen thread more than doubled in weight by this fraudulent device. Such silk is called *English black* by the French, who are not suffered to practise this deception. When silk is sold by superficial measure, on the other hand, it becomes the dyer's object to give it a black colour with as little weight of materials as possible. Hence the distinction well known in the trade of heavy and light silks.

The 25 per cent. of weight which silk has lost in scouring may be in a great measure recovered, by giving it a sufficient dose of galls. For this purpose a bath is made by boiling galls equal to two-thirds or three-fourths the weight of the silk for three or four hours in a sufficient quantity of water, and then letting the decoction settle for two hours. The silk must be steeped in this bath from twenty to thirty-six hours, and then washed in the river. The first galling is however commonly given with a bath somewhat spent; and for heavy blacks generally upon unscoured silk. Several successive immersions in gall-baths, and of considerable duration, are usually given to silk, with intervening washings and wringings at the peg.

The silk dyers keep up from year to year a black vat, often of very complex composition. The essential constituents of the vat are sulphate of iron and gum; but many vegetable matters, as well as filings of iron, are usually added. This bath being heated short of boiling, and then allowed to settle for about an hour, the silks are worked in it with much manipulation, occasional wringing out, airing, and re-dipping. As the copperas and gum get exhausted, the bath must be replenished with these ingredients in due proportions. The addition of logwood and verdigris is very useful to the black silk dye, and is now generally made. A ground of walnut peels is a good and cheap preparation for this dye.

We have entered into these theoretical and practical details concerning the black dye, as we conceive them likely to prove useful to our cloth manufacturers, many of whom have hitherto followed too much a blind routine. Every wearer of a black coat or trowsers is soon convinced to his cost that great improvements remain to be made in this department of dyeing.

II. *Brown or dun colour.*—This dye is not so common in this country as on the continent, where the colouring matter is generally produced at a very cheap rate by steeping ripe walnuts with their peels in water for a year or two till the vat acquires a deep brown colour and a fetid smell. This infusion affords very agreeable and permanent brown tints without any mordant, while it preserves the downy softness of the wool, and requires but a simple and economical process. In dyeing with this infusion, a quantity of it proportional to the shade required is to be put into the copper, diluted with water, and made to boil. The cloth or yarn needs merely to be moistened beforehand with tepid water, to be then plunged in the bath, and turned about till sufficiently dyed. Some dyers, however, give the stuff a preparatory mordant of alum, and leave it to drain for twenty-four hours before subjecting it to the bath of walnut-peels.

Sumach is usually employed in this country to dye fawns, and some browns; but more beautiful browns may be given to woollen stuffs by boiling them first with one-fourth their weight of alum and some tartar and copperas; washing, and afterwards dyeing them in a madder bath. The shade of colour depends upon the proportion which the copperas bears to the alum.

A good brown may also be obtained by mordanting every pound of the stuff with two ounces of alum and one ounce of common salt in a boiling bath; and then dyeing it in a bath of logwood to which some copperas has been added: or the stuff dyed red in the madder bath may be turned about in the black dye vat till the required shade be hit.

The finest browns are produced by boiling each pound of the wool with two ounces of alum, dyeing it in a cochineal bath, and then transferring it into a bath containing a little cochineal darkened with acetate of iron. Instead of cochineal the archil or cudbear bath may be used with a little sumach or galls. This forms a cheaper but a more fugitive colour.

A beautiful brown tint, on wool or silk, may be had by first giving a pale blue shade in the indigo vat, then mordanting with alum, washing and finishing in a madder bath till the proper brown be brought up. The Saxon blue vat may also be used. If the stuff be mordanted with alum and tartar, then boiled in a madder bath, afterwards in one of weld or fustic, to which more or less copperas has been added, we shall have a mordore, cinnamon, or chestnut brown. By the combination of olive shades with red, bronze tints may be produced. For twenty-five pounds of stuff a bath containing four pounds of fustic will suffice. Boil the wood two hours, then turn the stuff in the bath for an hour, take it out, and drain. Add to the bath four or six ounces of copperas and a pound of madder or sandal wood; then work the stuff in it till the wished-for shade is attained.

Silk may receive a ground of annatto, and then be dyed in a bath of logwood or Brazil wood, whereby a fine brown tint is obtained.

Catechu is used for giving a bronze and brown to cotton goods. [CALICO-PRINTING.]

Blue colours are dyed with indigo, Prussian blue, and woad. Yellows with fustic, Persian berries, quercitron, turmeric, and weld. Reds, with archil or cudbear, Brazil wood, cochineal, kermes, lac, logwood, madder, safflower, or carthamus.

The purple, green, and orange dyes may be conveniently considered under the heads of SCARLET DYE, INDIGO, and QUERCITRON.

We shall conclude this article with a few practical remarks. M. Roard, long the skilful director of the Gobelins' dye-works, has observed that copper boilers exercise a considerable influence upon delicate dyes. He found that ammonia causes a blue precipitate in the alum bath made in such boilers, while it causes merely a white precipitate in the same bath made in vessels of glass, porcelain, and tin. When wool is kept for some hours in boiling-water contained in a copper vessel, it acquires a greenish gray tint; a result increased by the ordinary mixture of alum and tartar. If into this bath white wool be plunged, it receives a greenish yellow, or sometimes an ochrey hue.

These observations of M. Roard are of considerable importance, and should lead dyers to employ tin or at least brass boilers instead of copper ones for all vivid colours. Heating with steam, either by double vessels, by straight or spiral tubes, ought on all occasions to be preferred in the dye-house to naked fires, which seldom fail to carbonize some portions of the vegetable or animal matters, and thereby to degrade the colours. The top edge, or surface of the boilers should be about three feet and a half above the floor; this being a height which the workmen find most convenient for their manipulations when they stand upon a step 8 or 10 inches high.

The stuffs mordanted with alum should not be transferred to the bath immediately, but be allowed to drain and air for 24 hours. The colours are thereby rendered more lively than when dyed soon after the aluming. As experience has proved that an old alum bath is better than one fresh made, it should not be thrown away, but be strengthened or refreshed by the requisite additions of alum and tartar. It is certain that wools boiled in alum the second time, are more beautiful than those boiled in it the first time.

DYER, JOHN, born in 1700, was the second son of a respectable solicitor of Aberglasney in Caermarthenshire. He received his education at Westminster school, and when that was completed, began the study of the law. An early taste for poetry and painting led him to relinquish his legal pursuits, and he travelled about South Wales in the capacity of an itinerant painter. At this period he wrote his poem 'Grongar Hill,' which was published in 1727. Though he seems to have made but small proficiency in painting, he went to Italy to study, where he wrote the 'Ruins of Rome,' a descriptive poem, published in 1740 On his return to

England, having a small independence, he retired into the country, entered into holy orders, and married a lady named Ensor, said to be a descendant of Shakspeare. He died in 1758, shortly after the publication of his longer poem 'The Fleece,' having gradually improved his fortune.

'The Fleece' is a long unreadable poem, of a purely didactic kind. The middle of the last century was remarkably prolific in poems which took for their model Virgil's 'Georgics.' Dyer's 'Fleece,' Grainger's 'Sugar-cane,' and Phillips's 'Cyder,' are all of this class. By selecting subjects essentially unpoetical, whatever might be the ingenuity of the writers, they could do no more than make a tolerable poem of a bad kind; for they did not confine themselves to a mere outline of the subject, which they might fill up with what colouring they pleased, but essayed to give, in a poetical form, the intricacies and minutiæ of various branches of manufacture. The selection of Virgil's 'Georgics' for a model was in itself a fallacy, as we question whether this work, with all its beauties, would be much read at the present time were it not for the opportunity which it affords of studying one of the most elegant writers of the Augustan age, and for the light it throws on the agriculture of the antients. The 'Ruins of Rome,' with here and there a fine line, seldom rises above mediocrity, and is a very heavy performance.

It is on the poem of his youth, 'Grongar Hill,' that Dyer's reputation depends. There is, perhaps, no depth of thought, no new idea in this work, but it is a most vivid and brilliant combination of pleasing images. The poet invokes the muse to 'draw the landskip bright and strong,' and the muse seems to grant his request. We may conceive the poem to be the work of a man walking up-hill, and struck with the succession of scenery which opens all around, he says the first thing that comes into his head; and as he is affected by none but beautiful prospects, what he says is sure to be pleasing. 'Grongar Hill' will always be a general favourite.

DYKE (in Geology), a fissure caused by the dislocation of strata, commonly also termed a fault. Dykes are of frequent occurrence, and often extend several miles, penetrating generally to an unknown depth. They must have been produced by some violent disturbances, and the amount of dislocation of necessity would vary in proportion to the intensity of the disturbing force. Accordingly there are many dykes of great width and extent, which materially affect the face of the country in which they occur, while there are others so slight that it requires much care and observation to ascertain their existence. The strata are in most cases uplifted on one side of the dyke much higher (varying many fathoms) than those on the other side, and produce an apparent irregularity of strata most perplexing to the geologist. Sometimes it happens that, without any irregularity of surface, two distinct strata appear to form a continuous line, as in the Black Down Hills in Devonshire. [CRETACEOUS GROUP.] In some cases, however, dislocation is found without any alteration of the *level* of the strata on either side, but the appearance of the strata immediately adjacent to the fault sometimes affords proof of the action of fire. [COAL FIELDS.] Dykes are of two distinct characters, depending upon the manner in which they have been filled up, and the substance of which they are composed. Dykes of the first description are those into which igneous rocks are supposed to have been injected in a state of fusion, and now appear as a consolidated mass. [BASALT.] In the second the fissures are filled with the debris, sometimes mixed with clay, of the dislocated strata through which they pass. In some cases the fissure has evidently remained unoccupied for a long period, and the filling up has proceeded gradually from the sides inwards. This is observed very evidently in the carboniferous limestones of England and Wales. Sometimes, in consequence of the great length of time intervening between the production of each coating of calcareous matter, the outside of each is covered with crystals, upon which the next layer has been formed. In the central portions of such fissures cavities are by no means uncommon.

DYLE. [SCHELDE.]

DYNA'MICS (*δύναμις*, force), a word of comparatively modern use, now universally adopted as signifying the science of matter in motion, as distinguished from *statics*, which relates to matter at rest. Under so general a term, our plan requires us simply to refer the reader to the several articles connected with the subject.

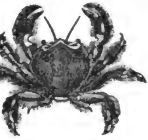
Dynamics may be divided into two distinct parts: the mathematical consideration of motion, without reference to any connexion with its cause, and the experimental investigation of the connexion between pressure and the motion produced by it, together with the mathematical exhibition of the laws under which the second is a consequence of the first. The former branch is purely mathematical, and will be further treated under the head MOTION, RELATIVE; the latter will be found, as to its experimental part, under MOTION, LAWS OF; and as to the mathematical part, under FORCES, IMPRESSED and EFFECTIVE, and VIRTUAL VELOCITIES, PRINCIPLE OF. We need not suggest that such articles as FORCE, GRAVITATION, ATTRACTION, PERCUSSION, FRICTION, &c. &c. contain the details of matters connected with the general term dynamics. The history of dynamics is particularly connected with the names of Galileo, Huyghens, Newton, D'Alembert, and Lagrange. See also on this point MECHANICS, the general term under which statics and dynamics are included.

DYNAM'OMETER (measurer of power), a term which has been applied to an instrument which measures any thing to which the name of power has been given, whether that of an animal, or (to take a very different instance) of a telescope. We have also seen the incorrect term *dynometer*.

DYNO'MENE, a genus of brachyurous crustaceans belonging to the division *Notopoda*, founded by Latreille.

Character.—Ocular pedicles longer than those of *Dromia. Shell* wide, nearly heart-shaped and truncated posteriorly, hairy or bearded. *Two posterior feet only* dorsal, and much smaller than the others.

Example, *Dynomene hispida*, the only species known to M. Latreille. Locality, Isle of France.



Dynomene hispida.

DYRRA'CHIUM. [DURAZZO.]

DY'SENTERY (Δυσεντερία, *Dysenteria*, from δύς, *with difficulty*, and ἔντερον, *intestine; difficultas intestinorum, bloody flux*), a disease in which there is difficulty and pain in passing the stools, which consist of mucus and blood, containing little or no fæculent matter, and generally attended with fever. The desire to evacuate the bowels is frequent and urgent: but the effort is accompanied with severe pain, and is often altogether ineffectual, constituting the affection called tenesmus. What scanty stools are passed consist, as has been stated, of mucus mixed with blood, or of pure blood in considerable quantity; and if any fæculent matter be present, it is commonly in the form of round and hard balls called scybalæ. There is always griping pain in the abdomen. More or less fever is invariably present. The seat of the disease is chiefly in the large intestines: the disease itself consists essentially of inflammation of the mucous membrane.

The forms of this disease, the causes which produce it, the circumstances under which it prevails, the pathological conditions on which its essential characters depend, and its degrees of intensity, are infinitely various; and these modifying influences cause it to assume at different seasons, in different climates, and in different constitutions, the most diversified aspects. It is sometimes a primary, sometimes a consecutive, and sometimes a symptomatic disease. It is now sporadic, now endemic, and occasionally both endemic and epidemic. It is sometimes inflammatory and sthenic, at other times typhoid and asthenic, at one time acute, and at another chronic. These differences are attended with essential differences in the nature of the disease, which not only communicate to it different external aspects, dependent on different internal conditions, but which require totally different remedies.

In the acute form of dysentery, when purely inflammatory, and when mild in character, constipation commonly precedes for some days the attack of diarrhœa. The liquid and frequent stools which at length succeed to this state of constipation soon become streaked with blood; the griping pains which accompany the evacuations, and the straining and tenesmus which follow them, are often attended with distinct chills. The stools may be from eight or ten to sixteen or twenty in the twenty-four hours. The pulse is commonly quick and small, the tongue loaded, and the appetite little impaired.

When the attack is more severe, it is generally attended at the very commencement with diarrhœa, often accompanied with nausea and vomiting, quickly succeeded by scanty, mucous, or gelatinous stools, streaked with blood, preceded by tormina, and followed by tenesmus. The pain in the course of the large intestines may be either severe, or it may not be urgent, but rather a sense of heat and aching than acute pain. Pain, however, is always induced by full pressure over the tract of the colon; and if, in any particular part of this tract, there be urgent pain, some degree of fulness may generally be perceived there. The progress of the disease is indicated by the increasing severity of all the symptoms, and more especially by the increasing frequency of the stools, by the increasing tormina and tenesmus, and the augmentation of the general febrile symptoms. It is not uncommon for from twenty to forty efforts at stool to be made in the twenty-four hours, with the effect of passing only a very small quantity of mucus and blood. In all cases the evacuations are exceedingly offensive; in the worst they are of a cadaverous odour, and the clots of blood are sometimes mixed with pieces of coagulated lymph or fibrin.

In hot climates the disease is still more intense. The heat, the tormina, and the tenesmus, are more urgent and distressing; the thirst becomes excessive, the urine scanty or altogether suppressed, the stools slimy, streaked with blood, and attended with *prolapsus ani*, or watery and ichorous, 'resembling the washings of raw beef, in which float particles or even large shreds of coagulable lymph, thrown off from the acutely-inflamed surface.' In these cases the prostration of strength is extreme, and is increased by most distressing and exhausting vomiting. When, as sometimes happens in this form of the disease, portions of the mucous coat of the intestine slough away, the countenance of the patient is sunk and cadaverous, and the odour of the stools, and in some degree, indeed, of the whole body, is putrid.

In the asthenic form of dysentery, the tormina, tenesmus, and mucous and bloody stools are attended with great depression of all the organic functions, and extreme prostration of strength. The local dysenteric symptoms, exceedingly urgent from the commencement, are rapidly followed by fever of a low nervous or typhoid type. This form of the disease often prevails as an epidemic; and under circumstances favourable to their accumulation and concentration, exhalations from the stools of the sick seem capable of producing dysentery in persons directly exposed to them, previously in a state of sound health. These forms of the disease are very apt to occur in hot seasons and in hot climates, where great numbers of persons are collected together in close and ill-ventilated apartments, in damp and unhealthy situations, as in barracks, garrisons, camps, crowded ships, &c. It is this form of dysentery which rages among the poor in seasons of scarcity, which sometimes destroys whole armies in countries laid waste by war, and which so constantly, in besieged towns, anticipates the havoc of the sword.

The duration of dysentery is as various as its types. It may prove fatal in a few days or hours, or last for weeks and even months, and ultimately destroy life by inflammation and gangrene of the bowels. In some cases the disease ceases spontaneously, the frequency of the stools, the griping and the tenesmus gradually diminishing, while natural stools return; but in other cases the disease with moderate symptoms continues long, and ends in protracted and exhausting diarrhœa.

The causes which predispose to dysentery appear to be long-continued exposure to a high temperature, or alternations of heat and cold; hence the disease is generally most prevalent in summer or autumn, after considerable heats have prevailed for some time, and especially after very warm and at the same time very dry states of the weather. It is certainly more frequent, as well as much more severe, in hot than in cold or even in temperate climates. All observation and experience show that a powerful predisposition to the disease is formed by the habitual use of a high and stimulating diet, and especially by indulgence in spirituous liquors, by excessive fatigue; and by all causes which enfeeble the constitution in general, at the same time that they over excite the alimentary canal in particular.

The exciting causes are long-continued exposure to intense heat, or to sudden and great alternations from heat to cold; exhalations from vegetable and animal matters in a state of decomposition, as from marsh, stagnant, river or sea water, from animalculæ and minute insects, or from the flesh of deceased animals; noxious exhalations from the bodies of persons crowded together in close and confined situations, and more especially, as would appear, from the discharges from the bowels of persons labouring under dysentery; scanty and bad food, consisting more especially of vegetable or animal matter in a state of decay, as tainted meat, stale fish, unwholesome bread, unripe rice, rye, &c.

The inflammatory affection of the mucous membrane of the large intestine in which dysentery essentially consists, passes, in the severe forms of the disease, into ulceration and even gangrene. On the examination of the large intestine in fatal cases after death, there is often found effusion of coagulable lymph, ulcers of various forms, and patches more or less extensive of mortification. In the most malignant varieties the internal surface of the whole alimentary canal is of a livid, purple, or dark colour, with patches of excoriation, ulceration, and gangrene.

In the acute form of dysentery, when the fever is high, the pain intense, and the inflammation active, blood-letting from the arm is indispensable, which must be repeated to the subdual of the acute inflammatory symptoms. After a moderate general blood-letting, however, the local abstraction of blood by leeching or cupping is more efficacious: the number and the repetition of the leeches must of course depend on the urgency of the pain and the strength of the patient. The employment of purgative remedies in dysentery requires the greatest discrimination and caution. If the colon be distended with feculent matter which it cannot discharge, no remedies will succeed until this accumulation is removed; if, on the contrary, there have been already frequent and copious discharges of feculent matter, the administration of purgatives is absurd, for all purgatives are irritants, and the diseased membrane is already in a state of intense excitement. The practitioner should therefore carefully examine the state of the bowels with regard to their fullness or emptiness of fæcal matter, and their actual state in this respect can almost always be ascertained with a great degree of certainty if due pains be taken to discover it. If there be reason to suppose that there is any accumulation of fæces, the mildest purgatives should be given, of which the best is castor oil, and this should be cautiously repeated until the irritating matter is wholly removed. Great relief is at the same time afforded to the distressing tormina and tenesmus by emollient and opiate enemas injected in very small quantities. After the subdual of the inflammatory state by blood-letting, and the evacution of the accumulated fæces by mild purgatives, the great object is to soothe the irritated membrane by opiates, on the judicious employment of which, and the skilful combination and alternation of this class of remedies with mild purgatives, the successful treatment of ordinary dysentery mainly depends. The acute forms of dysentery in hot climates require a prompt and decided combination of remedies, the best selection and administration of which it is impossible to discuss here. The asthenic forms with typhoid symptoms need a guarded yet active treatment, nearly the same as that which is proper to typhus fever with abdominal affection. [Fever.]

DYSPE'PSIA (Δυσπεψια, *dyspépsia*). *Indigestion*, the difficult and imperfect conversion of the food into nutriment. Digestion is a part of the great function of nutrition; its ultimate object is to convert the aliment into blood. Between the articles taken as food and the nutrient fluid of the body—the blood, there is no obvious analogy, and there is a wide difference in nature. Hence the function of digestion consists of a succession of stages, at each of which the food undergoes a specific change. Each change is effected by a peculiar process, for the accomplishment of which a special apparatus is provided. Of these processes the chief are mastication, deglutition, chymification, chylification, and fæcation. The delicacy and complexity of the apparatus by which each of these processes is carried on has been already shown. [Digestion.] The healthy condition and the natural action of every individual organ belonging to the portion of the apparatus proper to each of these processes is necessary to the sound state of the function of digestion. It is easy therefore to see by how many causes it may be disturbed; in how many different organs the source of the disturbance may have its seat, of how varied a nature the disturbance may be, and how greatly the disturbance of the digestive function may derange the other functions of the body.

In the history of the human family there is no known community of human beings in any country, and no age of human life, in which the first necessity of existence, that of taking food for the nourishment of the body, is not the cause of disease and death to great numbers, and of uneasiness, nay, sometimes even of intense pain to far greater numbers. Why is this? Why is the digestive process more productive of suffering, disease, and death in man than in the lower animals of a similar structure, in which the function, considered in a physiological point of view, is scarcely at all less complex? The correct answer to this question would include a clear account of the causes of dyspepsia, and would suggest the appropriate remedies for the disease.

Digestion being an organic function, when this function is healthfully performed, for reasons which have been fully developed, it is unattended with consciousness. The first effect of the disturbance of this function is to render the patient not only conscious, but painfully conscious, that he has a stomach. A sense of nausea, sometimes, when the affection is severe, even vomiting, an obscure feeling of uneasiness, fulness, distension, weight in the region of the stomach, occasionally amounting to pain, and even severe pain, flatulence, eructation, a sensation of sinking, and lastly, a loss of appetite, constitute the train of uneasy sensations which, coming on after the reception of food, indicate disordered digestion, and which take the place of the feelings of refreshment and exhiliration which result from healthy digestion.

When these uneasy sensations are occasioned by a disordered state of the stomach, it is easy to understand, from the exposition already given of the structure and function of this organ [DIGESTION], that the disorder may consist in a derangement either of its secreting arteries, or its mucous glands, or its organic nerves, or its muscular fibres, inducing a deficient secretion of the gastric juice, a deficient secretion of mucus, a diminished or increased irritability of the muscular fibres, by which the motions of the stomach are disturbed. If the gastric juice be deficient, the first step in the digestive process cannot take place, the food cannot be dissolved; if the mucus be excessive, the contact of the gastric juice with the food may be prevented: if the muscular fibres of the stomach are torpid or too irritable, the food may be detained too long or too short a time in the stomach.

The causes of dyspepsia are either those which act directly and immediately upon the stomach itself, or those which act upon the whole body or upon particular parts of it, but which still affect the stomach principally and almost solely.

Of the first kind are noxious, irritating, and indigestible substances taken into the stomach as articles of food or drink, such as tainted meat, decayed vegetables, unripe fruit, very acid matters, ardent spirits, &c.; and even wholesome food taken too frequently or in too large a quantity, especially when its nature is very nutritious, as when it consists principally of animal matter, or when a large quantity of nutriment is presented to the stomach in a very concentrated form, or is rendered too stimulating by being highly seasoned; the abuse of fermented and spirituous liquors, which is one of the most frequent causes of dyspepsia in its severest and most fatal forms; and large quantities of fluids, habitually taken at too high a temperature, as very hot tea, coffee, or soup.

Of the second kind, or the causes which act upon the whole body or upon particular parts and functions of it, are —want of pure air: hence the frequency of dyspepsia in large and crowded cities, and more especially in narrow and confined lanes and alleys, in the dirty and ill-ventilated houses of the poor. Want of exercise: from physical inactivity all the organs of the body languish, but the stomach first and most. Intense study or close application to business too long continued, implying both want of air and want of exercise. Mental emotion, more especially the depressing passions, fear, grief, vexation, disappointment, anxiety and hope deferred. Exposure to the influence of cold and moisture. In persons with weak stomachs and delicate skins, a cold damp day, more especially suddenly succeeding a hot day, often produces a severe attack of dyspepsia. Hence it is that dyspeptic complaints are so prevalent when cold and damp weather first sets in. Cold is a sedative to the nervous system, as heat is an excitant; and the depressing effects of cold seem to be peculiarly manifested in the nerves of the stomach. Excessive discharges from the body, as flooding, leucorrhœa, large bleedings from the arm, profuse and long-continued sweating, and above all protracted suckling. It is a common practice among the poor in this country to suckle their children too long. A feeble woman is often seen with a strong child at her breast a year and a half or two years old. The effect upon the constitution of the mother is most pernicious. Emaciation, sharpness of the features, with a peculiar expression in the countenance of languor and exhaustion, a sense of sinking at the pit of the stomach, dimness of sight, giddiness, spectra of different kinds dancing before the eyes, headache, with a small, quick, and sometimes almost imperceptible pulse, and total loss of appetite, are the peculiar characters of this variety of dyspepsia.

The state of dyspepsia is most frequently a state merely of disordered function, without any appreciable change of structure in any of the tissues of the stomach. But all the symptoms of dyspepsia are produced in their intensest degree when they arise from some organic disease of the stomach. Of these the most frequent is inflammation of its mucous coat. This inflammation may be either acute or subacute. When acute, the nature of the malady is indicated by characters so striking that it cannot be overlooked; but the subacute form often exists for a long period quite unsuspected, producing violent and obstinate dyspepsia, which is often greatly aggravated by the remedies employed to remove the complaint. The diagnostic sign of this form of the disease is tenderness on pressure in the epigastric region. In scirrhus of the pylorus and ulceration of the mucous glands of the stomach, organic disease not of unfrequent occurrence, there is superadded to the ordinary signs of dyspepsia a peculiar train of symptoms scarcely to be overlooked or mistaken.

But dyspepsia is often the result of disease situated not in the stomach, but in some other organ. The stomach has been justly called the centre of sympathies, and there is scarcely any disorder of the body which does not affect the functions of the stomach in a greater or less degree. The organs the diseases of which are most apt to produce disorder of the stomach are the liver, the spleen, the uterus, the kidney, the bronchi, and the skin. In this secondary form of dyspepsia, the disease cannot be removed unless the seat of the primary affection, and the true nature of that affection, be ascertained.

The stomach is the organ in which chymification is effected. Chylification is accomplished in the duodenum, and completed in the jejunum, ilium, and mesenteric glands; and the highly important part of the digestive process, that which consists in eliminating and carrying out of the system the non-nutrient portion of the aliment, is performed by the large intestines. Each of these organs may be the primary seat of disease, giving rise to the ordinary symptoms of dyspepsia; but to these there will generally be superadded peculiar signs pointing out the real seat of the malady, signs almost always to be observed if carefully looked for, and the detection of which is of the utmost importance in the treatment of the disease.

The indications of cure are to avoid or remove the remote causes, to remove the symptoms which especially contribute to aggravate and continue the disease, and to restore the healthy tone of the disordered organs. There is no drug, no class of medicines, no one mode of treatment capable of removing dyspepsia when present, or of preventing its recurrence. This can only be done by a careful study of the exact cause of the disease in every individual case, and the precise seat and nature of the affection. The mode of treatment must be modified in strict accordance with these circumstances; and no mode of treatment will be attended with success of which the appropriate regulation of the diet and exercise does not form an essential part.

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E.

E occupies the fifth place in the Hebrew alphabet and those derived from it. The vowels, when arranged according to their physical affinity, would lie in the series *i, e, a, o, u* [ALPHABET], and accordingly the vowel *e* is frequently interchanged with its neighbours *i* and *a*. It is occasionally convertible with *o* and *u*.

1. *E* is interchanged with *i*. Thus in Latin the old datives *heri, mani, ruri, musai,* afterwards took the forms *here, mane, rure, musae;* and the words *magis, videris, tristis,* when they appeared without an *s*, were written *mage, videre, triste.* The same interchange appears in the declension of the adjective *is, ea, id,* and the conjugation of the verbs *eo* and *queo.*

2. *E* in Latin often corresponds to *oi* in French. Thus many Latin infinitives in *ere* reappear in French with the termination *oir*, as *habere, debere; avoir, devoir.* The Latin past imperfect has the suffix *eba*, which passed through the forms *eva* and *ea* to *oie* and *oi*. Thus from *habebam* were deduced *aveva, avea, avoie,* and lastly *avois.* This final *s* does not appear in the oldest forms of the French language. Other instances of the change of *o* into *oi* may be seen in the Latin adjectives and other words in *ensis* or *esis*, which in French have the suffix *ois*, as *Viennensis, Viennois; mensis, mois.*

3. *E* Latin into *ie* French, as *mel, bene, ped; miel, bien, pied.*

4. *E* into *a*. This is well marked in the dialects of the Greek σοφιη, Ionic; σοφια, Doric, &c. Hence the Latins have often an *a* where the common dialect of the Greek had *e*, as μηχανη, πληγη; Lat. *machina, plaga.* Both forms often coexist in Latin, as *tristitia* and *tristitie.* The *a* is often changed into *e* in Latin, if a prefix is added, particularly if two consonants follow the vowel, as *factus, confectus; pars, expers; castus, incestus; ars, iners.*

5. *E* into *o*. Especially in Greek, as λεγω, λογος; νεμω, νομος. The Latin language prefers the *o*, as ἐμεω, *vomo;* πεπτω, *coquo;* νεος, *novus.* This change is particularly common in words beginning with a *w*, or with what was pronounced as a *w*, the Latin *v*. Thus *vester, velim, verto, veto,* were once written *voster, volim, vorto, voto.* Even in our own language *worm* (vermis, Lat.), and *work* (ἐργον, Gr.), are now pronounced as if written with an *e*. The Greek even interchanges a long *o* with a long *e*, as πατηρ, ἀπατωρ, εὐπατωρ.

6. *ĕ* Greek is changed into *u* in Latin before an *l*, as Σικελος, Siculus.

E (in music), the third note or degree of the diatonic scale, answering to the *mi* of the Italians and French.

EADMER, or EDMER, the friend and historian of Archbishop Anselm, lived in the twelfth century, but we have no information respecting his parents, or the particular time and place of his nativity. He received a learned education, was a monk of Canterbury, and became the bosom friend and inseparable companion of two archbishops of that see, St. Anselm and his successor Ralph. To the former of these he was appointed spiritual director by the pope. In 1120, by the desire of Alexander I. of Scotland, he was elected bishop of St. Andrews: but on the day of his election a dispute arose between the king and him respecting his consecration. Eadmer wished to be consecrated by the archbishop of Canterbury, who, he contended, was the primate of all Britain; while Alexander contended that the see of Canterbury had no pre-eminence over that of St. Andrews. Eadmer finally abandoned his bishopric and returned to England, where he was kindly received by the archbishop and clergy of Canterbury, who yet thought him too precipitate in leaving his bishopric. Eadmer at last wrote a long and submissive letter to the king of Scotland, but without producing the desired effect. Wharton fixes his death in 1124, the very year in which the bishopric of St. Andrews was filled up. Eadmer is now best known for his history of the affairs of England in his own time, from 1066 to 1122, in which he has inserted many original papers, and preserved many facts which are no where else to be found. His style is regular and good, and his work more free from legendary tales than is usual with the works of his time. The best edition is that by Selden, intitled 'Eadmeri Monachi Cantuariensis Historiæ Novorum, sive sui Sæculi, Libri Sex,' fol., London, 1623. His life of St. Anselm was first printed in 12mo, at Antwerp, in 1551, under the title of 'Fratris *Edmeri* Angli de Vita D. Anselmi Archiepiscopi Cantuariensis, Libri duo.' Several others of his works, with the 'Historia Novorum,' were edited by the congregation of St. Maur at the end of Father Gerberon's editions of the works of St. Anselm, fol., Par., 1675 and 1721. His Lives of St. Wilfrid, St. Oswald, St. Dunstan, &c., with that of St. Anselm, were inserted by Wharton in his Anglia Sacra. (Tanner, *Bibl. Brit. Hib.;* Præf. ad *Opera S. Anselmi* ut supr.; Chalmers's *Biogr. Dict.*)

EAGLE. [FALCONIDÆ.]

EAGLE (constellation). [AQUILA.]

EAGLE (coin). [MONEY.]

EAGLE, Roman Standard. The eagle, as a symbol of empire, is often seen on antient coins and medals, and on none more frequently than on those of the Ptolemies of Egypt and the Seleucidæ of Syria. As an ensign or standard, borne upon a spear, it was used by the Persians in the time of the younger Cyrus. (Xenoph. *Anab.* i. 10.)

Pliny (*Hist. Nat.* li. x. c. 4, edit. Hardouin, tom. i. p. 549) says that, till the time of C. Marius, the Romans used five different animals for standards—the wolf, the minotaur, the horse, the boar, and the eagle—but that in Marius's second consulate they adopted the eagle as the sole ensign for their legions.

The eagle used by the Romans as a standard was of gold or silver: the latter metal, we are told by Pliny, was most frequently used, as the more glittering, and of course more readily seen. It was borne, like the Persian eagle, on the summit of a spear, and was of the size of a pigeon, with its wings displayed. It sometimes rested upon a cross bar on the top of the spear, and sometimes upon shields piled up. On the reverses of some of the coins of Augustus and Galba, in second brass, the legionary eagle is represented holding the thunderbolt in its talons. The small size of the eagle often contributed to its concealment, when the legion to which it belonged was defeated. The name of the legion was usually engraved upon it. Tacitus, in his *Annals* l. i. 60. relates the finding of the eagle of the nineteenth legion by Germanicus, which had been lost in the massacre of Varus.

Cicero (*Catilin.* i. c. 24) says that Catiline had a silver eagle in his house as his tutelar divinity, which was also his standard in war.

A Roman eagle in steel, found at Silchester, presumed to have been a legionary eagle, was exhibited to the Society of Antiquaries in 1788 by the then bishop of Carlisle.

The reader will see a great deal of learning displayed upon this and the standard of the cohorts in M. Le Beau's 'Quatorzième Mémoire sur la Legion Romaine; Des Enseignes.' Mem. de l'Académie des Inscript. tom. xxxv. 4to. Par. 1770, pp. 277-308.

EAGLE-WOOD, one of those substances of which the name, from similarity of sound in a foreign language, has been converted into another having no reference to its original signification. It is a highly fragrant wood, much esteemed by Asiatics for burning as incense, and known in Europe by its present designation ever since the Portuguese visited and imported the substance direct from the Malayan islands and the kingdom of Siam, where it has always been abundant, and long established as an article of commerce. The Malayan name is *agila*, whence the wood was called pao-d'agila by the Portuguese, and has since been converted into pao-d'aguila, and pao-d'aquila, bois-d'aigle, eagle-wood, and agel-hout.

From the Malayan *agila* has probably been derived the Sanscrit *agara*, whence we have the Hindu *aggur*, if not from the more familiar appellation of *garoo*, by which eagle-wood is also known in the Malayan Archipelago. In Persian works on Materia Medica in use in India, we learn from Dr. Royle (*Illustr. of Himal. Bot.*, &c.) that several kinds of fragrant wood are described under the Arabic name *aod* (*haud* and *ud* of Garcias), and that he himself obtained three kinds in the bazaars of India, called *aod-i-hinder*, *aod-i-chinee*, and *aod-i-kimaree* (evidently the al-cemericum of Arabian authors), and that with the above Hindu a Greek synonyme, *agallochee*, is also given, and more especially applied to aod-i-kimaree, which is also called *aod-i-bukhoor*, incense-wood. As agallochee is no doubt a corruption of the *agallochum* of Dioscorides, described by him as a fragrant wood from India and Arabia, it is interesting to find that the translators from the Greek into the Arabic of the school of Bagdad settled these synonyms at a time when they must have been well acquainted, from their profession and position, with the substances to which both the Greek and Arabic names were applied. Serapion and Avicenna describe several kinds of this fragrant wood, and the latter under both agalugen or aghaloojee, and *aod*, which in the Latin version is translated *Xyloaloe*, a name that was applied by the later Greek medical writers to agallochum, whence we have lignum aloes, lign-aloe, and aloes-wood, the origin of which it is difficult, if not impossible, to ascertain, unless we suppose it to be a corruption of *agila;* for the bitter, scentless, spongy-textured stems of the genus aloe could not afford any substitute for this fragrant wood, or be thought to yield it, at least by the Arabs, who were well acquainted with, and accurately describe aloes, and the place, Socotra, where the best kind is found. Though Dioscorides notices only one, which some supposed to be the Tarum of Pliny, several kinds of agallochum are described by Serapion and Avicenna, which, as it is not possible at present to identify, it is unnecessary to notice, and therefore we shall refer only to the three kinds which have been traced to the trees yielding them, by naturalists who have visited the countries where these are indigenous.

An *Aguila brava* (wild) is mentioned by Garcias as produced near Cape Comorin, in the southern part of the Indian peninsula, and in the island of Ceylon; but the tree yielding this wood has not been ascertained. Rumphius (*Herb. Amb.* ii. p. 40), describes two kinds of *agallochum spurium*, found in Borneo and Sumatra, one of which he calls *Garo Tejampaca*, which is described as having leaves and flowers resembling those of the celebrated champa, *Michelia champaca*, and may be a species of the same genus. A third kind of spurious agallochum, differing much from the others as well as from the genuine, he describes in another part of his work, ii. p. 240, as the produce of his *Arbor excæcans*, so called from the acridity of its juice blinding people, and which is the *Excæcaria agallocha* of Linnæus. Considering that Rumphius, in originally describing this tree, has said 'Lignum hoc tantam cum agallocha similitudinem,' and as affording a substitute for that substance, it is not surprising that it should be frequently quoted as the tree which yields the genuine agallochum, or aloes-wood. Fée (*Hist. Nat. Pharm.*) states that he had seen a genuine specimen of the wood of this tree, and that its fragrance cannot be compared with the agallochum of Loureiro. Dr. Roxburgh mentions that the wood-cutters of the Delta of the Ganges, though well acquainted with the highly acrid and very dangerous milky juice of this tree (there called geria), do not mention agallochum of any kind being found in this tree.

Of the two kinds of agallochum which are most valued, and both considered genuine, one is distinguished by the name of Calambac, and the other as the Garo of Malacca.

The first, called calambac, and *agallochum primarium* by Rumphius, appears, as far as hitherto known, to be a native of Cochin China only, growing on the mountains of that country in about 13° of N. lat., near the great river Lavum, which may be the Meikeng flowing between Cochin China and the Laos. This tree was named *Aloexylum agallochum* by Loureiro, *Fl. Cochin Chinensis*, p. 327, and placed by him in Decandria Monogynia, and described as a lofty tree with erect stem and branches, long lanceolate shining leaves, terminal bunches of flowers, with a woody, falcate, one-seeded pod for its fruit, whence it is referred by De Candolle to the natural family of Leguminosæ. Loureiro states that the wood of this tree is white and inodorous, and that its fragrance is the result of disease, when the oily portions thicken into resin in the central parts of the tree, and that no part of the tree is milky or poisonous, but that paper is made from its bark in Cochin China, as in Japan from that of the mulberry.

The next kind of agallochum is that commonly called *garos*, and to which the name of eagle-wood is more frequently applied, and which has long been an article of export from Malacca and the kingdom of Siam. Specimens of the tree which yield this were first obtained by M. Sonnerat in his second voyage to India, from which probably have been given the figure and description by Lamarck. (*Enc. Méth.*, i., p. 49, Illustr. t. 376.) The plant he named *Aquilaria Malaccensis*. This, the *Garo de Malacca*, was introduced by Dr. Roxburgh into the Botanic Garden of Calcutta, and was not to be distinguished from specimens of a tree called *ugoon*, which is a native of the mountainous tracts east and south-east from Silhet, between 24° and 25° of N. lat., which flowers in April, and ripens its seed in August, and which he says there can be little or no doubt furnishes the real Calambac or Agallochum of the antients; adding, that there seems more reason to think that it was carried to China from our eastern frontier, than to suppose it was carried from Cochin China, or any other country in the vicinity of China, where it has always been in great demand. Small quantities are sometimes imported into Calcutta by sea, from the eastward; but such is always deemed inferior to that of Silhet. (*Fl. Ind.* ii. p. 423.) As the Malacca plant had not flowered, Dr. Roxburgh was unable to decide that they were positively the same with those from Silhet, and therefore named these *Aquilaria agallocha*, as another species of the same genus. By this name it has been figured in Royle's *Illustr.* i. 36, f. 1, from a drawing by Dr. Hamilton of a plant which he called Agallochum officinarum, and which he found near Goalpara, on the eastern frontier of Bengal. This drawing is illustrated with dissections by Dr. Lindley To the above-quoted work, and the latter's 'Natural System of Botany,' we refer for the botanical details and the characters of the family of *Aquilariaceæ*, to which this genus gives its name. The fragrant nature of genuine agila or eagle-wood is well known, and that it has from very early periods been employed both by the natives of India and of China as incense. Mr. Finlayson, in his visit to Siam, says, that the consumption of this highly odoriferous wood is very considerable in Siam, but that the greatest part is exported to China. In the latter, it is used in a very economical manner; the wood being reduced to a fine powder and mixed with a gummy substance is laid over a small slip of wood, about the size of bull-rush, so as to form a pretty thick coating. This is lighted, and gives out a feeble but grateful perfume. French authors inform us that the eagle-wood was burned as a perfume by Napoleon in the imperial palace.

We cannot conclude this subject without inquiring whether the substances of which we have been treating are the lign-aloes of Scripture, *ahaloth*, masc. *ahel*, whose plural is *ahalim*. It would be impossible to do justice to the subject in a small compass, or without referring to the numerous dissertations which have been written on it; but it may be observed, that these might have been much shortened, if the authors had been naturalists, or intimately acquainted with the natural history and usages of eastern countries; such information would at least have prevented any species of aloe being considered or figured as the far-famed and fragrant lign-aloe from a mere similarity in sound. In the present instance, the difficulty is increased by the supposed necessity of reconciling the different passages in which lign-aloes are mentioned, as in *Numbers*, xxiv. 6, where it is mentioned as a tree planted; but in the three other passages, *Prov.* vii. 17, *Psalms* xiv. 9, and *Canticles*, iv. 14, it is enumerated with the most fragrant products of the East, as cinnamon, cassia, calamus, camphor, frankincense, myrrh, spikenard, and saffron. Here we may observe, that a substance which was indigenous in a country was not likely to have been an article also of commerce from a far country in those early times; and that therefore, as it is disputed whether the word shall be translated *tents* or *lign-aloes*, the word may perhaps be used in a poetical sense, as it is thought to be by some commentators. In the three passages, it may be noted, that, except sandal-wood, there is no other substance which could be so well enumerated with those with which it is found in connexion as the agila wood of the East, whether we consider its high price, delicate perfume, or the long time in which it has been held in high estimation, while the similarity of its name is at the same time remarkable.

EAGRE. [Bore.]

EAR. Many animals unquestionably enjoy the faculty of hearing to a limited extent, which are found, upon examination, to be unprovided with organs exclusively appropriated to the concentration and transmission of sound. In fact, the sense of hearing is, strictly speaking, only a refinement of the sense of touch. The impressions with which it is conversant arise wholly [Acoustics] from peculiar undulations of the particles of ordinary matter, propagated in obedience to its ordinary laws through the medium in which the animal lives, and impinging more or less immediately upon a sensitive part; they have no necessary dependence, like those of sight, upon the agency of the more subtle fluids; nor have they any connexion, like those of smell and taste, with what may be called the *chemical* properties of matter. If to these considerations it be added that the vibratile substances which are commonly found to inclose the sensorium are not ill qualified to participate in the undulations of the surrounding medium, and carry them onwards to the internal seat of perception, the reader will be prepared to learn that the only *essential* part of the organ of hearing is a *nerve*, not materially different from those of common sensation, lodged at a sufficient depth to be secured from external injury, and sufficiently sensitive to be affected by these delicate impulses. This is called the *acoustic* or *auditory* nerve.

It is probable that even the lowest animals provided with a nervous system are able to perceive the notices thus conveyed of external objects, and turn them to account in the degree necessary for their security and comfort. But to meet the increasing wants and minister to the multiplied faculties of the more complete animals, various subsidiary parts are found to be added in something like a regular succession as we advance upwards in the scale, each lower grade possessing the rudiments of some additional provision more fully developed in the next above, till the organ reaches its greatest amplification and final perfection in man and the other mammalia. The particular use of many of these subsidiary parts has not yet been explained. We know in general that they must increase the force and vividness of the impression; that they afford indications of its direction, and the means of appreciating minute shades of difference in its kind and degree, and in the frequency of its repetition; that some of them add to the security of the organ without impairing its delicacy; and that others serve to adjust its position and to adapt it to various changes in the state of the atmosphere. It would be superfluous, in a work addressed to the general reader, and limited in space, to trace these gradual and complicated changes: we must content ourselves with noticing some of the most important of them, and then pass on to the description of the organ as it exists in man: advising the curious inquirer, after he has made himself acquainted with the details of that organ and with the classification of animals by Cuvier, an outline of which is given in a former part of this work [ANATOMY, COMPARATIVE], to consult the admirable essay on this subject by Professor Grant, in the third part of his 'Outlines of Comparative Anatomy,' where he will find a comprehensive and masterly summary of all that is known on the subject, from which we should be inclined to quote largely here, were space allowed and selection easy.

The *Radiata* (star-fish, sponges, &c.), which constitute the lowest, and in point of variety and number by far the most comprehensive division of Cuvier, appear to be universally unprovided with an organ of hearing: many of them have no nervous system, and are therefore probably altogether devoid of the sense.

The *Articulata*, which form the next division, are all furnished with a nervous system, and it is likely that they all enjoy the sense of hearing. Indeed, some of them are able to express their feelings and wants to their fellows by means of peculiar sounds, of which the cricket and queen bee are well-known examples. We find accordingly, that in many of the more perfect species the extremity of the acoustic nerve is expanded upon a simple kind of auditory instrument consisting of a whitish membranous bag of fluid, placed within the head in a somewhat larger cavity, the space between them being also occupied by fluid. This cavity is situated near the outer feelers, or *antennæ*. When the animal lives in water, it is commonly complete; if in air, there is a round external opening closed by a thin, tense and transparent membrane, showing the white colour within, to which the bag adheres, and which receives, concentrates, and transmits the sonorous vibrations of the surrounding medium. This kind of arrangement seems to be necessary, among other reasons, for the purpose of indicating the direction of the sound, which is probably made known in part by the clearer vibration of the membrane when turned in that direction, and in part by a comparison of the impressions on the two sides; for this organ, like all others which bring the animal into relation with the outer world (as distinguished from *vital* organs), is always double and symmetrical. It may be observed that the nerve distributed to the membranous bag just described is given on by that which supplies the antenna with its exquisite sense of touch: some have thought, but perhaps erroneously, that the faculty of hearing resides in the antennæ themselves.

The parts we have enumerated are all found, with others, in the higher animals, and may be considered as the most essential parts of an organ of distinct hearing. The cavity is called the *vestibule;* the soft membranous bag of fluid is the *vestibular sac;* the round external opening is called, from its shape in man and most other animals, the *fenestra ovalis;* the fluids within and without the sac are called respectively the *endo-lymph* and *peri-lymph*, (ἔνδον within, περὶ around); the latter, being analogous to the fluid discovered by Cotugno in the internal ear of mammalia is sometimes called, after his name, the *liquor Cotunni*.

The principal tribes of the Articulata ascertained to possess organs of this kind are the air-breathing *insects* of the orders *Hymenoptera* (bees), *Orthoptera* (grasshoppers), and *Coleoptera* (beetles); the *Arachnida* (spiders), and the *Decapodous crustacea*, such as the lobster and crab. In the common black beetle they are very conspicuous, appearing externally in the form of round white points on the head, a little nearer the middle line, and somewhat higher than the base of the long outer antennæ. In the lobster they are contained in a small nipple-like prominence or *papilla* upon the under part of the moveable base of the antennæ, looking downwards and forwards. This papilla consists of a substance harder and more brittle and probably more vibratile than the rest of the shell.

The *Mollusca*, though placed higher in the scale of animals by Cuvier, do not afford so many examples of animals possessing a distinct organ of hearing as the Articulata. Such as have been discovered all belong to the order of the *Cephalopods* with two *branchiæ*, or gills, which approach more nearly to the true fishes in their structure than the other mollusks.

In the *Sepia*, or cuttle-fish, which belongs to this order, and which may be taken as a type of the rest, there is a protuberance under the elastic gristly integument at the back part of the head which contains the ear. It consists of a pair of symmetrical vestibules, each containing an oval *sac* filled and surrounded with fluid. On the interior surface of this sac the acoustic nerve is expanded in the form of a white mucous pulp. The sac is supported in the perilymph not only by an adhesion to the inner side of the parietes of the vestibule at the entrance of the nerve, but also by a fine net-work of fibrils which pass from its outer surface to numerous prominent points on the inner surface of the vestibule. There is no fenestra ovalis, or membrane, as in the lobster and the air-breathing insects, but the sac contains a small loose bony or chalky concretion, called an *otolithe* (οὖς-ὠτὸς, the ear, and λίθος, a stone), which answers the same purpose, namely, to indicate the degree and direction of sound; for just as we estimate a weight by poising it in the hand, or, if it be suspended, by gently pushing it from us—thus measuring in our minds the muscular tension necessary to support it, or the force required to overcome its inertia, and conscious of the direction in which we exert our muscles—so, conversely (the weight and inertia of the *lapillus* always remaining the same), the degree and direction of a vibratory force affecting it from without through the medium of the integuments, the parietes of the vestibule, and the fluids within, may be estimated by a consciousness on the part of the animal of the nature of the stress on the sensitive membranes and fibrils which support it, which by their elasticity restrain and redress the slight movements impressed upon it. This should be borne in mind; for, as we shall see further on, it is in some degree by the exertion of the *muscular sense*, as Sir Charles Bell has called that by which we judge of weight and tension, that the human ear is enabled to estimate the intensity of sound. Other curious particulars as to the function of otolithes might be enlarged upon; but we have said enough to explain, as we think, the most important of them; and to correct the misstatements of authors who tell us that they are intended to *increase* the intensity of the vibrations of sound: they appear to us rather calculated to diminish it, as the board floating in the bucket of the water-carrier tends to prevent the fluid from dashing over the side. They undoubtedly play an important part in the organ of hearing, especially in the larger fishes, where they are more numerous, and attain a considerable size;

but it is difficult to conceive that they are possessed of any *intensative* power.

The *vertebrated* classes of the animal kingdom, comprising the true fish, reptiles, birds, and the mammalia, are all provided with acoustic organs, which are very various in their degrees of complexity, but much exceed in that respect the comparatively simple organs of the inferior divisions.

[*] In the cartilaginous fishes, such as the ray and the shark, the vestibule is deeply imbedded in the elastic walls of the back part of the cranium, near its junction with the spine. The fenestra ovalis, closed by a tense transparent membrane, faces upwards, backwards, and towards the middle line. The membrane is placed obliquely at the bottom of a more superficial, flattened, tubular cavity, which terminates beneath the integument in a kind of forked extremity, and may be considered as a rudiment of the *tympanum*, or middle ear, of the higher vertebrata, with its eustachian tube. The inner surface of the membrane is turned towards three *sacculi*, one of which is much larger than the rest, arranged at the opposite side of the cavity of the vestibule, and containing each an otolithe. The sacs are filled with a thick gelatinous endolymph, which adheres to the lapilli, and serves, with minute filaments such as those in the *sepia*, to steady them. The vestibule is filled with a limpid aqueous perilymph, traversed in all directions by a fine cellular network, by means of which its contents are supported in their relative situations. Besides the fenestra ovalis, other perforations lead out of the vestibule into three arched cylindrical canals of considerable diameter and dimensions, the diverging curves of which take a wide circuit within the cranial cartilage, and terminate at both ends in this central cavity. These passages, from their situation and form, are called the anterior, posterior, and horizontal *semicircular canals*. Within the canals, in which the vestibular perilymph freely circulates, there are three similarly curved but more slender membranous elastic tubes: they are nowhere in contact with the sides of the canals, but are suspended in the midst of them by means of the cellular network above mentioned. They all swell out at one end like a flask *(ampulla)* as they enter the vestibule, after which the anterior and horizontal tubes separately enter a common pouch or *sinus;* into this their other ends likewise open by a conduit common to both. The posterior tube, which is the largest and longest, after forming its ampulla, resumes its former calibre, and passing along the floor of the vestibule under the largest *sac*, to which it is connected by the net-work, returns into itself, thus completing a separate circuit.

The fluid contents of the several membranous cavities do not communicate with each other or with the vestibular perilymph; though, as they lie in close apposition, their vibrations are mutually interchangeable.

The acoustic nerve is distributed in two principal branches only to the sacs and the ampullæ; chiefly to the latter, to which it gives a white colour. The filaments form a fine net-work on the outside of the ampullæ, and then piercing their parietes, are raised up within into a kind of crescentic screen, in order probably that they may be more exposed to the impulse of the vibrations descending along the aqueous endolymph of the semicircular tubes. All the parts we have described are transparent, except the opaque ampullæ and the solid cretaceous otolithes. We have been particular in our account of these membranous parts, which are found with little essential variation in all the superior animals, man included, because in the cartilaginous fishes they admit of more easy examination from their great size and firmer texture, and from the softness of the cartilage that encloses them. In man and the mammalia, they are not only much smaller and more delicate, but encased in the hardest bone in the body, from which it is almost impossible to separate them with sufficient accuracy to be certain that the description is correct.

In some cartilaginous fishes, as the sturgeon, the fenestra ovalis is not closed by a membrane, but by a round button-like piece of semi-transparent cartilage, called an *operculum*, or lid.[†]

The parts are similar in the osseous fishes, except that they have generally no fenestra ovalis.

In serpents there is but one sacculus containing chalky matter, and all the semicircular tubes communicate with a central membranous sinus, which the anterior and posterior tubes enter by a common trunk. The fenestra ovalis is closed, not as in fishes by a membrane, but by the expanded trumpet-shaped extremity of a slender bone (*ossiculum* or *columella*) attached at the other extremity by a ligament to the outer end of the intermaxillary bone.

Nearly the same arrangement of the *internal* ear prevails in the four-footed reptiles (turtle, crocodile, frog, lizard); but a new and important step is here made towards the ultimate perfection of the organ by the development of an air-cavity, called the *tympanum* or ear-drum, between the vestibule and the surface of the head. This addition, which, as we said, first becomes more than a mere rudiment in the four-footed reptiles, permits the vestibule to be placed with equal advantage at a comparatively greater depth, and therefore in greater security; but it has more important uses in rendering the sound more clear, and facilitating in several ways (to be presently explained) its communication to the auditory nerve. Like the musical instrument from which it takes its name, the tympanum is provided with a membrane tightly stretched upon the margin of a round opening in the outer part of its bony or cartilaginous wall; and has an open vent or passage called after the anatomist who discovered it, the *Eustachian tube*, leading forwards from the cavity to the throat or back part of the nostrils, by means of which the air within it is adjusted to the variable state of the atmospheric pressure without. If the animal be amphibious, as many of the four-footed reptiles are, the membrana tympani is still covered entirely by integument, sometimes, as in the crocodile, by a movable flap of the scaly hard skin, which can be raised up when the animal is out of the water: more frequently however the membrane lies entirely beneath the skin, here thinner than elsewhere on the head, as in the tortoise. The *lacerta agilis*, or basking lizard, alone, which lives entirely on the land, has the membrane naked to the air. In this class of animals the columella is not directed forwards to the angle of the jaw as in serpents, but is attached by a cartilaginous extremity to the centre of the membrana tympani, and thus conveys the collected effect of its vibrations directly to the fenestra ovalis: the effect of this arrangement in rendering the impression of sound more definite must be obvious. In some species the cartilaginous portion of the columella is joined to the bony portion at an acute angle, like the letter V, which adds an elasticity to the mechanism very serviceable as a protection to the delicate parts within the fenestra ovalis from the injury they might otherwise sustain by a blow or undue pressure upon the membrana tympani. This is the case with the lizard mentioned above, in which there is also a rudiment of the muscle which serves in the higher animals to tighten the membrane; a circumstance which makes this elbow in the columella a still more essential provision against sudden changes in the distance between the centre of the membrane and the fenestra ovalis. It is worthy of remark that in one class of serpents, the *cæcilia* (blindworms), the ear is as complete as in any of the four-footed terrestrial reptiles; possessing a tympanum with its membranes, a Eustachian tube, and a columella bent to an angle. This departure from the usual rule in serpents appears to be one of those compensations so frequently met with in the animal kingdom, the organ of sight in the cæcilia being imperfectly developed.

In birds, besides a greater nicety and tenuity in the conformation of the parts hitherto described, the ear is furnished with two additional provisions, both probably of great consequence to the perfection of the organ. The first is a short *meatus auditorius externus*, or outer passage, which removes the delicate membrane of the tympanum to some depth from the surface of the head, and thus places it more securely, and at the same time, to greater advantage for observing the direction of sound. The other additional provision in birds is an appendage to the mechanism of the internal ear. This is a small conical cavity in the bone, somewhat curved, with a double spiral ridge winding round the interior, and enclosing a cartilaginous structure so corresponding in form with the ridge as to divide the cavity into two partitions. These communicate with another at the apex, and with the vestibule and tympanum respectively, at their other ends. The cavity is termed the *cochlea*, from its resemblance to a spiral shell; the partition communicating with the internal ear is the *scala* (winding stair) of the vestibule; the other is the *scala tympani;* the opening from the latter into the tympanum is called the *foramen rotundum*; it is closed by a membrane to exclude the air of that cavity while it permits the transit of vibration to or from the vestibular perilymph within; for that fluid, passing up the cochlea by the scala vestibuli, descends the scala tympani, and bathes the inner surface of the membrane of the fenestra rotunda. The cartilaginous *newel* is kept in its place like the semicircular tubes by retiform filaments, and is supplied with a separate branch of the acoustic nerve, which ramifies and expands on its surface. The *lapilli*, which seem to be chiefly a provision for hearing under water, and are therefore large and solid in aquatic and amphibious animals, appear in birds only as fine crystallized grains of chalk in the *utricle*, or sinus of the vestibule, rendering the endolymph somewhat turbid. The columella is straight, and the membrana tympani pressed outwards by it is consequently convex. There is a crescentic fold of skin extending upwards from the superior margin of the meatus externus, sometimes furnished, as in the horned owl, with a fringe of feathers which can be spread at pleasure like a fan to catch the sound. This fold of skin is a rudiment of the *concha*, or outer ear, of the mammalia.

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[*] Scarpa de Auditu.

[†] This is also found in the aquatic salamander, which, as concerns the organ of hearing, may be considered as the link between fish and reptiles, resembling the latter in the arrangement of the labyrinth, but being unprovided with a tympanum or a columella.

As we have already said, it is only in this last-mentioned class of animals that the ear reaches its complete development. It is nearly the same in all of them; the difference being only in the comparative size and shape of the component parts of the organ, and not in their essential structure, number, or arrangement.

We shall therefore describe the organ in one species only.

There is every reason to suppose that in hearing, as in sight, man has no superiority over many of the lower animals except what arises from that intellectual supremacy which enables him to discriminate and compare his sensations more justly than they can do. Indeed, it is certain that in the mere perception of sounds he is inferior to most of the mammalia, and probably to birds; and if the musical faculty should seem to imply a greater perfection of the organ, the error, for such we believe it to be, may perhaps disappear upon reflection We therefore select the human ear as the type of the organ in mammalia, not because it is in any respect more complete than the rest, but as the most interesting. The same description, of the more important parts at least, might be applied, nearly word for word, to all.

The parts now to be described fall naturally under a three-fold division into the internal, middle, and external ear.

1. The internal ear, comprising the acoustic nerve, vestibule, and labyrinth, is deeply placed in the interior of the head, within the most compact and hardest of the bones, denominated from that circumstance the *petrous* or rocky portion of the temporal bone. This wedge-like or triangular projection passes obliquely inward and forward in the direction of the outer tube of the ear, forming a strongly-marked knobby ridge within the cranium, in the basis or floor of that cavity. Near the inner point, which nearly meets its fellow on the other side, and upon its posterior declivity, there is a large trumpet-like hole (*meatus auditorius internus*) into which the seventh cerebral nerve enters from the *medulla oblongata*. [BRAIN, NERVE.] The meatus passes in a direction outwards, and therefore obliquely, into the petrous portion for half an inch, and then terminates abruptly in two *foveæ*, or pits: from the upper of these goes a winding canal through the substance of the bone, which is the course of the motor nerve of the face (the *portio dura* of the seventh pair), which, here separating from the auditory nerve, or *portio mollis*, we need not follow. The latter, splitting into several sets of filaments, finds its way through small sieve-like openings at the bottom of the lower fovea into the internal ear, and is here distributed in three separate portions to the cochlea, the ampullæ of the semicircular tubes, and the *utricle*, or vestibular sac. The cochlea is more complicated than in birds; it consists of a spiral canal in the bone, gradually diminishing as it ascends to a point, wound round a central hollow pillar of bone, called the *modiolus*, or newel. From its inner surface, that, namely, which may be considered as a groove in the modiolus, a thin and spongy lamella of bone projects rather more than half across the canal, ascending in a similar spiral. From the edge of this lamella, (called the *lamina spiralis*) a membrane passes to the outer surface of the canal, where it is attached; thus completing the separation of the canal into two *scalæ*, or winding partitions, which unite at the summit, and open (as before), the lower and narrower into the vestibule, the superior and larger into the tympanum; each *scala* taking two turns and a half round the modiolus in ascending from the base of the cochlea to the cupola, or inverted cup-shaped cavity at the summit, placed over the funnel (*infundibulum*) into which the top of the modiolus expands. The cochlea is on a level with the vestibule and anterior to it, the base being turned towards the meatus internus; the summit looking outwards and a little downwards, is turned towards the sudden bend of the wide canal in the petrous portion of the temporal bone by which the internal carotid artery enters the cavity of the head. It is the close neighbourhood of this artery as it passes through the compact bone that occasions the rushing sound of the pulse to be heard when the ear is placed upon a pillow, or the attention is led to dwell upon what passes within, by deafness arising from some cause not affecting the parts essential to hearing. The modiolus is hollow to some distance from the base. Up this tubular cavity rises the large cochlear branch of the acoustic nerve, giving off lateral filaments through minute openings arranged spirally, which pass through the light spongy bone, and emerge from different points on the spiral floors and sides of the scalæ, where they ramify in a delicate pulpy expansion upon the membranous tubes which line the spiral osseous canals: the rest of the cochlear nerve passes through capillary perforations in the cul-de-sac of the tubular cavity; and ascending in the substance of the central pillar of the modiolus, is distributed through the bone in a similar way to the upper turns of the cochlea and the infundibulum. The two other branches of the acoustic nerve are distributed to the vestibular sac, which lies in a round depression or pit in the barrel-shaped cavity of the vestibule, and to the ampullæ of the semicircular tubes. The latter all meet in a membranous sinus, or utricle, which occupies another distinct pit of the vestibule, called, from its shape, the elliptic fovea, much according to the arrangement already described in other animals. The principal opening from the vestibule is the fenestra ovalis, situated on the outer side towards the tympanum, which is closed by a membrane; at the lower and front part there is another opening into the scala vestibuli of the cochlea. There are five at its posterior and outer side, which lead into the semicircular canals, of which the superior and posterior enter the vestibule by a common foramen. The sac and utricle each contain a cretaceous deposit, which, in some of the lower mammalia, has the consistence of soft chalk. The cochlea and semicircular canals, from their complexity, are termed the *labyrinth*. With respect to the object of their peculiar arrangement, not even a probable conjecture has been hazarded. Yet they appear with surprising uniformity in all the mammalia, and some of them, as we have seen, in the more numerous tribes of birds, reptiles, and fishes. The bony canals of the labyrinth and vestibule are stated to be invested within by a delicate periosteum, the surface of which towards the perilymph is thought to be of the nature of a serous membrane, and to secrete that fluid.

Fig. 1.

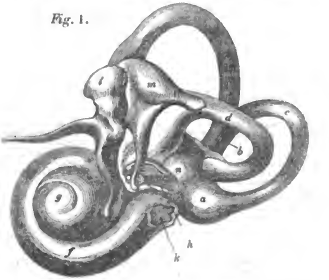

Fig. 1. Magnified view of the osseous labyrinth and vestibule as they would appear if the solid bone in which they are imbedded were removed, with the *ossicula auditûs* in situ. *a*, ampulla of the posterior semicircular canal; *b*, common tube by which this and the superior canal enter the vestibule. *c*, posterior canal; *d*, external canal; *e*, superior canal; *f*, cochlea, *g*. its cupola; *h*, fenestra ovalis covered by the stapes; *k*, fenestra rotunda; *l*, malleus; *m*, incus; *n*, vestibule.

The deafness which arises from causes which affect the fenestra ovalis, or the nerves and canals within the vestibule and labyrinth, is seldom or never cured; and it is unfortunately very common. There is a very easy way by which the nature of the case may be often sufficiently tested. If the internal ear be affected, especially the nerves of it, the ticking of a watch pressed against the teeth or the outer part of the head on that side, will be very obscurely distinguished. If not, the sound can be easily heard, as the solid bones interposed between the sonorous body and the nerve are excellent conductors of vibration.

2. The *middle* ear comprises the cavity of the *tympanum*' with its contents; the cells in the bony prominence behind the ear, called the *mastoid process*, with which the tympanum communicates; and the Eustachian tube, or passage leading from the tympanum into the upper and back part of the throat, where it opens in the form of an expanded slit on each side behind the posterior nares.

The tympanum is an irregular cavity scooped in the petrous portion of the temporal bone between the vestibule and the external meatus. The principal entrances to it are the fenestra ovalis and the round or somewhat oval opening at the bottom of the external passage upon which the membrana tympana is stretched. Between these there is extended a chain of three small bones, obliquely articulated to each other with perfect joints, so placed that the chain somewhat resembles in figure the letter Z.

These bones are called respectively the *stapes* (stirrup), the *incus* (anvil), and *malleus* (hammer), from some similarity in form to those implements. The base of the stapes is applied to the fenestra ovalis, exactly fitting it, and is attached firmly to its membrane. The extremity of the longer leg of the incus is articulated to the head of the stapes, and there is a minute bone between them of the size of a small shot, which is generally considered to be only a process of the incus. It is however called from its spherical shape the *os orbiculare*, and is sometimes reckoned as a fourth bone. (*Fig.* 3, *o.*) The shorter leg of the incus (*fig.* 2, *c,*) rests against the bony parietes of the tympanum at the back part, near the mastoid cells. Upon the hollowed cavity in the head of the incus (*fig.* 2, *a*) the lateral depression of the head of the malleus (*fig.* 2, *k*) is articulated, and moves easily; the long handle of the latter is attached by its extremity (*fig.* 2, *h*) to the middle of the membrana tympani, as well as by a portion of the side of the handle, which lies close to and parallel with the membrane. The long slender process of the malleus called the *processus gracilis* (*fig.* 2. *g*) lies in a slit passing to the articulation of the jaw called the *glenoid* fissure.

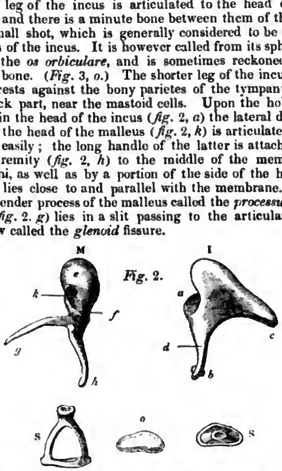

Fig. 2.

Fig. 2. Magnified view of the ossicula auditûs. M, malleus; I, incus; S, stapes; *o*, shape of the fenestra ovalis; *a*, cavity of the incus, which is articulated to the malleus; *d*, longer process of the incus with the os orbiculare attached at *b*; *c*, its shorter process; *e*, head of the malleus; *f*, its short process, or prominent point for the attachment of the tensor tympani; *k*, the depression which articulates with the incus; *g*, processus gracilis of the malleus; *h*, its handle, or manubrium.

Fig. 3.

Fig. 3 The same bones of their natural size. *m*, malleus; *i*, incus; *s*, stapes; *o*, orbiculare.

The use of these bones is undoubtedly to transmit the vibrations of the membrana tympani to the membrane of the fenestra ovalis, and thence to the internal ear. But they have another use which would be incompatible with a single bone passing between those membranes, as in birds and most reptiles; this is to permit the membrana tympan be drawn into a conical shape so as to tighten it, and ada either to resist the impulse of too loud a sound, or favo more acute or gentle one. The muscle which ch effects this object, called the *tensor tympani* (*fig.* 4, *a* attached near the head of the malleus to a point projec from it. (*Fig.* 2, *f.*) Other muscles, to steady and antago its action, called the *laxator major* and *minor tymp* are also attached to the malleus, the former (*fig.* 4, *b* the processus gracilis, the latter (*fig.* 4, *c*) to the handl

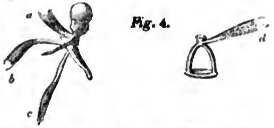

Fig. 4.

Fig. 4. Muscles attached to the *ossicula auditûs.* *a*, tensor tym *b*, laxator major; *c*, laxator minor; *d*, stapideus.

the bone. A further description of the directions and o attachments of these minute muscles would be tedious unintelligible to the general reader. No muscle is atta to the incus, but a small one of great importance is inse into the neck of the stapes, called the stapideus; the e of this is to counteract the obliquity of traction or *ing* of the stapes, which would otherwise ensue from movements of the other bones; by this means the mo of the stapes is directed either immediately to or from fenestra ovalis, the membrane of which is also further served from injury by the oblique arrangement of the jo of these minute bones, by means of which, although membrane of the tympanum oscillates through a cons able space in passing from tension to relaxation, that o fenestra is moved to a much smaller extent. It is t observed that the same action which draws the memb tympani into a cone thrusts the base of the stapes far into the fenestra ovalis.

These small muscles are not under the dominion o will, being supplied with nerves in a way peculiarl teresting to a physiologist, and acting automatically in respondence with the impressions on the auditory n Yet the instinctive consciousness we have of the degr their contractions in adjusting the tension of the n brana tympani to circumstances, is probably one of our means of estimating the intensity of sounds.

The fenestra ovalis is situated nearly opposite the n brana tympani, on the upper edge of a prominence c the *promontory;* it faces outwards and a little downwa and beneath it, concealed by the promontory, is the fora rotundum, closed by a membrane, and leading into cochlea by the scala tympani. The object of this last o ing is disputed: some think it conveys in part the v tions of the air of the tympanum to the internal ear; b seems more reasonable to suppose, with Sir C. Bell, the end it chiefly serves is to give vent and freedo those of the fluids pent up in the unyielding bony c of the labyrinth. Besides these openings from the ty num, there are others which lead into the mastoid behind it; these are also filled with air, and are suppos contribute to the distinctness of the tympanic vibrat There is also an opening from the tympanum forwards the Eustachian tube. This canal is nearly two inches l the first part of its course from the tympanum is bon then becomes cartilaginous, and widens as it approache throat, the mucous membrane of which lines it, and th passing into the tympanum, spreads over the surface o whole cavity, investing the ossicula and its other cont as well as the mastoid cells.' From this circumstance a the tendency of the inflammation of cold or sore thro extend into the tympanum, producing temporary deaf ear-ache, and sometimes mischief of a more permanent k From the deafness which accompanies the closure of Eustachian tube by that or other causes, the importan its functions in renewing and giving vent to the air wi the tympanum may be appreciated. Besides the foran already mentioned, there are others through which ne and vessels enter the tympanum. We have not spac describe them: we shall only mention that one of the ne called the *chorda tympani*, originally connected with *portio dura* of the seventh nerve, after traversing the pet bone in a circuitous course, enters the cavity of the tympanum, and passing quite across it, is transmitted through the glenoid fissure to a salivary gland under the lower jaw. The object of this singular but uniform course of the chorda tympani is not well understood.

Deafness arising from closure of the Eustachian tube has been sometimes cured by dilating that canal by instruments passed for that purpose into its outer expanded extremity through the nostrils, or from the back of the throat; or by injecting fluids into it by means of a syringe with a small curved pipe. This latter plan has also been successful in curing deafness arising from chronic inflammation, or morbid secretion within the tympanum. Suppuration within that cavity, or in the mastoid cells, sometimes results from high inflammation, and has been attended with fatal consequences by spreading to the bones of the cranium, or along the nerves to the brain, or its membranes. Cases of this kind generally originate, as we have already stated, in cold with sore throat, and are found to occur chiefly in scrofulous habits.

Fig. 5.

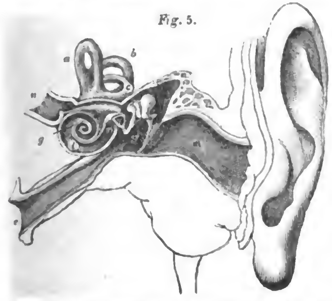

Fig. 5. This is not to be considered as a correct delineation of the organ, being intended only as a *diagram*, to give a general idea of the relative situations of the several parts. *a*, superior semi-circular canal; *b*, posterior ditto; *c*, external ditto; *d*, scala tympani of the cochlea opened, to show *r*, the fenestra rotunda, entering the tympanum under the promontory; *e*, Eustachian tube; *f*, membrana tympani; *g*, vestibule, not laid open; *m*, meatus auditorius externus; *n*, meatus internus, terminating in two *foveæ*.

3. The external ear consists of the *meatus auditorius externus* (*fig.* 5, *m*) and *concha*. The former, commencing from the membrana tympani, is an osseous canal in the first part of its course in the adult, and then becomes nothing more than a tubular continuation of the expanded cartilage of the concha, or outer appendage of the ear. It is lined throughout with a delicate skin, covered by thin cuticle, which also covers the outer surface of the membrane. Beneath the skin, and opening through it on the surface, are numerous glandular follicles which secrete the ear-wax or *cerumen*. In the fœtus and new-born infant there is hardly any appearance of this tube; the membrane of the tympanum being close to the surface of the head, stretched upon the inner margin of a bony ring (*annulus auditorius*) which afterwards increases in length and becomes a tube. In the adult the length of the whole tube may be nearly an inch; but from the obliquity of the membrane, which faces a little downwards, it is longer below than above. Its direction *from* the membrane is outwards and a little backwards, and it is slightly convex upwards, and rather narrower in the middle than elsewhere. The last mentioned peculiarity is the reason why it is so much easier to introduce beads and other round bodies (as children are apt to do) than to get them out. This however must always be done as soon as possible when such an accident happens; for the presence of the foreign body sometimes excites great inflammation and swelling, and may lead to very serious consequences. The most easy method and the least painful is to direct a strong stream of warm water into the tube with a syringe, which commonly succeeds immediately if resorted to before there is much swelling. Other means will readily suggest themselves; but if resorted to, they should be very tenderly used, for the part is extremely sensitive, especially the membrane itself, to rough contact. The wax, which is very bitter, serves to prevent the entrance of insects and to keep the skin soft. When secreted too abundantly, it is often a cause of deafness, and should be removed as a foreign body by means of a syringe and a solution of soap in warm water. The commonest kind of ear-ache is that caused by inflammation of this passage, and is generally followed by a copious and fœtid secretion poured out by the ceruminous follicles. If this last long, deafness is sometimes the result from thickening of the membrane, and has been removed, as well as that arising from closure of the Eustachian tube, by puncturing the membrane. This part is sometimes ruptured by the spasmodic action of the tensor muscle caused by loud sounds, or by driving air up the Eustachian tube in a forcible expiration, as in blowing the nose violently. This accident is not followed by the degree of deafness that might be expected, unless the stapes becomes displaced from the fenestra ovalis: the other ossicula may be lost with comparative impunity for obvious reasons.

Fig. 6.

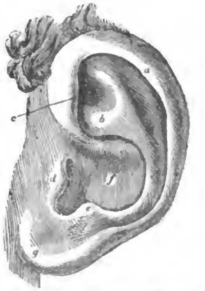

Fig. 6. View of the *pinna*, or *auricle*. The cartilaginous prominences are, *a*, helix; *b*, anti-helix; *d*, tragus; *e*, anti-tragus: the lobe or lobulus, *g* contains no cartilage, being composed only of skin and a fatty cellular tissue. The depressions are *c*, the scapha or scaphoid (boat-like) fossa; and *f*, the concha, a term often used to denote the whole appendage of which it is the most important part.

The *concha*, or *pinna*, or *auricle* (for by all these names the outer appendage of the ear is known), consists of several pieces of elastic cartilage expanded in a form more or less resembling an ear-trumpet in different animals. In man it serves the purpose of collecting the sonorous vibrations and directing them into the meatus externus much less perfectly than in many other animals, which are also provided with muscles for directing it to the source of sound, which in man are but rudimentary. It is marked with various prominences and hollows, of which the names are given in the figure. It does not seem necessary to describe them more particularly. The cartilages are bound by ligaments to the neighbouring prominences of bone, and are covered by a smooth and closely adherent skin.

It may be observed that the aquatic mammalia (whales, porpoises, &c.) are unprovided with this part of the organ; and have a very narrow but long and curved meatus externus, passing obliquely into the surface of the head, and in some instances capable of being closed by a flap of movable skin to exclude the water. In these animals also the cochlea is imperfect, the scalæ making but one turn and a half round the modiolus.

(Scarpa, *de Auditu;* Soemmering, ditto; Breschet, ditto; Blainville, *Comp. Anat.;* Bell's *Anatomy;* Grant's *Outlines.*)

EAR-RING; a ring hung from a hole, perforated for that purpose through the ear, sometimes set with pendant jewels, pearls, or other precious stones. The word is Anglo-Saxon, *ear-hring*. Ornaments of this sort, large or small, have been worn in almost all countries by women, from the earliest ages; but more rarely by the men. Montfaucon says that the men, in many instances, wore them as amulets. In the Latin of the middle age ear-rings are termed *pendentes*, from the more common form of the ornaments usually attached to the ring itself. Sir Richard Hoare, in his antient Wiltshire, describes the ear-rings of a British female found in one of the barrows of that county.

EARL. The title of count or earl, in Latin *comes*, is the most antient and widely spread of the subordinate or subject titles. This dignity exists under various names in almost every country in Europe. By the English it is called earl, a name derived to us from the ealderman of the Anglo-Saxons and the eorle of the Danes. By the French it is called *comte*, by the Spaniards *conde*, and by the Germans *graf*, under which generic title are included several distinct degrees of rank,—landgraves, or counts of provinces, palsgraves, or counts palatine, of which there are two sorts, markgraves, or counts of marches, or frontiers, (whence marchio, or marquess), burghgraves, or counts of cities, counts of the empire, counts of territories, and several others. [COUNT; BARON.]

As to the English earls,—after the battle of Hastings, William the Conqueror, as it is well known, recompensed his followers with grants of the lands of the Saxon nobles who had fallen in the battle, to be held of himself as strict feuds; and having annexed the feudal title of earl to the counties of the Saxon earls (with whom the title was only official), he granted them to his principal captains.

These earldoms were of three kinds, all of which were by tenure. The first and highest was where the dignity was annexed to the seisin or possession of a whole county, with 'jura regalia.' In this case the county became a county palatine, or principality, and the person created earl of it acquired royal jurisdiction and seigniory. In short, a county palatine was a perfect feudal kingdom in itself, but held of a superior lord. The counties of Chester, Pembroke, Hexham, and Lancaster, and the bishopric of Durham, have, at different times, been made counties palatine; but it does not appear that the title of earl palatine was given to the most antient and distinguished of them, viz., the earl of Chester, before the time of Henry II., surnamed Fitz-Empress, when the title of palatine was probably introduced from the empire. The earls of Chester created barons and held parliaments, and had their justiciaries, chancellors, and barons of their exchequer. This county palatine reverted to the crown in the reign of Henry III. The second kind of earls were those whom the king created earls of a county, with civil and criminal jurisdiction, with a grant of the third part of the profits of the county court, but without giving them actual seisin of the county. The third kind was where the king erected a large tract of land into a county, and granted it with civil and criminal jurisdiction to be held *per servitium unius comitatûs*.

Under the early Norman kings, all earls, as well as barons, held their titles by the tenure of their counties and baronies; and the grant, or even purchase, with the licence of the sovereign of an earldom or a barony, would confer the title on the grantee or purchaser; but with the solitary exception of the earldom of Arundel, earldoms by tenure have long since disappeared, and in late times the title has been conferred by letters patent under the great seal. Earls have now no local jurisdiction, power or revenue, as a consequence of their title, which is no longer confined to the names of counties or even of places; for several earls, as Earl Spencer, Earl Grey, and others, have chosen their own names, instead of local titles.

The coronet of an English earl is of gold surmounted with pearls, which are placed at the extremity of raised points or rays, placed alternately with foliage. The form of their creation, which has latterly been superseded by the creation by letters patent, was by the king's girding on the sword of the intended earl, and placing his cap and coronet on his head and his mantle on his shoulders. The king styles all earls, as well as the other ranks of the higher nobility or peerage, his cousins. An earl is entitled right honourable, and takes precedence next after marquesses, and before all viscounts and barons. When a marquess has an earldom, his eldest son is called earl by courtesy; but notwithstanding this titular rank, he is only a commoner, unless he be summoned to the House of Lords by such title. So the eldest sons of dukes are called earls where their fathers have an earldom but no marquisate, as the duke of Norfolk, &c.

EARL MARSHAL OF ENGLAND, one of the great officers of state, who marshals and orders all great ceremonials, takes cognizance of all matters relating to honour, arms, and pedigree, and directs the proclamation of peace and war. The *curia militaris*, or court of chivalry, was formerly under his jurisdiction, and he is still the head of the heralds' office, or college of arms. Till the reign Richard II., the possessors of this office were styled sim Marshals of England: the title of Earl Marshal was stowed by that king in 1386 on Thomas Lord Mo bray, Earl of Nottingham. The office is now hereditary the family of Howard, and is enjoyed by the duke of N folk. (Chamberlaine's *State of England*. Dallaway's *quiries into the Origin and Progress of Heraldry England*, 4to., Glouc. 1793, pp. 93-95.)

EARSHELL. [HALIOTIDÆ.]

EARTH (Astronomy). In the language of astronome the earth is rarely treated as a planet. All the phenome connected with its motion are seen in the apparent moti of the SUN, to which article we therefore refer.

EARTH, CONTROVERSY ON THE MOTION THE. [MOTION OF THE EARTH.]

EARTH, DENSITY OF THE. The fundamental periment of Cavendish for the determination of this ast nomical element being likely to be shortly repeated, i advisable to defer this article: see therefore WEIGHT OF EARTH.

EARTH, FIGURE OF THE. [GEODESY.]

EARTH. The old chemists imagined that all mater substances were ultimately resolvable into four sim bodies, viz. air, fire, water, and earth, which were theref called the four elements. This term is still occasiona employed in a more restricted sense, as when mention made of *earthy* salts, &c. It is now universally admitt that the bodies called earths are compounds of oxygen a a base, and in fact that they are mostly metallic oxi The principal earths are alumina [ALUMINUM], bary [BARIUM], glucina [GLUCINUM], lime [CALCIUM], magn [MAGNESIUM], silica [SILICIUM], strontia [STRONTIC yttria [YTTRIUM], zirconia [ZIRCONIUM].

EARTH-NUTS are either the fruit of certain pla which bury it below the ground after the flowering is p as the Arachis hypogæa, Lathyrus amphicarpos, others, or else the subterranean tubercles of fleshy-roo plants, such as Bulbocastanum, Cyclamen, Lathyrus tu rosus, Apios tuberosa, and the like.

EARTHENWARE. The art of moulding earthen ves for domestic use appears to have been practised in earliest ages, and undoubtedly has been known among rudest nations. The most antient records allude to potter's wheel, and we have proof that great skill had b acquired in the manufacture of porcelain of a supe quality in China and in Japan at a very remote date. little figures, covered with a fine deep-blue glaze, which deposited with Egyptian mummies, and numerous some specimens of which may be seen in the British seum, show that in Egypt likewise the art was antie practised; and indeed we see in Egyptian paintings re sentations of vessels (presumed to be earthen) which clo resemble those made in Egypt at present, and also the presentations of the manufacturing process itself. (*Libr of Entertaining Knowledge*, Egypt, ii. 179.) [COOLE It has been supposed that the Britons understood the ter's art before the Roman occupation of this island, s urns of earthenware have been found in barrows in diffe parts of the kingdom; but other writers affirm, though believe without proof, that our ancestors were in those supplied with such articles by the Phœnicians. Vest of considerable Roman potteries have been discovered many parts of this island, particularly in Staffordsh and there is an interesting account by Governor Pow (*Archæologia*, 5th vol., p. 282, &c.) of the discovery numerous vessels of pottery which were fished up in Queen's Channel, near Margate. It was for some time posed that a Roman trading vessel, freighted with pott had been wrecked at this place; but on a more partic examination of the spot, called by the fishermen Puddi pan Sand, Roman bricks cemented together, apparently ruins of a building, were likewise discovered, and on fart investigation it was found that an island existed form on this spot on which there had been a large pottery e blished by the Romans. Many of the earthen pans w recovered in a perfect state, and several of them had name of Attilianus neatly impressed upon them. The isl has long since disappeared, but specimens of the manu ture carried on there were frequently drawn up during last century in the nets of the Kentish fishermen.

In newly-discovered countries it has been found that use of earthen vessels is familiar among people other little acquainted with the arts of civilized life. Vases have been found among the aboriginal Indians on the Mosquito shore which were preserved as memorials of antiquity; and there is strong evidence for believing that these vessels were the manufacture of the country in which they were found, since the remains of antient potteries have been discovered at a considerable distance up the Black River on that coast. In the United States of North America also fragments of pottery made by the native Indians have often been discovered.

Although earthenware may be considered as a general term applicable to all utensils composed of earthen materials, it is usual to distinguish such utensils more particularly into three different kinds; namely,—pottery, earthenware, and porcelain. Under the first of these terms are classed the brown stone-ware made into jugs, &c., the red pans and pots in common use, porous vessels, &c. [POTTERY.] Porcelain is distinguished from earthenware as being a semi-vitrified compound, in which one portion remains infusible at the greatest heat to which it can be exposed, while the other portion vitrifies at a certain heat, and thus intimately combines with and envelops the infusible part, producing a smooth, compact, shining, and semi-transparent substance, well known as the characteristic of true porcelain. [PORCELAIN.] At present our notice will be confined to earthenware as used in its distinctive meaning.

Until the beginning of the eighteenth century the manufacture of earthenware in this country was confined to a few objects of the coarsest description, and till nearly the close of the same century, the porcelain of China was still in common use on the tables of the wealthy, the home manufacture being confined to articles of the commonest domestic use. Earthenware was likewise largely imported from Holland, and superior kinds from Germany and France English earthenware and porcelain are now not only brought into general use in this country, to the exclusion of all foreign goods, but earthenware is also largely exported to almost every part of the known world, and even to those countries where the art was previously prosecuted. M. Faujas de Saint Fond observes on this subject—'Its excellent workmanship, its solidity, the advantage which it possesses of sustaining the action of fire, its fine glaze impenetrable to acids, the beauty and convenience of its form, and the cheapness of its price, have given rise to a commerce so active and so universal, that in travelling from Paris to Petersburg, from Amsterdam to the furthest part of Sweden, and from Dunkirk to the extremity of the south of France, one is served at every inn upon English ware. Spain, Portugal, and Italy are supplied with it; and vessels are loaded with it for the East Indies, the West Indies, and the continent of America.' England is mainly indebted to Mr. Wedgwood for the extraordinary improvement and rapid extension of this branch of industry. Before his time our potteries produced only inferior fabrics, easily broken or injured, and totally devoid of taste as to form and ornaments. Wedgwood's success was not the result of any fortunate discovery accidentally made, but was due to patient investigation and unremitting efforts. He called upon a higher class of men than had usually been employed in this manufacture to assist in his labours, and in prosecuting his experiments he was guided by sound scientific principles. The early and signal success which crowned his first exertions only served as an additional motive for continuing his pursuit. One of the principal inventions of Mr. Wedgwood was his *table ware*, known at present as *queen's ware*, in consequence of the patronage of the queen, who commanded it to be thus designated. It is characterised as a dense and durable substance, covered with a brilliant glaze, and capable of bearing uninjured sudden alternations of heat and cold. From its first introduction, it was manufactured at so cheap a rate as to render it an article within the reach of all. Soon after, embellishments were introduced which very little enhanced the cost of the article; first, a coloured edge, or painted border was added to the queen's ware, and, lastly, printed patterns covering the whole surface, which at first exhibited very little taste, but by degrees reached the perfection which the art has now attained. Mr. Wedgwood's more beautiful inventions were—a *terra cotta*, which could be made to resemble porphyry, granite, Egyptian pebble, and other beautiful stones of the silicious or crystalline kind: a black porcelainous biscuit, very much resembling basalt in its properties, and therefore called *basaltes*: a white and a cane-coloured porcelain biscuit, both smooth and of a wax-like appearance; and another white porcelainous biscuit, distinguished as jasper, having in general all the properties of the basaltes, with a very important addition, the capability of receiving through its whole substance from the admixture of metallic oxides, the same colours as those oxides communicate to glass or enamel in fusion. This peculiar property renders it applicable to the production of cameos and all subjects required to be shown in bas-relief, as the ground can be made of any colour while the raised figures are of the purest white. Mr. Wedgwood likewise invented a *porcelain biscuit* nearly as hard as agate, which will resist the action of all corrosive substances, and is consequently peculiarly well adapted for mortars in the chemist's laboratory.

The principal ingredients employed in the composition of all kinds of pottery are clay and flint. The nature of the clay used in the manufacture is of great importance, and so also is the combining of it with a due proportion of flint. The clay principally used in the English potteries is obtained from Dorsetshire and Devonshire; that from the former county is brought from the Isle of Purbeck, and is considered superior to the Devonshire clay. It is of two kinds, distinguished as brown clay and blue clay. The clay from Devonshire is likewise of two distinct qualities, and known as black clay and cracking clay. All these clays are of good working quality, and burn extremely white, being free from any impregnation of iron: the blue clay is considered the best. Another description of clay, superior to either of the former, was first discovered in Cornwall by Mr. Cook worthy, in 1768, and is commonly denominated China clay, because similar in its properties to the porcelain earth of China. It is very white and unctuous, and on investigation has been found to be formed by the gradual disintegration of the felspar of granite. This Cornwall clay is prepared on the spot where it occurs. The partially decomposed granite is broken into small pieces, and thrown into a running stream, where the argillaceous parts are washed off and held suspended in the water, while the mica and quartz being heavier remain at the bottom. At the end of the stream the water is stopped by a dam, and the pure clay gradually subsides. When the whole has separated itself from the water, the latter is drawn off and the solid matter dug out in blocks, which are placed in a situation exposed to a free current of air, and when sufficiently dry are packed in casks for shipment in the state of a fine smooth white powder. Mr. Wedgwood found by analysis that this substance contains sixty parts of alumina and twenty parts of silica; it is infusible,[*] and remains unaltered in the greatest heat of a porcelain furnace. The price of this material is much higher than that of the other English clay; but in the making of porcelain it is indispensable, and it is also used in some of the finer kinds of earthenware.

Preparation.—In the preparation of the clay some labour is required, before it is in a fit state to be combined with the flint. It is first mixed with very pure water to the consistence of cream: this work is called *blunging*, and in large establishments is performed by means of machinery. The result is a smooth pulp, which is then passed through a series of sieves of increasing degrees of fineness, till at length it is perfectly fitted to enter into the composition of the ware. If the clay were moulded and dried without the addition of any other body it would certainly crack, as the evaporation of the water with which it is mixed, in order to render it sufficiently plastic for the potter's wheel, would cause it to shrink in the proportion of one part in twelve in drying. In combination with silicious earth in proper proportions, it bears the action of fire without cracking, while the silica materially improves the whiteness of the ware.

The flints are prepared by being burnt in a kiln, and removed while red-hot from the kiln and thrown into cold water. By this operation their attraction of aggregation is lessened, and the labour of grinding them is much facilitated. They are then broken and ground to a very fine powder in a mill constructed for the purpose, the original of which was invented by Brindley. A quantity of water is thrown into the mill with the flints, by which the process is quickened and the health of the workmen is preserved, the finer particles of flint being thus prevented from flying off and mixing with the atmosphere which the workmen inhale.

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[*] The fusible quality of felspar is owing to the presence of about an eighth part of potass. This alkali is separated by decomposition, and thus the felspar being deprived of it becomes infusible, as is the case with this China clay

The flints, when reduced to powder, are transferred from the mill into another vessel, where more water is added, and the whole is violently agitated by mechanical means; the finer parts are in consequence held in suspension above, and in this state are passed into a reservoir, while the grosser particles are left behind at the bottom of the vat. After subsidence, the supernatant water is drawn off from the reservoir, and the pulverized flint is in a fit state for use. It is considered of a proper fluidity for mixing with the clay when a pint weighs 32 oz., while an equal measure of the diluted clay should weigh 24 oz. The proportions in which the clay and flint are mixed vary with the quality of the clay, with the nature of the ware to be produced, and also with the practice of each manufacturer. Parkes, in his 'Essay on the Making of Earthenware,' &c., though his knowledge was obtained by a residence of some years at the seat of manufacture, does not give any precise information on the subject, but states that flint forms a fourth, a fifth, or a sixth part by weight of the prepared paste. The dilutions of clay and flint being brought together in suitable proportions, are intimately mixed by agitation, and passed, while in a state of semi-fluidity, through different sieves, whereby the whole becomes a smooth homogeneous mass. This mixture, technically called *slip*, is then very carefully evaporated, the mass being frequently stirred and turned over lest a part should become improperly hardened while the remainder continues too fluid. When the clay or paste is removed from the *slip-kiln*, it is well incorporated together by beating it with wooden mallets, in order to expel the air which it contains. The next operation is cutting it into small pieces, which are thrown together again with all the strength of the workmen; and this process is continued until the mass is considered in a complete state of consistence. When in this state it should be allowed to remain for a considerable period before being used, since it becomes more intimately united by time than by any mechanical means.

The paste, when taken for use, undergoes the process of *slapping*, which is similar in its effect to the last operation, and should incorporate the whole mass so completely, that wherever it is cut, it should exhibit a perfectly smooth and uniformly close appearance. The clay, being thus prepared, is now in a fit state for forming into ware. The processes for this purpose are of three different kinds—throwing, pressing, and casting, which are respectively employed according to the form of the article required.

The operation of throwing is performed upon a machine called a potter's lathe, and is used in shaping vessels which have a circular form. By this means the *thrower* moulds the clay into the form which he desires; and when finished to his satisfaction, he removes his work to a board or shelf, where it is left to dry partially; and when in a particular state of hardness, called the *green state*, well known to the operator, the vessel is in proper order for being further smoothed and shaped in the *turning-lathe*, and for being furnished with handles, spouts, or any other addition. The turning-lathe is similar to that used by the turner in wood, and by means of it rings, rims, &c. are formed on the vessels. For making dishes, plates, and other similar shallow vessels, a plaster mould is used, which is placed on the block at the top of the upright spindle of the lathe, and the workman continues the process in nearly a similar manner as in throwing. When sufficiently dry to be taken from the mould, the edges are pared with a sharp knife, and the vessels are placed in piles and left to harden, preparatory to their being baked.

A machine called an *engine-lathe*, which has a horizontal movement backwards and forwards, in addition to the rotary motion, is used in giving to earthenware a milled edge. Handles, spouts, &c. are fixed on the vessels as soon as they are taken out of the turning-lathe. They are affixed by means of slip, with which the parts designed to come in contact are moistened: in a short time, when dry, the union of the parts is found to be perfect. Handles, &c. are made by pressure in a small metallic cylinder, which has an aperture in the centre of its bottom, to which plugs of various shaped orifices are fitted. There is likewise a piston, so fixed as to be worked by a screw up and down the cylinder. The cylinder, being filled with clay, the piston is inserted, and forces the clay through the orifice at the bottom, and consequently gives it the same form as the aperture through which it was pressed. Being then cut into lengths and bent to the desired shape, the clay is ready, when sufficiently dry, to be joined to the vessel. For ornamental spouts, small ornaments, and other appendages of the like nature, the clay is pressed in moulds, the particular mode of doing which may be readily conceived.

When the vessels are sufficiently dry they have to be submitted to the action of fire. For this purpose they are placed in deep boxes called *seggars*, made of a mixture of fire-clay and old ground seggars, and capable of sustaining the most intense degree of heat without being fused. The seggars are of various sizes, shapes, and depths, adapted to the different pieces which they are to contain. In no case is one piece placed in or on another in the seggar, and all is so arranged that the heat may be equally applied to every part of each. The seggars, with their contents, are then disposed in the oven in such a way that the heat may be distributed fairly throughout: they are built one layer on the top of another until they reach nearly to the top of the oven, each seggar forming a cover to the one beneath it, and the upper seggar in each pile being always empty. The oven is of a cylindrical form, and very similar to the common kilns used for burning tiles. The process of baking usually lasts from forty-eight to fifty hours, during which time the heat is gradually increased, as it would be injurious to the ware to apply a very high degree at first. To ascertain when the baking has been carried far enough, the workman uses tests of common Staffordshire fire-clay, the pyrometer of Wedgwood having been long laid aside. [PYROMETER.] When the appearance is considered satisfactory the firing is discontinued, and the oven is suffered gradually to cool during twenty-four or thirty hours before the contents are taken out. The ware in this state is called *biscuit*. The glaze is now applied; the pieces are again placed in seggars, and conveyed to the glass-oven, where heat is applied to them of sufficient intenseness to fuse the glaze; but the heat must by no means be so great as that to which the *biscuit* has previously been exposed, as the glaze would crack or peel off if the vessels were liable to any further shrinking.

The glaze generally used for common kinds of earthenware is a compound of litharge and ground flints, in the proportion of ten pounds of the first to four pounds of the latter This method of glazing is however highly objectionable on account of its injurious effects on the health of the workman, while the lead being soluble by acids, makes a most pernicious glaze for vessels which are used for containing many articles of prepared food. Glazes for porcelain and the finer kinds of earthenware are generally made with white lead, ground flints, ground flint-glass, and common salt. But almost every manufacturer uses a peculiar glaze of his own, the manner of making which he keeps in as much mystery as possible. Some glazes are made without the admixture of any lead, and in the whole of the better glazes this ingredient enters in so small a quantity as not to be injurious. The manner of applying the glaze is, to reduce the ingredients to powder, mix them with water to the consistence of cream, and then merely dip the pieces into the preparation and withdraw them immediately, taking care that all the parts have been wetted with the glaze.

When the earthenware is to be printed it undergoes this process previously to glazing. It is thus performed:—the landscape or pattern is engraved upon copper, and the desired colour being mixed with linseed-oil, is laid on the plate, and impressions are taken off on tissue-paper, in the manner usually employed by copper-plate printers. The paper, wet with the colour, has then all the blank parts cut away, leaving only the pattern entire, which is applied lightly to the ware when in the state of biscuit. It is then rubbed with a piece of woollen cloth, and rolled tightly in the form of a cylinder, till the colour is pressed sufficiently into the ware. In this state the whole is left for an hour, when it is placed in a cistern of water, so that the paper becomes sufficiently moistened to peel off readily, having transferred to the biscuit the colour and impression which it had received from the copper-plate. When the pieces thus printed are sufficiently dry they are placed in an oven and exposed to a gentle heat, in order to dissipate the oil: they are then in a fit state to receive the glaze. Till within the last few years, blue produced from the oxide of cobalt was the only colour employed, but at present many other colours are printed with equal facility.

The art of painting on earthenware more particularly applies to porcelain: the description of the colours used, which are all metallic oxides, and the manner of applying them, therefore more properly belong to the article under that head, as well as the method of gilding porcelain. Gold and silver *lustre ware* is commonly of an inferior quality. The metallic oxides used for this purpose are intimately mixed with some essential oil, and then brushed entirely over the surface of the vessel: the heat of the enamelling oven dissipates the oxygen, and restores the oxides to their metallic state, but with their brilliancy somewhat diminished.

The principal seat of the manufacture of earthenware in England is in Staffordshire, about a mile from the borders of Cheshire. This district, known as 'The Potteries,' extends through a distance of more than seven miles, in which there are towns and villages so thickly built and so close to each other that to a stranger the whole appears one large straggling town. There are likewise extensive manufactures of earthenware and porcelain in Yorkshire, and Worcestershire. There are establishments for making the commoner kinds of ware in many parts of the kingdom. In the evidence given by Mr. Wedgwood before a committee of the Privy Council in 1785, it is stated that the manufacturing part alone in the Potteries and their immediate vicinity gives bread to 15,000 or 20,000 people; yet this is but a small part when compared with the whole number of those who depend upon it. A very great number of persons are employed in raising the raw material and the coals for fuel, in the conveyance of these materials to the Potteries, and in the re-conveyance of the finished goods to every part of England and to the different ports where they are shipped for foreign consumption.

The number of pieces of earthenware of English manufacture exported, and the real value of the same in each year, from 1831 to 1835, were as follows:—

	Pieces.	Value.
1831	37,028,897	£461,090
1832	43,265,283	490,787
1833	46,258,549	496,963
1834	44,015,623	493,382
1835	45,893,446	540,421

Shipments of these goods are made to every country with which Great Britain has any trading relations. The exports in 1835 were sent to various quarters in the following proportions:—

	Pieces.	Value.
Northern Europe, chiefly to Germany and the Netherlands .	7,214,515	£65,716
Southern Europe, chiefly Portugal, Spain, and Italy . . .	3,293,870	42,726
Africa	855,695	10,160
Asia, chiefly East India Company's territories, islands of the Indian Seas, and New South Wales .	2,534,811	30,563
United States of America . .	17,527,271	246,220
Other parts of North America, chiefly British colonies . . .	6,706,156	74,183
Brazil	5,369,103	42,123
Other States of South and Central America	2,059,943	24,537
Guernsey, Jersey, Alderney, &c. .	332,082	4,193
Pieces .	45,893,446	£540,421

EARTHQUAKES are the most terrific of all natural phænomena. The solid surface of the globe is put in motion by them, and assumes an appearance which in some cases may be compared with the sea when agitated by the wind.

The least dangerous of these phænomena are those which by the Creoles of South America are called *Tremblores*, a term which may be translated by *tremors*. The surface of the earth is put in a trembling motion, by which such objects as are not well supported are thrown to the ground, and even walls are split, but the damage does not extend farther. Life is safe, and property but slightly injured. These tremors are by far the most common kind of earthquakes, and occur in some countries of South America, especially in Chile, almost every day, at least in certain seasons.

The *terremotos* of the Creoles, or proper earthquakes, give to the surface either horizontal oscillations, not dissimilar to the waves of an agitated sea, or they consist in violent perpendicular upliftings, so that it would seem as if repeated explosions were exerting their force against the roof of a subterraneous cavern, threatening to burst it open and to blow into the air every thing placed over it. By these earthquakes walls are overthrown, and fissures are produced in the ground. The latter are frequently more than a foot in width, and sometimes water gushes out of them like a fountain.

Nothing makes such an awful impression on the senses as an earthquake. The earth is violently convulsed, heaving up and down in a manner hardly conceivable by those who have not witnessed it. The tottering buildings, the crashing of the timbers of the roofs, and the falling of the tiles, completely distract the senses. Fear drives men from their houses; but they do not always find safety out of doors. No person can stand without support: people cling to one another, to trees, or to posts. Some throw themselves on the ground; but the motion of the earth is so violent that they are obliged to stretch out their arms on each side to prevent themselves from being tossed over. Animals are equally alarmed. They stand with their legs spread out and their heads down, trembling violently. The air itself seems to participate in the convulsion, for the birds fly about wildly. Meanwhile the sea retires from the shore; but after a few minutes it returns in a high wave, which advances like a watery wall with incredible velocity, and covers all those tracts which are not more than fifty feet above high-water mark. It rushes back with equal velocity. This motion of the sea is repeated as long as the shocks of the earthquake are violent. Vessels sailing along a coast convulsed by an earthquake feel also a motion quite different from that produced by gales or currents. The loss of life by earthquakes is sometimes considerable. It is chiefly produced by the falling of the buildings when the shock is so unexpected that the inhabitants have not time to escape. In some cases the overflowing of the sea has been fatal to a great number of persons. People have also been swallowed up by the fissures caused by earthquakes.

Earthquakes are generally preceded and sometimes attended by a subterraneous noise, which is compared by some to that of a very heavy artillery waggon rolling quickly over a stone pavement at a distance; by others, to the echo of distant thunder in a mountainous country. It is worthy of remark that this noise is sometimes heard without any earthquake taking place, as in 1784 at Guanaxuato, in Mexico, and that it has been as audible in places situated at a considerable distance from the seat of the earthquake as in those which experienced the shocks. There are also several cases on record in which the earthquakes have not been attended by such subterraneous noise.

Considerable changes may be produced on the surface of the globe by earthquakes. It is said that by the earthquake of 1783 in Calabria some mountains changed their relative positions to one another; but this fact is not well established. It is, however, beyond all doubt that the coast of Chile has undergone a considerable change by earthquakes during the last fifteen years. In 1822 the coast, north of Valparaiso, to the extent of fifty miles, was raised nearly three feet above its former level; in some places the rocks on the shore were raised four feet. In 1825 the island of S. Maria (near 37° S. lat.) was upheaved nine feet, so that the southern port of this island has almost been destroyed, and the soundings round the island have diminished a fathom and a half every where.

The single shocks of an earthquake last from a few seconds to two or three minutes. Sometimes they follow one another at short intervals. It is remarkable that generally either the first or one of the first shocks is the most violent, and that they afterwards gradually decrease in force. Sometimes they return for several days, and even weeks; and in some places, as at Copiapò, in Chile, they are of daily occurrence.

Earthquakes are sometimes experienced over an immense tract of country. The last earthquake in Chile (in 1835) was felt at all places between the Island of Chiloe (40° S. lat.) and Copiapò (27° S. lat.); consequently over thirteen degrees of latitude. It extended from the Island of Juan Fernandez to the town of Mendoza, on the east side of the range of the Andes, over ten degrees of longitude. But when earthquakes extend over such an immense tract of country, some districts are always convulsed with greater violence, and these may be considered as the centre of the earthquake. The farther a place is removed from these centres, the less violent, as a general rule, are the shocks.

We know little, or rather nothing, of the origin or cause of earthquakes. It may, however, be considered as certain that they are due to the same agency which produces volcanic eruptions. These eruptions are frequently preceded by earthquakes; and whenever, in places situated near active volcanoes, it is observed that no smoke issues from their craters, the inhabitants begin to fear the approach of an earthquake.

It is not quite certain whether or not there is any connexion between the state of the atmosphere and the phænomena of earthquakes. It is not improbable that such is the case with the slighter shocks, the *tremblores*. They commonly occur, or at least are by far most frequent, at the time of the changes of the seasons, in Guatemala as well as in Chile. But the more violent concussions seem to be quite independent of the seasons, and they occur both in calm and cloudless weather and in storms and during rain. In some instances they have been preceded by luminous meteors.

Antient authors, especially Thucydides, frequently mention earthquakes; but only in general terms. Yet we learn enough from these slight notices to show that they were often equal in violence to those which in modern times have convulsed the continent of Europe and Asia. (Thucyd. i. 101; iii. 89; v. 50; viii. 41.) No detailed description of an earthquake in Europe or in the old continent exists before that which, on the 1st of November, 1755, almost destroyed the city of Lisbon. This is the most destructive earthquake which has ever occurred in Europe. The number of persons that perished by it is stated to have been 30,000. In February and March, 1783, the north-eastern part of Sicily and the southern portion of Calabria were convulsed by repeated and very violent shocks, which overthrew the town of Messina, and killed many thousands of its inhabitants, as well as many persons in Calabria. The last considerable earthquake in Europe extended over the middle of the kingdom of Naples, and was most destructive in the districts lying along the declivities of Mount Matese. (41° 30′ N. lat.) The number of persons who perished by it amounted to 3274, besides 1615 who were wounded.

On the first day of the present year (1837) the countries along the eastern extremity of the Mediterranean, especially Syria, were violently agitated by an earthquake. The towns of Damascus, Acre, Tyre, and Sidon, suffered great damage, and Tiberias and Safet were entirely destroyed. It is stated that about 6000 lives were lost.

America is more subject to earthquakes than any portion of the Old Continent, but they are only strongly felt between 20° N. lat. and 40° S. lat; and it is not the whole country included between these latitudes that is visited by them, but only the table-lands of the Mexican isthmus, the Andes, and the countries bordering on them, and those which are adjacent to the Caribbean Sea. Mention of earthquakes in these countries occurs in the Spanish historians of the Conquest; but it would seem as if the earthquakes were less destructive formerly than in the last century. In 1717 the town of Guatemala was greatly damaged by an earthquake on the 29th of September; and on the 29th of June, 1773, the town was almost entirely destroyed. Caracas was destroyed by an earthquake on the 26th of March, 1812, when upwards of 12,000 of its inhabitants were buried in the ruins; and the same town experienced, in 1826, another earthquake, which was hardly less destructive. Bogotà experienced a very severe shock in 1827. On the table-land of Quito violent earthquakes are frequent. In 1698, on the 20th of June, Lacatunga and Hambato were destroyed; and on the 4th of February, 1797, the town of Quito was greatly damaged, and Riobamba levelled to the ground. Not less than 40,000 persons are stated to have perished by this last earthquake on the table-land. Lima and the countries about it are likewise subject to frequent and violent earthquakes. The town of Lima was almost entirely destroyed on the 20th October, 1687, and again on the 28th October, 1746. In this latter catastrophe the port of Callao was inundated by the sea, and the whole population perished. Arequipa has had its share of earthquakes; but the last violent one occurred in 1725. Copiapò was destroyed on the 11th of April, 1819, and again in 1822. By this last earthquake, which happened on the 19th of November, the town of Valparaiso was levelled to the ground. Santiago has suffered largely from the destructive effects of the earthquakes so frequent in Chile: on the 8th of July, 1730, it sustained great damages. But no place in Chile has so frequently been destroyed as Concepcion. It was first destroyed by the united effects of repeated shocks and the inundation of the sea in 1730, and again in the same manner in 1751. After this the town was rebuilt on another site; but this new town and its port of Talcahuano were entirely demolished on the 20th of February, 1835. A most graphic description of this dreadful earthquake is given in the 'London Geographical Journal,' vol. vi. p. 319, &c., to which we are much indebted for several valuable facts and remarks. The inundation of the sea during this calamity may be compared with the narrative of a similar event recorded by Thucydides (iii. 89).

EARWIG. [Forficulidæ.]

EASEL (derived by some from the Teutonic *asel*, or *esel*, an ass), the wooden frame, furnished with a set of moveable pegs, or more convenient sliding ledge, on which pictures are placed while being painted, and which raises or lowers them according to the artist's convenience. Its antiquity is manifest, from its appearance in pictures discovered in Herculaneum.

EASEMENT (from the French words *aise, aisement*, ease), is defined by the old law writers as a service or convenience which one neighbour hath of another by charter or prescription without profit; as a way through his ground, a sink, or the like. It includes rights of common, ways, water-courses, antient lights, and various other franchises, issuing out of corporeal hereditaments, and sometimes, though inaccurately, applied to rights of common. (Kitchin; Woodd. *Lect.*)

At the common law these privileges (which can only be created and transferred by deed) might be claimed either under an immemorial custom or by prescription; but 20 years uninterrupted and unexplained enjoyment of an easement formerly constituted sufficient evidence for a jury to presume that it originated in a grant by deed; except in the city of London, where the presumption of a grant from 20 years' possession of windows was excluded by the custom which required that there should exist 'some written instrument or record of an agreement.' Nonuser during the same period was also considered an extinguishment of the right, as raising a presumption that it had been released.

By the recent statute 2nd and 3rd William IV., cap. 71, several important alterations have been made with regard to this description of property: 40 years' enjoyment of any way or other easement, or any water-course, and 20 years uninterrupted 'access and use of any light to and for any dwelling-house,' &c., now constitute an indefeasible title in the occupier, unless he enjoys 'by some consent or agreement expressly given or made for that purpose by deed or writing.' The same statute also enacts that nonuser for the like number of years (according to the description of the particular right) shall preclude a litigating party from establishing his claim to it.

The easements of the English correspond to the Servitutes of the Roman and the Servitudes of the French law. The servitutes were a class of rights which gave rise to numerous complicated questions. Those of road, water, light, drains, were the principal. (*Dig.* lib. viii. *De Servitutibus; Code Civil des Français*, liv. ii. tit. 4, *Des Servitudes*.)

EAST, the point of the compass which is in a direction at right-angles to that of north and south, and which is towards the *right* hand of a spectator who faces the north. The distinction between east and west must ultimately be derived from a reference to the human body; for we can only define a spectator's *right* hand by saying that it is the hand which is not upon the same side as the heart.

EAST INDIA COMPANY This association originated from the subscriptions, trifling in amount, of a few private individuals. It gradually became a commercial body with gigantic means, and next, by the force of unforeseen circumstances, assumed the form of a sovereign power, while those by whom it was directed continued in their individual capacities to be without power or political influence; thus presenting an anomaly without a parallel in the history of the world.

The company was first formed in London in 1599, when its capital, amounting to 30,000*l*., was divided into 101 shares. At the end of the next year the adventurers obtained a charter from the crown, under which they enjoyed certain privileges, and were formed into a corporation for fifteen years under the title of 'The Governor and Company of Merchants of London trading to the East Indies.' Under this charter the management of the company's affairs was intrusted to 24 members of a committee chosen by the proprietors from among their own body, and this committee was renewed by election every year

The first adventure of the association was commenced in 1601. In the month of May of that year, five ships, with cargoes of merchandise and bullion, sailed from Torbay to India. The result was encouraging, and between 1603 and 1613 eight other voyages were performed, all of which were highly profitable, with the exception of the one undertaken in the year 1607. In the other years the clear profits of the trade varied from 100 to 200 per cent. upon the capital employed. At this time the trading of the company was not confined to the joint stock of the corporation, but other adventurers were admitted, who subscribed the sums required to complete the lading of the ships, and received back the amount, together with their share of the profits, at the termination of every voyage.

The charter of the company was renewed for an indefinite period in 1609, subject to dissolution on the part of the government upon giving three years' notice to that effect. In 1611 the company obtained permission from the Mogul to establish factories at Surat, Ahmedabad, Cambaya, and Goga, in consideration of which permission it agreed to pay to that sovereign an export duty upon all its shipments at the rate of 3½ per cent.

After 1612 subscriptions were no longer taken from individuals in aid of the joint-stock capital, which was raised to 420,000*l.*, and in 1617-18 a new fund of 1,600,000*l.* was subscribed. This last capital, although managed by the same directors, was kept wholly distinct from the former stock, and the profits resulting from it were separately accounted for to the subscribers.

The functions of government were first exercised by the company in 1624, when authority was given to it by the king to punish its servants abroad either by civil or by martial law, and this authority was unlimited in extent, embracing even the power of taking life. Under the peculiar circumstances of the case the granting of such a power might perhaps be necessary in order to prevent the grossest disorder in distant settlements, where no authority more regular was established; but this necessity proves only the impropriety on the part of the government of permitting the formation of settlements without at the same time making provision for the regular administration of justice.

The success which attended its commercial operations naturally induced a desire for their extension. In 1632 a third capital, amounting to 420,700*l.*, was raised, and its management, although confided to the same directors, was also kept distinct from that of the first and second subscriptions.

There is some obscurity in the early annals of the company, which makes it uncertain whether the capitals here severally mentioned were considered as permanent investments or were returned to the subscribers at the termination of each different adventure.

A rival association, formed in 1636, succeeded in obtaining from the king, who accepted a share in the adventure, a license to trade with India, notwithstanding the remonstrances of the chartered body, of whose rights this was deemed an infringement. Promises indeed were given that the license should be withdrawn, but these promises were never fulfilled, and after carrying on their trade for several years in a spirit of rivalry which was fatal to their prosperity, the two bodies united in 1650, and thenceforward carried on their operations under the title of 'The United Joint Stock.' Two years after this arrangement was made the Company obtained from the Mogul, through the influence of a medical gentleman, Mr. Boughton, who had performed some cures at the Imperial Court, the grant of a license for carrying on an unlimited trade throughout the province of Bengal without payment of duties: for this privilege the very inadequate payment of 3000 rupees (375*l.*) was made by the Company.

Some proprietors of the Company's stock becoming dissatisfied with the management of the directors, obtained from Cromwell in 1655 permission to send trading vessels to India, and nominated a committee of management from their own body, for which they assumed the title of 'The Merchant Adventurers' The evils to both parties of this rivalship soon became apparent, and in about two years from the commencement of their operations the Merchant Adventurers threw their separate funds into the general stock under the management of the directors. On this occasion a new subscription was raised to the amount of 786,000*l.* In April, 1661, a new charter was granted to the Company, in which all its former privileges were confirmed, and the further authority was given to make peace or war with or against any princes and people 'not being Christians;' and to seize all unlicensed persons (Europeans) who should be found within the limits to which its trade extended, and to send them to England.

The settlement at Madras, on the Coromandel coast, was made about 1648, to facilitate the investments in piece-goods, then a chief object in the trade with India; and in 1668 the Company obtained a further settlement on the western coast of the peninsula by the cession in its favour of the Island of Bombay, made by Charles II., into whose hands it had come as part of the marriage portion of the Princess Catherine of Portugal. Bombay had been in possession of the English government during only a very few years, and its cession to the Company was only made because the expense which it occasioned was far beyond the revenue which it could be made to produce to the crown. The grant declares that the island is 'to be held of the king in free and common soccage, as of the manor of East Greenwich, on the payment of the annual rent of 10*l.* in gold on the 30th of September in each year.' At the same time the Company was authorized to exercise all the powers necessary for the defence and government of the island.

The first occasion on which the Company was brought into hostile collision with any of the native powers of India occurred in the beginning of 1664, when Sevajee, the founder of the Maharatta States, found occasion, in the prosecution of his plans, to attack the city of Surat. On this occasion the native inhabitants fled; but the members of the British factory, aided by the crews of the ships in the harbour, made a successful resistance, and forced Sevajee to retire. To show his satisfaction at the conduct of the Europeans upon this occasion, the Mogul accompanied the expression of his thanks with an extension of the trading privileges enjoyed by the Company. Another attack made upon Surat by the Maharattas in 1670 was repelled with equal success.

The right given to the Company by the charter of 1661 of seizing unlicensed persons within the limits above mentioned, and sending them to England, was soon exercised in a manner which produced a very serious dispute, in 1666, between the two houses of parliament. A merchant, named Skinner, had gone in a ship loaded with merchandise to the Island of Barella, off the north-east coast of Sumatra, which he had bought from the king of Jambee, and upon which he had made a settlement. His ship and the island, with all the property thereon, were seized by the Company, upon which Mr. Skinner made complaint to the government, and by his importunities caused the matter to be referred first to a committee of the privy council, and next to the House of Peers. It is difficult to understand the grounds for this last proceeding, or how the House of Peers could act judicially upon any case not brought before them by appeal from a court of law. Having awarded a compensation of 5000*l.* to Mr. Skinner for his losses, the affair was taken up by the House of Commons, who sent Mr. Skinner to the Tower, and passed a resolution declaring that any person who should proceed to execute the decision of the House of Lords was a betrayer of the rights and liberties of the Commons of England, and an infringer of the privileges of their house. These contentions proceeded to such a height, and were renewed so often, that the king adjourned the parliament in consequence seven times before he was able to induce the houses, by personal interference and persuasion used to influential members of both, to erase from their journals all their votes and resolutions relating to the subject. Mr. Skinner ultimately failed to procure any redress or compensation for his losses.

For several years following the junction with the Merchant Adventurers the trade of the Company was carried on uninterrupted by any serious rivalry, and with considerable success. Sir Josiah Child, who was one of the directors of the Company, in his Discourses on Trade, published in 1667, represents that trade as the most beneficial branch of English commerce, employing from 25 to 30 sail of the finest merchant ships in the kingdom, each manned with from 60 to 100 seamen,[*] and supplying us with saltpetre, pepper, indigo, calicoes, and drugs, besides materials for export to Turkey, France, Spain, Italy, and Guinea, without which a profitable trade with those countries could not be carried on. According to this representation, the trade of England must at that time have been insignificant indeed when compared with its amount in more modern times. In 1677-78 the whole adventure of the Company to India was 7 ships, with an investment of 352,000*l.* In 1678-79 the number of ships was 8, and the amount employed 393,950*l.* In 1679-80 there were despatched 10 ships with cargoes valued at 461,700*l.* In 1680-81, 11 ships, with the value of 596,000*l.*; and in 1681-82 there were 17 ships employed, and the investment amounted to 740,000*l.*

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[*] To show how imperfectly these matters were understood at that time, it may be mentioned that in a tract published in 1615, entitled 'The Trade's Increase,' and which was greatly esteemed, complaint is made of the decay of the English navigation, which is ascribed to the great consumption of mariners in the East India trade.

It was probably the indication of its profitableness afforded by the augmentation of the trade in the later years of the series just quoted, added to the great increase of commercial capital in the nation, that caused the formation of a project for establishing a rival company in 1682-83, but which failed to obtain the sanction of the government. As one means for discouraging similar attempts in future, the Company ceased to give any detailed statements concerning the amount of the trade, and for several years we have no knowledge as to the tonnage and amount of money to which it gave employment. Such an expedient was not likely to answer the end proposed. The veil of mystery thrown around their proceedings caused the public to entertain an exaggerated opinion concerning them, and tempted many private adventurers to set the regulations of the Company at defiance, and to despatch ships to trade where, according to the general belief, such great profits were to be obtained. These *interlopers*, as they were called, were seized by the Company's officers wherever they could be found, and under the pretext of piracy or some other crimes, they were taken before the Company's tribunals. Sentence of death was passed upon several, and the Company boasted much of the clemency that was shown in staying execution until the king's pleasure could be known; keeping the parties meanwhile in close confinement.

A new charter, to have effect for twenty-one years, was granted in 1693, in which it was stipulated that the joint-stock of the Company, then 756,000*l.*, should be raised to 1,500,000*l.*, and that every year the corporation should export British produce and manufactures to the value of 100,000*l.* at least. The power of the crown to grant the exclusive privileges given by this charter was questioned by the House of Commons, which passed a declaratory resolution to the effect 'that it is the right of all Englishmen to trade to the East Indies, or any part of the world, unless prohibited by act of parliament.' To obtain a charter thus at variance with the feelings of the people, it is known that bribery to a great extent was practised. The books of the Company, which were examined by order of the House of Commons, proved, indeed, that such practices were by no means new; that for many years bribes had been regularly given to men in power; and that in the year in which the charter was obtained nearly 90,000*l.* was distributed in this manner. The Duke of Leeds, who was charged with receiving 5000*l.*, was impeached by the Commons; and it is said that the prorogation of parliament which occurred immediately afterwards was caused by the tracing of the sum of 10,000*l.* to a much higher quarter.

As might be expected, the resolution of the House of Commons just recited, unnoticed as it was on the part of the crown, acted as an encouragement to new adventurers, many of whom, acting individually, began to trade with India; but a still more formidable rival arose in a powerful association of merchants, whose means enabled them to outbid the old Company for the favour of the government. The necessities of the crown being at that time great, the Company offered as the price of the confirmation of its charter the loan of 700,000*l.*, at 4 per cent. interest; but the associated merchants offering to lend 2,000,000*l.* at 8 per cent. interest, this offer was preferred, and an act was passed incorporating the association by the name of 'The General Society,' and authorizing the subscribers to trade with India, each one to the amount of his subscription, while such as desired to trade in combination might do so to the amount of their aggregate subscriptions. The old Company was allowed to trade for three years, and further to subscribe towards the stock of the General Society, of which latter privilege it availed itself to the amount of 315,000*l.* Those members of the General Society who preferred to trade upon a joint-stock soon after obtained another charter of incorporation, under the title of 'The English Company trading to the East Indies.' Their subscribed capital, which formed part of that of 'The General Society, being all lent to the government, their trade was by that means greatly crippled, and did not equal in amount that carried on by the old Company, which body procured an act of parliament continuing its corporate rights, and entitling the members to trade on their own account in respect of the stock which they held in the General Society.

The commercial and political inconvenience that attended the working of these rival corporations was soon made apparent, and great efforts were made to bring about their union. The king himself strongly recommended such a course to both parties; but such was the spirit of hostility by which each was actuated, that whenever any advance towards accommodation was made by one, the other immediately drew back, and it was not until January, 1702, that the general terms of union were adjusted and mutually approved. The principal points embraced in this arrangement were, that of the court of twenty-four directors, twelve individuals should be chosen by the subscribers of each of the companies; that the directors should every year determine the amount of the exports, one half of which should be furnished by each company; that seven years should be allowed for winding up the separate concerns of each company, during which time each should appoint and employ separate factors in India; but that at the end of the seven years one great joint-stock should be formed by the complete union of the funds of both companies, which thenceforward were to be wholly subject to the absolute management of the same directors in England, and the same officers in India. An indenture, to which the queen was made a party, was drawn up to give efficacy to this arrangement: this indenture was passed under the great seal of the kingdom, and the two companies took the common name which has been continued to the present day, of 'The United Company of Merchants trading to the East Indies.'

That part of this arrangement which provided for the independent management of the affairs of each company in India during seven years was the occasion of many serious disagreements, which however gave place to a feeling of common danger. The necessities of the government induced it to call upon the Company for a loan of 1,200,000*l.* without interest, and it was impossible for it to raise the necessary funds unless their disputes were previously settled, while there was danger lest some other association might be formed which should take advantage of the wants of the government to obtain privileges at the expense of the existing corporation. Under this feeling, both parties agreed to refer their differences to the arbitration of Lord Godolphin, then lord high treasurer of England, whose award, dated in September, 1708, was made the foundation of the Act, 6 Anne, chap. 17, which is the foundation of the privileges long enjoyed by the United East India Company. Under this act, the Company advanced the sum required (1,200,000*l.*) without interest, to government. This sum, added to the former loan of 2,000,000*l.* at 8*l.* per cent., made the debt of the government 3,200,000*l.*, and the interest equal to 5*l.* per cent. upon the whole sum. The charter which under the old indenture might have been terminated in 1711, was continued until the expiration of a notice of three years, which could not be given earlier than March, 1726, and further until the money borrowed by the government should be repaid. The Company was empowered to add the 1,200,000*l.* to its capital, and to raise 1,500,000*l.* either by bonds under its common seal or by contributions from its members.

Having thus briefly sketched the history of the various bodies which, after successive unions and arrangements, came, in 1708, to form the body which has since performed so important a part in the history of the world under the title of the United East India Company, it is necessary now to give some account of its constitution and government, and to trace that part of its history which has carried it from conquest to conquest, and made it in fact one of the greatest sovereign powers of the present times.

The capital stock of the Company, which, in 1708, amounted to . . . . . £ 3,200,000
was increased, under successive acts of parliament, as follows:—

In 1786 . .	800,000
1789 . .	1,000,000
1794 . .	1,000,000
Making its present capital	£ 6,000,000

upon which sum dividends are paid: the later subscriptions were made at rates considerably above par, so that the money actually paid into the Company's treasury on that account has been 7,780,000*l.*

The home government of the Company consists of—

1st. The Court of Proprietors.

2nd. The Court of Directors; and

3rd. The Board of Control, the origin and functions of which body will be hereafter explained.

The Court of Proprietors elect the directors of the Company, declare the amount of dividend, and make bye-laws, which are binding upon the directors for the management of the Company in all respects which are not especially regulated by act of parliament. The votes of the proprietors are given according to the amount of stock which they possess. The lowest sum which entitles a proprietor to vote is 1000*l.* of stock; 3000*l.* stock entitles to two votes; 6000*l.* to three votes; and 10,000*l.* to four votes, which is the largest number of votes that can be given by any one proprietor. At the time of the last parliamentary inquiry into the concerns of the Company, it was stated that the number of proprietors entitled to vote was 1976: of this number 54 were entitled each to four votes; 50 had each three; 370 had two votes; and 1502 had single votes.

The Court of Directors consists of 24 proprietors elected out of the general body. The qualification for a seat in the direction is the possession of 2000*l.* stock. Six of the directors go out of office every year; they retire in rotation, so that the term of office for each is four years from the time of election. The directors who vacate their seats may be re-elected, and generally are so, after being out of office for one year. The chairman and deputy chairman are elected from among their own body by the directors, thirteen of whom must be present to form a court.

The power of the directors is great: they appoint the governor-general of India and the governors of the several presidencies; but as these appointments are all subject to the approval of the crown, they may be said to rest virtually with the government. The directors have the absolute and uncontrolled power of recalling any of these functionaries. All subordinate appointments are made by the directors, but as a matter of courtesy a certain proportion of this patronage is placed at the disposal of the President of the Board of Control.

The Board of Control was established by the act of parliament passed in August, 1784, and which is known as Mr. Pitt's India Bill. This board was originally composed of six privy councillors, nominated by the king; and besides these, the chancellor of the exchequer and the principal secretaries of state are, by virtue of their offices, members of the board. It is no longer necessary to select the members from among privy councillors. In practice the senior member, or president, ordinarily conducts the business, and on rare occasions only calls upon his colleagues for assistance. It is the duty of this board to superintend the territorial or political concerns of the Company; to inspect all letters passing to and from India between the directors and their servants or agents which have any connexion with territorial management or political relations; to alter or amend, or to keep back, the despatches prepared by the directors, and, in urgent cases, to transmit orders to the functionaries in India without the concurrence of the directors. In all cases where the proceedings of the directors have the concurrence of the Board of Control, the court of proprietors has no longer the right of interference. The salaries of the president and other officers of the Board, as well as the general expenses of the establishment, are defrayed by the East India Company. With the powers thus described, the president of the Board of Control has been correctly described as 'a secretary of state for the affairs of India, governing by means of the court of directors as its instrument in all matters of a political nature,' which, since the last renewal of the charter in 1833, includes all the functions of the company, the right of trading having by that act been taken away.

The act 6 Anne, c. 17, already mentioned, conferred upon the company the exclusive privilege, as regarded English subjects, of trading to all places eastward of the Cape of Good Hope to the Straits of Magalhaens; and these privileges, with some unimportant modifications, which it is not necessary to explain, were confirmed by successive acts of parliament, and continued until 1814. By the act 53 Geo. III., c. 155, passed in 1813, the Company's charter was renewed for twenty years, but received some important modifications, the trade to the whole of the Company's territories and to India generally being thrown open to British subjects under certain regulations; the trade between the United Kingdom and China was still reserved as a monopoly in the hands of the East India Company. It was also provided by the act of 1813 that the territorial and commercial accounts of the Company should be kept and arranged so as to exhibit the receipts and expenditure of each branch distinctly from those of the other branch. These accounts, made out in forms approved by government, the directors are obliged to lay before both houses of parliament in the month of May in every year, 'made up according to the latest advices that shall have been received, and with as much accuracy as the nature of the case will admit.' In imposing this obligation upon the directors, it would almost appear that the legislature must have had in view the course which, twenty years later, on the next occasion of renewing the charter, was actually pursued. The act of 1833, by which the charter was renewed for twenty years, takes away from the Company the right of trading either to its own territories or the dominions of any native power in India or in China, and throws the whole completely open to the enterprise of individual merchants. The progress of the Company's trade at different periods has not been regularly published. The investigations that have been made into its concerns by committees of the houses of parliament, when it has been necessary to renew its charter, have been the means of bringing to light some information upon this subject; but the returns called for on each of these occasions have generally had reference only to the period immediately preceding that in which the inquiry has been made. The committee of secresy which sat in 1773 did indeed call for various statements embracing a considerable period of time; and it is from the report of this committee that the following particulars relating to the trade of the Company, in the forty years between 1732 and 1772, have been obtained. Dividing this term of forty years into decennary periods, the average result in each period was as follows:—

	Exports of goods and bullion.	Bills of exchange paid.	Total cost of goods received.	Amount of sales of goods.
1733 to 1742	£617,283	£167,311	£784,594	£1,699,775
1743 .. 1752	886,938	196,160	1,083,098	2,058,862
1753 .. 1762	797,318	303,076	1,100,394	2,030,104
1763 .. 1772	667,600	323,422	991,022	2,298,768
Average of 40 years.				
1733 .. 1772	742,285	247,492	989,777	2,171,877

It would appear from this statement that the trade must have been highly advantageous. The average annual profit upon the amount invested, as above shown, amounted, in the first decennary period, to 116 per cent.; in the second period to 90 per cent.; in the third period to 84 per cent.; in the fourth period to 132 per cent.; and embracing the whole forty years, the gross profit amounted to 119½ per cent. It must be borne in mind, however, that this was *gross* profit, and that the expenses of carrying on the trade according to the method employed of establishing factories were necessarily very great. In fact, they were such as to absorb the profits and to bring the Company considerably into debt: a result which it would be more correct to attribute to the political character of the Company than to its necessary commercial expenditure.

When compared with the commercial dealings of even individual merchants in modern times, the trade of the East India Company, as exhibited above, is insignificant. Small as it was, however, it afterwards experienced a considerable diminution, and in 1780, the entire value of the exports of goods and bullion amounted to only 401,166*l.*, a large part of which must have consisted of military stores and supplies required by the various factories and establishments of the Company. The commutation plan of Mr. Pitt, under which the duty on tea was reduced to 12½ per cent. *ad valorem*, and which came into effect in September, 1784, caused a considerable augmentation of the Company's outward investments, in order to procure the quantity of tea needed for use in this kingdom. The sales of tea at the India House, which, in the three years preceding the commutation, averaged 5,721,655 lbs., rose in the three following years to the average of 16,054,603 lbs., at which quantity it remained nearly stationary for several years. Notwithstanding this circumstance, the value of the exports made by the Company in each of the three years which preceded the renewal of the charter in 1793 did not exceed one million. Under the provisions of this new charter, the Company was bound to provide 3000 tons of shipping every year for the accommodation of private traders, and it is deserving of remark that under this apparently unimportant degree of competition the trade of the Company increased rapidly and greatly. During the last four years of its existence, from 1810-11 to 1813-14, the average annual exports of the Company were—

	Goods.	Stores.	Total.
	£	£	£
To the three Presidencies, Batavia, Prince of Wales's Island, St. Helena, and Bencoolen .	722,033	397,481	1,119,514
To China	1,023,065	2,786	1,025,851
Total . . .	1,745,098	400,267	2,145,365

On the occasion of the next renewal of its charter, viz. in 1814, the Company was obliged to make a further cession of its exclusive privileges, and stipulating only for the continuance of its monopoly in the importation of tea into this country, to allow the unrestricted intercourse of British merchants with the whole of its Indian possessions. Under these circumstances the Company found it impossible to enter into competition with private traders, whose business was conducted with greater vigilance and economy than was possible on the part of a great company; its exports of merchandise to India fell off during the ten years from 600,000*l.* in 1814-15 to 275,000*l.* in 1823-24, and to 73,000*l.* in the following year, after which all such exportation of merchandise to India on the part of the Company may be said to have ceased. The shipments to China were still continued, and large quantities of stores were also sent to India for the supply of the army and other public establishments.

It will be seen from the following statement of the value of exports from this country from 1814 to 1832 to all places eastward of the Cape of Good Hope, except China, in which the shipments of the Company (which include stores) are distinguished from those of private traders, that while the trade of the Company was thus falling off, that of private merchants was carried to an amount much greater than had existed during the monopoly of the Company.

	By the East India Company.	By Private Traders.	Total Value of Exports.
1814	. £826,558	. £1,048,132	. £1,874,690
1815	. 996,248	. 1,569,513	. 2,565,761
1816	. 633,546	1,955,909	. 2,589,455
1817	. 638,382	2,750,333	. 3,388,715
1818	. 553,385	. 3,018,779	. 3,572,164
1819	. 760,508	. 1,586,575	. 2,347,083
1820	. 971,096	. 2,066,815	. 3,037,911
1821	. 887,619	. 2,656,776	. 3,544,395
1822	606,089	. 2,838,354	. 3,444,443
1823	. 458,550	. 2,957,705	. 3,416,255
1824	. 654,783	. 2,841,795	. 3,496,578
1825	. 598,553	. 2,574,660	. 3,173,213
1826	. 990,964	. 2,480,588	3,471,552
1827	. 805,610	. 3,830,580	4,636,190
1828	. 488,601	. 3,979,072	4,467,673
1829	. 434,586	. 3,665,678	. 4,100,264
1830	. 195,394	. 3,891,917	. 4,087,311
1831	. 146,480	. 3,488,571	. 3,635,051
1832	. 149,193	. 3,601,093	3,750,286

The impossibility, as thus shown, of the Company's entering into competition with private merchants had a powerful influence with parliament when it was last called upon to legislate upon the affairs of India, and in the charter of 1833 not only was the monopoly of the China trade abolished, but the Company was restricted from carrying on any commercial operations whatever upon its own account, and was confined altogether to the territorial and political management of the vast empire which it has brought beneath its sway.

Having thus, as briefly as possible, traced the progress of the Company from its foundation to the close of its commercial existence, it remains to describe it in its far more important capacity as the possessor of an empire almost unexampled in extent, and containing a population of one hundred millions of subjects.

The commencement and early progress of the politic power of the East India Company in India have already bee described. [BENGAL.] It would extend this notice to unreasonable length if we attempted to trace the successi wars and conquests which mark the annals of the Compan this, indeed, is the less needed because of the notices give in our account of the various provinces and states of Ind in which that information necessarily finds a place. A that it appears requisite to give under this head will found in the following chronological table of the acqui tions of the British in India, in which are stated the powe from whom the territory has, from time to time, bee acquired.

Date.	Districts, &c.	Power from whom acquired.
1757	Twenty-four Pergunnahs	. Nabob of Bengal
1759	Masulipatam, &c.	. The Nizam
1760	Burdwan, Midnapore, and Chittagong	. Nabob of Bengal
1765	Bengal, Bahar, &c.	. The Mogul
,,	Company's Jaghire, near Madras .	. Nabob of Arcot
1766	Northern Circars	. The Nizam
1775	Zamindary of Benares	. Vizier of Oude
1776	Island of Salsette	. The Maharattas
1778	Nagore	. Rajah of Tanjore
,,	Guntoor Circar	. The Nizam
1786	Pulo Penang	. King of Queda
1792	Malabar, Dundigul, Salem, Barramahal, &c.	Sultan of Mysore
1799	Coimbatore, Canara, Wynaad, &c. .	. Ditto
,,	Tanjore	. Rajah of Tanjore
1800	Districts acquired by the Nizam in 1792 and 1799 from Sultan of Mysore . .	The Nizam
1802	The Carnatic	. Nabob of the Carnati
,,	Gorruckpore, Lower Doab, Bareilly .	. Vizier of Oude
,,	Districts in Bundelcund . . .	. The Peishwa
1804	Cuttack and Balasore	. Rajah of Berar
,,	Upper part of Doab, Delhi, &c. . .	. Dowlut Rao Scindia
1805	Districts in Gujerat	. The Guicowar
1815	Kumaon and part of the Terraie .	. Rajah of Nepal
1817	Saugur and Huttah Darwar, &c. .	. The Peishwa
,,	Ahmedabad Farm	. The Guicowar
1818	Candeish	. Holkar
,,	Ajmeer	. Dowlut Rao Scindia
,,	Poonah, Concan, Southern Maharatta Country, &c.	The Peishwa
1820	Lands in Southern Concan . . .	. Rajah of Sahwuntwa
1822	Districts in Bejapore and Ahmednuggar	. The Nizam
1824	Singapore	. Rajah of Johore
1825	Malacca	. King of Holland
1826	Asam, Aracan, Tarvi, &c.	. King of Ava
,,	Districts on the Nerbudda, Patna, Sambhulpore, &c.	Rajah of Berar

It has always been felt to be highly anomalous that association of individuals, the subjects of a sovereign sta should wage wars, make conquests, and hold possession territory in foreign countries, independent of the gove ment to which they owe allegiance. At a very early riod of the Company's territorial acquisitions, this feel was acted upon by parliament. By the act 7 Geo. I c. 57 (1767), it was provided, that the Company should allowed to retain possession of the lands it had acquired India for two years, in consideration of an annual paym to the country of 400,000*l.* This term was extended by 9 Geo. III., c. 24, to February, 1774. The sums paid to public under these acts amounted to 2,169,398*l.* The of these payments, which should have been made in 17 was not received until 1775, and could not then have be paid but for the receipt of 1,400,000*l.* which was lent to Company by parliament. This loan was afterwards d charged, and the possession of its territory was from year year continued to the Company until 1781, and was th further continued for a period to terminate upon three yea notice to be given after 1st March, 1791. Under this the Company paid to the public 400,000*l.* in satisfaction all claims then due. In 1793 the same privileges were tended until 1814, the Company engaging to pay to public the sum of 500,000*l.* annually, *unless prevented* *war expenditure;* but owing to the contests in which was engaged throughout that period, two payments 250,000*l.* each, made in 1793 and 1794, were all that public received under this agreement.

The act of 1813, by which the charter was renewed twenty years from 1814, continued the Company in possession of its territory, without stipulating for any i mediate payment to the public; it provided that the accou of the Company, both in England and in India, should so kept as to exhibit the territorial and political, disti from the commercial, branch of its concerns, the territor revenue being appropriated strictly to the expenses of vernment and the repayment of the territorial debt, wh the commercial receipts and profits were alone applicable commercial objects, and to the payment of dividends to proprietors. The 59th section of the act provided th when the territorial debt should be reduced to 13,000,00 the territorial profits should be applied first to the repayment of any public funds that might have been created in this country for the use of the Company, and that they should be then paid into the public exchequer to accumulate until the deposits should amount to 12,000,000*l.*, which sum should be retained for securing the capital stock of the Company, and providing an annuity to the proprietors equal to the rate of dividend, 10½ per cent. per annum, which they then received. In the event of the accumulations going beyond 12,000,000*l.*, one-sixth only of the surplus was to go to the Company, and five-sixths to be the property of the public. By these provisions, the right of parliament to assume possession of the Company's territories and of the revenues derived from them is clearly established.

Throughout the whole of the territories held in absolute sovereignty by the East India Company, it exercises the right of ownership in the soil, not by retaining actual possession in its own hands, but by levying assessments, which have usually been so calculated as to yield the greatest amount of present rental that could be collected from the cultivators, very frequently 'all that could be raised without diminishing the number of the inhabitants or desolating the country.' Before the sway of the English in India, the lands were held by a class of men who cultivated the soil with their own hands, whose right of perpetual occupancy was never questioned, but who were subject to the demands of their several governments, demands unlimited as to the right of the sovereign, but limited in fact by custom, which was stronger than the sovereign power. Different systems, as regarded the mode of collecting the rent on the part of the government, existed in different parts of the country. In some places the rent, or rather the amount of the tax, was collected in one sum from each village, which kept up an establishment of officers, whose functions consisted in first proportioning according to the means of each, and in then levying the sum assessed among the cultivators. In other cases, government officers were appointed who received charge of several districts, and who were paid for their services by a per-centage upon the amount collected. These officers were known as Talookdars, or more commonly as Zamindars, and this system has from them acquired its name of the Zamindary system. It was usual formerly for the government to allow to the zamindar one-tenth of the amount of the collections, and to require the remaining nine-tenths to be paid into its treasury. In 1793, however, the Marquess Cornwallis, being then Governor General of India, formed the resolution of fixing the assessment, and placing the zamindars in the situation of proprietors, engaging not to raise at any time the amount of the assessments against them. This arrangement, known as the *permanent settlement*, has been established through a great part of the presidencies of Bengal and Madras, including also certain polygars in the south, and hill chiefs in the Northern Circars.

It was hoped that by this means the zamindars would have been induced to improve their estates, since the whole increased revenue resulting from such improvements would have been permanently theirs. Unfortunately the power thus confided to the landholder has been used principally as the means of oppressing the actual cultivators, the ryots, and in order to repair this evil, the Company has of late years become the purchaser of all estates thus held which have been brought to sale, and making its bargain direct with the ryots, the actual cultivators of the soil, with the view of abolishing the system of employing middle-men: this plan is known under the name of *the ryotwary system*.

The executive government of the Company's territories is administered at each of the presidencies by a governor and three councillors. The governor of Bengal is also the governor-general of India, and has a control over the governors of the other presidencies, and if he sees fit to proceed to either of those presidencies, he there assumes the chief authority. The governors and their councils have each in their district the power of making and enforcing laws, subject in some cases to the concurrence of the supreme court of judicature, and in all cases to the approval of the court of directors and the board of control. Two concurrent systems of judicature exist in India, viz.: the Company's courts and the king's or supreme courts. In the Company's courts there is a mixture of European and native judges. The jurisdiction of the king's courts extends over Europeans generally throughout India, and affects the native inhabitants only in and within a certain distance around the several presidencies: it is in these courts alone that trial by jury is established. Every regulation made by the local governments affecting the rights of individuals must be registered by the king's court in order to give it validity.

The constitution, in other respects, of the East India Company is shown by the following brief analysis of the principal clauses of the act 3 and 4 William IV., c. 85, which received the royal assent, 28th August, 1833, and under which its concerns are at present administered:—

Sec. 1.—The government of the British territories in India is continued in the hands of the Company until April, 1854. The real and personal property of the Company to be held in trust for the crown, for the service of India.

2.—The privileges and powers granted in 1813, and all other enactments concerning the Company not repugnant to this new act, are to continue in force until April, 1854.

3.—From 22nd April, 1834, the China and tea trade of the Company to cease.

4.—The Company to close its commercial concerns and to sell all its property not required for purposes of government.

9.—The debts and liabilities of the Company are charged on the revenues of India.

43.—The governor-general in council is empowered to legislate for India and for all persons, whether British or native, foreigners or others.

44.—If the laws thus made by the governor-general are disallowed by the authorities in England, they shall be annulled by the governor-general.

81.—Any natural-born subject of England may proceed by sea to any part or place within the limit of the Company's charter having a custom-house establishment, and may reside thereat, or pass through to other parts of the Company's territories to reside thereat.

86.—Lands within the Company's territories may be purchased and held by any persons where they are resident.

87.—No native nor any natural-born subject of his majesty resident in India, shall, by reason of his religion, place of birth, descent, or colour, be disabled from holding any office or employment under the government of the Company.

88. Slavery to be immediately mitigated, and abolished as soon as possible.

The alterations in the constitution and administration of the Company effected by this act of 1833 are calculated to exercise a very important influence upon the future condition of the inhabitants of India. So long as the Company was allowed to combine commercial pursuits with its political character, its power might always have been, and very frequently was exercised in a manner ruinous to private traders. The extensive scale upon which its purchases were made raised prices in the country of production, and tended to lower them in Europe, and as it was never known in what articles the investments of the Company were to be made, their competitors were always forced to act under apprehension of interference, that set all their calculations at defiance. Now that the trade has been allowed to take a more natural course, we may confidently expect that the usual good result will attend upon the employment of individual skill and enterprise, that greater regularity of prices will be experienced, and that production will be stimulated until the prices of India produce are brought within the compass of a larger number of European consumers than at present. The advantages to England of this state of things must be great. To use the emphatic words of Dr. Wallich, the superintendent of the Company's botanic gardens at Calcutta, "The Company's territories in India are productive of every article which can conduce to the happiness of man; and it only requires skill and ingenuity, and encouragement, both to the natives and to Europeans in India, to select every thing that can possibly be desired.' On the other hand, the luxuries and conveniences of European production, which are suited to the tastes of the natives of India, are equally varied and numerous, and present experience warrants the belief that under a regular course of trade, the circle of our customers for these productions will be continually enlarged. The progress here described must be greatly accelerated by the provisions contained in the 81st and 86th sections of the act, which authorises the settlement of Europeans in India and the purchase of lands by them. Previously to the passing of this act, the Company possessed the right of arbitrary deportation against Europeans without trial or reason assigned, and British-born subjects were not only restricted from purchasing lands, but were prohibited from even renting them. Under the 87th section, if fairly carried into execution, a greater inducement than had hitherto been offered, is held out to the natives of India to qualify themselves for advancement in the social scale; a circumstance from which the best moral effects upon their characters are expected to result.

The revenue of the Indian government is not confined to its collections from the land, but consists likewise of customs—duties, stamp-duties, subsidies, and tribute from certain native states, some local taxes, and the profits arising from the monopolies of salt and opium. The following is an abstract of the revenues and charges of the Indian government during each of the three years 1831-32 to 1833-34, the latest for which the accounts have yet been presented to parliament.

	1831-32.	1832-33.	1833-34.
REVENUES.	£	£	£
Bengal	9,474,084	9,487,778	8,844,241
Madras	3,322,155	2,969,956	3,235,233
Bombay	1,401,916	1,497,308	1,600,691
Total revenues of India .	14,198,155	13,955,042	13,680,165
CHARGES.			
Bengal	7,535,170	7,687,228	7,018,449
Madras	3,239,261	3,174,347	3,258,995
Bombay	2,060,498	2,034,710	1,968,045
Charges on account of St. Helena	94,152	95,553	91,641
Charges disbursed in England	1,476,655	1,227,536	1,293,637
Total charges of India .	14,405,736	14,219,374	13,630,767
Deficiency . . .	207,581	264,332	—
Surplus . . .	—	—	49,398

	Debts.	Annual Amount of Interest.
Public debts bearing Interest.	£	£
Bengal	31,508,574	1,609,844
Madras	3,351,271	112,857
Bombay	603,638	31,844
	35,463,483	1,754,545

The great extent of its territories, and the nature of the tenure by which they are held, oblige the Company to keep on foot a large standing army, which is necessarily accompanied by great expense. The most recent detailed account that has been given upon this subject has reference to the year 1830, in which year the total number of the military force employed at the three presidencies and subordinate settlements in India amounted to 224,444 men, and its expense to 9,474,481*l*. The different descriptions of force and the expense attending each were then as follows:—

	Total.	Expense.
Engineers—Officers, European and Natives, and Rank and File	1084	£83,873
Artillery—European—Horse	2560	199,141
Foot	7469	252,343
Native—Horse	1062	74,239
Foot	6294	100,740
Cavalry—European—King's .	2577	172,588
Native—Company's—Regular	12,248	718,853
Irregular	4714	179,393
Infantry—European—King's .	17,731	628,612
Company's .	3634	122,400
Native—Regular	124,391	3,103,355
Irregular	24,306	270,712
Invalids . .	10,588	
Pioneers	3487	74,511
Hospital	1266	
Expense of Medical Department		132,858
Staff	1033	488,490
Commissariat .		614,327
Other Military charges .		2,258,046
Total Force	224,444	
Total Expense . . .		£9,474,481

The distribution of this force on the 30th of April, 1830 was as follows:—

		Bengal.	Madras.	Bombay	Prince of Wales's Island.	St. Helena.	Total.
Engineers . .		869	30	185	..	..	1,084
Artillery.—	European	4,402	2,779	2,425	..	423	10,029
	Native	3,539	2,773	1,044	..	..	7,356
Cavalry.—	European	1,235	637	705	..	..	2,577
	Native	9,211	4,934	2,817	..	..	16,962
Infantry.—	European	8,350	8,166	4,404	..	445	21,365
	Native	80,482	42,868	25,347	..	..	148,697
Invalids . .		2,746	5,887	1,863	..	92	10,588
Pioneers . .		851	1,718	918	..	..	3,487
Hospital . .		457	494	292	15	8	1,266
Staff . . .		440	445	148	..	..	1,033
		112,583	70,730	40,148	15	968	224,444

EAST INDIES. The portion of the globe to which the name of India, or the East Indies, is given, is usually understood to comprehend the peninsula of Hindostan lying to the east of the river Indus, and thence eastward as far as the boundary of the Chinese empire, by which empire, and by Tartary, India is also bounded on the north. The East Indies include also the islands of the Indian Ocean which lie between Hindostan and Australia as far north as the Philippine Islands, and as far east as Papua, but without including either the Philippines or Papua.

EASTER, Anglo-Saxon *Eastre*, a moveable feast, held in commemoration of the Resurrection; being the most important and most antient in observance, it governs the whole of the other moveable feasts throughout the year. In the Greek and Latin churches it is called Πασχα, *Pascha*, originally derived from a Hebrew word signifying a passage, which was the name given to the great feast of the Passover, held by the Jews on the same day with that on which our Saviour held his paschal feast. The etymologies of the word Easter have been various. Bede says, it was derived from a goddess called *Eostre*, to whom the people used at this season to celebrate festivals; but the most obvious is the Anglo-Saxon *yst*, a storm, the time of Easter being subject to the continual recurrence of tempestuous weather.

That the observation of Easter is as antient as the time of the Apostles seems undoubted. In the second century, however, a controversy arose as to the exact time of its celebration. The Eastern churches kept it on the 14th day of the first Jewish month; the Western churches on the night which preceded the anniversary of our Saviour's resurrection. The inconvenience of the former was, that this festival was commonly held upon other days of the week than the first, or Sunday, which was undoubtedly the proper day. The disputants retained their respective customs till towards the middle of the fourth century, when the rule for the celebration of Easter was fixed by the Council of Nice, A.D. 325. It was ordered to be held on the Sunday which falls next after the first full moon following the 21st of March, or vernal equinox.

Brand, in his Popular Antiquities, has given a long enumeration of the sports and observances at Easter in former times, including a few superstitions. The mutual presentation of coloured eggs at this season from friends continues both in the East and in Russia. (See Dr. E. D. Clarke's *Travels*, vol. i., 4to., Cambr., 1810, p. 59.) *Lifting*, originally designed to represent our Saviour's resurrection, is also still practised on Easter Monday and Tuesday in England, in Lancashire and some other counties; on which days, as well as at Whitsuntide, the Londoners repair to the celebration of their popular gaieties at Greenwich fair. Tansey puddings and cakes were antiently eaten in England at Easter.

(Broughton's *Dict. of all Religions*, fol., London, 1756, p. 395; Brady's *Clavis Calendaria*, 8vo. London, 1812, vol. i., p. 269; Brand's *Popular Antiquities*, vol. i., p. 137-155.)

EASTER, Method of Finding. The importance of this question, in aiding historical reference, is confined to that definition of Easter Sunday which was finally adopted by the western church. It is as follows: the Sunday following the full moon which follows the 21st of March; if a full moon fall *on* the 21st of March, therefore, the next full moon is the paschal moon; and if the paschal moon fall *on* a Sunday, the next Sunday is Easter Sunday.

By common consent, it is not the real sun or the rea moon which is employed in finding Easter, but the fictitious sun and moon of astronomers, which move uniformly with the average motion of the real bodies. It must therefore never surprise any one to find the Easter of any year not agreeing with the above definition, since such a case might (and sometimes must) arise. Say, for instance, that the real opposition of the sun and moon took place at a minute before twelve o'clock at night, March 21, and that of the average sun and moon two minutes after the above. The consequence would be that, counting by the real bodies, the full moon in question would not be the paschal full moon, while that of the average bodies would be so. But the following rules will determine the Easter day of chronologists in any year of the Christian æra, which is all that is required:—

First, ascertain the dominical letter, taking the second where there are two. [Dominical Letter]. Next, ascertain the golden number (year of the Metonic cycle) as follows: add one to the date of the year and divide by 19, the remainder (or if there be no remainder, 19 itself) is the golden number. The following table must then be used, in the manner to be immediately explained:—

	O.S.	N.S.		O.S.	N.S.
March 21 C	16	14	April 9 A	17	15
22 D	5	3	10 B	6	4
23 E	—	—	11 C	—	—
24 F	13	11	12 D	14	12
25 G	2	—	13 E	3	1
26 A	—	19	14 F	—	—
27 B	10	8	15 G	11	9
28 C	—	—	16 A	—	—
29 D	18	16	17 B	19	17
30 E	7	5	18 C	8	6
31 F	—	—	19 D	—	—
April 1 G	15	13	20 E	—	—
2 A	4	2	21 F	—	—
3 B	—	—	22 G	—	—
4 C	12	10	23 A	—	—
5 D	1	—	24 B	—	—
6 E	—	18	25 C	—	—
7 F	9	7			
8 G	—	—			

O. S. means *old style*; N. S., *new style*.

Having the golden number, and the dominical letter, find out the golden number in the second or third column, according as old style or new style is meant; and look down the first column until the *next* occurrence of the dominical letter comes. Easter day is opposite. Thus the golden number being 13 and the dominical letter F, Easter day is March 31 in the old style, April 7 in the new style.

Example 1.—What was Easter day A.D. 1688 (old style)?

The dominical *letters* are A G. Take the second, G.

1688
1
19)1689(88
rem. 17 the golden number.

Opposite to 17, under O. S., comes April 9 A, and the next G which occurs is opposite to April 15, which was therefore Easter day.

Example 2.—When will Easter day fall, A.D. 1841?

The dominical letter is C.

1841
1
19)1842(96
rem. 18 the golden number.

Opposite to 18, under N. S., is April 6 E, and the next C is opposite to April 11, which is therefore Easter day.

The following table gives Easter day for every year from 1800 to 1999. Thus in 1873 Easter day is April 13 (a. 13); in 1973 it is April 22 (a. 22).

	18.	19.		18.	19.		18.	19.
00	a. 13	a. 15	34	m. 30	a. 1	67	a. 21	m. 26
01	a. 5	a. 7	35	a. 19	a. 21	68	a. 12	a. 14
02	a. 18	m. 30	36	a. 3	a. 12	69	m. 28	a. 6
03	a. 10	a. 12	37	m. 26	m. 28	70	a. 17	m. 29
04	a. 1	a. 3	38	a. 15	a. 17	71	a. 9	a. 11
05	a. 14	a. 23	39	m. 31	a. 9	72	m. 31	a. 2
06	a. 6	a. 15	40	a. 19	m. 24	73	a. 13	a. 22
07	m. 29	m. 31	41	a. 11	a. 13	74	a. 5	a. 14
08	a. 17	a. 19	42	m. 27	a. 5	75	m. 28	m. 30
09	a. 2	a. 11	43	a. 16	a. 25	76	a. 16	a. 18
10	a. 22	m. 27	44	a. 7	a. 9	77	a. 1	a. 10
11	a. 14	a. 16	45	m. 23	a. 1	78	a. 21	m. 26
12	m. 29	a. 7	46	a. 12	a. 21	79	a. 13	a. 15
13	a. 18	m. 23	47	a. 4	a. 6	80	m. 28	a. 6
14	a. 10	a. 12	48	a. 23	m. 28	81	a. 17	a. 19
15	m. 26	a. 4	49	a. 8	a. 17	82	a. 9	a. 11
16	a. 14	a. 23	50	m. 31	a. 9	83	m. 25	a. 3
17	a. 6	a. 8	51	a. 20	m. 25	84	a. 13	a. 22
18	m. 22	m. 31	52	a. 11	a. 13	85	a. 5	a. 7
19	a. 11	a. 20	53	m. 27	a. 5	86	a. 25	m. 30
20	a. 2	a. 4	54	a. 16	a. 18	87	a. 10	a. 19
21	a. 22	m. 27	55	a. 8	a. 10	88	a. 1	a. 3
22	a. 7	a. 16	56	m. 23	a. 1	89	a. 21	m. 26
23	m. 30	a. 1	57	a. 12	a. 21	90	a. 6	a. 15
24	a. 18	a. 20	58	a. 4	a. 6	91	m. 29	m. 31
25	a. 3	a. 12	59	a. 24	m. 29	92	a. 17	a. 19
26	m. 26	a. 4	60	a. 8	a. 17	93	a. 2	a. 11
27	a. 15	a. 17	61	m. 31	a. 2	94	m. 25	e. 3
28	a. 6	a. 8	62	a. 20	a. 22	95	a. 14	a. 16
29	a. 19	m. 31	63	a. 5	a. 14	96	a. 5	a. 7
30	a. 11	a. 20	64	m. 27	m. 29	97	a. 18	m. 30
31	a. 3	a. 5	65	a. 16	a. 18	98	a. 10	a. 12
32	a. 22	m. 27	66	a. 1	a. 10	99	a. 2	a. 4
33	a. 7	a. 16						

EASTER ISLAND, an island in the eastern part of the Pacific Ocean, more than 2000 miles distant from the coast of South America, is situated between 75° 5′ and 75° 12′ S. lat., and between 109° and 110° W. long. It is about thirty or forty miles in circuit, with a stony and hilly surface, and an iron-bound shore. The hills appear to rise to the height of 1200 feet, according to Beechey. At the southernmost extremity of the island is an extinct volcano. Lava seems to form the principal component of the hills, which rise gradually and are covered with grass. The island has no safe anchorage, no wood for fuel, no fresh water, and no domestic animals, except a few fowls. The inhabitants live on yams, potatoes, and sugar-cane. In physiognomy, language, and manners, they resemble the inhabitants of the other groups of islands lying farther west. But it is remarkable, that on this island are found a number of colossal statues, some of which are fifteen or even eighteen feet high; they stand on platforms, which have been made with a considerable degree of art. Some conjecture that these monuments have been erected by a nation more numerous than its present inhabitants. Cook estimated the population at 600 or 700; but La Perouse thought that it amounted to 2000, and Beechey to 1230. (Cook, La Perouse, and Beechey.)

EAVES. [House.]

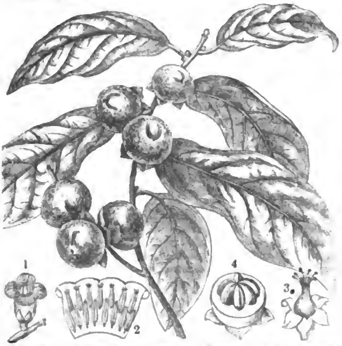
EBB. [Tides.]

EBEL, JOHN GOTTFRIED, an esteemed writer on statistics and geology, born at Francfort on the Oder, October 6, 1764; died at Zürich, 1830. After completing his studies and taking his degree as doctor of medicine, he went to France, and became intimately acquainted with the Abbé Sieyes. In 1801 he went to Switzerland, and resided chiefly at Zürich. He travelled through Switzerland in all directions, and published some very valuable works on the natural history and statistics of the country. The most popular is his 'Guide to Travellers in Switzerland.' In his description of the mountaineers of Switzerland, he draws an interesting picture of the inhabitants of Appenzel and Glarus. His work on the geology of the Alps touches also on the structure of the globe in general, and contains valuable information on the geognostical relations of the Alps.

EBELING, CHRISTOPHER DANIEL, born 1741, at Garmissen in Hildesheim: died in 1817. He studied theology at Göttingen, and acquired great knowledge of the oriental languages, especially the Arabic, and was thoroughly acquainted not only with the classical literature of Greece and Rome, but also with that of modern Europe, particularly England. He published numerous translations, &c., but his chief work is his 'Geography and History of the United States of North America,' 7 vols. 8vo., which was justly considered as a masterpiece, not only in Europe, but still more in America itself. He was chosen a member of almost all the learned societies of the country, and the Congress voted him public thanks for his services. That part of his library which related to America, consisting of 3900 volumes, was purchased after his death by M. Israel

Thoredino, a friend of learning, at Boston, and presented to Harvard college. Ebeling was for thirty years professor of history and of the Greek language in the gymnasium at Hamburg. His industry was extraordinary. Besides the duties of his professorship and the composition of his chief work, he was for above twenty years keeper of the public library of the city, into which he introduced order and judicious arrangement, and composed a catalogue, which was much wanted. He besides contributed largely to numerous periodicals. He was of a most friendly, cheerful, and social disposition; and we must admire the wonderful patience and equanimity with which he bore for thirty years a hardness of hearing, which gradually increased to almost total deafness, so that a loud voice was scarcely perceptible to him even with the aid of an ear-trumpet.

EBENA'CEÆ, a natural order of monopetalous exogens with the following essential character:—Flowers either with separate sexes, or occasionally hermaphrodite. Calyx permanent, with from three to six divisions. Corolla monopetalous, regular, of a thick leathery texture, usually downy on the outside, with the same number of divisions as the calyx. Stamens twice or four times as numerous as the lobes of the corolla, adhering to its tube, and usually in two rows; sometimes adhering in pairs. Styles several. Fruit fleshy, superior, with only one pendulous seed in each cell. Embryo lying in much albumen, with large leafy cotyledons and a long taper radicle. The species consist entirely of bushes or trees, some of which are of large size; their leaves are alternate, with no stipules, and generally leathery and shining. Diospyrus Ebenus, and some others, yield the valuable timber called ebony. The fruit of Diospyrus Kaki is about as large as an apricot, and is dried as a sweetmeat by the Chinese. Most of the plants of this order are tropical; of the few found beyond the tropics, Diospyrus Lotus inhabits Africa and Switzerland, and D. Virginiana, the United States.



A branch of Diospyrus Lotus in fruit; 1, a flower; 2, a corolla, cut open; 3, the calyx and ovary; 4, a section of a ripe fruit, showing the seeds.

EBERSBACH, the largest village in the kingdom of Saxony, is situated in the eastern part of that kingdom, and in the circle of the Land, a subdivision of the province of Lusatia, in 51° 0′ N. lat., and 14° 38′ E. long. It is the centre of the linen manufacture of Saxony, is divided into Upper and Lower Ebersbach, has two churches, three schools, and about 700 houses, with upwards of 5000 inhabitants. There are more than 2000 looms in activity. It lies about nine miles north-west of Zittau.

EBIONITES, a sect of Christian Jews, which existed in Palestine and other parts of the East in the first and second centuries of our æra. Like the Nazarenes, with whom they have been often confounded, they continued to observe the precepts and ceremonies of the Mosaic law; they kept both the Sabbath and the Sunday, made their ablutions, used unleavened bread in the celebration of the eucharist, and moreover, abstained from eating flesh. Still they do not seem to have formed a distinct sect till after the second destruction of Jerusalem by Hadrian, when they became separated from the rest of the church by their dogmas as well as by their external practices. Origen, Epiphanius, Eusebius, and other early fathers, distinguish two sorts of Ebionites, namely, those who denied the divinity of Jesus Christ, asserting that he was the son of Joseph and Mary, though endowed with a prophetic gift, and those who maintained that he was born of a virgin, but denied his preexistence as God. The Ebionites in general acknowledged only one gospel, namely, the Hebrew one, which goes by the name of St. Matthew, and that one mutilated. They discarded the Acts of the Apostles, and especially the Epistles of St. Paul, whom they considered as an apostate from the old law. They had several apocryphal books; among others, a life of St. Peter. The earlier Ebionites lived a regular life, and many of them observed celibacy, which they held in great esteem. The later Ebionites became much more lax in their morals. The name of Ebionites is said by Eusebius, Origen, and Irenæus to be derived from a Hebrew word of contempt, meaning 'poor low people,' which the Jews applied to those of their countrymen who had embraced Christianity. Others have derived it from a philosopher of the name of Ebion, whose existence however is doubtful. Epiphanius speaks at length of the Ebionites, but he confounds them with other sects, and his account cannot be trusted. (Mosheim, *Institutes of Eccles. History*, with *notes* by Dr. Murdoch; Neander, *Kirchengeschichte*.)

EBOE, is the name given in the West Indies to the blacks imported from the coasts of the Bight of Benin, as distinct from the natives of the Gold Coast and other parts of Africa. 'In their complexion they are much yellower than the Gold Coast and Whidah Negroes; but it is a sickly hue, and their eyes appear as if suffused with bile, even while in perfect health. The conformation of the face in a great majority of them very much resembles that of the baboon.' (Edwards' *History of the West Indies*.) The Eboes are subject to great despondency and depression of spirits, which form a striking contrast to the frank and fearless temper of the Koromantyns, or Gold Coast Negroes. When the slave trade was still in vigour, the distinction between these two races was much attended to by the planters, who treated the Eboes with greater indulgence, in order to prevent their committing suicide, to which they were very prone. The Eboes practised circumcision and worshipped the guana. They were said to be cannibals in their native country.

EBONY is well known as a hard black-coloured wood, brought from the hot parts of the world. The Greek name is ĕbenos (ἔβενος), from which the Latin ĕbenus, and our word ebony have been immediately derived. It is first mentioned by Ezekiel, xxvii. 15, but in the plural, hobnem, where the men of Dedan are described as bringing to Tyre horns of ivory and ebony. The Persian name, abnoos, is that by which it is commonly known all over India; it is probable, therefore, that the name, like the wood itself, had an Eastern origin. From its hardness, durability, susceptibility of a fine polish, and colour, which has almost become another name for blackness, ebony has always been in high estimation, and in the present day is much used for mosaic work and ornamental inlayings, though cheaper woods dyed black are frequently substituted.

Herodotus (iii. 97) mentions ebony as part of the presents brought in considerable quantities to the king of Persia by the people of Ethiopia. Dioscorides describes two kinds, one Ethiopian, which was considered the best, and the other Indian, which was intermixed with whitish stripes and spotted; and hence commentators have disputed whether there were one or two kinds of ebony. But the fact is, that several trees yield this kind of wood, and all belong to the genus Diospyrus. Owing to the known geographical distribution of this genus, the antients must have derived their ebony either from the peninsula of India and the island of Ceylon or by the coasting trade from Madagascar; for no species of Diospyrus has yet been discovered by botanists in the upper parts of Egypt or in Abyssinia, though it is not improbable that some may be found, as the climate is well suited to their existence.

The genus Diospyros (from dios and puros, which may be translated celestial food) has been so named from some of its species affording edible fruit. They all form large trees, with alternate, thick, often coriaceous leaves. The flowers are usually single and axillary, the male and female flowers separate or united. Calyx and corolla four-cleft, rarely five-cleft. Stamina often eight, but varying in different species. Germ superior, often eight-celled; cells one-seeded;

attachment superior. Styles three or four, rarely five, or one, and variously divided. Berry from one to twelve-seeded, often eight-seeded. Embryo inverse, and furnished with albumen. Male flower frequently with twin anthers. The species are found chiefly in the tropical parts both of Asia and America, as in the Malayan archipelago and peninsula, and in almost every part of India. One species extends southwards to New Holland; one, D. Lotus, to Switzerland, and D. Virginiana into the United States of America. As some are remarkable for the wood which they afford, and others on account of their fruit, it is necessary only to notice a few of each, though the whole require the labours of a monographist.

Diospyros Ebenus, the true ebony, and that which is considered to be of the best quality, is a large tree, a native of the Mauritius, Ceylon, and apparently also of Madagascar: for D. lanceolata, Poir., collected by Commerson in that island, is considered the same. The leaves are very smooth, short, petioled, alternate, bifarious, oblong in shape, the buds very hairy; male flowers sub-racemed, with about twenty anthers, the hermaphrodite solitary, octandrous. Large quantities of the ebony of this species have been sometimes imported into Europe.

D. Ebenaster. This is also a tree of considerable magnitude, a native of Ceylon, of which the leaves are coriaceous and smooth on both sides, and the buds smooth.

D. reticulata (Tesselaria, Poir.) is another elevated tree, a native of the Mauritius, of which the heart-wood forms ebony.

D. melanoxylon, described and figured by Rumph, iii., p. -9, Corom. Plants, 1 to 46, by Dr. Roxburgh, is the ebony tree of the Coromandel coast. It is found on the mountains of that coast as well as of Malabar, and in Ceylon. It grows to be very large, particularly the male tree, of which the wood is also most esteemed. The leaves, which are sub-opposite, oval, oblong, obtuse and villous, are deciduous in the cold season, the new ones appearing with the flowers in April and May; as in other species, it is only the centre of large trees that is black and valuable, and this varies in quantity according to the age of the tree. The outside wood, which is white and soft, time and insects soon destroy, leaving the black untouched. The ripe fruit is eaten by the natives, though rather astringent, as is also the bark. D. tomentosa and Roylei are other Indian species which yield ebony.

Several species of the genus bear fruit, which, though clammy and sub-astringent, is eaten by the natives of the countries where the trees are indigenous. We need name only the most celebrated, as D. Lotus, a native of Africa, and now common in the south of Europe, which bears a small yellow sweetish fruit about the size of a cherry, and which has by some been supposed to be the famous Lotus of the Lotophagi; but this is more likely to have been the jujube, called by botanists Zizyphus Lotus.

Diospyros Kaki is celebrated in China and Japan: specimens introduced into the Botanic Garden of Calcutta were found to be identical with others from Nepal. The fruit is described by Dr. Roxburgh as being tolerably pleasant. It is esteemed in China, where it attains the size of an orange, and is frequently sent to Europe in a dried state, and called the date-plum of China, and also keg-fig of Japan.

D. discolor of the Philippine Islands also bears a fruit which is esteemed, and called Mabolo.

D. Virginiana, the Persimmon tree, is indigenous in North America, especially in the middle and southern of the United States, where it attains a height of sixty feet, but it does not flourish beyond the 42° of N. latitude. The fruit while green is excessively astringent, but when ripe, and especially after it has been touched by the frost, it is sweet and palatable. The fleshy part separated from the seeds is made into cakes, which are dried and preserved. A kind of cider has also been made from this fruit, and a spirituous liquor distilled from its fermented infusion.

D. glutinosa also affords a fruit which, though edible, is far from palatable, but more valuable as an article of commerce. The tree is middle sized, a native of the moist valleys amongst the mountains of the Circars, and all along the foot of the Himalaya to 30° N. latitude. Sir William Jones first mentioned what is well known throughout Bengal, that the astringent viscid mucus of the fruit is used for paying the bottoms of boats. The unripe fruit contains a large proportion of tannin, and its infusion is employed to steep fishing-nets in to make them more durable.

EBRO, IBE'RUS, a river of Spain, which rises near Reinosa in Old Castile, at the foot of the Asturian mountains, flows in an east-south-east direction, and crosses the north part of Old Castile. Afterwards, on reaching the frontiers of Biscay, it inclines more to the south-east, and marks the boundary between Biscay and Navarra on its left and Castile on its right bank, passes by Miranda and Logroño, then enters Navarra, and divides the districts of Tudela and Cascante from the rest of that province. It then enters Aragon, which it divides into two nearly equal parts, one to the north-east and the other to the south-west of its course, flows by Zaragoza and Mequinenza, and below the latter town enters Catalonia, when it assumes a south-south-east direction, and passes by Tortosa, below which it enters the sea by two branches, the southernmost of which forms the port of Alfaques. [Catalonia.] The whole course of the Ebro, with its numerous windings, is rather more than 400 miles. The valley of the Ebro, lying between the great Pyrenean chain and the highlands of Castile, forms a natural division between the northern provinces of Spain and the rest of the peninsula, and the course of the Ebro has therefore been often assumed as a military line in the wars of that country. Previous to the second Punic war, it formed the line of demarcation between the dominions of Carthage and those of Rome. It afterwards formed the boundary between the dominions of Charlemagne and his successors and those of the Moors. The French in their Spanish wars have repeatedly purposed to make the Ebro the boundary between France and Spain. The Ebro begins to be navigable for boats at Tudela in Navarra, but the navigation is often impeded by rapids and shoals. To avoid these, the imperial canal has been constructed, which begins at Fontelles near Tudela, and running parallel to and south of the river, rejoins it six miles below Zaragoza. It was intended to carry it as far as Tortosa. [Aragon.]

The Ebro receives numerous affluents from the Pyrenean chain, the principal of which are as follows. The Aragon, which rises in the mountains of Navarra and enters the Ebro near Milagro. The Gallego, from the mountains of Jaca in Aragon, enters the Ebro nearly opposite Zaragoza. The Segre, swelled by its numerous affluents, the Chinca, the Noguera Pallaresa, Noguera Ribagorza, and others, draining a vast tract of country both in Aragon and Catalonia, enters the Ebro below Mequinenza on the borders of the two provinces. On its right bank the Ebro receives, above Zaragoza, the Jalon, joined by the Jiloca, coming from the central highlands between Aragon and Castile. The Guadalupe, which comes from the mountains of Teruel in S. Aragon, enters the Ebro above Mequinenza.

EBULLITION. [Boiling of Fluids.]

EBURNA. [Entomostomata.]

ECBA'TANA (Ἐκβάτανα), the antient capital of Media, founded by Deioces (Herod. i. 98). The genuine orthography of the word appears to be Agbátana (Ἀγβάτανα: see Steph. Byzant. v. Ἀγβάτανα), as it is now written in the text of Herodotus, and, as we are informed by Stephanus, it was written by Ctesias. It appears in the 'Itinerary' of Isidore of Charax under the form of Apobátana. There was a city of the same name in Syria, of uncertain position (Herod. iii. 64), where Cambyses died. [Cambyses.]

Ecbatana was situated, according to the testimony of antient writers, in a plain at the foot of a lofty mountain called Orontes. Herodotus, who had probably seen the place, describes it as built on a conical kind of hill, and consisting of seven circular inclosures or walls, one within another, each wall being higher than that which surrounded it, and the innermost wall, which surrounded the palace, of course the highest of all. Ecbatana being a high and mountainous country, was a favourite residence of the Persian kings during summer, when the heat at Susa was almost insupportable.

Hamadan, which is on or near the site of Ecbatana, is near the parallel of 35° N. lat. and in 48° E. long., in a low plain at the foot of Mount Elwund. Elwund belongs to that mountain-chain which forms the last step in the ascent from the lowlands of Irak Arabi to the high table-land of Iran. [Asia, p. 470.] 'During eight months in the year the climate of Hamadan is delightful; but in winter the cold is excessive, and fuel with difficulty procured. The plain is intersected by innumerable little streams, covered with gardens and villages, and the vegetation is the most luxurious I ever beheld.' (Kinneir's *Persia*, p. 126.) Kinneir says that the summit of Elwund is tipped with continual snow, and seldom obscured by clouds. Hamadan has a large manufacture of leather, and also a considerable trade, owing to its position on the high road from Bagdad to Tehran and Ispahan. According to Kinneir, it has about 10,000 inhabitants. [Asia, pp. 469, 470.]

The site of Ecbatana has been a matter of dispute; but the dispute has arisen solely because those who have discussed the question either did not know the evidence on which the question must be decided, or did not understand it. The route of commerce between the low country in the neighbourhood of the antient Seleuceia and the modern Bagdad and the high table-land of Iran, is determined by the physical character of the country, and has continued the same from the earliest recorded history of those countries to the present day. The places marked in the 'Itinerary' of Isidore as lying between Seleuceia and Ecbatana are the places indicated by modern travellers as lying on the route between Bagdad and Hamadan. This question is fully discussed in the 4th No. of the 'Journal of Education.'

For further references as to the history of Ecbatana, in addition to those given in the 'Journal of Education,' the reader may consult Bähr's 'Ctesias,' p. 88: the note on Q. Curtius, v. c. 8, ed. Pitiscus, 1708; and Wesseling's note on Herod. i. 98.

ECCLESIASTES, or **THE PREACHER**, a canonical book of the Old Testament, placed after the Proverbs and before the Song of Solomon. The English title is adopted from that in the Greek Septuagint ('Εκκλησιαστής, *Ecclesiastes*), which is a translation of the Hebrew title קהלת, *Choheleth*, that is, one who calls together or calls out to an assembly—a public declaimer. A review of the various learned interpretations of this term is given in Mr. Holden's work on Ecclesiastes, p. 31. Widely different opinions have been expressed by many biblical critics concerning the author, date, and design of this portion of the Bible. The Rev. G. Holden, in the preface to his learned 'Attempt to illustrate the Book of Ecclesiastes,' 8vo. 1822, observes that, 'In common with most other students, he has felt much perplexed by the many difficulties of this book; that of all the Hebrew Scriptures none present greater obstacles to the expositor; for besides the obscurities possessed in common with the others, it has some peculiar to itself; that, with respect to the nature of the author's argument, style, and design, the opinions of critics and commentators have diverged to incredible distances; and their labours serve rather to perplex than to assist the inquirer.' The general supposition that Ecclesiastes was written by Solomon is apparently warranted by the passages i., 1, 12, 16; ii., 4-9, which designate the author as the son of David, king of Israel, and the greatest possessor of wealth and wisdom in Jerusalem. However, it is not only doubted by some commentators, as Semler (*Apparatus in Vet. Test.*, p. 203), that Solomon is the author, but by many other critics and divines of the greatest learning and reputation it is declared to be a production of the age of or subsequent to the Babylonish captivity (600 B.C.), that is, 400 years after Solomon, who reigned 1000 B.C.: Zirkel and others date it as late as 130 B.C. (Grotius, *Prolegom. in Ecclesiastem;* Hermann von der Hardt, *De Libro Koheleth;* Van der Palm, *Diss. de Libro Ecclesiastes;* Doederlein, *Scholia in Ecclesiastem;* Professor Dathe, *Notæ in Ecclesiastem;* Zirkel, *Untersuchungen in Ecclesiastes;* and especially Jahn, *Introduct. ad V. Test.;* and Eichhorn, *Einleitung in das Alte Test.*, vol. iii.) The writers of the Talmud and Rabbi Kimchi attribute this book, as well as Proverbs and the Song, to King Hezekiah or the prophet Isaiah. Dr. Adam Clarke (*Preface to Ecclesiastes*, in his ed. of the Bible) asserts that the traditionary notion entertained by the Jews and many Christian divines, as Jerome, Huet, Michaelis, &c., that Ecclesiastes was written by Solomon in his old age, after recovering from idolatry and sensuality, is an assumption which never has been nor can be proved to be true; for since it was 'when Solomon was *old*, that his heart was turned away after other gods by his 700 wives and 300 concubines' (1 *Kings*, ii. 3 and 4), and as he died about the age of sixty, the supposition of a final period of philosophical and pious contrition is not warranted by probability. 'The language,' says the same divine, 'puzzles me not a little; Chaldaisms, Syriasms, and Chaldee words are frequent, and the style is that of the authors who lived at or after the captivity.' Bishop Lowth remarks that the style is peculiar; the diction low, exceedingly obscure, loose, unconnected, and resembling conversation. (*Prælect.* 24.) The greatest difficulty in expounding this book consists in ascertaining the proper principle of interpretation; for many passages understood literally *seem* to sanction a belief in the non-existence of a divine Providence (ii. 11, 'All things, time and chance, happen alike to the righteous and the wicked'); in annihilation or materialism (iii. 19, 'A man hath no pre-eminence over a beast: both die alike; and the dead (ix. 5) have no knowledge and no reward'); splenetic repining is apparently sanctioned (iv. 3, 'It is more fortunate not to be born than to be either living or dead'); so voluptuousness (ii. 24, viii. 15, &c., 'Man hath no better thing than to eat, to drink, and be merry'); which is contradicted, (vii. 3,) where sorrow is said to be better than laughter. To clear the author from the imputation of teaching erroneous and contradictory doctrines, and promoting sensuality and despair, it has been suggested that the treatise is a series of counter propositions, or objections and replies. With this view Mr Holden has composed an elaborate paraphrase of the original text, and by qualifying and judiciously modifying the expressions and interweaving many ingenious explanations, has reduced the whole to consistency. The general opinion of the commentators, that the design of the book is to inquire about the supreme good*, and to show that it consists in religious wisdom, is adopted by Mr. Holden, with the idea also of its consisting of two divisions: the first, to verse 10 of chap. vi. being occupied in setting forth the vanity of all the labours and enjoyments of human life, the second in eulogizing religious wisdom and describing its nature and effects. The learned Desvoeux, in his 'Philosophical and Critical Essay on Ecclesiastes,' 4to. 1760 having collected and discussed many fanciful opinions of other expositors with regard to the design of this book, suggests and maintains it to be 'to prove the immortality of the soul and a future state of restitution.' Dr. Graves adopted this opinion; but Mr. Holden rejects and refutes it, remarking that 'the doctrine of a future state is left in great darkness and obscurity, not only in Ecclesiastes, but in all the Hebrew Scriptures, in no passage of which it is announced as a necessary article of faith.' Various fanciful conjectures have been offered in commenting on the figurative language of the last chapter, descriptive of old age (See Holden, p. 161.) In addition to the works already mentioned, the following may be found useful for reference:—Greenaway's translation of Ecclesiastes; Hodgson's translation: Bishop Reynolds's 'Comment on Ecclesiastes;' Dr. Wardlaw's 'Lectures on Ecclesiastes.' For numerous others, see Watt's 'Bibliotheca Brit.'

ECCLESIA'STICUS, or **THE WISDOM OF JESUS THE SON OF SIRAC**, an apocryphal book of the Old Testament. It is stated to have been originally written in Syro-Chaldaic, by Jesus, the son of Sirac, a learned Jew who travelled in pursuit of knowledge 130 years B.C. It was translated into Greek for the use of the Jews of Alexandria, by the grandson of the author, or rather compiler. for it is evidently a collection of fragments, written at different times and on various occasions, consisting of meditations and proverbs relating to religion, morals, and the general conduct of human life. But though it is manifest that no methodical plan or arrangement was observed in the composition, the commentators remark that the whole will admit of division into three parts. The first extends to the end of chap. 43, and is occupied in the commendation of wisdom and the statement of moral precepts. The second celebrates the virtues of the patriarchs and prophets of the Jews, and extends to the end of chapter 49. The third part is comprised in the 50th and concluding chapter, and consists of a prayer or hymn, exhorting mankind to the pursuit of wisdom. These meditations display much acuteness of thought, with propriety of diction, and occasionally poetical eloquence. They closely resemble the numerous other oriental proverbs, and especially the collection attributed to Solomon. In the western Christian church this book was highly esteemed the council of Carthage made it canonical, as the fifth book of Solomon, and the council of Trent confirmed the decision. It was also introduced by the early Protestant reformers into the liturgy of the church of England.

Addison, in the 68th number of the Spectator, observes, that were this collection issued under the name of Confucius, or one of the sages of Greece, it would be regarded as one of the most brilliant moral treatises ever published. The opinion which attributes it to Solomon is falsified by several allusions to the captivity, showing that some parts at least were written under the monarchs of Babylon (c. 47, &c.), 400 years subsequent to the reign of Solomon. The Greek fathers frequently cite the book of Ecclesiasticus as ἡ Ἰησοῦ Σοφία, the Wisdom of Jesus: Πανάρετος Σοφία, the Excellent Wisdom; and Λόγος, the Rational Discourse. The Latin fathers named it Ecclesiasticus, or the Book of the Church, from its being then appointed to be read in churches. A Syriac and an Arabic version are extant. The Latin version, which is supposed to be of the first century, contains numerous words adopted from the Greek, but differs much from the present Greek text. (*Ecclesiasticus, or the Book of the Church*, by Luke Howard, F.R.S., 1827; Dalrymple, Lord Hailes, *Wisdom of Solomon, or Ecclesiasticus*, 1755; Sonntag, *Comment. de Jesu Siracidæ Ecclesiastico*, 4to., 1792; Bretschneider, *de lib. Jesu Siracidæ* (prolegom. pp. 10-32), dates the original compilation 180 B.C.; Horne's *Introduct. to the Bible*, vol. iv.)

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* See, on the question of the summum bonum, Aristotle's 'Nicomac. Ethic.;' Plato's 'Philebus;' Cicero, 'De Finibus;' Stobæus, 'Eclog. Ethic.;' St. Augustin, 'Civitas Dei;' Harris 'On Happiness.'

ECCREMOCARPUS SCABER, a climbing Chilian half-shrubby plant belonging to the natural order Bignoniaceæ, inhabiting thickets and hedges in its native country, and scrambling among the branches of bushes and small trees. It has an angular cinnamon-brown stem, with pale-green succulent branches; opposite pinnated trifoliolate leaves, with obliquely cordate serrated leaflets, and a terminal tendril; horizontal racemes of tubular orange-scarlet obliquely ventricose flowers, the limb of whose corolla is narrow and five-lobed; and remarkable oval compressed pods covered all over with short tubercles, and opening into two thin convex valves, within which is placed a number of thin winged netted seeds. It is a handsome half-shrubby plant, which will live in the open air in the milder parts of England. By some it is called Calampelis scabra.

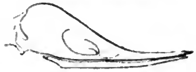
ECHARD, LAWRENCE. It is unknown when this author was born; but his translation of the 'Amphitryo' of Plautus was published in 1694. He was educated at Cambridge, and having taken orders, was presented to a living in Lincolnshire. In 1712 he became archdeacon of Stowe and prebendary of Lincoln. His historical works have long ceased to be read; but his translation of Terence is still frequently purchased by indolent schoolboys, who could not well buy a more unprofitable book. The characters of the elegant and refined Terence are made to utter all the vulgarisms and scurrilities of the eighteenth century: thus we have such expressions as 'the devil a person,' 'damnable roguery,' 'fools' paradise,' constantly before us. Sir Charles Sedley has left a version of Terence's 'Eunuch' somewhat in the same style; but he has had the good sense merely to take the plot of the classic, and represent the characters as modern Englishmen; whereas Echard has committed the palpable absurdity of putting his ribaldry in the mouths of Athenian citizens: and to crown all, has written a most self-complacent preface, wherein he acknowledges he could not have followed his author more closely without destroying his design 'of giving an easy comic style.' We should not have been so pointed in our remarks on this worthless book had we not been fully aware, that while classical studies form so considerable a branch of education, it is of the utmost importance that the young student should not acquire those incongruous and absurd notions which he cannot fail to imbibe from such works as Echard's 'Terence.'

E'CHEVIN, the name given under the old French monarchy to the municipal magistrates of various cities and towns. At Paris there were four échevins and a prévôt des marchands, whose jurisdiction extended over the town and adjacent territory; in the other towns there was a maire and two or more échevins. In the south of France the same officers were called by other names, such as consuls in Languedoc and Dauphiné, capitouls at Toulouse, jurats at Bordeaux. The last name, that of jurats, is retained in some of the English municipalities. They tried minor suits, laid the local duties or octroi upon imports, had the inspection of the commercial revenues and expenditure, as well as the superintendence of the streets, roads, and markets, the repairs of public buildings, &c. The name échevins seems to have been derived from scabini, a Latin word of the middle ages, which was used in Italy under the Longobards, and in France, Flanders, and other countries under the Carlovingian dynasty. In Holland they are called schepens. The scabini were the assessors to the counts or missi dominici, appointed by the monarch to administer a province or district; and they were chosen among the local inhabitants. Afterwards, when charters were given to the communes, the municipal magistrates elected by the burgesses assumed also the name of scabini or échevins. (Ducange, *Glossarium*.)

ECHIDNA (Cuvier), Tachyglossus (Illiger), a genus of *Monotremes*, *Monotremata* (Geoffroy), the third tribe of the order *Edentata* (Cuvier's sixth order of Mammifers) none of which have any incisor teeth in either jaw.

The peculiar structure of the group, consisting of *Echidna* and *Ornithorhynchus*, will be treated of under the title MONOTREMES.

Echidna.
Dental formula 0



Skull of Echidna.

Muzzle elongated, slender, terminated by a small mouth furnished with an extensible *tongue*, similar to that of the *Ant-eaters* and Pangolins. *No teeth*, but the palate armed with many rows of small spines directed backwards. *Feet* short, very robust, and formed for digging, each armed with five long claws. *Tail* very short. Body covered with spines like that of the hedge-hog. *Stomach* ample and nearly globular; cæcum moderate. Leur verge se termine par quatre tubercules.

Of this curious genus, zoologists are agreed that only one species has been yet discovered, though two have been recorded; viz. *Echidna Hystrix* and *Echidna setosa*, the so-called two species being the same animal in the clothing of different seasons, or of different periods of age. This species is the *Myrmecophaga aculeata* and *Porcupine Ant-eater* of Shaw, *Ornithorhynchus aculeatus* of Home, *Echidna Hystrix* and *Echidna setosa* of G. Cuvier, *Echidna Australiensis* of Lesson, *Hedge-hog* of the colonists at Sidney.

Size, about that of the common hedge-hog. *Spines* dirty-white for the greatest part of their length, and black at their extremity. *Hair* of a chestnut colour, soft and silky, in such abundance, at a certain season, as to half cover the spines, whilst, at another, the hair entirely disappears.

Food.—Ants, which the animal captures with its extensile tongue.

Habits.—The habits of the Echidna in a state of nature are but little known. It digs for itself burrows, wherein it remains during the dry season, coming out of the earth only during the rains. It is supposed to be capable of supporting a long abstinence, and has intervals of suspended animation (engourdissemens), which continue for eighty hours at a time, and recur frequently when the animal is kept in confinement. For protection, the animal is said to be able to roll itself up like a common hedge-hog.

But, if we know little of the natural habits of the *Echidna*, we are indebted to Lieutenant Breton, Corr. Memb. Zool. Soc., for an account of its manners in captivity, and for some suggestions which we hope will be attended to if this article should meet the eye of any one who may have it in his power to put them in practice. If they are carefully followed, we may yet see this most interesting quadruped in the gardens of the Zoological Society in the Regent's Park.

Lieut. Breton had an *Echidna* which lived with him for some time in New Holland, and survived a part of the voyage to England. The animal was captured by him on the Blue Mountains: it is now very uncommon in the colony of New South Wales. It burrows readily, but he does not know to what depth. Its strength he considers as exceeding, in proportion to its size, that of any other quadruped in existence.

Previous to embarkation, Lieutenant Breton fed his *Echidna* on ant eggs (pupæ) and milk, and when on board its diet consisted of egg chopped small, with liver and meat. It drank much water. Its mode of eating was very curious, the tongue being used at some times in the manner of that of the chameleon, and at others in that in which a mower uses his scythe, the tongue being curved laterally, and the food, as it were, swept into the mouth: there seemed to be an adhesive substance on the tongue, by which the food was drawn in. The animal died suddenly off Cape Horn while the vessel was amidst the ice; perhaps in consequence of the cold, but not improbably on account of the eggs with which it was fed being extremely bad.

Lieutenant Breton concurs with MM. Quoy and Gaimard in thinking that there would be little difficulty in bringing the *Echidna* to Europe, and the following plan is suggested by him for effecting its importation.

Previously to embarkation the animal should be gradually weaned from its natural food (ants). This may be done by giving it occasionally ants and ant-eggs, but more generally milk, with eggs chopped very small, or egg alone. It should be kept on shipboard in a deep box, with strong bars over the top, and a door. The box or cage must be deep, because the animal constantly tries its utmost to escape; and, as it possesses very great strength, it is liable to injure itself in its exertions to force its way through the bars. Its excrements are so extremely fetid, that it cannot be kept altogether in a cabin, unless the cage be frequently cleaned. While this is being done, the *Echidna* may be allowed its liberty, but must be narrowly watched, or it will certainly go overboard. It is absolutely necessary that the eggs on which it is fed during the voyage should be as fresh as possible: they can be preserved in lime water. If milk is not to be procured, water must be supplied daily; and egg and liver, or fresh meat, cut small, should be given at least every alternate day. When the weather will permit, it should be fed once a day. Half an egg, boiled hard, and the liver of a fowl or other bird, will suffice for a meal. The animal should be kept warm, and should be well supplied with clean straw. It will be as well to nail two or three pieces of wood (battens) across the floor of the cage, to prevent the animal from slipping about when the ship is unsteady. (*Zool. Proc.*, 1834, Part 2.)

Localities.—Blue Mountains, &c., the environs of Port Jackson, and Van Diemen's Land.

Echidna Hystrix.

ECHI'NADES. [ACHELOUS.]

ECHINASTRÆA. [MADREPHYLLICEA.]

ECHI'NIDÆ, a family of radiated animals, comprehending those marine animals popularly known by the name of *sea-eggs*, or *sea-urchins* (*oursins* of the French).

De Blainville makes the *Echinidea*, the second order of the class *Echinodermata*, and he thus defines the order.

Body oval or circular, regular, sustained by a solid *shell*, which is calcareous and composed of polygonal plates, disposed in radiated order in twenty rows, which are either equal, or alternately and regularly unequal. The shell supports upon proportionable mamillary projections stiff spines which are extremely variable in form, and is pierced by series of pores, forming by their assemblage a kind of ambulacra. It radiates more or less regularly from the summit to the base and gives exit to tentaculiform cirrhi.

Mouth armed or unarmed, pierced in a notch of the shell invariably on the lower side.

Vent always distinct, but offering many variations in its position.

Generative Orifices four or five in number, disposed round the dorsal summit.

Anatomy, Reproduction, &c.—Not completely known notwithstanding the labours of Réaumur, Klein, Cuvier Lamarck, De Blainville, Gray, Delle Chiaje, Tiedemann, and Dr. Sharpey, to whose works we must refer the reader. We shall only here observe that the whole of the *Echinidæ* are probably hermaphrodites, and that consequently reproduction is carried on without the aid of a second individual: but this is uncertain. On the European coasts the Echinidæ are observed with their ovaries in a turgescent state in the spring, and we may thence conclude that the time of ovipositing is the summer; the places of deposit are most probably the fissures or cavities of rocks and aggregations of fucus, and the deposit itself is made in one mass. Nothing certain appears to be known as to the development of the eggs, the duration of that development, or of the length of the life of the animal.

Geographical Distribution.—In almost all seas, but more especially in those of warm climates, on rocky or sandy coasts, often free, sometimes sunk in the sand. The species are very numerous.

Habits.—All the *Echinidæ* are locomotive, though their locomotion, which is effected principally by means of their contractile tubular feet, and in a degree by their spines, is rather laborious. Some of the species, which repose on rocks, have a power of eroding the stone so as to make a nidus for themselves, which is generally not deep.

Food.—Animal probably and molecular in the edentulous species. Those whose mouth is armed with teeth are supposed to live on marine plants. Cavolini, at least, says as much of the *sea-eggs* (*oursins*), properly so called.

Utility to Man.—When the ovaries of some of the species are fully developed (*Echinus edulis*, for instance), they are collected as an article of food.

Fossil Echinidæ.

There are few animal remains, with the exception of the shells of the testaceous mollusks, which are better preserved than those of the *Echinidæ*. They occur in a fossil state in almost incredible numbers, and are to be traced through all the formations, from the epoch of the transition series to the present time. Dr. Buckland remarks that he found, many years ago, fossil Echinidans in the carboniferous limestone of Ireland, near Donegal, and that they are rare in the transition formation, become more frequent in the muschel-kalk and lias, and abound throughout the oolitic and cretaceous formations*.

Their abundance may be, in some degree, accounted for by the habits of a great proportion of them, which lead them to bury themselves in the sand, &c., so that their preservation must for the most part be complete. The nature also of the shell and its structure are other causes of fossil durability, for it is almost spathose in parts, while the animal is yet alive. The peculiar fracture presented by the shell and spines is relied on by De Blainville as indicating the place of the *Echinidæ* in the natural series to be with the Encrinites, and not with those *Zoophytaria* which are near the *Pennatulæ*, as some zoologists have thought.

Systematic Distribution.

Breyn, Klein, Linnæus, Leske, Lamarck, Cuvier, Gray, Desmarest, Goldfuss, Von Buch, Agassiz, are the principal zoologists who have undertaken the classification of the *Echinidæ*. De Blainville observes that the relative position of the mouth and the vent, and above all, of the ambulacra, are the principal points on which most of these writers have rested; and as he considers that this mode of viewing the subject has led to approximations not very natural, he proposes a system based on the following grounds:—

1st. On the general form of the body of the animal, which, at first subradiated, becomes, by little and little, completely radiated in all the parts which constitute it.

2nd. Upon the position of the mouth, which, nearly terminal and transverse, or bilabiated, in the first species, becomes completely central and circular in the last.

3rd. On the arming of this mouth, which, completely null in a great proportion of the *Echinidæ*, is, on the contrary, very powerful in the rest.

4th. Finally, on the position of the vent, on the number of ovaries and their orifices, on the nature of the spines and the tubercles which support them, as well as on the disposition of the ambulacra.

Synoptical Table of the Genera, according to De Blainville.

Mouth	Subterminal		Spatangus. Ananchites.
	Subcentral	Without teeth .	Nucleolites. Echinoclypeus. Echinolampas. Cassidula. Fibularia. Echinoneus.
		Armed with teeth	Echinocyamus. Laganus. Clypeaster. Echinodiscus. Scutella.
	Central; Vent.	Infra-lateral	Galerites.
		Central .	Echinometra. Echinus. Cidaris.

Sub-Family. 1.

Excentrostomata.

Genera. Spatangus.

Body oval, more or less elongated, heart-shaped, wider before than behind, with a furrow more or less profound at the anterior extremity. *Shell* delicate, of little solidity, composed of large polygonal plates, not many in number. *Spines* short, flat, sessile and scattered. *Ambulacra* incomplete, only four in number. *Buccal notch* more or less anterior, transverse, bilabiated, circumscribing a mouth without teeth. Vent terminal, and rather above than below the border. *Genital pores* four in number, disposed in two pairs. The species are very numerous, and are subdivided by De Blainville and others into sections according to their shape, &c. The following is De Blainville's method.

α.

Species whose ambulacra are not petaloid, and form scarcely but two lines, a little broken or bent at their internal side, and which have a rather deep anterior furrow, and the mouth not much in front.

Example, *Spatangus arcuarius.*

De Blainville observes that Mr. Gray places *Spatangus Atropos* in this section; but the former thinks that it sensibly differs from those classed under it, and places it in the following section.

β.

Heart-shaped species, with five deep and straight dorsal furrows, in which the ambulacra are hidden.

Example, *Spatangus Atropos.*

γ.

Species whose ambulacra are petaloid, going from a centre, and which have an antero-dorsal furrow more or less deep, occupying the place of the fifth ambulacrum; the posterior pair shorter than the anterior.

This section is divided into subsections, according to the depth of the ambulacra.

Example of the first (*Spatangus*, Klein, Gray), *Spatangus purpureus*. Example of the second (*Ovum*, Van Phelsum, Gray), *Spatangus canaliferus*.

δ.

Species whose anterior furrow is much less deep, or nearly null, and whose ambulacra, more or less petaloid, to the number of four, occupy the greatest part of a sort of dorsal plate, circumscribed by a sinuous line without tubercles or spines. (Genus, *Brissus*, Klein, Gray.)

Example, *Spatangus pectoralis.*

ε.

Heart-shaped species, rather strongly widened and notched in front, with five distinct and truncated ambulacra. Example, *Spatangus gibbus.*

ζ.

Species whose anterior furrow is still distinct; whose ambulacra, to the number of four, are marginal, and sometimes complete, or reaching up to the mouth; and whose genital pores are five. This section is subdivided into two, according to the extent of the ambulacra, the first, (example, *Spatangus subglobosus*,) with ambulacra only reaching the circumference; the second, (example, *Spatangus cordatus*, *Ananchites cordatus*, Lam.,) with ambulacra reaching to the border.

Geographical distribution.—In almost all seas, including our own. Numerous in the Mediterranean.

Habits.—Not known, but they seem to live constantly burrowed in the sand.

Food.—De Blainville supposes that the *Spatangi* are nourished with the animal matters which are mingled with the sand; for their intestinal canal, which is thin as a spider's web, was always found by him full of fine sand.

Fossil Spatangi.

The species are numerous in the chalk and cretaceous group, and occur in the oolitic group.

Ananchites. (Fossil only.)

Body oval in its longer diameter (from before backwards), rounded and a little wider, but without a furrow, anteriorly, subcarinated posteriorly, conical, elevated at its summit, which is mesial, entirely flat below, covered with a very few small scattered tubercles. Ambulacra, to the number of five, rather large, divergent, comprised between double lines of pores but little approximated, and scarcely overpassing the borders. *Mouth* and *vent* subterminal and inferior. De Blainville subdivides this genus into two sections: the first, with the ambulacra prolonged up to the borders (*Ananchites*, Lam.), example, *Ananchites ovatus;* the second, with the ambulacra prolonged up to the mouth (*Echinocorys*, Leske, Gray; *Galea*, *Galeola*, Klein), example, *Ananchites pustulosus*, *Echinocorytes pustulosus*, Leske. M. Defrance enumerates 12 species: to these are to be added M. Risso's three species, *A. carinatus*, *A. rotundatus*, and *A. stella*, if they be distinct. De Blainville observes that Lamarck's *Ananchites ellipticus* most probably does not belong to this division, and that his *A. Cor avium* belongs to the same division as the *Violet Spatangus* Goldfuss has described some new species.

Sub-Family II.

Paracentrastomata Edentata.

Genera. Nucleolites. (Fossil only.)

Echinobrissus of Breyn and Gray, adding the *Cassiduli*.

Body oval or heart-shaped, wider and with a large furrow behind, rather convex, the summit subcentral and moderately elevated above, somewhat concave below; covered with small, equal and scattered tubercles. *Ambulacra*, to the number of five, subpetaloid, open at the extremity, dorsal and marginal, and continued by as many furrows up to the *mouth*, which is inferior, subcentral, and anterior. *Vent* subcentral, above, in the furrow. *Genital pores* to the number of four. Example, *Nucleolites depressus*, *Spatangus depressus*, Leske, Klein; *Clypeus lobatus*, Fleming.

Locality, &c.—The species are tolerably numerous and are frequent in the chalk, but are also found in the beds anterior and posterior to it.

Echinoclypeus. (Fossil only.)

Body depressed or conical, circular or inclining to oval, with a furrow behind, convex and with a subcentral summit above, rather excavated below, formed of distinct plates and covered with very small equal tubercles. *Ambulacra* to the number of five, dorso-marginal, subpetaloid; the double rows of pores united by a transverse furrow. *Mouth* subcentral, a little more anterior, pentagonal, with five converging, ambulacriform furrows. *Vent* entirely above, behind the summit, and at the origin of the posterior furrow. Genital pores to the number of four.

De Blainville remarks that this generic section, established by Klein under the name of *Clypeus*, has been confounded by Lamarck with his *Galerites*, which belong to an entirely different division of the *Echinidæ;* and he observes that they might much better be confounded with the *Nucleolites*, after the arrangement of Defrance. He adds that he should not be surprised if the *Cassidulus scutella* belonged to this division.

Echinolampas, Gray. (Echinanthus? Leske.)

Body oval or circular, depressed, subconvex above, rather concave below, rounded and widened forward, rather narrowed towards the anal extremity, composed of great polygonal plates and covered with spines, probably very small; *Ambulacra*, to the number of five, subpetaliform, not closed at their extremity, and nearly approaching the border. *Mouth* round, subcentral, and nevertheless a little anterior *Vent* entirely marginal, terminal. *Genital pores* four only in number Example, *Echinolampas orientalis* (recent).

The form occurs fossil; see, for instance, *Trans. Geol. Soc.* (*Second Series*) i., tab. 3, fig. 3, 4, 5. (*Echinonäus Lampas.*)

Cassidulus.

Body oval, more or less depressed, composed of indistinct plates and covered with small spines. *Ambulacra* five, dorsal, rarely marginal. *Mouth* below, submedian, in a stelliform notch. *Vent* postero-dorsal, or above the border. *Genital pores* four.

De Blainville subdivides this genus into the following sections:—

α.

Species whose ambulacra form a dorsal star, and whose mouth is at the bottom of a stelliform impression. Example, *Cassidulus Lapis Cancri.*

β.

Species whose ambulacra are prolonged to the border and not closed. Example, *Cassidulus Australis.*

γ.

Species whose ambulacra are not known to De Blainville. Example, *Cassidulus scutella.*

De Blainville observes that this genus (Lamarck's) is evidently artificial; for that the position of the vent cannot furnish any character of much importance. He remarks that there is but one recent species; the others, to the number of nine, according to Defrance, are fossil, from the beds anterior to the chalk, and with some little doubt, from more recent formations. Goldfuss unites the genus with *Nucleolites.*

Fibularia.

Body globular, but rather higher than it is wide, ribbed, as it were, with about twenty ribs, formed probably by so many ranks of polygonal scales, and covered with very fine spines. *Ambulacra* five, very short, and not shut at the extremity. *Mouth* round, subcentral. *Vent* inferior and much approximated to the mouth. *Genital pores* unknown. Example, *Fibularia craniolaris.*

De Blainville observes that this genus was established by Van Phelsum and by Leske, under the denomination of *Echinocyamus*, adopted by Mr. Gray. De Blainville only leaves under it *F. craniolaris* and the seven or eight but little distinguished or indistinct species which Van Phelsum established, and probably the *C. trigona* of Lamarck, but he says that he has seen none of them; and he adds that, in the genus as defined by him, only living species have yet been found.

Echinoneus.

Body rounded or oval, generally excavated below, composed of plates often distinct and covered with small spines. *Ambulacra* five, large, complete, radiating from the dorsal centre to the mouth, and formed by ambulacral lines, which are very close and impressed. *Mouth* central or subcentral, without teeth, and pierced in a subtriangular hole of the shell. *Vent* towards the border below or even above, in a longitudinal and subsymmetrical hole of the shell. *Genital pores* four.

De Blainville subdivides the genus into the following sections:—

α.

Oval species, with the anal hole longitudinal and below. Example, *Echinoneus minor.*

β.

Circular species, with the vent below and round. (*Discoidea*, Gray.) Example, *Echinoneus subuculus.*

γ.

Oval species, with the vent entirely marginal, and the genital pores to the number of seven? Example, *Echinoneus ovalis.*

δ.

Circular species, which are depressed and have a margino-dorsal, nonsymmetrical anal opening. Example, *Echinoneus cassidularis.*

De Blainville observes that no *Echinoneus* with the anal opening below is known in a fossil state; so that in the genus, as defined by Lamarck, there are no fossil species according to Defrance; but that in his (De Blainville's) method of arrangement there are many; and he remarks that Goldfuss figures four species from the chalk, but he adds a query whether they belong to this genus.

Sub-Family III.

Paracentrostomata Dentata.

Mouth subcentral, in a regular notch of the shell, and provided with teeth.

Genera. Echinocyamus.

Body depressed, oval, wider behind than before, a little excavated below, covered with rounded tubercles pierced at the summit and rather large in proportion, supported internally by five double inferior ribs, terminating round the buccal notch by as many simple apophyses. *Ambulacra* dorsal, not marginal, completely open at the extremity, a little enlarged, and forming a sort of cross with dilated branches. *Buccal opening* subcentral, regular, armed with five teeth as in *Clypeaster. Vent* below, between the mouth and the border. *Genital pores* four. Example, *Echinocyamus minutus.*

De Blainville states that he characterized this genus from a considerable number of individuals of a very small species found in the intestines of a turbot, and which occurs in great quantity in the sand of the coasts of the English Channel, according to Pallas, both on the French and English shores. He adds that, very probably, it is the *Fibularia ovulum* of Lamarck; and that, without doubt, *Fibularia Tarentina* belongs to this genus, as well as *Echinoneus Placenta* of Goldfuss.

Lagana. Gray. (*Echinodiscus*, Van Phelsum, Leske.)

Body depressed, circular or oval lengthwise, a little convex above, concave below, with an entire disk and borders, composed of plates but little distinct and covered with scattered spines. *Ambulacra* five, regular, petaloid, shut or nearly so at the extremity, with the pores of each side united by a furrow. *Mouth* median in the middle of a hole, with converging furrows and furnished with teeth. *Vent* inferior, pierced in a regular hole, situated between the mouth and the border. *Genital pores* five. The genus is thus sub-divided by De Blainville:

α.

Circular species. Example, *Lagana orbicularis.*

β.

Oval species. Example, *Lagana ovalis.*

γ.

Polygonal species. Example, *Lagana decagona.*

The genus approximates to *Clypeaster*, under which Lamarck arranges the species.

Clypeaster.

Body much depressed, rounded and rather thick on the borders, sometimes incompletely orbicular or radiated, enlarged towards the anal extremity, composed of large and unequal plates, covered with very small, equal, scattered spines supported on very small tubercles pierced with a pore. *Ambulacra* constantly five in number, dorsal, petaloid, the two rows of pores of each branch united by a furrow. *Mouth* central or sub-central, at the bottom of a sort of tunnel, formed by five grooves and armed with five teeth. *Vent* terminal and marginal. *Genital pores* to the number of five.

Living species few. *Localities*, the seas of warm countries—in Asia and America.

Example, *Clypeaster rosaceus.*

Fossil species more numerous and generally from the tertiary beds. Defrance enumerates eleven. Goldfuss figures ten new ones; but De Blainville adds a query whether they are all of this genus.

De Blainville states that this division of Echinidans was established by Breyn under the name of *Echinanthus*, which Mr. Gray has retained, and under that of *Echinorodon* by Van Phelsum.

Echinodiscus.

Body rounded, depressed, sub-quinquelobated (the posterior lobe a little notched in the median line), rather conical above, concave below, composed of plates in twenty rows, placed two and two. The *ambulacraires* narrower and covered with very small, fine, close-set spines. *Ambulacra* to the number of five, diverging by the complete separation of each double line of pores. *Mouth* median, round, towards which converge five straight and stelliform furrows. *Vent* marginal. *Genital pores* to the number of four. Example, *Echinus Parma.*

Locality of the species.—De Blainville observes that it was generally believed that all the species were the inhabitants of warm climates; but he quotes Dr. Fleming for a statement that Professor Jameson had received *Echinodiscus placunaria* (*Scutella placunaria*, Lam.) from the Isle of Foulah, where it would, nevertheless, seem to be very rare.

De Blainville further remarks, that no fossil species have as yet been discovered, unless *Scutella lenticularis*, Lamarck, belongs to this genus, which he thinks probable. He considers that these *Echinidæ* appear to form the passage to the Polygonal Asteridians.

Scutella. (*Mellita*, Klein; *Echinodiscus*, Leske.)

Body irregularly circular, wider behind, extremely depressed, borders nearly sharp-edged, sub-convex above, a little concave below, composed of large polygonal scales and covered with very small, uniform, and scattered spines. *Ambulacra* five, more or less petaliform, the two rows of pores of each branch united by transverse furrows, which makes them appear striated. *Mouth* median, round, furnished with teeth, and towards which converge five vasculiform furrows more or less ramified and sometimes bifid from the base. *Vent* always inferior and at some distance from the border. *Genital pores* four.

Living Species.

α.

Species whose disk alone is perforated. Example, *Scutella hexapora.*

β.

Species whose disk and borders are perforated. Example, *Scutella tetrapora.*

γ

Species whose border only is notched. Example, *Scutella aurita.*

δ.

Species whose disk and border are entire. Example, *Scutella integra.*

ε.

Species whose disk is perforated and their border multidigitated. Example, *Scutella octodactyla.*

ζ.

Species whose disk is imperforate and the border multiradiated. (*Demi-soleils.*) Example, *Scutella dentata.*

Localities.—The living species whose habitat is known are foreign, and the South Seas appear to be their principal locality. Nevertheless, as De Blainville observes, we ought to remember that Defrance, in the description of a fossil species, *Scutella Hispana*, says, that it bears great resemblance to a species that lives in the English Channel and which is found on the coasts in the department of Calvados. De Blainville adds, that he has not seen this species, and that it is the first time we find it stated that a *Scutella* exists in our seas. None of the English, Italian, or French authors whom he consulted mention it.

Fossil Species.

Tolerably numerous and occurring generally in the *calcaire grossier* of Paris, Grignon, and the environs of Nice. None as yet recorded in any other beds than those posterior to the chalk

Sub-family IV

Centrostomata.

Mouth quite central. *Summit* median. *Body* regularly oval or circular, covered with tubercles and mamillæ, and consequently with spines of two sorts. *Vent* variable, ordinarily medio-dorsal.

Genera. *Galerites* (Fossil only) *Conulus*, Klein; *Echinoconus*, De Blainv.

Body nearly regularly circular or polygonal, entirely flat below, convex and often conical with the summit median above, formed of very dissimilar plates and covered with tubercles of two kinds. *Ambulacra* complete, narrow, to the number of five or four, dorso-buccal. *Mouth* central and probably armed. *Vent* infero-marginal. *Genital pores* to the number of five.

α.

Species with four ambulacra and consequently with six series of plates. Example, *Galerites quadrifasciatus.*

β.

Species with five ambulacra. Example, *Galerites vulgaris*

γ.

Species with six ambulacra. Example, *Galerites sexfasciatus.*

The genus is often found silicified and in casts. The greater portion belong to the chalk and a small number to the beds anterior to the chalk. None have as yet been found in the more recent strata.

Echinometra. (Gray.)

Body thick, solid, transversely oval, a little depressed, convex, with the summit (which is median) flat above and arched below, covered with mamillated tubercles of two sorts and bearing diversiform, but always strong and large spines. *Ambulacra* five, enlarging themselves below. *Buccal opening* of the shell large, transverse, with very powerful auricles on its internal circumference. Five sharp *teeth* at the mouth, with a complicated apparatus, as in *Echinus. Vent* medio-superal or opposed to the mouth. *Genital pores* to the number of five. Example, *Echinometra atrata.*

Localities.—The seas of warm climates. Unknown in those of England and France.

No fossil species known.

Echinus.

Body in general very regularly circular or sub-polygonal, sometimes slightly transverse, composed of twenty radiated rows, alternately unequal, of polygonal plates bristled with diversiform spines of two kinds, and supported on imperforate mamillated tubercles. *Ambulacra* constantly to the number of five and complete. *Mouth* central, armed with five pointed teeth, supported upon a very complicated internal apparatus. *Vent* median, superior, or exactly opposite to the mouth. *Genital pores* to the number of five.

Food.—The food is generally believed to consist of mollusks and crustaceans. Tiedemann found in *E. Saxatilis* small univalve and bivalve shells entire among the excrements, as well as fragments of larger ones. Bosc is said to have witnessed an Echinus in the act of seizing and devouring a small crustacean. Dr. Sharpey usually found in the intestine of *E. esculentus* small morsels of sea-weed, for the most part encrusted with *flustra*: and he says that the excrements, which are in the form of small round pellets about the size of peppercorns, consist chiefly of sandy matter with fragments of shells. But he adds that it would be difficult to say whether these are the remains of digested mollusca or merely a portion of the usual testaceous debris so abundant in sand and mud.

α.

Arbacia, Gray; *Echinocidaris*, Desmoulin.

Species perfectly regular, ordinarily depressed; area very unequal: ambulacraires very narrow, bordered by ambulacra nearly straight, and composed to the right and left of a double series of approximated pores; auricles divided and spatulate. Example, *Echinus pustulosus*

β.

Regular species, more or less convex, but, for the rest, diversiform; areæ sub-equal, bordered by a double series of pores, forming at the exterior, denticulations more or less marked and each with three pairs of holes.

De Blainville subdivides this section into three, with still further subdivisions depending on the non-fissured or more or less fissured angles of the buccal opening of the shell, and other variations. He states that he has been able to study a great number of living species, and though many have been only known to him by means of the shell, he has been able, he says, to find constant specific characters 1st, in the proportion of the ambulacral and anambulacral areæ; 2nd, in the number of lines of double pores which limit the ambulacra; 3rd, in the number of those double pores which form the festoons of these lines; 4th, in the form of the auricles, serving for the insertion of the muscles of the dental apparatus; 5th, in the disposition of the border of the buccal orifice. He states as a result, that though he has indicated nearly double the number of species pointed out by Lamarck, they are much more easily recognized.

Localities, Habits, &c.—The form is widely diffused, and there are species in most European seas. The Mediterranean produces some very fine ones. They live free at the bottom of the sea at considerable depths, or on the rocks of the coast in the midst of fuci. They lay an immense quantity of eggs.

Fossil Echini.

Desmarest distinguishes thirteen species from the beds anterior and posterior to the chalk. Risso gives one new from the environs of Nice, and Goldfuss nine from Germany.

Cidaris.

Body circular, regular, more or less elevated or depressed, composed of polygonal plates, covered with mamillated tubercles constantly perforated at the summit, and supporting spines of two kinds: one very long and sharp, the others short and nearly squamous. *Ambulacra* complete, to the number of five. *Mouth* below, central, furnished with five pointed teeth. *Vent* superior and central. *Genital pores* to the number of five.

α.

Subspheröidal species, more elevated than wide, with very narrow ambulacral areæ; the lines of double pores sinuous. (*The Turbans.*) Example, *Cidaris imperialis*

β.

Orbicular species, depressed; ambulacral areæ less narrow, bordered by straight ambulacra; spines ordinarily fistulous. (*Diadema*, Gray.) Example, *Cidaris Diadema.*

γ.

Orbicular species, very depressed; interambulacral areæ equalling the half of the others, and bordered by straight and very large ambulacra. (*Astropyga*, Gray.) Example, *Cidaris radiata.*

Localities.—Seas of the southern hemisphere. Two species already known in the seas of Britain and France, one on the coasts of Scotland, rare; the other very common in the Mediterranean.

Fossil Species.

Cidaris occurs in a fossil state in the chalk and the anterior beds. Defrance mentions three, but hardly characterizes them. Risso adds two new ones; Fleming four; and Goldfuss has figured and characterized nineteen.

Mr. Gray (*Proceedings of the Zoological Society*, 1835) divides the genus *Echinus*, as restricted by Lamarck and modern authors, into what he considers four natural genera, adapted to facilitate the distinction of the species of this extensive group. He regards this distinction as of the more importance, inasmuch as some of the characters which had been used for this purpose, such as the number of the *tesseræ* and of the pores in the *ambulacra*, have been found to be inconstant; the number of these increasing, as they are now known to do, with the age of the specimens. The following is Mr. Gray's subdivision:—Genus 1. *Arbacia.* This corresponds with section A of M. de Blainville. Example, *Arbacia pustulosa* (*Echinus pustulosus*, Lam.) Genus 2. *Salenia*, only known in a fossil state, and hitherto confounded with *Cidaris;* but its tubercles are not pierced. Example, *Salenia scutiger* (*Cidaris scutiger*, Munst.) Genus 3. *Echinus* containing sections B*, C, E, and G of De Blainville. Mr. Gray divides it into two sections:—1. The species with narrower ambulacra and with the pores moderate and approximated, which is subdivided into *those with a subintegral mouth* (type, *Echinus esculentus*) and *those with the mouth deeply incised.* (Example, *Echinus excavatus*, Lam.) 2. The species with wide ambulacra; the pores separated by small tubercles; the mouth five-incised. Example, *Echinus ventricosus*, Lam. Genus 4. *Echinometra*, containing sections B**, D, and F of De Blainville, as well as the Echinometra of that author. In this genus Mr. Gray observes the ambulacral plates may be considered as being composed of five or more doubly-pierced pieces, which form an arched line round the outer edge of the *tessera*, with a single pair of pores at its lower inner angle. Mr. Gray stated that he had formerly separated from the *Echini* some of the species of this genus, which are peculiar for their oblong form, and that the genus so proposed by him had been adopted by M. de Blainville; but a much more extended examination had convinced Mr. Gray that individuals of the same species vary from roundish to oblong; and therefore, having observed many round species agreeing with the oblong ones in the peculiar character of the *ambulacra*, he has unit them to the former under the same name. Mr. Gray ı marked, as throwing doubt on the bilaterality of the *Ech nidæ* attempted to be established by M. Agassiz, that t spongy ovarial plates which that gentleman regarded as t mark of the hinder part of the *Echinidæ*, is always plac on one side or the other of the longer axis of the oblo species. See also Mr. Gray's paper on the genera of the animals in the 'Annals of Philosophy;' and Dr. Sharpe article 'Echinodermata' in the 'Cyclopædia of Anato and Physiology.'

ECHINOBRI'SSUS. [Echinidæ, p. 259.]

ECHINOCACTUS, a genus of Cactaceous plants, wi the stem of an ovate or spheroidal form, the sides bei divided into many ribs, upon whose projecting angles a stationed at short intervals little spiny stars, which are t rudiments of leaves, and from whose centre the flowers pear. The latter consist of numerous sepals collected i a tube, an equally large number of petals, numerous s mens, and a filiform style divided into many lobes at t point. The species are very remarkable for the singu forms of their stems, and for the curious manner in whi their spines are arranged. They are often moreover c spicuous for the beauty of their large flowers. The gen is extremely near Cereus, from which, according to Candolle, it only differs in having the sepals and petals d tinct from each other, not united into a tube. But Cereus triangularis has its sepals distinct, and all t Echinocacti have more or less of a tube, we consider it bet to limit the latter to such species as have a depressed spheroidal form. With such a limitation the Echinocac Eyriesü, one of the most beautiful of plants, will really long to the genus Echinocactus, of which it has all t habit; otherwise it would be a Cereus, to which its ste bear but little resemblance. Most of the species are tives of Mexico and the West Indies. A few are found Brazil.

Echinocactus Eyriesü.

ECHINOCIDARIS, p. 261.

ECHINOCLY'PEUS. [Echinidæ, p. 259.]

ECHINOCO'NUS. [Echinidæ, p. 261.]

ECHINO'CORYS. [Echinidæ, p. 259.]

ECHINOCY'AMUS. [Echinidæ, p. 260.]

ECHINODE'RMATA. Lamarck made his *Radiar Echinodermes* consist of three sections. 1st, the *Stell deans* (star-fishes), including *Comatula, Euryale, Ophiu* and *Asterias;* 2nd, the *Echinidæ;* and 3rd, the *Fistulid* comprehending *Actinia, Holothuria, Fistularia, Priapul* and *Sipunculus.*

Cuvier's *Echinodermes* form his first class of zoophyt and this class is divided into two orders, viz., 1st, the *Pe cillated Echinoderms*, containing the great genus *Aster* and its subgenera the *Encrinites*, the *Echinidæ*, and *Ho thuria;* and 2nd, the *Footless Echinoderms*, consisting *Molpadia, Minyas, Priapulus*, the *Lithoderms, Sipuncul Bonellia*, and *Thalassema*, with its subgenera *Echiur* and *Sternaspis.*

De Blainville's *Echinodermata* are placed as his fi class of *Actinozoa*, and are divided into three orders: 1st, *Holothuridea;* 2nd, *Echinidea* [ECHINIDÆ]; 3rd, *Stelleridea*, embracing the *Encrinites* as well as the *Free Star-fishes*, &c.

The *Echinodermata* belong to the Cycloneurose subkingdom.

ECHINODISCUS. [ECHINIDÆ, p. 260.]

ECHINOLAMPAS. [ECHINIDÆ, p. 259.]

ECHINOMETRA. [ECHINIDÆ, p. 261.]

ECHI'NONEUS. [ECHINIDÆ, p. 260.]

ECHINO'PORA. [MADREPHYLLIŒA.]

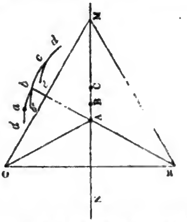
ECHI'NORODON. [ECHINIDÆ, p. 260.]

ECHI'NUS. [ECHINIDÆ, p. 261.

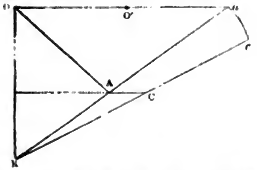
ECHI'TES, a genus of twining Apocynaceous plants inhabiting tropical countries. They have handsome yellow or white corollas, and are moreover remarkable for the singular fruit, which consists of two divaricating woody pod-like follicles containing a large number of silky seeds. They are dangerous lactescent plants of no known use.

E'CHIUM, an irregular-flowered genus of Boraginaceous plants, with handsome campanulate corollas. Echium vulgare is the most striking of our wild herbaceous plants; many species found at the Cape of Good Hope are shrubs.

ECHO. (ἠχὼ, ἦχος, *sound*). When sonorous undulations are propagated from any origin through the elastic medium of the air, the spherical wave-like surface then generated conveys the sound through the circumjacent space, and moves from its origin and centre with a velocity of about 1125 feet in a second, at the ordinary atmospheric pressure and temperature; for the velocity of undulations propagated through elastic media depends only on their indices of elasticity and not on their intensity. [ACOUSTICS.]



Suppose the point O to be the origin of a sound which in its progress encounters a plane obstacle NM; if this plane be sufficiently extended, a point M may be easily found which the sound will have just reached at the end of a given time. The waves which have previously reached the nearer points A,B,C, being precluded from advancing, are there reflected, that is, new spherical undulations $a'ab$, $b'bc$, $c'cd$ are generated from A,B,C as centres, and their radii at the moment we have spoken of are respectively Ab=OM—OA, Bc=OM—OB, Cd=OM—Oc, and it is easily seen that all these spherical surfaces originating from A up to M and existing simultaneously, may be exactly enveloped by a single portion of a spherical surface of which the centre is placed in a position R corresponding to O in respect to its distance from NM, but at the opposite side of the obstacle; this spherical surface, of which the radius is RM, is the true returning wave at that moment, and being impressed on the auditory organs, so as to be distinguished from the original sound, is called the echo.



When a sound originates at a point O, and is reflected by a plane obstacle AC, the reflected pulsation of the air occupies the space of a conical frustum $a$AC$c$ the vertex of the cone R being situated symmetrically with O at the opposite side of AC. In order that a person may hear the echo of his own sounds, it is therefore necessary that his situation may be at a point O′ in a perpendicular to AC; and that a second person may hear the echo of the voice of another at O, he must be situated in the frustum $a$AC$c$, so that the angles of incidence and reflection of the sound which reaches his ear may be equal; in both cases the distance from AC must be sufficiently great to distinguish between the original and the reflected sound.

Hence it follows, that wherever a person is situated, the echo of a single sound necessarily follows and cannot precede the original sound, for the two sides OA, Aa are greater than the third Oa through which the direct sound is propagated, and the velocities are in both cases alike.

However, the echo of a continued sound or note may be heard in the inverse order of time to that in which it was generated, provided the origin of the sound moves more rapidly towards the hearer than the rate at which sound travels. Thus a flash of lightning moving towards a person will produce a roll of thunder which, echoed by clouds, will be heard as it were backwards; but if the direction of the flash be such that the points of its current are nearly equidistant from the auditor, an instantaneous and intensely loud clap will be substituted for a continued roll.

The murmuring sound produced by the discharge of great guns is the succession of echoes from the particles of vapour floating in the atmosphere, and when the discharge is effected under a dense cloud, the echoes are stronger and better reflected, and a noise resembling a thunder-roll may then be heard. The whizzing of a bullet is attributed to its impinging in a state of rapid rotation on particles of vapour.

The time intervening between the primitive sound and its echo has sometimes been employed in determining the distance from the observer to the reflecting object, allowing 571 feet for each intermediate second of time; but like all methods dependent more on individual judgment than mechanical measurement, this process must be liable to considerable irregularities.

When several objects reflect sound, the number of echoes is greatly multiplied, not only from the primary echoes of each, but also from secondary and tertiary echoes by second and third reflections of returning waves against the reverberatory obstacles: each re-echo consists of only portions or frusta of the preceding; their intensities therefore diminish, and they gradually die away upon the ear, in the same manner that the images become obscure and by degrees imperceptible in consequence of the diminution of light when we look between two opposite and parallel plane mirrors.

The first echo heard in such circumstances is by no means necessarily the loudest. Taking any ellipse of which one focus is the origin of the sound and the other the place of the auditor, it is a well-known property of this curve that right lines drawn from the foci to any point in it make equal angles with the tangent at that point. Conceive now this ellipse to rotate round the line joining the foci so as to form a prolate spheroid, then sound emanating from one focus and reflected by a portion of the surface will be directed after reflection to the other, and its intensity will depend on the solid angle subtended at the focus by the reflecting body. Each echoing body may be conceived as a portion of such a spheroidical surface, taking a great axis major to comprehend the more distant bodies; and since the sum of the solid angles subtended by the more distant reflectors may be greater than those given by the nearer, the echo produced by them, though not reaching the ear as soon as that of the nearer, may, under such circumstances, be louder, bearing in mind in our estimate that this intensity has a source of diminution in the increase of distance. This case frequently occurs in places encompassed by chains of mountains, as the Killarney and Welsh lakes, &c.

When the succession of echoes from several bodies is sufficiently rapid, a continued sound or note may be produced, though the original sound was merely momentary; and when not sufficiently rapid for this purpose, a clamorous noise is produced, and hence Echo with her thousand tongues and babbling propensities has furnished matter for poetic imagination from Ovid to Shakspeare. As a single *ha* may be converted into an imitation of a stunning laugh, the romantic and echoing regions inhabited by the Scandinavian races materially assisted their untutored imaginings in attributing this appalling music to the aërial revelries of invisible hags or witches.

But when, as in the case of the electric fluid, the original cause of sound may be said to exist simultaneously through an extensive tract of an excited atmosphere, a sound perfectly continuous and majestic is produced in the thunder-roll, which may frequently be heard again echoed by neighbouring clouds, or awfully prolonged by repeated reflections from an amphitheatre of mountains.

A similar effect of rapidly repeated echoes may be perceived in the prolonged tread and ringing sounds which we hear when walking in stillness through long galleries, cloisters, and other narrow passages with parallel sides, particularly when the air is confined; but hangings and carpetings, yielding to the impulse of the sonorous waves, or stifling them by a multitude of interior reflections, together with open windows or much furniture, diminish these effects to a great extent.

The distribution of sound in public edifices, so that the echoes may be most advantageously brought to strengthen the original sound, is a subject practically deserving of much attention. For some sensible observations on the errors of architects in this respect, we must refer to Sir J. Herschel's treatise on Sound. Certainly the unlucky error of placing the confessional in the cathedral of Girgenti in a focus conjugate to another and unenclosed part of the church, by which Echo was instrumental in informing a husband of the infidelity of his spouse, and the parabolic reflector of a late ingenious clergyman at Cambridge, which had the effect of completely stunning him, however impartially his voice was distributed to his congregation, are not inconveniences of such common occurrence as those contrivances by which a part of an audience in a church or theatre possesses a monopoly, while the remainder witness the ceremony or performance in dumb show.

A ludicrous anecdote, mentioned by Lord Bacon, of a Frenchman calling out Satan, and being answered Va-t'en, led him to assert that the letter S was not echoed, and this assertion has been copied by several cyclopedists. The fact is, that S being in a great measure a breathing, the distance necessary for the production of a distinct echo is too great to render it audible, owing to its small intensity; but when its echo is taken at a small distance, the effect is to increase the sound, and this very disagreeable prolongation is very perceptible in churches whenever persons in repeating the service make use of this letter. The whispering gallery of St. Paul's is another instance of this error, for a low whisper uttered at one end is conveyed by successive reflections along its curved roof, and being again concentrated at the other end, may be distinctly heard.

When the reflecting surfaces, instead of plano, are curved, as in caverns, grottos, rocks, or ruined buildings, the reflected sound will be most intense at the foci, or the points which would be most enlightened *by reflection* if a luminous body were substituted in the place of the original source of sound.

Whatever may be the figure of the echoing surface, the total path traversed by a wave in a given time before and after reflection taken together is constant (and in different times is proportional to the time); therefore a small portion of a plane section of the echoing surface is common also to an ellipse having one focus at the origin of sound, the other in the returning wave, and the axis major equal to the space traversed by sound in a given time. Hence, first, the plane sections of the returning wave are the loci of the second foci of a series of ellipses, having a common focus and equal axes major, and all touching the section of the echoing surface; and, secondly, the figure of an obstacle necessary to produce a given wave will be found by taking the curve which touches a series of ellipses having their second foci in this wave surface and their first focus and axes major as before: this, strictly speaking, should however be confined to surfaces of revolution.

E'CIJA, a town of Andalusia, in the intendencia or province of Sevilla, situated on the river Genil, in a fine plain, on the high road from Sevilla to Cordova, about 55 miles north-east of the former city. Its antient name was Astigis; the Romans afterwards gave it the name of Colonia Augusta Firma. The name of Ecija was given to it by the Moors (Miñano). Ecija has a population of 34,000 inhabitants, many churches and convents, several hospitals, and other public buildings, and a very fine promenade along the banks of the Genil, adorned with fountains and statues. It is the residence of a corregidor and an alcalde mayor. The territory is rich in corn and olives; there are also some manufactories of woollens and linens. Ecija is the birthplace of Luis Velez de Guevara, a Spanish dramatist of the seventeenth century. There are several Roman inscriptions and a few other remains of antiquity.

ECKHEL, JOSEPH HILARY, an eminent antiquary and numismatist, was born at Entzersfeld, in Austria, January 13, 1737. His father, who was in the service of Count Sinzendorf, sent him at a very early age to the Jesuits' College at Vienna, where, in 1751, he was enrolled in their society. He studied philosophy, mathematics, divinity, and the learned languages; but devoted himself chiefly to antiquities and medals. His skill in the latter induced the superiors of the college, a few years afterwards, to give him the place of keeper of their cabinet of medals and coins. In 1772 he went to Italy, where the grand duke of Tuscany, Leopold II., engaged him to arrange his collection; and on his return to Vienna, in 1774, he was appointed director of the Imperial Cabinet of Medals, and professor of antiquities. In 1775 he published his first work upon his favourite study, entitled 'Numi veteres Anecdoti ex Museis Cæsareo Vindobonensi, Florentino Magni Ducis Etruriæ, Granelliano nunc Cæsareo, Vitzaiano, Festeticsiano, Savorgnano Veneto, aliisque,' 4to Vienna. This was followed in 1776 by 'Catalogus Musei Cæsarei Vindobonensis Numorum Veterum, distributus in partes ii. quarum prior Monetam Urbium, Populorum, Regum, altera Romanorum complectitur,' 2 tom. folio, accompanied by eight plates of inedited coins. In 1786 he published his 'Sylloge 1ma. numorum anecdotorum Thesauri Cæsarei,' 4to.; and his 'Descriptio Numorum Antiochiæ Syriæ, sive Specimen Artis criticæ Numariæ,' 4to., likewise printed at Vienna, the same year: and in 1787 produced a small elementary work on coins for the use of schools, in his native language, entitled 'Kurzgefasste Anfangsgründe zur alten Numismatik,' 8vo., Vien. This work has more recently been improved and published in France, under the title of 'Traité Elémentaire de Numismatique Grecque et Romaine, composé d'après celui d'Eckhel,' par Gerard Jacob, 2 tom. 8vo., Par. 1825. In 1788 Eckhel published a folio volume upon the gems of the Imperial Collection, 'Choix de Pierres gravées du Cabinet Imperial des Antiques, représentées en xl. Planches;' and in 1792 the first volume of his 'Doctrina Numorum Veterum,' Vienna, 4to.; the eighth and last volume of which was published in 1798. A supplement to it, with his portrait prefixed, has since appeared, 'Addenda ad Eckhelii Doctrinam Numorum Veterum ex ejusdem Autographo postumo,' 4to., Vindob., 1826. This work, which embraces the science of numismatics in general, has placed Eckhel at the head of all the writers upon antient coins. He died, May 16th, 1798, at the house of his friend the Baron de Locella.

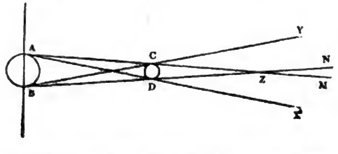
In his younger years Eckhel published three or four small pieces unconnected with numismatics: namely, two Latin odes on the nuptials of Joseph II., in 1765; another in German, in 1768, on the departure of Maria Carolina, archduchess of Austria, from Vienna; and two years afterwards an oration in German on the occasion of the emperor's visit to Italy, 'Rede auf die Reise Josephs II. in Italien,' 8vo., Wien., 1770. An 'Explication grammaticale des Prophéties d'Haggée,' by him, appeared in Millin's Magasin Encyclopédique, II^e année, tom. ii., p. 461.

(Saxii *Onomasticon;* Visconti's account of Eckhel in the *Biographie Universelle*, tom. xii., 8vo., Par. 1814, p. 463-467; and the 'Notitia Literaria de Vitâ et Scriptis J. H. Eckhel, translated from the French of Millin, prefixed to the 'Addenda ad Doctrinam Numorum Veterum.')

ECKMÜHL or **EGGMÜHL**, a village on the Laber consisting of about sixteen houses, with a castle, and situated in the Bavarian circle of the Regen, in 48° 47′ N. lat., and 12° 3′ E. long. It owes its celebrity to the signal victory which the French and Bavarians, under the emperor Napoleon, gained over the Austrians, under the archduke Charles, on the 22nd April, 1809. In testimony of the skill and intrepidity which Marshal Davoust displayed on this occasion, Napoleon conferred the title of prince of Eckmühl upon him.

ECLECTICS, the name given to those philosophers who, without adopting any particular system or dogmatizing for themselves, professed to select (ἐκλέγειν) from other philosophical systems whatever they conceived most conformable to truth, and fitted those detached parts together so as to form a new whole. The notion of such a union of jarring systems seems first to have originated with the Neoplatonists, who endeavoured to settle the dispute between themselves and the Peripatetics by the adoption of such parts of the doctrine of Aristotle as could be made to tally with their modification of the academic philosophy. This union of the Aristotelian and Platonic philosophies was attempted first by Potamo of Alexandria, whose principles were taken up and maintained by Ammonius Saccas. It may be doubted however if the title of Eclectics can be properly given to Potamo or Ammonius, the former of whom was in fact merely a Neoplatonist, and the latter rather jumbled together the different systems of Greek philosophy (with the exception of that of Epicurus) than selected the consistent parts of all of them. The most eminent of the followers of Ammonius were Plotinus, Porphyry, Jamblichus, Proclus, and Clemens Alexandrinus; and the antient Eclecticism became at last little more than an attempt to reconcile Platonism with Christianity. The modern and more genuine school of Eclecticism sprung up in the seventeenth century, when Bacon and Descartes flourished. These philosophers refusing to acknowledge themselves members of any particular sect, or to adopt any principle on the mere authority of their predecessors, formed systems for themselves which admitted the doctrines of any other sect without distinction whenever those doctrines were not at variance with what their own investigation had taught them of the nature of things. But modern philosophers have since then formed themselves into new sects, and a new Eclecticism has consequently arisen in our own days, of which the originator was Hegel, and the present supporter Victor Cousin: this newest Eclecticism resembles that of the Alexandrian Platonists in being rather a union of systems than a selection from them, and though it has partisans on the continent, and especially at Berlin, it is not very likely that it will be soon taken up in this country, where persons who read or talk about metaphysics are generally attached to some particular sect of modern philosophy.

ECLIPSE (*ecleipsis*, ἔκλειψις), an astronomical phenomenon, being the disappearance of a heavenly body. This may happen in two distinct ways; either the disappearing body may be lost on account of another body coming between it and its source of light, and thus intercepting the light; or the disappearance of a body may be caused by another body coming between it and the spectator. These two sets of circumstances, though ending in the same species of phenomenon, are yet of a character so different that it will be advisable to consider the two in separate articles. We shall therefore here content ourselves with an enumeration of the various kinds of eclipses; leaving further detail, when necessary, to the articles which will be referred to.



Let us suppose a spherical body A B, which is luminous, and another C D, the smaller of the two, which is not luminous. Let us consider first the circular sections of these bodies made by the plane of the paper, and let common tangents be drawn to these sections, four in number, namely, AX, BY, AM, and BN. If the bodies be very distant from each other, in comparison with their bulk, then it will be sufficient for practical purposes to consider these common tangents as intersecting at A and B, and C and D, the opposite extremities of two parallel diameters. If the whole figure then revolve round the line joining the centre of the two circles, the spherical bodies will be reproduced, together with the conical envelopes by which it may be seen on what the phases of an eclipse depend.

The whole space generated by the revolution of Y C D X is, in whole or in part, deprived of the light from A B. Within the space C D Z (or the cone generated by its revolution), the loss of light is total: a spectator situated within that cone sees no part of A B, and a planet which receives its light from A B cannot, when in that cone, be visible in any part of space. This is even true at the point Z; but anywhere within the cone N Z M, more or less of the border of A B is visible, and C D hides a portion of the middle of A B. If C D be small in comparison with A B, then the effect of C D to a spectator situated far off in N Z M is only the appearance of a small dark spot upon the face of A B.

Within the spaces Y C Z N and M Z D X, a part only of the face of A B is hidden from a spectator there situated, and part only of the light of A B is lost. On the lines C Y or D X the spectator imagines the two bodies AB and CD to be in contact.

The eclipses in which the disappearance takes place by the removal of the light from the body are—

1. The eclipse of the moon. [Moon, Eclipse of.]
2. The disappearance of a portion of Jupiter's surface, occasioned by one of its satellites passing between it and the sun. This is usually called the transit of the satellite's shadow over the disc of Jupiter. [Jupiter.]
3. The eclipses of Jupiter's satellites. [Jupiter.]

The eclipses in which the disappearance arises from the absolute interposition of another planet are—

1. The eclipse of the sun [Sun, Eclipse of], meaning the eclipse of the sun by the moon.
2. The eclipse of the sun (that is, of a very small portion of the sun) by Mercury or by Venus, commonly called the *transit* of Mercury or Venus over the sun's disc. [Mercury, Transit of; Venus, Transit of.]
3. The occultation of a fixed star by the moon. [Moon.]
4. The eclipse of a portion of Jupiter by one of its own satellites, or transit of a satellite over the disc. [Jupiter.]
5. The eclipse of a satellite of Jupiter by Jupiter itself, or occultation of a satellite by the planet. [Jupiter.]

We have here mentioned such eclipses as are not unfrequent: the only additional phenomenon which we are aware of is the eclipse of a portion of the ring of Saturn by a satellite, or passage of a satellite over the ring, seen by Sir W. Herschel. The satellites of Saturn must suffer eclipses of the first kind by entering the shadows either of the planet or the ring, and of the second kind both from the planet and the ring; but these satellites are only seen with very good telescopes and under very favourable circumstances, so that their eclipses excite little public curiosity.

ECLIPTIC. [Equator and Ecliptic.]

ECLOGUE. [Bucolics.]

ECONOMISTES. [Political Economy.]

ECPHIMO'TES (Fitzinger), a genus of Saurians, possessing the teeth and pores of the genus *Polychrus*, but with small scales on the body only. The tail, which is large, has great scales, which are pointed and carinated. The head is covered with plates. The form is a little short and flattened like that of some of the *Agamæ*, rather than like the slender shape of *Polychrus*. Example, *Ecphimotes tuberculatus* (*Agama tuberculata*, Spix; *Tropidurus torquatus*, Pr. Max.)

Description.—Ash-coloured, sprinkled with whitish blotches: a demi-collar of black on each side of the neck.

Locality, Brazil.

ECTOPISTES. [Columbidæ, vol. vii., p. 373.]

ECTOPISTI'NÆ. [Columbidæ, vol. vii., p. 373.]

ECUADOR is one of the three republics, which, before 1831, constituted the republic of Colombia, but since that time has become a separate government. It comprehends the antient kingdom of Quito, with the plains extending east of it between the Amazon river on the south, and the Uaupes, the principal branch of the Rio Negro, on the north. Its boundaries are not marked by natural objects, but follow mostly imaginary lines. A line beginning at Tabatinga, on the Amazon, and running due north, along the meridian of 70° 12′, divides Ecuador from Brazil as far as 1° 10′ N. lat., whence the boundary line runs on this parallel to the Rio Negro. The Rio Negro separates Ecuador from the republic of Venezuela, and the Uaupes forms in the whole length of its course the boundary between it and New Granada. Farther west this line extends over the mountain range in which the Rio Magdalena and the Rio Cauca originate, then passes over the northern ridges of the mountain-knot of Los Pastos, and terminates with the lower course of the Rio de los Patias, on the Pacific. The Pacific forms its western boundary. On the south, Ecuador is separated from Peru by a line beginning near

Tumbez, on the Bay of Guayaquil, and running in a south-south-east direction to the Rio Amazon, which it joins a short distance above S. Jaen de Bracamoros. From this point the Rio Amazon constitutes the boundary line between both republics.

Ecuador extends from 5° 50′ S. lat. to 1° 12′ N. lat., and from 69° 40′ to 80′ 40′ W. long. Its surface is vaguely calculated at more than 537,000 square miles, or more than four times and a half the area of the British Islands.

About one-fourth of its surface is mountainous. The Andes enter the country between the Bay of Guayaquil and S. Jaen de Bracamoros, and thence run in a northern and north-eastern direction to the northern boundary. This chain forms in the southern and northern extremity two large mountain-knots, that of Loxa, between 5° 30′ and and 3° 15′ S. lat., and that of Los Pastos, between 21′ and 1° 13′ N. lat. The first occupies, according to Humboldt, 11,650 square miles, and the second 8700. Between these two mountain-knots the Andes form an enormous mass of rocks, covering in width an extent of 70 or 80 miles. Both declivities are rather steep, but especially that towards the eastern plains. On both edges of this mass are lofty ranges running parallel to one another, and crowned by numerous summits, several of which rise above the line of perpetual congelation. The highest ridges of those ranges may be about fifty miles distant from one another; and between them extends a longitudinal valley, which measures from fifteen to twenty miles across, and extends nearly 300 miles in length. At two points transverse ridges unite the two ranges, and thus the great valley is divided into three smaller valleys. The most southern of these valleys, that of Cuença, extends from 3° 15′ to 2° 27′ S. lat., with a mean elevation above the sea of about 7800 feet. Its waters join the Rio de S. Jago, a tributary of the Amazon. The summits of the ranges which surround it rise only to about 10,000 feet and nowhere attain the snow-line, except the range of Assuay (2° 27′ to 2° 30′ S. lat.), which separates the valley of Cuença from that of Alausi and Hambato, and rises near the Ladera de Cadlud, on the great road, to 15,520 feet, and consequently approaches the snow-line. To the north of this transverse ridge extends the valley of Alausi and Hambato from 2° 27′ to 30′ S. lat. Its surface is somewhat higher than that of the preceding valley, and may be about 8000 feet above the sea. Its waters run off to the Marona and Pastaza, two tributaries of the Amazon. On the range east of this valley are the volcanoes of Sangay of Collanes and of Llangate, and on that on the east rises Chimborazo (21,420 feet above the sea), and the Carguairazo. The transverse ridge which separates this valley from that of Quito is called the Alto de Chisinche. It is only about 500 feet above the plains contiguous to it on the northern side, and is of inconsiderable width. At its western extremity stands the volcano of Cotopaxi, which attains a height of 18,880 feet, and at its eastern the Yliniza, which rises to 17,376 feet. This Alto de Chisinche forms the water-shed between the Pacific and Atlantic seas. The valley of Quito extends from 40′ S. lat., to 20′ N. lat. to the mountain-knot of Los Pastos. Its mean elevation above the sea is about 9600 feet. Its waters run off by the Rio Pita, which joins the Rio de las Esmeraldas, and thus flows into the Pacific. On the range standing east of this valley are the Antisana, 19,136 feet high, and the Cayambe Urcu, 19,548 feet high. The Cayambe Urcu is on the equator. On the western range are the Pichincha, 15,936 feet high, and the Cotocache, which rises to 16,448 feet. On the mountain-knot de los Pastos are several volcanoes, as those of Cumbal, Chiles, and Pasto. The elevated plains, which are inhabited, on that mountain region are 10,240 feet above the sea.

The country between the Andes and the Pacific is filled up with mountains of various elevations, which towards the shores sink down to hills. The shores themselves are high, but not of great elevation, except in a few places, as at Cape S. Lorenzo. The country along the river of Guayaquil forms an exception. Here a plain extends several miles in width, and is so low that part of it is covered by the inundations of the river in the rainy season, and part has been changed into a swamp.

The great plain east of the Andes is partly wooded and partly a savana; but in its present state it is of little importance, being only inhabited by the natives.

The principal river of Ecuador is the Amazon, which is here called Tunguragua. Where it leaves Peru, and begins to form the boundary-line between the two republics, commence the series of cataracts and rapids with which it issues from the Andes. Near S. Jaen de Bracamoros is the Pongo de Rentema, where the river, according to Humboldt, is only 1232 feet above the level of the sea. Lower down at the mouth of the Rio de Santiago, and between Santiago de las Montanes and Borja, is the rapid or Pongo of Manseriche, where the river is narrowed to about 150 feet, and for about seven or eight miles rushes down with incredible velocity. Below this Pongo the Amazon becomes navigable, and continues so to its mouth. [Amazon.] Within the boundary of Ecuador, the Amazon receives the Marona, Pastaza, Tigre and Napo, which descend from the eastern declivities of the Andes. The Putumayo and the Yapura, which descend from the same range and in the same direction, fall into the Amazon within Brazil. The rivers which descend from the western side of the Andes have a comparatively short course. The most remarkable are the Rio de los Patias, Rio de las Esmeraldas, and the river of Guayaquil; but only the latter, so far as we can learn, is navigated by large vessels to the town of Guayaquil, and by river-boats about seventy or eighty miles higher.

The temperature must, of course, differ considerably in the elevated valleys which are surrounded by the high peaks of the Andes, and in the low countries on both sides of the range. In the valley of Quito the seasons are scarcely perceptible. The mean temperature of the day, all the year is round, is between 60° and 67°, and that of the night between 48° and 52° of Fahrenheit. The winds blow continually, but never with great violence. They generally come from the north or south, but occasionally shift to other quarters, without apparently depending in any degree on the seasons. During the whole morning, till one or two o'clock, the weather is generally delightful, and the sky serene and clear; but after this hour vapours begin to rise, and the whole sky is gradually covered with black clouds, which bring on dreadful tempests of thunder and lightning, followed by torrents of rain. At sunset the weather generally clears up, and the nights are as serene as the mornings. The rains sometimes continue all night, and occasionally, though rarely, three or four days in succession. At other times a few fine days, without rain, follow one another. The interval between September and May is called the winter, and the remainder of the year the summer. The winter is only distinguished by a somewhat greater quantity of rain, and the summer by a greater number of fine days. These valleys are also subject to frequent earthquakes, of which those of 1698 and 1797 were particularly destructive. In the last earthquake 40,000 inhabitants are stated to have perished in the valleys; and, it is said, that the climate of Quito has become much colder than it was formerly.

At Guayaquil and on the other valleys along the coast the mean temperature of the year varies between 78° and 82°. From December to April the heat rises to 95° and no more. In this season an unvarying calm prevails, and the rain continues day and night with short interruptions; it is accompanied with frequent and dreadful tempests of thunder and lightning. In the remainder of the year the heat is moderated by the south-western and west-south-western winds, which blow with considerable force from noon to five or six in the morning of the following day. The sky is always serene and bright, gentle showers being rarely known to fall. This season is stated to be very healthy.

The great plain extending along the Rio Amazon and its numerous tributaries has a hot climate. The mean temperature probably does not fall short of between 75° and 85°, and the heat sometimes rises to 95° and more. But every day at two o'clock a wind begins to blow with great force, and continues to sun-set. It always proceeds from the east, and is considered as the continuation of the trade-winds. Near the base of the Andes it frequently blows with the violence of a storm. In this region rain falls nearly every day, generally after noon, when the wind commences.

Agriculture varies with the elevation of the cultivated land above the level of the sea. Near the snow-line, which in this part of the Andes occurs at the height of 15,750 feet, the vegetation of the *Páramos* (flat tracts on the summit of the range, from 11,000 to 14,000 feet above the sea) is extremely scanty, consisting only of two or three species of plants. Districts situated at an elevation of 10,000 feet are covered with grass, which affords good sheep-walks; such are the plains in the mountain-knot of Pastos. The culture of European cerealia and fruits prevails between 10,000 and 4000 feet, especially in the great valley of the Andes, where excellent wheat is raised, with barley and Indian corn. Lucern is also extensively grown as fodder for beasts of burden. In those parts of the country which do not exceed in elevation 4000 feet above the sea the vegetables cultivated for food are chiefly sweet potatoes, mandiocca, yams and bananas, with rice, Indian corn, and some leguminous plants. The most common fruit-trees are cherimoyers, pine-apples, papayas, and anonas. There are also extensive plantations of sugar-cane, cotton, tobacco, and cocoa. Among the forest-trees is that which gives the cinchona bark. This tree is most frequent on the heights of the mountain-knot of Loxa, where it grows on the eastern declivities at an elevation of 6000 or 8000 feet above the level of the sea.

Sheep and cattle are reared in great numbers, the former especially in the valleys of the Andes, and on the higher declivities of the mountains. Horses, asses, and mules, are sufficiently numerous to be articles of export. In some districts, especially in the valleys along the coast, a considerable quantity of wax is collected; and still higher up are some spots where the cochineal insect is reared. Along the coast a murex is found which juice is used in dyeing purple.

Ecuador is less rich in the precious metals than the other countries of South America which comprehend a portion of the Andes. There are several mines of gold and silver, and a few are still worked; but the annual produce is not considerable. Lead and quicksilver occur in some places, and in others sulphur is prepared in considerable quantity. Salt is obtained from sea-water along the coast.

The population of Ecuador is composed of the descendants of Spaniards and of the aborigines. The proportion of both races is not stated, but it would appear that the aborigines constitute at least three-fourths of the population. Those Indians who inhabit the elevated valleys belong to the race of the Peruvians, and speak the Quichua language. They are mostly agriculturists, and cultivate their lands with much care. They apply themselves also to manufactures, and make coarse stuffs of wool and cotton. The Indians who inhabit the eastern plain are much lower in civilization. They cultivate only small pieces of ground, and apply themselves almost exclusively to fishing and hunting. The Jesuits had made considerable progress in bringing them over to Christianity and civilization; but as their successors did not pursue this object with equal zeal or success, the *missiones* decreased gradually in extent and population. The political events which have taken place since the year 1812 have driven the monks out of the country all the missiones are in ruins, and the Indians have returned to the forests, and lost all marks of civilization. The whole population was thought to amount in 1827 to 492,000, with the exception of the Indian bravos of the plain. Three-fourths of the population are in the elevated valleys of the Andes.

When it formed a part of the republic of Colombia, Ecuador was divided into three departments. We cannot learn whether a new division of the territory has been made since its separation, and we shall therefore notice that which existed before.

1. The department of Ecuador or Quito extends along the coast from the mouth of the Rio de Patias to Cape Pasado, and comprehends the two valleys of Quito and of Hambato and Alausi; to which is added a portion of the eastern plains along the upper courses of the rivers Yapurá, Putumaya, Napo, Tigre, and Pastaza. In the elevated valleys in several places are the ruins of antient palaces of the Incas, and in many districts there are traces of the great road which in the time of the Incas led from Quito to the southern extremity of the valley of Titicaca (from the equator to 20° S. lat.). Its principal wealth consists in its extensive cornfields, and its numerous herds of sheep, cattle, asses, and mules: it has also a few mines of silver and gold. It is divided into three provinces, named from three mountains, Imbabura, the northern, Pichincha, the central, and Chimborazo, the southern province. The capital of the republic, the department, and the central province, is Quito. [QUITO.] North of this place lies S. Miguel de Ibarra, or briefly Ibarra, a well-built town, with about 12,000 inhabitants, and manufactures of wool and cotton: it is the capital of the province Imbabura. Not far from it is Otavalo, which likewise has manufactures of wool and cotton, and 20,000 inhabitants. On the coast are the harbours of Esmeraldas, Atacames, and Carondelet, but they are not visited by foreign vessels.

South of Quito is Tacunga, with 3000 inhabitants, which. between 1698 and 1797, was four times destroyed by earthquakes. Riobamba was entirely destroyed in 1797. The new town, which was built four or five miles farther south, contains 15,000 inhabitants, and is the capital of the province of Chimborazo. In its neighbourhood, at Tesoan, great quantities of brimstone are made. Hambato, north-east of Mount Chimborazo, with 9000 inhabitants, and Guaranda, south of the same mountain, have some commerce, owing to their situation on the road between Guayaquil and Quito. The missiones in the eastern plain have almost disappeared.

2. The department of Guayaquil comprehends the coast between Cape Pasado and a short distance from the boundary-line of Peru, and extends inland to the upper declivity of the Andes. Its commercial wealth consists in its tropical productions, especially in cocoa, of which there are extensive plantations. It is divided into two provinces, Manabi, the northern, and Guayaquil, the southern. The capital is Guayaquil. [GUAYAQUIL.] On the banks of the Rio de Guayaquil are Babayhoyo and Caracol, which are situated at the points where the river ceases to be navigable at different seasons, and consequently on that account are used as commercial depôts. Puerto Vejo, a small place, is the capital of the province of Manabi: its harbour is at Manta. Another harbour is at Punta de S. Elena, where much salt is made. The island of Puna, in the Bay of Guayaquil, has an area of more than 200 square miles. At the arrival of the Spaniards it had a population of 20,000 individuals, who are now reduced to a few fishermen. To this department belong the Galapagos Islands. [GALAPAGOS.]

3. The department of Assuay derives its name from the mountain-ridge which divides the valley of Alausi from that of Cuença. It comprehends the last-named valley, the mountain-knot of Loxa, and a few miles of sea-coast along the Gulf of Guayaquil, contiguous to the boundary of Peru, with by far the greatest part of the eastern plains. In a few places ruins of antient temples and palaces occur. Cinchona-bark forms its principal article of exportation. This department contains many herds of sheep and cattle, and the valley of Cuença produces grain in abundance. A few mines are found, but most of them are, we believe, not worked at present. This department is divided into three provinces, Cuença, which comprehends its valley and the sea-coast; Loxa, extending over the mountain-region of that name; and S. Jaen de Bracamoros, in which the valley of the Amazon and the eastern plains are included. The capital is Cuença, 8640 feet above the sea, a large but meanly-built town, with 20,000, or, according to others, 30,000 inhabitants. It has a university; and some institutions for education have been recently established. At Azogues are mines of quicksilver. Loxa, in a valley 6768 feet above the sea, has some fine churches, and 10,000 inhabitants. It trades extensively in cinchona-bark. Zaruma, on the western declivity of the Andes, has a population of 6000, and mines of gold and silver in its neighbourhood. The port of Tumbez, in the Bay of Guayaquil, is the place where Pizarro made his descent on the Peruvian coast: in its neighbourhood are some mines. Jaen de Bracamoros has 4000 inhabitants. Borja is a small place, where the Pongo de Manseriche terminates. The missiones, in the eastern plains, which formerly were numerous and extensive, are now reduced to a very low state.

The manufactures in cotton and wool are considerable in Quito as well as in Ibarra and Otavalo. The fabric is course, but strong and durable, and was formerly in great request in New Granada, and in several sea-ports; but its use has lately somewhat diminished on the shores of the Pacific. Lace of a good kind is also made in Quito; but there is no other important branch of industry.

All the maritime commerce of Ecuador is concentrated in that of Guayaquil [GUAYAQUIL], from which town there is a road to Quito, running first along the banks of the Rio de Guayaquil to Caracol, and then for some miles through a low and level country. It then begins to ascend the western declivity of the Andes, and between Caluma and Guaranda the ascent is extremely steep. From Guaranda it runs over the plain to Hambato, and thence to Quito. The great road which connects New Granada and Peru runs through the high valleys of Ecuador. It leads from Almaguer in New Granada over the Páramo de Puruguay (9408 feet above the sea) to Pasto (8578 feet), and hence over the Páramo de Boliche (11,504 feet), and the Alto de Pucara (10,400 feet) to Ibarra (7368 feet) and Quito (9536). In the Alto de Chisinche it attains an elevation of about 10,000 feet. Hence it traverses Hambato (8864 feet), Riobamba Nueva (9472 feet), and Alausi (7984 feet), and attains on the Páramo de Assuay 15,536 feet. In passing this range many lives are annually lost. From Cuença (8640 feet) it runs over the Alto de Pulla (10,000 feet) to Loxa (6768 feet) and hence to Ayavaca (8992 feet) in Peru. From the latter place it proceeds to Truxillo and Lima. Formerly European commodities were imported into Ecuador by this road from New Granada, but since the opening of the trade nearly the whole country receives them from Guayaquil.

Ecuador was discovered by Francis Pizarro in 1526, and came into the hands of the Spaniards at the downfal of the empire of the Incas. The Spaniards remained in the possession of the country up to the year 1812, when the country declared against them. Quito was then a part of the vice-royalty of New Granada, and it participated fully in the frequent vicissitudes of the war, which ended in 1823 with the complete expulsion of the Spaniards. By the convention of Cucuta in 1821, New Granada and Venezuela united and formed one republic under the name of Colombia, but this union lasted only till 1831, when these countries again separated. Ecuador, or the antient kingdom of Quito, was then also separated from New Granada, and since that time has existed as an independent state. While it was united to New Granada and Venezuela the whole republic was under a central government. We do not know whether such a government has been preserved in the new republic of Ecuador, or if it at present consists of a number of smaller states united by a federal government. (Condamine, Ulloa, Humboldt, Caldas in Mollien's *Travels*.)

EDDA. The northern mythology, which in regard to wild imagination and sublime conceptions surpasses that of Greece or Rome, is chiefly contained in two collections called 'The Eddas,' which have been handed down from time immemorial by the scalds, or antient minstrels, of Denmark, Sweden, Norway, and Iceland. The word Edda signifies Mother of Poetry. In the beginning these mythological records were communicated from mouth to mouth, and afterwards written down with the sacred characters of the north, the Runic characters, an alphabet which the Scandinavians are said to have obtained from the seafaring Phœnicians. The Scandinavians initiated in the mysteries of their religion the Saxons, who were forced by Charlemagne to exchange it for Christianity. After the conquest of the Saxons by Charlemagne, the worshippers of the religion of Odin withdrew to Iceland, where the sacred books of the Scandinavians were preserved, from which Samund Sigfudson, a clergyman, and Are Frode, the historian, collected, between the years 1056 and 1133, the older Edda.

This important work was concealed and forgotten for nearly 400 years. However, in the year 1643 a fine copy of these poems was found by Bishop Svensen, and published in 3 vols. 4to., containing the original text, a Latin translation, and a dictionary of the northern mythology. The contents of the poems are prophecies, elevated conversations, and magic songs.

The new Edda, composed or arranged two hundred years later, is a systematic poetical compendium of the former, and is divided into three books; one dogmatical or doctrinal, the second narrative, and the third critical. The Icelandic text of this second Edda was translated in the year 1640, by Resenius, and hence it is called the Resenian Edda.

Some modern critics have endeavoured to question the authenticity of these books, but their objections have been completely refuted by P. C. Müller, Von der Hagen, and the brothers Grimm.

The distinguishing characteristic of the mythology of the Eddas, as compared with that of Greece and Rome, is its systematic or rather epic unity. The mythology of the Greeks and Romans splits into numerous branches, and loses itself in the ocean of real events. That of the Edda, on the contrary, presents in the very beginning the germs of one all-destroying catastrophe, of a creation which by necessity involves the final destruction of the universe. The cosmology itself is truly original. According to the Edda, there was once no heaven above nor earth below, but only a bottomless deep, and a world of mist in which flowed the fountain that strives to devour every thing. Twelve rivers issue from this fountain. When they had flowed so far from their source that the liquid which they contained had become hardened, they ceased to flow, and froze into ice; and one layer of ice accumulating over the other, the great deep was thus filled up.

Southward from the World of Mist was the World of Light. From the former proceeded every thing dark and cold; from the latter whatever is warm and light. The one was the principle of wrath and death; the other, the principle of love and life; a warm wind blowing from the latter upon the ice melted it. The melted drops became animated by the power of him who had sent the wind, and from them sprung Ymir the giant, and the holy Ash Ydrahill, or the tree of life, which spreads its roots through all the deep, and its branches over the universe. Under Ymir's left arm grew a little man and woman, and from them proceeded the ice giants, the heroes, and the gods. This cosmogony is the offspring of a northern view of nature. It is natural that ice should appear to the Scandinavians as dead matter, or as the bad principle, and heat and light, on the contrary, as the creative powers, or good principle. The contrast of these two principles under different symbols, of good and bad genii, heroes, and gods, the alternate ascendancy of the one over the other until the fiery snake consumes universal nature with all-destroying flames, forms the cyclus of the great tragedy—among the incidents of which, the death of Baldur, the beau ideal of Scandinavian heroism, the Achilles of the north, forms one of the most heart-touching episodes. The existence of one supreme ruling principle, and the acknowledgment of a spiritual immortal soul in man, are also traceable in different symbols of the Edda. In both Eddas we find also the first rudiments of the great German national epic poem, 'Der Niebelungen Lied.'

Those who wish for further information on this subject may consult *Edda Saemunda hins Froeda*, and Creuzer's *Symbolik*.

EDDOES, the name by which the esculent Caladium is known by the blacks of the Gold Coast. The leaves are boiled and eaten as cabbages with us, but their acridity renders them unsuitable for a European palate.

EDDY is a circular motion of the water, either in rivers or in the sea. It exists more frequently in rivers between the proper current and the counter current. The edges of one current brushing against another give to a small portion of water a circular motion. But an eddy is also produced when the current, running with some violence against a rock or elevated shore, is driven back and meets in the bed of the river or on the opposite shore another obstacle to its course. In this case the eddy generally occupies the greatest part of the bed of the river, and is frequently called a whirlpool. Eddies occur in the sea likewise, where two currents run parallel, but in different directions, as between the Equatorial and North African current. Whirlpools also occur frequently among rocky islands near a coast. [WHIRLPOOL.]

EDDYSTONE or EDYSTONE LIGHTHOUSE is constructed on the sloping side of a rock which bears from Plymouth south by west, and from the Ram Head south half a point east. It is distant from the anchoring in the Sound four leagues, and from Ram Head about three leagues and a half, which latter is the nearest shore to the lighthouse. The Isle of Maystone bears from the lighthouse about north-east by north, and is also four leagues distant. All the rocks near the house are on the east side, stretching to the north and south, and they are all covered at high water; but on the west side any ship may sail close by the house in twelve or thirteen fathoms water, and there are no hidden rocks. Towards the east by north, about a quarter of a mile from the house, there is a rock which never appears but at low spring tides. (Winstanley's *Lighthouse*, book i., cap. 11; Smeaton's *Narrative*.)

The present edifice is a circular tower of stone sweeping up with a gentle curve from the base, and gradually diminishing to the top, somewhat similar to the swelling of the trunk of a tree. The upper extremity is finished with a kind of cornice, and is surmounted with a lantern, having a gallery round it with an iron balustrade. The tower is furnished with a door and windows, and a staircase and ladders for ascending to the lantern, through the apartments for those who keep watch. Mr. Smeaton undertook the arduous task of constructing the present lighthouse in the spring of the year 1756, and completed it in considerably less time than was originally proposed, which was four years. In order to form his foundation, Smeaton accurately measured the very irregular surface of the rock, and made a model of it. (Book ii., chap. 11 of his *Narrative.*)

The materials employed in building the tower are moorstone, a hard species of granite, and Portland stone. The granite rock was partially worked to form the foundations; and as the ground joint would be more subject to the action of the sea than any other, it was found necessary not only that the bed of every stone should have a level bearing, but that every outside piece should be grafted into the rock, so as to be guarded by a border thereof at least three inches in height above it, which would in reality be equivalent to the founding of the building in a socket of three inches deep in the shallowest part. On the 3rd of August, 1756, Smeaton fixed the centre point of the building and traced out part of the plan on the rock; and on the 6th, nearly the whole of the work was set out. (See the plan in the *Narrative*, showing the dovetail recesses.) On the 4th of September, the two new steps at the bottom of the rock and the dovetails were roughed out, and some of the beds brought to a level and finished, after very great labour. The stones for the several courses were rough worked at the quarries according to various draughts made by the engineer.

A part of the upper surface of the rock having been taken carefully off, but without the use of gunpowder, lest it should loosen the rock, six foundation courses dovetailed together were then raised on the lower part of the rock, which brought the whole to a solid level mass. These courses, with eight others raised above them, form the solid bed of the work, and take the form of the swelling trunk of a tree at its base. The courses of masonry are dovetailed together in the most skilful manner, and each layer of masonry is strongly cemented together, and connected by oaken trenails or plugs, and the whole strongly cramped. (See the various plans in the *Narrative.*) The general weight of the stones employed is a ton, and some few are two tons. In the solid work the centre stones were fixed first, and all the courses were fitted on a platform and accurately adjusted before they were removed to the rock.

The first lighthouse built on the Eddystone rock was constructed by Mr. Winstanley, a gentleman of Essex, who was a man of a mechanical turn. His work was begun in 1696, and completed in four years. While some repairs were making under his inspection, the building was blown down in a terrible hurricane during the night of the 26th November, 1703, and he and his workmen perished. Not a vestige, except some iron stancheons and a chain, was left behind. It appears from the drawing to have been insufficient for one of its proposed purposes, durability.

It was not till the spring of the year 1706 that an Act was passed for rebuilding the lighthouse, and Mr. Rudyerd, a silk-mercer, was employed by the lessee of the lighthouse to construct a new building. Mr. Rudyerd's want of personal experience was made up by the employment of two of the shipwrights from the royal arsenal at Woolwich.

Mr. Smeaton was of opinion that Rudyerd directed the performance of his work in a masterly manner, and so as perfectly to answer the end for which it was intended, until it was destroyed by fire in 1755. The worm appears, however, to have affected the timbers.

Winstanley's building was constructed principally of wood, and part of the base of stone; Rudyerd's was built entirely of wood, except five courses of moor-stone on the rock. (See the plates in '*A Narrative of the Building, and a Description of the Edystone Lighthouse,' &c.*, by John Smeaton, Civil Engineer, F.R.S.)

Mr. Foster's lighthouse, built on the Black Rock, at the mouth of the Mersey, and the Bell Rock lighthouse, off the coast of Fife, are similarly constructed.

The Eddystone lighthouse has not only the merit of utility, but also of beauty, strength, and originality, and is itself sufficient to immortalize the name of the architect. The reader will find every thing curious and interesting connected with this undertaking in Smeaton's splendid folio above referred to.

The base of the tower is about 26 feet 9 inches in diameter, taken at the highest part of the rock. The diameter at the top of the solid masonry is about 19 feet 9 inches, and the height of the solid masonry is 13 feet from the foundation. The masonry may still be considered of solid construction to the top of the stone staircase; the height to the top of which from the centre of the base is 28 feet 4 inches. The height of the tower from the centre is 61 feet 7 inches; the lantern, the base of which is stone, is 24 feet; and the diameter of the tower below the cornice is 15 feet. The whole height is therefore 85 feet 7 inches, according to the scale given by Smeaton to his drawings.

The upper part of the building, constructed of wood, was burnt in 1770, and renewed in 1774.

EDELINCK, GERARD, a distinguished engraver, and likewise eminent as a painter, was born in 1649 at Antwerp, where he acquired the rudiments of his art; but it was in France that his talents were fully developed, and the favours bestowed on him by Louis XIV. induced him to fix his abode in that country. Among his engravings the following are especially worthy of notice:—the Holy Family, after Raphael; Alexander in the Tent of Darius, after Lebrun; the Combat of Cavalry, after Leonardi da Vinci; and, above all, the Crucifixion, after Lebrun. In his larger plates of historical subjects, we too often have reason to lament the choice; many pictures owe all their celebrity to his master-hand. Edelinck was equally happy in his portraits, of which he has left a great number of the most distinguished characters of his age. Several of them are in the collection of eminent men by Perrault. A remarkably pure and brilliant burin, a bold manner, correct drawing, fidelity to nature, and inimitable harmony of execution, place the works of Edelinck in the highest rank among those of his nation. He was engraver to the king, and member of the Royal Academy of Painting, and died at Paris in 1707. Neither his brother John, born 1630, nor his son Nicholas, born at Paris, 1680, equalled him in his art.

EDEN. [CUMBERLAND.]

EDENTATA, Cuvier's sixth order of mammiferous animals, characterized by the absence of teeth in the front of the jaws. Their claws are large, and they are more endowed with strength than agility. Cuvier divides them into three tribes.

1st, the *Tardigrades*. Example, *the Sloths* (*Bradypus*, Linn.) [AI.]

2nd, *the Armadillos* (*Dasypus*, Linn.) [ARMADILLO.] *Chlamyphorus* [CHLAMYPHORUS] comes under this tribe, as well as *Orycteropus* [AARD-VARK], *Myrmecophaga* [ANT-EATER], and *the Pangolins* (*Manis*, Linn.).

The third tribe consists of the Monotremes. [ECHIDNA; ORNITHORHYNCHUS; MONOTREMES.]

Some large extinct fossil animals, the *Megatherium*, for instance, belong to this order.

EDESSA. [ORFA.]

EDFU, a small town of Upper Egypt, on the left bank of the Nile, in 25 N. lat., remarkable for its temple, which is one of the finest and best preserved in Egypt, though much encumbered with sand and rubbish, and with the huts of the inhabitants, who have built their village around and on the top of it. The outward access to the temple is between two enormous propyla, or truncated pyramids, 104 feet long, 37 wide at the base, and 114 feet high. At the summit the horizontal section is 84 feet by 20. On the fronts of these moles immense figures are sculptured in a masterly style. Between the two propyla is the doorway, after passing which we enter a court, 161 feet long and 140 wide, surrounded with walls; on each side of which there is a row of pillars placed at some distance from the side wall, the space between the pillars and the wall being roofed over with stone, forming a covered portico. From the base of the pillars to the top of the stone covering is about 35½ feet. The court is now filled with rubbish, and encumbered with wretched buildings, forming part of the modern village of Edfu, the remainder being built on the roof of the temple itself. From the entrance of the court there is a gradual ascent by a kind of steps to the pronaos or portico of the temple, which is supported by eighteen pillars, six in a row, the whole height of it being about 56 feet above the lowest level of the court. The intercolumniations of the front pillars are built up to more than half the height. Passing through the pronaos, we come to a doorway leading into a kind of hypostyle hall, 66 feet by 33, supported by twelve pillars, with a flat roof formed by large beams of stone crossing from each pillar to the next in the same row, the whole being covered with thick flat slabs. The pillars have the quadrilateral two-headed capital as at Denderah. From this chamber we pass into another long and narrow one, from which there are two small entrances to the side galleries, wherein we see flights of steps leading upwards to the roof of the sekos or cell. Proceeding onwards through the middle chamber, we pass into another small one, with an apartment on each side of it, probably for the use of the priests. From this last-mentioned chamber we enter the holy recess itself, an oblong room about 33 feet by 17, in which the figure of the deity was placed. Two galleries run down on each side of it, leading to a doorway at the back of it, by which the priests might walk into a large but perfectly retired space all round the sanctuary, or might ascend on the roof by a flight of steps to enjoy the air and light on the terraced roof, for below they had no light at all, except it might be from small apertures, through which the Fellahs, who now live on the roof with their families and cattle, discharge all their dirt into the temple. The chambers of the Sekos serve them as repositories for grain and other commodities. It will be observed that from the covered gallery or portico on each side of the outer court there is a path continued all round the temple, between the outer and the inner walls. Probably the vulgar were allowed the use of this walk, as a thick wall was between them and the apartments devoted to the priests and the worship of the deity; for none but the priests, and probably the kings, were admitted into the inner apartments, much less into the adytum or sanctuary, which contained the representation of the deity. The temple, as well as every part of the wall, are covered with hieroglyphics and figures. The outer wall, which joins the two propyla and completely incloses both the court and the temple, is 414 feet on each of its longer sides, and 154 on its shorter side at the back of the temple.

The temple of Edfu may be compared with that of Denderah for preservation, and is superior to it in magnificence. The propylæon is the largest and most perfect of any in Egypt; it contains several apartments in the interior, which receive light by square apertures in the sides. The entrance court is the only one to be seen in Egypt in such perfection, though completely encumbered with Arab huts. The pronaos or portico is magnificent, but unfortunately above three-fourths of it are buried in rubbish. Upon the whole, the temple of Edfu, although built much later than many of the others, being generally attributed to the age of the Ptolemies, is perhaps the most complete specimen remaining of an Egyptian temple, which can give a good idea of the respective proportion and distribution of the different parts of their exterior appearance when entire, and the strength of those formidable citadels, which, while they served as a protection to the town, commanded the respect of the inhabitants, and prevented or defeated any attempts to dispute the authority of their priestly rulers. (See *British Museum, Egyptian Antiquities*, vol. i., in the *Library of Entertaining Knowledge*, with a *ground-plan* of the temple of Edfu; Belzoni; and Wilkinson's *General View of Egypt*.) [EGYPTIAN ARCHITECTURE.]

EDGAR, surnamed the Peaceable, was the second and youngest son of King Edmund I. by his wife Elgiva, or Algiva. He appears to have been born in 943, and consequently was only about three years old at his father's death in 946. His brother Edwy, or Eadwy, may have been a year or perhaps two years older. In these circumstances, Edmund's brother Edred was unanimously chosen to succeed him by the Witenagemote. On the death of Edred, however, in 955, Edwy was placed on the throne; and at the same time his brother Edgar was appointed governor or subregulus of Mercia, which was still considered as a distinct though subject kingdom. When, about two years after his accession, the enmity between Edwy and the church interest broke out into an open quarrel, the people of Mercia and Northumbria, instigated to revolt by Archbishop Odo, or at least timing their movement very opportunely for the purposes of the clerical party, placed Edgar at their head and proclaimed him king. It was finally arranged that Edwy should retain the sovereignty of the territory to the south of the Thames, and that all the rest of the kingdom should be made over to Edgar. The death of Edwy, however, about a year after, made Edgar king of all England (A.D. 959).

The celebrated Dunstan, banished by Edwy, had been recalled by Edgar, and made his chief counsellor, as soon as he found himself established as king of the country to the north of the Thames. Being as yet only in his sixteenth year (or perhaps not quite so old) when he became full king, he was of course entirely in the hands of the monks and clergy, whose instrument he had hitherto been. Dunstan, already bishop both of Worcester and London, was now promoted to the primacy, as well as restored to his abbey of Glastonbury, and became the chief director of affairs both in church and state. The government of the kingdom by Edgar, under the guidance of this ecclesiastic, was unquestionably conducted with remarkable ability and success. Throughout the whole reign England remained undisturbed by war; the northern pirates, who had harassed the country so incessantly for 150 years before, and who, twenty years after the death of Edgar, renewed their attacks, and did not desist until they had effected its conquest, were, during his life, deterred from showing themselves on the English coasts by the powerful naval force that was kept up by this king. The old writers make the fleet of Edgar to have consisted of 3600 ships. 'The number,' says a modern historian, in a somewhat decisive style of narration, 'appears to me enormous: I have therefore retrenched a cipher.' (Lingard, *Hist. Eng.*) In this fleet, which was divided into three squadrons, Edgar is said by Malmsbury to have every Easter circumnavigated the island in person; but this story seems to be merely one of the improbable inventions by which Edgar's monkish admirers have laboured to magnify his name. It may be doubted whether we ought not to regard in the same light what some of the chroniclers tell us about his making annually a progress through the different provinces of his kingdom for the administration of justice. Another work of great public benefit which is attributed to him is the reformation of the coinage. He is also said to have freed Wales from wolves by commuting the money tribute imposed upon the Welsh by his predecessors for a tribute of 300 heads of these animals annually; by which means the wolves were extirpated in four years. But there were wolves in England long after this. Edgar has been chiefly lauded by the monkish annalists for his restoration of the church both to its antient possessions and to a more perfect state of discipline than it had probably ever before known. Under the vigorous administration of Dunstan and his subservient associates Ethelwold and Oswald, the bishops of Winchester and Worcester, the married clergy were at length removed almost to a man from the cathedrals and abbeys; and no fewer than fifty-four monasteries were founded or restored in different parts of the kingdom, and filled with monks as well as richly endowed. They were all subjected to the Benedictine rule.

The laws of Edgar that have been preserved consist partly of some enactments touching the payment of the tithes and other church-dues, and partly of a few civil regulations chiefly relating to the improvement of the police of the kingdom and the better administration of justice. One is directed against the crime of malicious defamation, and enacts that if the falsehood of the evil report can be proved, the defamer should either have his tongue cut out (that was no doubt thought a peculiarly appropriate punishment), or should redeem it with the value of his head, that is to say, should pay the sum at which his life was valued according to the class of society in which he was ranked. Another directs that the Winchester measure should be the standard for the kingdom. These laws, however, were only enforced in the Saxon provinces of Edgar's dominions. To his Danish subjects, who occupied nearly or fully half the kingdom, he appears to have only recommended the adoption of some of the English laws. The majority of these Danes resident in England were still pagans, and were governed by earls of their own nation, though they acknowledged the supremacy of the Saxon king; and it was not till towards the close of the reign of the Confessor that the authority of the English law was fully extended over the part of the country which they occupied. Edgar however had spent his earliest years among the Danes, and it was by their aid chiefly that he had acquired his first throne: these circumstances at once attached them to him, and gave him great influence over them; and this good understanding appears to have formed a chief part of the strength of his government, and to have very essentially contributed to the preservation of the tranquillity which the kingdom enjoyed during his reign.

The monkish chroniclers give the loftiest descriptions of the power and extensive authority of this king, telling us that he was acknowledged as their supreme lord by all the other kings of Britain and the surrounding islands. The story told in the Saxon chronicle and elsewhere of his having been rowed in his barge on the Dee by the eight subject kings of Scotland, Cumberland, Anglesey with the Isle of Man and the Hebrides, Westmoreland, Galloway, North, South, and Middle Wales, is well known. It is also affirmed that the greater part of Ireland had submitted to his authority. The dominion which he arrogated to himself appears in fact not to have been inferior to what we find claimed for him by his panegyrists. Among the titles assumed by him on his seals and in charters are—'Edgarus Anglorum Basileus, omniumque regum insularum oceani quae Britanniam circumjacent, cunctarumque nationum quae infra eam includuntur, Imperator et Dominus'—'Rex et Primicerius tocius Albionis'—'Basileus dilectae insulae Albionis, subditis nobis sceptris Scottorum, Cumbrorumque, atque Brittonum, et omnium circumcirca regionum,' &c. These 'pompous and boastful titles,' observes Mr. Turner, 'sometimes run to the length of fifteen or eighteen lines.' Much difficulty in believing that this assumption of power had any real foundation is occasioned by the absence of any record or notice of the subjugation of the more important of these neighbouring kingdoms by any of the Anglo-Saxon monarchs. What event ever happened for instance that could possibly have induced the king of Scotland to acknowledge himself in this manner as the vassal of the king of England? The pacific character claimed for the reign of Edgar, who is said never to have had occasion to draw the sword against an enemy, makes it still more difficult to understand how he should thus have compelled all his neighbours to do him homage, and take him for their lord and master.

The monkish writers, with whom Edgar is such a favourite, have not altogether concealed the fact that he was no saint in his morals. Even Lingard seems to admit that one story is tolerably well authenticated, which attributes to him the violation of a lady of noble birth, and that too while she was resident in a convent. Another is told of his having, on one occasion, ordered one of his nobles, whose guest he was, to give him his daughter for a bedfellow, and of the young lady's honour having been saved by her mother substituting for her a handsome slave, with whom the king was so well pleased that, after discovering the deception, he took her to court and retained her for some years as his favourite mistress. He was twice married, first to Elfleda the Fair, by whom he had a son, Edward, who succeeded him; and, secondly, to Elfrida, the daughter of Ordgar, Earl of Devonshire, who bore him Edmund, who died in his infancy, and Ethelred, for whom his infamous mother opened a way to the throne by the murder of Edward. The circumstances of the marriage of Edgar and Elfrida—the commission given by the king to Ethelwold to visit the lady and ascertain the truth of the reports of her beauty—the treachery of Ethelwold, who represented her to his royal master as unworthy of her fame, and then married her himself—the discovery by her and Edgar of the deceit that had been practised on both of them—and the subsequent assassination by the king of his unfaithful emissary—are related by Malmsbury on the faith of an antient ballad. There is nothing in the character either of Elfrida or Edgar that need occasion us any difficulty in believing the story.

Edgar, for some reason which does not clearly appear, was not solemnly crowned till the fourteenth year after he succeeded to the throne. The ceremony was performed at Akemanceastre, that is, Bath, on the 11th of May, 973. He lived only two years longer, dying in 975, when he was succeeded by his eldest son Edward, afterwards designated the Martyr.

EDGAR ATHELING, that is, Edgar of the blood royal, or Prince Edgar, as we should now say. [Atheling.] The personage commonly understood in English history by this title is Edgar, the grandson of King Edmund Ironside through his son Edward surnamed the Outlaw. Edward and his brother had been sent from England by Canute in 1017, the year after his accession, to his half-brother Olave, king of Sweden, by whom it was probably intended that they should be made away with; but Olave spared the lives of the children, and had them removed to the court of the king of Hungary. All the English historians make the Hungarian king by whom they were received to be Solomon; but this must be a mistake, for that king did not ascend the throne till 1062, and was only born in 1051. The king of Hungary at the time when the children of Edmund Ironside were sent to that country was Stephen I., who reigned from 1001 to 1038. The story, as commonly related, goes on to state that one of the brothers, Edmund (or, as some call him, Edwin), married a daughter of the Hungarian king, but died without issue; and that the other, Edward, married Agatha, the daughter of the Emperor Henry II. and the sister of Queen Sophia, the wife of Solomon. Here again there must be some great mistake; for the Emperor Henry II. never had any children. Who Agatha really was, therefore, it is impossible to say. She bore to her husband, besides Edgar, two daughters, Margaret and Christina.

Edgar, as well as his sisters, must have been born in Hungary; but the year of his birth has not, we believe, been recorded. His father, after an exile of forty years, was sent for to England, in 1057, by his uncle King Edward the Confessor, who professed an intention of acknowledging him as next heir to the crown: the Outlaw accordingly came to this country with his wife and children, but he was never admitted to his uncle's presence, and he died shortly after, not without the suspicion of foul play, which one hypothesis attributes to Earl Harold, another to the duke of Normandy. There is nothing like proof, however, of the guilt of either. The event in the mean time was generally considered as placing young Edgar in the position of his father as heir to the crown; and it seems to have been now that the title of the Atheling (which had been borne by his father) was assumed by or conferred upon him. He was at any rate the Confessor's nearest relation; and if Edmund Ironside, from whom he sprung, was illegitimate, as some have supposed, the circumstance of his having worn the crown seems to have been regarded as sufficient to wipe away the stain, and to bring his descendants into the regular line of the succession. All Edmund's brothers and half-brothers, with the exception of the reigning king, had perished, most of them having been cut off by Canute and the other kings of the Danish stock; and the Confessor himself and his grandnephew, young Edgar, were now the only remaining male descendants of Ethelred II.

Edgar was still in England when the Confessor died in January, 1066; but he was yet very young, and appeared to be feeble in mind as well as in body, and therefore was in nowise fitted either to take a part, or to be used as an instrument by others, in the first tumult of the contest in which two such energetic spirits as Harold and the Norman William now proceeded to try their strength. Insignificant as he was, however, from his personal endowments, the Atheling derived an importance from his descent and his position which afterwards occasioned him to be conspicuously brought forward on various occasions, and has made him an historic character. On the destruction of the power of Harold at the battle of Hastings, he was actually proclaimed king by the citizens of London; but on the approach of the Conqueror, he was one of the first to go to him at Berkhamstead and to offer full submission. He then took up his residence at the court of William, who allowed him to retain the earldom of Oxford, which had been bestowed upon him by Harold. When the Conqueror the following year visited his Norman dominions, we find him taking the Atheling in his train. In 1068, however (the Saxon Chronicle says in 1067, but see a note upon the discrepancy of the authorities as to this and other dates in Lord Hailes's Annals, A.D. 1068), Edgar appears to have fallen into the hands of the discontented Northumbrian lords Maerleswegen (or Marleswine), Cospatric, and others, who, deserting the Norman conqueror, carried the heir of the Saxon line and his mother and sisters with them to the court of the Scottish King Malcolm Canmore. This movement was attended with important consequences. Malcolm soon after married Edgar's eldest sister Margaret, and of this marriage came Matilda, whose union (A.D. 1100) with Henry I. of England was the first step towards the reconcilement of the Saxon and Norman races. Meanwhile Edgar and his friends were followed to Scotland by many other Saxon fugitives, who were the means of introducing into that country much of the superior civilization of the southern part of the island. A connection between Scotland and Hungary appears also to have arisen out of this flight of Edgar and the subsequent marriage of his sister with the Scottish king.

It was not intended however by Cospatric and his associates that Scotland should serve them merely as a place of refuge. A powerful confederacy was immediately formed against the English king, in which they and their protégé Edgar were associated with the men of Northumberland and Sweyn Estridsen the king of Denmark. The united forces of these several powers stormed the castle of York on the 22nd of October, 1069, and put the Norman garrison to the sword; on which, according to some authorities, Edgar Atheling was a second time actually proclaimed king. But the approach of William soon compelled him to fly for his life, and he again took refuge in Scotland. Here he appears to have remained inactive till the year 1073, when he was again induced to engage in a scheme for annoying the English king at the instigation of Philip king of France, who invited him to come to that country, promising to give him some place of strength from which he might attack either England or Normandy. Edgar on this set out with a few ships; but he was wrecked in a storm on the coast of Northumberland, from which he with difficulty made his escape for the third time to Scotland, in a state of almost complete destitution. He was now advised by his brother-in-law Malcolm to make his peace with William; and that king having received his overtures favourably, he proceeded to England, where William gave him an apartment in his palace, and a daily allowance of a pound of silver for his support. In this state of dependence he remained for some years; but at length he seems to have gone over to Normandy, where, after the death of the Conqueror, his son Duke Robert made the Saxon prince a grant of some lands. The grant, however, for some reason which does not appear, was soon resumed, and the Atheling was compelled, for the fourth time, to betake himself to Scotland in 1091. In the end of the same year it is related that a peace was effected by the good offices of Edgar and Duke Robert between Malcolm and William Rufus, when their armies were met and ready to engage, in *Lothene* or *Loidis* (that is, most probably, the part of Scotland now called Lothian, then considered as a part of England). On this occasion Edgar was reconciled to the English king, and he again took up his abode at the court of William. In January, 1092, however, Duke Robert and he suddenly withdrew together to Normandy; and not long after Malcolm and William were again at war. The Scottish king fell in a conflict with an English force commanded by Robert de Moubray near Alnwick on the 13th November, 1093; his eldest son Edward was slain with him; and his Queen, the sister of Edgar Atheling, died three days after, having only survived to learn the loss of her husband and her son. Immediately after this we read of Edgar securing the children of his deceased brother-in-law and sister from the attempts of their uncle, Donald Bane, who had usurped the Scottish throne, and conveying them to a place of safety in England, a circumstance that would apparently imply that he had himself returned to that country from Normandy, and once more secured the protection of the English king. Here he seems to have remained during the remainder of the reign of Rufus. In 1097 he is recorded to have raised, with the approbation and aid of that king, a body of troops, and marched with them into Scotland, where he drove Donald Bane from the throne, and placed on it his nephew Edgar, the son of Malcolm. One account makes him to have immediately after this joined his old friend Robert duke of Normandy in the Holy Land with a force of 20,000 men, collected from all parts of England and Scotland; but this part of his story is neither well supported, nor very probable in itself. It is certain however that on the breaking out of the war between Henry I. and his brother Robert, a few years after the accession of the former to the English throne, Edgar was found on the side of Robert, although the recent marriage of his sister to Henry might be supposed to have attached him to the interests of that prince. He was one of the prisoners taken by Henry at the decisive battle of Tinchbrai on the 27th of September, 1106, in which Robert finally lost his dukedom and his liberty. The victor however treated the Saxon prince with more lenity or contempt than he showed in his treatment of his own brother. Soon after being brought to England, Edgar was restored to liberty; and some accounts state that he subsequently visited Palestine. But the remainder of his history is very obscure. Malmsbury only informs us, without specifying any date of his decease, that he died in England after having lived to a good old age, without ever having been married or having had any issue, leaving behind him the character of a weak but inoffensive and well-intentioned man. He has certainly the distinction of being about the most insipid hero of anything like romance on record, and the narrative of his life may be quoted as a curious instance of the interest that will be sometimes awakened by the position and fortunes of an individual however personally insignificant.

EDGE. [ARRIS.]

EDGEHILL. [CHARLES I. OF ENGLAND.]

EDGEWORTH, RICHARD LOVELL, an ingenious mechanical philosopher, but better known as the father and literary associate of Maria Edgeworth, was born at Bath, in 1744. He was descended from an English family, which had settled in Ireland in the reign of queen Elizabeth, and resided at Edgeworth-town, in the county of Longford, where his boyhood was chiefly spent. A hasty marriage, contracted at the age of nineteen, while he was an under-graduate of Corpus College, Oxford, cut short his studies at that university, and led him to return home; but in 1765, intending to be called to the bar, he came to England, and took a house at Hare Hatch, between Maidenhead and Reading. During his visits to London to keep his terms, he became acquainted with Sir Francis Delaval and other gay and sporting men of the day, concerning whom a number of anecdotes are preserved in Mr. Edgeworth's autobiography. In that society he was distinguished by a high flow of spirits, and an uncommon share of that activity and ingenuity which adapts itself to the lighter pursuits of social amusement as readily as to higher and more serious purposes. At home he was chiefly occupied in prosecuting a variety of ingenious mechanical contrivances, among which we may mention the first erection of a telegraph in England, originating in a bet relative to the speedy transmission of racing news from Newmarket to London. During this residence in Berkshire he became acquainted with the eccentric philanthropist Thomas Day, with whom he lived in the closest friendship. His mechanical pursuits introduced him to Dr. Darwin, and subsequently to Watt and Bolton, Wedgwood, and other eminent scientific men. In 1769, by his father's death, he came into possession of a handsome, fortune and gave up the intention of following the law as a profession.

Mr. Edgeworth returned to Ireland in 1782, 'with the firm determination,' he says, 'to dedicate the remainder of his life to the improvement of his estate and the education of his children, and with the sincere hope of contributing to the amelioration of the inhabitants of the country from which he drew his subsistence.' To this resolution, during the remaining thirty-five years of his life, he steadily adhered; devoting his best powers to the useful performance of his duties as a magistrate, a landlord, and a father. He was an active and influential member of the Irish Volunteers, and continued, after their dissolution, and through life, a steady advocate of reform in parliament. He was a member of the last Irish house of commons, and spoke and voted in opposition to the Union. Retaining the ardent spirit of his youth, he engaged in a variety of projects for reclaiming bogs, establishing a system of telegraphic communication, experiments on the construction of carriages, moveable railroads, &c. In the cultivation of his estate and in the management of his tenantry he was skilful, prudent, and humane and in his 'Memoirs' (vol. 2, chap. ii.) may be found an instructive account of the difficulties to be met and the patience requisite in effecting any real improvement in the condition of the Irish peasantry. His judicious and discriminating kindness and his acknowledged impartiality as a magistrate (a rare quality then in Ireland) gained their sincere affection, insomuch that in the insurrection of 1798, though he was absent and assisting with his corps of yeomanry in the defence of Longford, his house at Edgeworth-town was visited by the rebels, and yet was preserved uninjured and untouched. He died June 13, 1817, after an old age of unusual activity and power of enjoyment.

Mr. Edgeworth married four wives, by all of whom he had children. The number of his children, and their unusual difference in age, a difference amounting, between the eldest and youngest, to more than forty years, gave him unusual opportunities of trying experiments in education, and watching their results. His family were brought up almost entirely at home, and with an unusual degree of parental care. The results of his experience were made public in 1798, in 'Practical Education,' a treatise written principally by Miss Edgeworth, but partly by himself; and based on his theory of education, his observation, and the experience of his own house. It attracted much attention, and no doubt had considerable effect, in conjunction with the writings of Hannah More and Mrs. Barbauld, in bringing about that improvement in domestic education which has taken place within the last 40 years. Many persons may dissent from some of its views, or some of its principles; but as a repository of valuable suggestions and ingenious expedients, as to children, their habits, tempers, and ways of influencing them, it will always be worthy the attention of parents.

Mr. Edgeworth said he was not a ready writer; and it may have been partly owing to this that he preferred engaging in a sort of literary partnership with his daughter to embarking alone in any work of length. 'Practical Education' and 'Irish Bulls' were avowedly written by them in common; and Miss E. in her father's 'Memoirs' (vol. ii. chap. xvi.) has recorded in warm terms of filial affection her obligations to him in her other works. It was his habit to revise and correct all her productions carefully, and to sanction their issue to the world by his paternal *imprimatur;* a form which the world thought might as well be omitted. But the sterling merits of Mr. Edgeworth's character were amply sufficient to atone for some egotism and vanity.

The following works are published in his name:—'Rational Primer;' 'Poetry Explained;' 'Readings in Poetry;' 'Professional Education;' 'Letter to Lord Charlemont on the Telegraph;' 'Speeches in Parliament;' 'Essay on the Construction of Roads and Carriages.'

He also published papers in the Philosophical Transactions, Nicholson's Journal, and the Transactions of the Royal Irish Academy on various subjects, as the Telegraph, Resistance of the Air, Aerostation, Railroads, the construction of Carriages, and the description of a handsome spire which he had erected *inside* the steeple of the parish church, and then lifted into its place. (*Memoirs of R. E. Edgeworth*, 1820.)

EDICTS, EDICTA, one of the five sources of Roman law enumerated by Gaius (i. § 2). 'The magistrates of the Roman people have authority to make edicts; but the greatest weight is given to the edicts of the two prætors, the Prætor Urbanus and the Prætor Peregrinus. In the provinces the governors (præsides) have the same authority as the prætors (in the city). The authority of the curule ædiles, as to making edicts, is the same as that of the prætors, and in the provinces their powers are possessed by the quæstors.' (On the Edict. Ædil. see *Dig.* xxi. tit. 1; *Cod.* iv. tit. 58.)

It was the custom of the prætors on their accession to office to publish edicts, which were rules adapted to regulate the practice of their courts, similar to the Orders promulgated by the English chancellors. This power of legislating having been abused, it was enacted by the Cornelian law B.C. 67, that when a prætor, on his accession to office, had published any edict or general rule, he should be bound to keep to it during the whole year of his office. A prætor was not bound by the edicts of his predecessor: if he confirmed them, the edicts were called Vetera et Tralatitia; if he made new edicts, they were called Nova. On an occasion mentioned by Cicero (*De Offic.* iii., 20) the prætors and tribunes of the Plebs united in drawing up an edict relative to the coinage. This instance will serve as an example of the extent to which the prætors under the Republic exercised legislative power. Instead of confining themselves to rules for the regulation of the practice of the courts they gradually assumed the power of repealing written law and making new laws, on the ground of correcting the error of the written laws whenever they seemed inapplicable from generality or other defect. (See the various titles of the *Digest.* lib. xxxvii.) From the decisions of the prætors arose a large body of law, which was known by the name of Jus Honorarium or Prætorium (Papinian. *Dig.* i., tit. 1. 7.), as distinguished from the Jus Civile, and may, to a certain extent, be considered as corresponding to the equity of the English Court of Chancery.

Under the early emperors the magistrates published edicts, but Hadrian commissioned Salvius Julianus (A.D. 132) to make a digest of all the best decisions, which were collected in a small volume called the Edictum Perpetuum, and ratified by a Senatus Consultum. From that time the power of making edicts was taken from the magistrates, and the legislative power was vested in the emperors. (*Cod.* i., tit. 17.) [CONSTITUTIONS, ROMAN.]

EDINBURGH COUNTY, or MID-LOTHIAN, is bounded on the north by the Frith of Forth; on the south by the counties of Selkirk, Peebles, and Lanark; on the east by Haddington, Berwick, and Roxburgh; and on the west by Linlithgow: comprehending an area of 354 square miles, or 226,560 English statute acres. The surface is in general uneven. The most hilly district is the south-eastern part, which is traversed by the Heriot and Galla Waters. In the high ground which divides this district from that traversed by the rivers falling into the Frith of Forth, is the Sayrs Law, 1739 feet above the sea. The western continuation of this high ground forms the boundary between Edinburgh on the north, and Peebles and Lanark on the south, and perhaps attains a general elevation of 800 or 1000 feet above the sea. It is for the most part rather flat, and covered with bogs and mosses; but in some parts there are hills of considerable elevation, as, near the sources of Muirfoot Water, the Coat Law (1680 feet), and the Blackhope Scares (1850 feet). Between the origin of the North Esk and the Leith Water are several high hills, as the Cairn Hill (1800 feet), and others which belong to the Pentland Hills. Farther west only isolated hills occur, the highest of which, Leven's Seat, at the western extremity of the county, is about 1200 feet above the sea.

Of the country extending between this high ground and the Frith of Forth, only the middle district between the North Esk and Leith Water is very hilly. Here are the Pentland Hills, the highest summits of which are from 1800 to 1900 feet above the sea, but their mean elevation probably does not exceed 1000 or 1200 feet. They terminate to the south of Libberton and to the west of Laswade. The country on both sides of this district is less hilly; the heights neither attain such an elevation, as in the part just described, nor do they terminate with steep declivities, except along the banks of some of the rivers. A line drawn from Dalkeith through Libberton, Collington, and Currie to Rath marks the northern boundary of the more hilly part of the country. North of this line the country presents an undulating surface, on which a few hills rise to a moderate elevation. Such is Arthur's Seat, near Edinburgh, 822 feet above the sea, and farther west the Corstorphine Hills, which extend two miles in length and rise to 470 feet. The principal rivers are the Galla Water, which falls into the Tweed; and the South and North Esk, which unite below Dalkeith; the Water of Leith; and the Almond Water, which separates this county from that of Linlithgow. These rivers fall into the Frith of Forth.

It is said that at Dalkeith, on an average of eight years, the annual fall of rain was $22\frac{8}{10}$ inches. Dr. Brewster states the mean annual temperature at Leith to be 48° 36′. At Edinburgh, which is elevated from 300 to 400 feet above the level of the sea, and situated about two miles from it, the mean annual temperature is 47° 8′. This may be taken as a near approximation to that of the more inland parts of the south of Scotland.

Part of an important mineral district, the great coal-field of Scotland, is within this county. The county also contains considerable beds of limestone and freestone. The former are principally about Dalkeith. The principal freestone quarries are at Craigleith, Hales, and Redkall. Clay soil predominates in the county, and there are few parts remarkable for natural fertility. Two-thirds of the land, however, is now under cultivation, of which from 15,000 to 18,000 acres are employed to raise wheat. There is a considerable number of large estates in the county, but on the whole property is much divided.

The county is in various ways affected by the circumstance of its containing within it the capital of the kingdom. This circumstance evidently modifies the productions and uses of the soil. To this also we owe the excellent state of the public roads in the county, the railways, and the Union canal, though this last has hitherto proved a most unprofitable speculation to the proprietors.

The population of the county has stood as follows:—

Year.	Persons.	Families.
1755	90,412	
1801	122,954	
1811	148,607	
1821	191,514	
1831	219,345	47,415

Mid-Lothian returns four members to parliament—one for the county of Edinburgh, two for the city, and one for the burghs of Leith, Musselburgh, &c.

EDINBURGH CITY, the chief town of Edinburghshire, or Mid-Lothian, and the capital of Scotland, is situated in 55° 57′ 20″ N. lat., and 3° 10′ 30″ W. long., about 392 miles north from London. It stands upon a group of hills separated by deep depressions, and is at once the site and the scene of views of great beauty and grandeur. On the highest of the hills the Old Town is built; the summit of the hill forms a street upwards of a mile long, ascending in nearly a straight line from the palace of Holyrood on the east, about 120 feet above the level of the sea to the Castle, which is elevated upwards of 380 feet above the same level, and is accessible only on the eastern side, all the others being nearly perpendicular. The view from this height is singularly varied and grand; the spectator is in the midst of an amphitheatre of hills. On the east are the Calton Hill, Salisbury Craigs, and Arthur's Seat, rising 822 feet above the level of the sea; and on the west are the Pentland range, and the woody eminence of Corstorphine. Below, on the north, are the noble mansions of the New Town, the Frith of Forth, with its ports and shipping, and the counties on the opposite coasts to the Highland hills; a landscape forming a beautiful contrast with the rich open country which spreads before us on the south to the hills of Berwickshire and the borders, till at length the eye rests upon the Braid Hills.

Edinburgh is supposed to have derived its name from Edwin, a king of Northumberland in the time of the Heptarchy. Simeon of Durham mentions the town of *Edwinesburch* as existing in the middle of the eighth century; and in the charter of foundation of the abbey of Holyrood, in the year 1128, King David I. calls it *his burgh of Edwinesburg*, whence we infer it was then a royal burgh. The historians of Edinburgh say that the first parliament held in the city was on the accession of King Alexander II.; but upwards of half a century previous, we find a 'concordia,' or agreement, entered into between the bishop of St. Andrews and the abbot of Dunfermline, *apud Castellum Puellarum* (a name long bestowed on Edinburgh Castle), in presence of the king, Prince Henry his son, and their barons (Connell *On Tithes*, App. No. 1), which we apprehend was no other than an assembly of the great council of the nation. The castle was then perhaps the chief building and place of concourse in the city; and in the reign of King Malcolm IV., Geoffrey de Maleville, of Maleville Castle, in the shire of Edinburgh, was *vicecomes de Castrum Puellarum*, meaning thereby, no doubt, sheriff of the shire, in like manner as Macbeth, the earliest sheriff in the shire of Perth, was styled sheriff of Scone. The abbey of Holyrood, however, was growing into importance. In 1177 a national council was held there on the arrival of the legate Vivian, to determine the dispute between the English and Scottish clergy; and it is not unlikely that its neighbourhood early became a royal residence.

The city appears to have remained open and defenceless till about the middle of the fifteenth century, when, on the representations of the provost and community, King James II. granted the citizens 'full license and leiff to fosse, bulwark, wall, tour, turate, and other ways to strength the burgh, in quhat maner of wise or degree that beis sene maist spedeful to thaim.' The same king soon afterwards granted a charter to the city confirming to it the privilege of holding therein the antient and important court of Four Boroughs, 'sicut à temporibus retroactis tenebatur.' His successor, grateful for the interest which the citizens had shown in his behalf when he was at variance with his nobles, erected the city into a sheriffdom within itself, and presented to the incorporated trades a banner or standard, which has since been known by the name of the Blue Blankot, and is still preserved. King James IV. patronized the erection of its first printing-press; and in the succeeding reign it became the undisputed capital of the kingdom; the seat of the royal palace, of the parliament, and of the superior courts of justice.

The accession of King James VI. to the throne of England put a temporary stop to the progress of the town; but at the Union the spirit of improvement revived, and has continued to our own day.

Edinburgh is divided into three principal parts: the Old Town, the South Side, or Southern Districts, and the New Town; each of which has its own peculiar features and character. The Old Town is intersected by the street previously mentioned: on each side descend in regular lines a multitude of narrow wynds, closes, and styles, which on the south lead for the most part into the Cowgate, a confined street running along the southern base of the hill, and one of the earliest additions to the town after the erection of the city-wall in the middle of the fifteenth century. Over this street the South Bridge, and more lately King George the Fourth's Bridge, are thrown, to connect the Old Town with the South Side or Southern Districts. These districts mostly stand upon a rising ground, which is here closely adjacent to the Old Town ridge, but neither so elevated, so limited in extent, nor so steep in its descent, as that hill. From its western side, however, there runs a hill of a different character, and thence called the High Riggs. It is separated from the Castle-hill by a spacious street called the Grass Market, and on it are built Heriot's Hospital and the neighbouring suburb of Portsburgh. On a line with the South Bridge is the North Bridge, thrown from the summit of the Old Town ridge, at the middle of the High-street, to the rising ground which forms the site of the New Town. This ground partakes much of the character of the Old Town ridge, and terminates like it in a bold rock, namely the Calton Hill; but the aspect of the houses is wholly different: for having been erected according to regular plans conceived in a spirit of improvement, the greatest regularity and beauty characterize its buildings, streets, and squares. From the earth and rubbish thrown from the foundation of the New Town buildings, the Earthen Mound was formed as a communication across the morass which lies between the Old and New Town.

Among the chief buildings of the city is the Castle, which is the most antient part of the city, and must have been of considerable importance in former times. It is now, however, a place of little strength, and derives its interest chiefly from the associations connected with it and its own formidable appearance. At no great distance from the Castle stands the Parliament House, with the courts of justice. In the first of these the parliament of Scotland met between the time of its erection in 1640 and the Union. The hall now forms the Outer House of the Court of Session, and in its immediate neighbourhood are rooms appropriated to the Inner House and to the courts of Justiciary and Exchequer. The valuable library of the faculty of advocates occupied till lately the ground-floor of the Parliament House. A considerable part still remains there; but adjacent buildings have been erected not only for it, but also for the library of the writers to the signet. The courts of the sheriff and justices of the peace are held in the county hall, an elegant building of recent erection, close by the range of building which contains the library of the writers to the signet. The antient Gothic fabric, formerly the cathedral of St. Giles, is also in this neighbourhood; from between the arches which constitute the imperial crown that rests upon its lofty tower, there is an interesting view of the city and surrounding country. On the opposite side of the street is the Royal Exchange, with the common council-room and other offices of the magistracy: and in the centre of the street, a little way down, is a radiated causeway to mark the site of the old market cross, where proclamations used to be made and offenders punished. At the foot of the High Street stands one of the oldest stone houses in Edinburgh, the house of the great Scottish reformer, John Knox; and on the front wall, to the west, is a figure in alto rilievo pointing to a radiated stone, whereon is sculptured the name of the Deity in Greek, Latin, and English. Below this is the Canongate, at the foot of which are the palace and abbey of Holyrood, whose extensive precincts constitute a sanctuary for insolvent debtors. On the summit of the Calton Hill, which rises in the immediate neighbourhood, and commands a delightful prospect of the Forth and surrounding scenery, some columns of the National Monument have been erected, and stand in solitary grandeur. Near them are the observatory and the monuments to Dugald Stewart and Playfair. On the low ground, towards the west, are the bridewell and gaol; and in the same line, at a point nearly equidistant from the palace and castle, stands the Register House, where the public records of the kingdom are preserved, and what is almost peculiar to this part of the empire, the register of all deeds conveying or charging territorial property.

The city churches are properly 13 in number, among which the most deserving of notice are St. Giles's, St. George's, St. Andrew's, St. Stephen's, and St. Mary's; but to these are to be added St. Cuthbert's or West Kirk, the Canongate Church, and various chapels belonging to the establishment. The elegant Gothic edifices, St. Paul's, St. Giles's, and St. George's chapels, belonging to the episcopal communion, are also deserving of attention, and the Roman

Catholic chapel at the head of Leith Walk. The Roman Catholics have another chapel in the town, and at the head of Bruntisfield Links, a convent of nuns, attached to which is an establishment at Milton House, in the Canongate.

Edinburgh has some noble hospitals and charitable institutions. Among these are the Royal Infirmary, erected on a rising ground in the neighbourhood of the college; Heriot's Hospital, already mentioned; Watson's Hospitals, Merchant-Maiden and Trades'-Maiden Hospitals, Orphan Hospital, and Gillespie's Hospital; Institution for the Deaf and Dumb, Asylum for the Blind, Magdalen Asylum, and Lunatic Asylum. Most of the banking-houses of Edinburgh are large edifices: such, in particular, are the Bank of Scotland, the Royal Bank, and the Commercial Bank.

The public amusements of Edinburgh are limited, and do not, generally speaking, succeed. The habits of the people are domestic; and the professional and literary, not less than the religious character which prevails, does not accord with the occupations of the theatre and assembly-rooms. Printing, shawl-making, and coach-building, are carried on with much success; but the manufactures of Edinburgh are of no great importance. The city however is well situated both for water and fuel, which might be made available for manufactures. They have been of essential consequence to the comfort of the inhabitants; and notwithstanding the variable climate, there are few, if any, diseases to which the residents of Edinburgh can be said to be peculiarly liable. The situation of the place is favourable to health and energy, and the mortality, it is believed, is small in proportion to the population. The city returns two members to parliament.

Until a comparatively recent period, Edinburgh was a place of very limited extent. The contiguous country, which has now been made to form a part of the capital, comprehends various places antiently subject to different jurisdictions, and which have as yet continued municipally disunited, except for the purpose of returning members to parliament under the recent Reform Act. Besides various districts subject only to the jurisdiction of the county sheriff, the boundaries fixed by the Reform Act include within their limits—

1. The Royalty of Edinburgh. 2. The Burgh of Regality of Canongate. 3. The Burgh of Barony of Portsburgh, Easter and Wester. 4. Calton.

The existence of Edinburgh as a king's burgh may be traced to the reign of David I., and before the middle of the twelfth century. At a very early period it was one of those burghs royal whose magistrates constituted the Court of Four Burghs; and by a charter dated in 1452 king James II. conferred on it the privilege of being exclusively the seat of that court: the other three burghs were Stirling, Linlithgow, and Lanark. In 1482 the valuable right of sheriffship within the bounds of the burgh was given by James III., and this jurisdiction was confirmed by succeeding monarchs. A general charter of confirmation was granted to Edinburgh by James VI. in 1603; and another charter, known under the name of Novo Damus, was the gift of Charles I. in 1636. These charters specify Leith and Newhaven as belonging to the burgh, and detail the markets, tolls, and customs, which constitute 'a part of the common good,' for the protection of which a comprehensive jurisdiction is conferred. Other grants and charters were afterwards obtained at different times from the crown, prior to the Union in 1707; but not any of these created any substantial change in the political or municipal constitution of the burgh. Since the Union, and more particularly within the last fifty years, various acts of parliament have been passed for extending the bounds of the royalty, and for purposes of police. By a charter of George III. in 1794, the provost, who by previous charters was sheriff and coroner, was constituted lord-lieutenant of the county of the city.

Previous to the late Scotch Burgh Reform Act, Edinburgh was governed by a close corporation, the members of which constantly re-elected each other; but by that act (3 and 4 Will. IV., c. 76), the right of election to corporate offices was declared to be in all those persons who are entitled to vote for members of parliament.

The government of the city of Edinburgh is vested in the magistracy and town council. The magistracy consists of a lord provost, a dean of guild, a treasurer, and four baillies, each of whom is *ex officio* a member of the council. The council consists of seventeen merchants, six deacons, and two trades' councillors, in all twenty-five; the six deacons are selected from among fourteen who are elected by the citizens; the remaining eight, who are called extra deacons, are not called councillors, but have a vote in the council in all cases where the money in question exceeds 1*l.* 13*s.* 4*d.* (20*l.* Scots). For the purposes of the election the city is divided into wards or districts. One-third part of the councillors go out of office every year, but are eligible for re-election. The provost, baillies, treasurer, and other office-bearers, are elected by the councillors. The provost's term of office is three years, and he is eligible for immediate re-election. The other office-bearers go out at the expiration of one year, and cannot be re-elected until each shall have been out of his particular office one year; but this does not prevent their being kept in the council from year to year by their being elected to fill the different offices in succession.

None but burgesses or freemen of the burgh are entitled to carry on trade or manufactures within the bounds. There are eight incorporated crafts within the burgh, all enjoying exclusive privileges and possessed of funds which are appropriated to the support of decayed members or the widows of such as are deceased. These crafts are hammermen, tailors, wrights, bakers, shoemakers, weavers, fleshers, and barbers: the number of burgesses has not been ascertained, but is estimated to amount to about 400. The magistrates grant temporary licenses to trade to persons not freemen, and charge for such licenses from 5*s.* to 10*s.* per annum.

From an early period the property of the burgh has been administered very improvidently. In 1658 the debt of the city was stated to amount to 54,761*l.* sterling, and in 1692 had increased to 64,250*l.* In 1819, when the affairs of Edinburgh were examined by a Committee of the House of Commons, the actual debts of the city were stated to amount to 497,101*l.* including 264,258*l.* incurred on account of the Leith docks; and in 1833 a statement was drawn up under the authority of the magistrates and council which gave the amount of ordinary debts and obligations of the city at 425,194*l.*, in which amount the engagements on account of the Leith docks are not included. The revenue of the city, as stated under the same authority, amounted then to 27,524*l.*, and its annua current expenditure to upwards of 33,000*l.* Under these circumstances, the city was declared insolvent, and an act was passed in August, 1833, conveying its whole properties and revenues to trustees for the general benefit, whereby they were preserved from the legal attacks of individual creditors. Some circumstances connected with the accounts of the city have been published, which have subjected the members of its government to much censure. Among these circumstances, it may be stated that the late Dr. Bell having bequeathed a considerable fund for the purposes of education, a sum of 10,000*l.* 3 per cent. stock was placed in the hands of the magistrates and council in trust to apply the dividends to the support of a school or schools in Edinburgh on the principles of the Madras system. Being pressed by a clamorous creditor for the payment of his claim, this stock was sold, and the greater part of the proceeds appropriated 'to prevent a blow-up in the city's affairs, and to enable them to continue the existing system a little longer.'

The population of the city of Edinburgh and the suburbs, which together constitute the capital, were at each census of the present century as follows:—

	1801.	1811.	1821	1831.
Parishes in the city	20,658	22,578	29,850	40,315
" the suburbs, including Canongate and St. Cuthbert's	45,886	59,206	82,385	95,379
" North and South Leith	15,272	20,363	26,000	25,865
	81,816	102,147	138,235	161,909
The population of the Shire of Edinburgh at these four periods, including the capital, was	122,954	148,607	191,514	219,345

The further particulars obtained at the census of 1831 exhibit the following results:—

	Edinburgh city.	Remainder of county.	Total.
Houses inhabited	10,179	9,565	19,744
" building	95	55	150
" uninhabited	582	527	1,109
Families	35,116	12,299	47,415
" employed chiefly in agriculture	563	3,076	3,639
" " in trade, manufactures, &c.	17,190	3,864	21,054
" all not comprised in the two preceding classes	17,363	5,359	22,722
Males	72,299	27,504	99,803
Females	89,610	29,932	119,542
Males 20 years of age and upwards	36,667	13,415	50,082
Female servants	12,429	3,045	15,474

Edinburgh contains the supreme courts of justice for

Scotland, and is the residence of the principal practitioners of the legal profession; it is also the chief school of medicine and other sciences in Scotland. In the strict sense of the word, only a small part of the population, as already observed, can be said to be engaged in manufactures; the number of males 20 years of age stated to be so engaged in 1831 was 792; a great part of these were employed in making shawls, and the rest in weaving hair-cloth and silk, net-weaving, lace-making, and other small wares. The trade of Edinburgh is carried on through its port, Leith, under which head it will be described. [LEITH.] The amount of postage collected in Edinburgh during the last five years was as follows:—

1832 . .	£42,759
1833 . .	41,864
1834 . .	41,680
1835 . .	41,959
1836 . .	43,520

The University of Edinburgh consists of the College of King James, founded by James VI. of Scotland, by a charter dated 24th April, 1582. By this charter, which still forms the only constitution of the university, the provost, bailies, and town councillors of Edinburgh, and their successors in office, were invested with the sole power both of electing the professors and of dismissing them. In virtue of this authorization, indeed, the town council, or corporation of the burgh, has ever since assumed nearly the entire direction and control of the university—electing the professors, founding new chairs, managing the funds, and even regulating the class fees and the discipline of the institution. The Senatus Academicus, or body of professors, if such a body has any legal existence (for no senate or other academical court or council is constituted by the charter), is understood not to have the right of interfering in any of these matters, although it may sometimes have passed regulations of discipline which the town council has not thought proper to disturb. Indeed the supremacy of the town council, even in regard to making regulations as to the course of study for degrees, when it was a few years ago resisted by the professors, was affirmed in the most ample terms by a judgment of the Court of Session. Some years ago the clergy of the city put forward their claim to a voice in the election of professors, on the ground of a direction in the charter that the right of appointment given to the town council should be exercised *cum avisamento ministrorum*. The claim was keenly agitated in pamphlets and in the church courts, and some steps were taken to enforce it; but on application being made to the Court of Session in the case of a particular election, the court refused to grant an interdict, and the question was dropped. The only interference with their sole right of control that has been submitted to by the town council are the following. In modern times, about eight or nine new professorships have been founded by the crown, of which it has retained the patronage; but against the exercise of this power a protest is regularly taken by the town council that it shall not hurt or prejudge their rights. In the case of a few other chairs there has always been an interference with the nomination of the professor on the part of certain public bodies. For the most part this has been grounded on the contribution by the said bodies of part of the professor's salary; but in one instance at least no such reason for the practice can, we believe, be alleged, in that, namely, of the professorship of Humanity, or Latin, which is besides one of the oldest chairs. The professor of Humanity is thus elected according to the late Report of the Commissioners appointed by the crown for inquiring into the state of the Universities and Colleges of Scotland: 'The Lords of Session name two delegates, the town council name one, the Faculty of Advocates one, and the Society of Writers to the Signet one. They meet together and appoint the professor. They then lay their minute of election before the town council, who issue a commission, in their own name, proceeding on the narrative of the election of the delegates, and binding the professor to obey laws and regulations, the same as if he were appointed solely by themselves,' (p. 117). Many visitations of the university have also taken place under the authority of the crown, of parliament, and even of the general assembly; but what legal force may belong to any regulations that may have been laid down by the visitors does not clearly appear. In this non-recognition of any authority, or at least of any independent and supreme authority, as belonging to either the entire body of the professors and students, or even to the Senatus Academicus, or council of the professors only, the University of Edinburgh differs from all the other Scottish colleges. 'The Senatus Academicus,' says the Report of the Commissioners, 'acknowledge no authority but their own for instituting new faculties, and for fixing the privileges and immunities belonging to them.' But what privileges they can confer, or ever have conferred, is not stated. The Senatus does not appear to have ever been recognised by the town council as anything more than a mere meeting of the professors. Until of late years it is not recollected that there ever had been a vote in it (*Report*, p. 115), and it would still probably be impossible to quote any resolution it has passed which has been operative in any quarter except where it was voluntarily acquiesced in.

One of the consequences of this non-incorporation of the university in any form has been, that it is without certain public officers which are found in all the other universities. There is no mention in the charter of a Chancellor; and although in early times the name was occasionally taken by the provost of the city, this must be regarded as having been quite an unauthorized assumption, and the office does not now exist at all, and has not existed for a long period. The case with regard to the office of Rector is nearly the same. 'This important office,' say the Commissioners, 'has been much less efficient in Edinburgh than in the other universities. * * * The existence of the office itself has often been, apparently at least, suspended.' They afterwards state that it was held by several persons, though with frequent intervals, during the greater part of a century from the foundation of the university; but from the beginning of the eighteenth century, they conclude, 'till within these few years the office was never heard of in the university, much less known as an office attended with the performance of any duties. It is accordingly explicitly asserted, that no chancellor or vice-chancellor, rector, or dean of faculty, exercises any authority or jurisdiction over the principal, professors, or students in the University of Edinburgh.'—(pp. 114, 115.)

The charter of king James in fact merely gave power to the town council to build houses for professors of certain departments of science and learning, and to engage persons to act as such. Proceeding upon this authority, the provost and magistrates of Edinburgh on the 14th September, 1583, entered into a contract with Mr. Robert Pollock, one of the professors or regents of the university of St. Andrews, to exercise the same office of regent in the new seminary. He was engaged at first only for a year, and at a salary of no more than 40*l.* Scots, that is, between 3*l.* and 4*l.* sterling, in addition to the fees to be paid by the students. In 1584 the king executed a new deed in relation to the university, conferring certain property for its support on the magistrates and council. The following year the council constituted Pollock Principal master of the college. At this time, or soon after, there are said to have been four other regents engaged in teaching. A second charter, ratifying what had been already done, was granted by the king in 1612; and in 1621 an act of the Scottish parliament was passed, confirming certain grants of property which had been made to the town of Edinburgh for the support of the institution. The preamble states, that the college, which is described as 'for profession of Theology, Philosophy, and Humanity,' had greatly flourished during the thirty-five years it had been in existence. It was by this charter that the name of King James's College was conferred upon it.

The system of teaching originally pursued was the same as at the other Scotch universities. The Principal was regarded as Professor of Divinity, and his prelections were confined to that department. But each of the other four regents carried his students, during the four years they remained under his care, over the entire curriculum of literature and philosophy. In 1620 a second Professor of Theology was appointed, and then the Principal ceased to teach that science, though down to the year 1765 he used to deliver one discourse in each session. Since the cessation of this practice, in the time of Dr. Robertson the historian, the office has been a mere sinecure. A commission of visitation, appointed by parliament in 1690, directed that each professor should for the future be confined to one particular department; but this important alteration was not carried into effect till about the year 1708. The old practice was continued in Mareschal College, Aberdeen, down to the year 1753, and in King's College until 1800.

Minute details on the subject of the property belonging to the university are given in the Report of the Commissioners, pp. 103-113. It is derived from a variety of sources, but is altogether of inconsiderable amount. The management of it is wholly in the hands of the town-council, which is in the habit of supplying the difference betwixt the income and expenditure of the college from the funds of the city. In 1825 the total college revenue amounted only to 888*l*., while the expenditure was 2223*l*. And in addition to the last-mentioned sum, there were paid to different professors by royal grants the sum of 1435*l*.; by royal grant for the support of the museum 100*l*.; to the Professor of Agriculture 50*l*., from funds provided by the late Sir William Pulteney, the founder of the chair; and to the professor of Conveyancing 120*l*., from the Society of Writers to the Signet. From the year 1776, also, to the year 1828 inclusive, it appears that 819*l*. had been granted by the crown for defraying the expenses of the Botanical Garden.

A bequest which is described as of large amount has been left to the administration of the Principal and professors by the will of the late General Reid, dated in 1806, for founding a professorship of music, and making additions to the library, or otherwise promoting the general interest and advantage of the university; but we are not aware that it has yet become available, the income arising from the funds having been left to the testator's daughter during her life. A valuable collection of pictures and marbles was bequeathed for the use of the university by the late Sir James Erskine, of Torry, bart.

The bursaries or exhibitions attached to the university are eighty in number, of which three are of the annual value of 100*l*. each; six of 30*l*.; ten of 20*l*.; five between 20*l*. and 15*l*.; eleven between 15*l*. and 10*l*.; forty-two between 10*l*. and 5*l*.; and three under 5*l*.

The foundation of a university library was laid about the time that the seminary was opened, by the transference to it by the town-council of a library of about 300 volumes, chiefly theological, which had been bequeathed in 1580 'to Edinburgh and the kirk of God' by one of the citizens, Mr. Clement Little, commissary. The collection was augmented in early times by various donations, among which was one of his whole library, consisting of about 500 volumes, by the poet Drummond of Hawthornden. No catalogue of the university library has ever been printed, although one has been lately completed in manuscript. The entire number of volumes is now not much under 100,000. The annual pecuniary income of the library is stated, in the Report of the Commissioners, at about 1150*l*., derived chiefly from fees paid on matriculation and graduation. Besides the public library, there is a theological library for the use of the students of theology, founded by Dr. George Campbell, professor of theology, about the end of the seventeenth century. It now consists of above 5000 volumes. An observatory, a museum of natural history, an anatomical museum, and a botanical garden also belong to the university.

The buildings of the university consist of a single quadrangle, which is not yet entirely completed, on a scale reduced from the original design by the late Mr. Robert Adam, although it was begun so long ago as in the year 1789. The funds were at first contributed by subscription, but at length an annual grant of 10,000*l*. was obtained from parliament. The fabric, upon which a very large amount in all has been expended, is one of considerable magnificence. It was originally designed to contain houses for the professors, as well as the library, museums, and class-rooms; but only one official house has been built, which is occupied by the principal librarian.

The progressive increase of the establishment of the university and the particulars of its present state will be most conveniently exhibited in the following table, compiled from the Report of the late commission.

Offices.	Dates of Foundation.	Patrons.	Salaries.			Class Fees.			No. of Students.
			£.	*s.*	*d.*	£.	*s.*	*d.*	
Principal	1585	Town Council	151	2	2	None		.	None.
Professor of Humanity	1597	Town Council, &c. (see ante)	87	4	4	1319	17	0	419
,, Divinity	1620	Town Council	196	2	2	400	0	0?	200
,, Oriental Languages	1642	Ditto	115	0	0	142	16	0	68
,, Mathematics	1674	Ditto	148	6	8	618	9	0	166
,, Botany	1676	Town Council and Crown	127	15	6	898	16	0	214
,, Theory of Physic	1685	Town Council	None		.	882	0	0	210
,, Practice of Physic	1685	Ditto	None		.	1008	0	0	240
,, Ecclesiastical History	1695	Crown	200	0	0	260	0	0?	129
,, Anatomy and Surgery	1705	Town Council	50	0	0	969	3	0	257
,, Public Law	1707	Crown	485	0	0	None		.	None.
,, Greek	1708	Town Council	87	4	4	1171	16	0	372
,, Natural Philosophy	1708	Ditto	52	4	4	638	8	0	152
,, Moral Philosophy	1708	Ditto	102	4	4	556	10	0	150
,, Logic	1708	Ditto	52	4	4	551	5	0	175
,, Civil Law	1710	Ditto and Faculty of Advocates	100	0	0	151	4	0	36
,, Chemistry	1713	Town Council	None		.	2213	8	0	527
,, Universal History	1719	Ditto and Faculty of Advocates	100	0	0	105	0	0	25
,, Scotch Law	1722	Ditto	100	0	0	953	8	0	227
,, Midwifery	1726	Town Council	None		.	596	8	0	142
,, Clinical Medicine	1741?		None		.	801	3	0	197
,, Rhetoric	1762	Crown	100	0	0	134	8	0	32
,, Natural History	1767	Ditto	100	0	0	714	0	0	170
,, Materia Medica	1768	Town Council	None		.	1281	0	0	305
,, Practical Astronomy	1786	Crown	120	0	0	None		.	None.
,, Agriculture	1790	Town Council, University, and Judges of Courts of Session and Exchequer	50	0	0	63	0	0	30
,, Clinical Surgery	1803	Crown	100	0	0	611	2	0	194
,, Military Surgery	1806	Ditto	100	0	0	75	12	0	36
. Medical Jurisprudence and Police	1807	Ditto	100	0	0	18	18	0	6
,, Conveyancing	1825	Town Council, Writers to Signet, and Deputy Keeper of Signet	120	0	0	462	6	0	110
,, General Pathology	1831	Town Council	Unknown.			Unknown.			Unknown.

A few observations, however, must be added in explanation of some parts of this statement.

The professorships are considered as divided into the four faculties, or classes, of arts, law, medicine, and theology; 'although,' according to the Report, 'as to some of them it has not yet been decided to which class they should be assigned.' The professorships of Universal History and of Agriculture are particularly mentioned as in this predicament. None of these faculties, it is added, 'can be traced to any deed, act, regulation, or constitution of a faculty.'

The Principal is considered as *ex-officio* convener of the faculty of theology. The others have each a dean or convener chosen by the faculty.

There is considerable discordance among the statements given in different parts of the Report as to the dates at which the chairs were founded. The four professorships set down as being founded in 1708 were evidently the four regentships, which, along with the principalship, constituted the original establishment of the college, but the holders of which, as already mentioned, were not confined to the teaching each of a particular department till the date here given. The writer of the Report (p. 117) perplexes himself unnecessarily by overlooking this fact. A professorship of Law, it is said in one place (p. 117) was appointed so early as 1588. The present law-school of Edinburgh, however, must be considered as not older than the commencement of the last century, and the medical school as dating from the close of the century preceding. It was not, indeed, till a considerably later period that the latter began to acquire celebrity.

In the few cases in which the right of appointing the professors is shared by the town council with other parties, the mode of the interference of the latter is not uniform. The professors of Scotch Law, of Civil Law, and of Civil History are elected by the council from a leet (as it is called) of two names in each case, submitted by the Faculty of Advocates; a form which, in effect, gives the appointment to the latter body. In the appointments to the chairs of Humanity, Agriculture, and Conveyancing, delegates from the different bodies meet and vote. The professor of Botany holds two commissions, one from the crown as Regius Professor of Botany and Keeper of the Garden, and another from the town-council, as Professor of Medicine and Botany. The class of Clinical Medicine is taught in rotation by certain of the medical professors, according to an arrangement among themselves.

The sums mentioned in the column of salaries include the grants from the crown and the allowances made to some of the professors for house-rent, as well as what are properly called their salaries. The salary and class fees added together give the entire average emoluments of the professorship. The calculations however are, for the most part, made on returns for the five years preceding 1826, and might possibly require to be considerably modified in order to be applicable to the present time. The professors of Divinity and Ecclesiastical History received no fees at the date of the Commissioners' Report; but they are now, we believe, paid two guineas by each student, which would give them about the sums assigned to them in the table. The salary of the professor of Public Law, who teaches no class, is in part made up of a pension of 200*l.* a year from the crown, which the present professor holds so long as he retains the office. The fees at the different classes vary from two to four guineas. The total number of students was, in 1811, 1644; in 1821, 2224; and in 1825, 2236.

For 50 years preceding 1826 the total number of graduates in arts was only 168. During the same period 100 degrees of D.D. were conferred; and 56 of LL.D. The number of medical degrees was 18 in 1776; 32 in 1786; 31 in 1796; 37 in 1806; 76 in 1816; and 118 in 1826. Yet it is stated that the number of medical students was 764 in 1806, and only 896 in 1826.

There is only one regular university session, or term, in the year, beginning on the last Wednesday of October, and ending the last day of April. Some of the classes, however, are not taught for the whole of this time. Of late years a few of the classes, principally of the medical faculty, have also been taught during a summer session, beginning with the 1st of May, and ending with the 31st of July. Each class meets only for an hour at a time; but some of them meet twice in the day; and some of the professors have two or three classes.

No academical dress is worn by the students; no attendance upon divine service is enforced; and scarcely any discipline can be said to be exercised beyond the walls of the class-room. The students are examined in several of the classes; but there is no public examination of any kind in the university.

Schools.—The oldest of the Edinburgh schools is the High School, originally instituted in 1519, and re-erected, upon having fallen into decay, in 1577; it now consists of a rector and four other Greek and Latin masters, a teacher of writing, a teacher of arithmetic and mathematics, and a teacher of French. The Edinburgh Academy, also principally for instruction in the classics, was founded in 1824, and consists of a rector and four other classical masters, with teachers of English, French, mathematics, and writing. Among the other educational establishments are the Hill-street Institution, opened in 1832, and furnished with teachers of the classics, English, elocution, writing, geography, history, natural history, mathematics, arithmetic, French, German, Italian, and drawing; the Circus Place school, having a rector and five other masters; the Southern Academy, instituted in 1829; the Ladies' Institution for the Southern districts, founded in 1833; the Scottish Institution for the Education of Ladies, founded in 1834; the School of Arts or Mechanics' Institute; Dr. Bell's School, attended by about 400 children; the schools of the Lancasterian School Society, in which there are about 600 boys and girls; and the well-known school, called the Sessional School, so ably conducted by Sheriff Wood.

EDINGTONITE, a rare crystalline mineral, which occurs in the cavities of Thomsonite, near Dumbarton; the crystals are small and distinct, greyish white, translucent, and have a square prism as their primary form. Cleavage parallel to the lateral planes; fracture uneven; hardness 4·0,4·5; sp. gr. 2·7; lustre vitreous. According to Turner, it contains silica 35·09; alumina 27·69; lime 12·68; water 13·32; and probably 10 to 11 per cent. of some alkali.

EDMUND I., king of the Anglo-Saxons, was the son of King Edward the Elder, by his third wife Edgiva. He appears to have been born in 923, or about two years before his father's death. He succeeded his half-brother Athelstane, 27th October, 941. Immediately after his accession the Danish people of Northumbria rose in revolt under the same Anlaf (as the name is commonly given, but it should probably be Aulaf) or Olave, who had been defeated by Athelstane some years before in the great battle of Brunanburgh, and forced to flee to Ireland After the war had lasted about a year, an accommodation was brought about by the Archbishops Odo and Wolstan, by which it was arranged that all the territory to the north of Watling-street should be given up to Olave. These terms prove that Edmund had by no means the best of the contest. Fortunately for him, however, the Danish earl died the next year; and Edmund, by a prompt and vigorous use of the opportunity, was successful in recovering all that he had lost. In 945 he also succeeded in reducing the hitherto independent state of Cumbria (including the modern Cumberland and Westmoreland), which, after cruelly putting out the eyes of the two sons of the king, Dunmail, he made over to Malcolm I. of Scotland, to be held by him as the vassal of the English crown. The reign of Edmund, who was distinguished not only for his personal courage, but by his taste for elegance and splendour, on which account he received the surname of the Magnificent, was terminated 26th May, 946, by a death-blow which he received from an outlaw of the name of Liof, who had the audacity to present himself at the royal table, as the king was celebrating the feast of St. Augustine at Pucklekirk, in Gloucestershire: Edmund, on his refusal to leave the room, rose himself to assist in expelling him, when the ruffian, with a dagger which he had concealed under his clothes, stabbed him to the heart. King Edmund I. left, by his wife Elfgiva, two sons, Edwy and Edgar, who eventually both sat on the throne; but as they were mere children at the time of their father's decease, they were set aside for the present, and his immediate successor was his brother Edred.

EDMUND II., king of the Anglo-Saxons, surnamed Ironside, either from his great strength, or the armour which he wore, was the son of king Ethelred II., and was born A. D. 989. According to the account that has commonly been received, his mother was Elgiva, or Ethelgiva, the daughter of earl Thored, or Toreth, who was Ethelred's first wife. Other authorities, however, assert that the mother of Edmund, and also of several of his brothers, was a foreign lady, who was only Ethelred's concubine. On the whole, the point of his legitimacy must be considered doubtful. Among modern historians, Lingard has set him down as the eldest son of Etheldred by his first wife, without intimating that any other account has been given; Turner describes him in one place as illegitimately born, in another, as the son of Ethelred by an earl's daughter whom he had married. (*Hist. Ang. Sax.*, ii., 314 and 323, 3rd edit.)

Edmund appears, in the history of the latter years of his father's calamitous reign, as the chief champion of the English cause against Canute and his Danes, who had, by this time, nearly overrun the kingdom. On the death of Ethelred in 1016, Edmund was proclaimed king by the burgesses of London, and soon after, at least all the kingdom of Wessex, the hereditary dominion of his family, and which was now considered as comprehending the whole territory to the south of the Thames, appears to have submitted to his authority. He had the year before, by a marriage with Elgiva, the widow of Sigeferth, a thane of Danish descent, who had been put to death by Ethelred, made himself master, in defiance of the despised and dying king, of estates of great extent; and the power he thus acquired is supposed to have materially assisted him in securing the throne.

The short reign of Edmund was nearly all spent in a continuation of the sanguinary struggle in which he had already so greatly distinguished himself. His exploits are dwelt upon by the old national chronicles with fond amplification, but it is not very easy to separate what is of historical value in their narratives from the romantic decorations. Immediately on Edmund's accession, the Danish forces appear to have besieged London. The English king remained in the capital till it was considered secure; after which we find him engaging Canute, first at Pen, in Dorsetshire (or, according to another account, near Gillingham, in Somersetshire); and then at a place called Sceorstan, which is supposed to be the spot still marked by a stone at the meeting of the four counties of Oxford, Gloucester, Worcester, and Warwick. In both these fights Edmund appears to have been victorious; that of Sceorstan lasted two days. A third engagement took place at Brentford, the issue of which is disputed. Soon after the two armies met again at Ottenford, or Otford, in Kent, when the Danes were defeated with great slaughter. Finally, however, Edmund sustained a decisive discomfiture at the great battle of 'Assandun,' supposed to be Assington, in Essex. After this, according to one account, which, although it has been generally discredited by modern historians, is not without some features of probability, Canute and Edmund agreed to decide their quarrel by single combat, and the encounter accordingly took place on an islet called Alney, or Olney, in the Severn, which some place near Deerhurst, others near Gloucester, between Overbridge and Maysemore. The result was that Canute was obliged to yield and sue for his life. Whether the single combat took place or not, it is certain that an arrangement between the parties was now made, by which Mercia and Northumbria were made over to Canute; while Edmund was allowed to retain possession of the rest of the kingdom, with the nominal sovereignty of the whole. It is also said to have been stipulated that when either should die the other should be his successor. Edmund died a few weeks after this pacification, having worn the crown only about seven months; and although there is considerable variation and obscurity in the accounts of his death, there are strong reasons for believing that he was made away with by the contrivance of Canute. The northern historians state this in distinct terms. Canute immediately mounted the vacant throne A. D. 1016. Edmund Ironside left by his wife, Algitha, two sons, Edward, called the Outlaw, and another, whom some call Edmund, others Edwin, and of whom it is not known whether he was older or younger than Edward. [See EDGAR ATHELING.]

EDO'LIUS. [LANIADÆ.]

EDOM. [IDUMÆA.]

EDRED, king of the Anglo-Saxons, was the youngest of the sons of Edward the Elder, his mother being Edgiva, the second (or, according to some, the third) wife of that king. [EDWARD THE ELDER.] When the throne became vacant, in 946, by the death of his elder brother, Edmund I., Edred was recognized as his successor, Edwy and Edgar, the two sons of Edmund, being considered to be excluded for the present by their extreme youth. Edred was in a bad state of health when he came to the throne, and he does not seem ever to have recovered. Yet he is recorded to have, soon after his accession, repressed in person an insurrection of the turbulent Danish population of Northumberland; and he appears to have reduced that province to greater quiet and subjection than any of his predecessors. In these military operations, as well as in the management of civil affairs, he was mainly directed by the counsels of his chancellor Turketul, who had served in the same capacity under the two preceding kings, Athelstane and Edmund. Another distinguished character of this reign was the celebrated Dunstan, who owed his first rise at court to the patronage of Turketul, and acquired under Edred that extraordinary power in the state which he preserved during several succeeding reigns. [DUNSTAN.] Edred died, after a reign of between nine and ten years, on the 23rd of November (St. Clement's Day), A. D. 955, and was succeeded by his nephew Edwy, the eldest of the two sons of his predecessor king Edmund.

EDRIOPHTHALMA (Leach), a legion of crustaceous animals with sessile eyes, which are generally compound, but sometimes simple, situated on the sides of the head. The mandibles are often furnished with a palp, and the head is almost always distinct from the body.

Desmarest makes the *Edriophthalma* comprehend the *Amphipoda* of Latreille, which, the former observes, Leach has not admitted, and which includes the two first sections of his legion of *Malacostraca Edriophthalma*, and corresponds to the genus *Gammarus* of Fabricius.

The *Amphipoda* are characterized as having a *head* distinct from the trunk, and formed of a single piece; *mandibles* provided with a palp; jaws to the number of three pairs, the external pair of which represent a lip with two palps or two small feet united near its origin; a *body* laterally compressed, and divided into seven segments; fourteen *feet*, of which the anterior are often terminated by a claw with a single finger; vesiculous *branchiæ* situated at the internal base of the feet, with the exception of that of the anterior pair; *tail* composed of from six to seven articulations, and bearing underneath five pairs of *false feet*, in form of filaments, with two very moveable branches, and thus divided by Desmarest:—

The first section consists of those species whose antennæ are inserted one on each side of the front; whose tail is terminated by styliform filaments; and whose head is large and vertical. Example, *Phronima*, Latr., Leach, Lam., &c. &c. *Cancer*, Herbst, Forsk.

The second (not admitted by Leach) comprises those with four antennæ; two flattened leaflets serving for fins, placed at the end of the tail, in place of the styles; and the head large and vertical. Example, *Hyperia*, Latr.

The third includes those which have four antennæ; the tail terminated by styliform filaments; the head moderately large and not vertical, and contains six divisions, some of which are subdivided. *Talitrus*, Latr.; *Atylus*, Leach; *Dexamine*, Leach; *Melita*, Leach; *Gammarus*, Fabr.; *Podocerus*, Leach; *Corophium*, Latr.; *Cerapus*, Say, may be taken as examples of some of the forms of these divisions and subdivisions.

The other orders arranged by Desmarest under the *Edriophthalma* are the *Læmodipoda*, Latr., and the *Isopoda*, Latr.

Mr. Milne Edwards makes the *Edriophthalmans* consist of the same orders, placing them as a legion of the subclass of *maxillated crustaceans*, next to the legion of *Podophthalmians*.

EDRISI, with his complete name Abu-Abdallah Mohammed ben Mohammed ben Abdallah ben Edris, a well known Arabian writer on Geography, who flourished about the middle of the sixth century of the Mohammedan æra. Of the circumstances of his life little is known. He was a descendant of the family of the Edrisides, who for upwards of a century possessed the sovereignty over the Mohammedan provinces of Northern Africa. When, in A.D. 919, the Edriside dynasty in Africa was overthrown by Mahedi Abdallah, the survivors of the family went to Sicily; and there our Edrisi seems to have been born. The geographical treatise, which has made his name celebrated, was written at the command of Roger II. king of Sicily, whom he frequently mentions in the body of the work; he informs us in the preface that he completed it in the year 548 of the Hegira, A.D. 1153-4; and that it was intended to illustrate a silver terrestrial globe, 450 Greek pounds in weight, which King Roger had caused to be made. The time at which he wrote it is further ascertained from an incidental allusion to the fact of the town of Jerusalem being then in the possession of the Christians, which occurs in the work, and to the capture of Tripolis and Bona by Roger, which events happened in the years 540 and 548 of the Hegira (1145-6 and 1153-4 of our æra). The work itself also affords internal evidence of its having been written by a person who had visited Spain and Italy. Gabriel Sionita and Johannes Hesronita, who, in

1619, published a Latin translation of an abridgment of Edrisi's work, were induced by an erroneous reading of the only manuscript which they had, in a passage where Edrisi speaks of the Nile dividing the country adjoining it into two halves (*ardinâ* 'our country' instead of *ardihâ* 'its country,' the true reading), to suppose him a native of Nubia; and this mistake gave occasion to the designation of *Geographus Nubiensis*, under which Edrisi, of whose real name the translators were ignorant, soon became universally known. His work bears the title *Nuzhat al-mushtâk fî ikhtirâk al-âfâk*, *i.e.* 'Amusement of the curious in the exploring of countries.' Besides the abridged translation above-mentioned, we now possess the first volume of a French version of what seems to be the complete original work, by M. Amédée Jaubert, made from two Arabic manuscripts, the one found in the royal library at Paris, the other (which is accompanied with maps) recently procured in Egypt by M. Asselin, and now likewise belonging to the Bibliothèque du Roi. Two other manuscripts of the original work of Edrisi are preserved in the Bodleian library at Oxford (Cod. Graves, No. 3837, and Cod. Pocock, 375), an edition and English translation of which, by the Rev. G. C. Renouard, was some years ago announced as preparing for the press under the auspices of the London Oriental Translation Committee. The globe which this treatise was intended to illustrate is entirely lost; but a planisphere, which is inserted in one of the Bodleian manuscripts, may be seen engraved in Vincent's 'Periplus of the Erythrean Sea,' who observes (p. 568) that 'it is evidently founded upon the error of Ptolemy, which carries the coast of Africa round to the east, and forms a southern continent totally excluding the circumnavigation into the Atlantic Ocean.' It appears, from a comparison of this planisphere with the maps of Fra Mauro and the globe of Martin Behem at Nüremberg, that for upwards of three centuries the globe of Edrisi remained the foundation upon which all subsequent representations of the earth's surface were constructed. In his descriptive treatise, Edrisi, like all other Arabian geographers, distributes the portion of the globe known at his time into seven climates, each of which he subdivides into ten regions: in the account which he gives of them he follows the uniform plan of proceeding from west to east; but he does not, like Abulfeda, determine the longitude and latitude of the places which he mentions. The abridgment of the work contains little more than an itinerary of these different regions; but the original performance now translated adds many remarks on their inhabitants, natural productions, &c. Edrisi frequently refers to writers that have preceded him: among others to an Arabic translation of Ptolemy of Claudias, to Abdallah ben Khordadbeh, and Masudi.

The Arabic text of the abridgment of Edrisi's work, which is now extremely scarce, appeared under the following Latin title: *De Geographia universali, Hortulus cultissimus, mire orbis regiones, provincias, insulas, urbes, earumque dimensiones et orizonta, describens;* Romæ, in typographia Medicea, 1592, 4to. The Latin translation of the same by Gabriel Sionita and Johannes Hesronita, bears the title: *Geographia Nubiensis, id est, accuratissima totius orbis in septem climata divisi descriptio;* Paris, 1619, 4to. Of other publications relating to the work of Edrisi, we shall mention only two: *Descripcion de España de Xerif Aledris conocido por el Nubiense; con traduccion y notas de* Don J. A. Conde; Madrid, 1799, 8vo.: and J. M. Hartmann's *Commentatio de Geographia Africæ Edrisiana;* Göttingen, 1791, 4to. The first volume of M. Jaubert's French translation has appeared under the auspices of the French Geographical Society, and forms the fifth volume of the 'Recueil de Voyages et de Mémoires,' published by that society. It has also the following separate title: 'Géographie d'Edrisi, traduite de l'Arabe en Français, d'après deux MSS. de la Bibliothèque du Roi, et accompagnée de notes par M. Amédée Jaubert.' Paris, 1836, 4to.

EDUCATION is the art of preparing youth for the business of after-life. This is not offered as a complete or exact definition; it is only proposed as sufficient to indicate in a general way the subject matter here under discussion.

In every nation, even those called uncivilized, there are, and necessarily must be, certain practices and usages according to which children are instructed in those things which are to form the occupation of their future life; and every civilized nation, and, we may presume, nations also called uncivilized, have some general and collective term by which they express this process of instruction. In the European languages derived from the Latin, and in others that have a mixture of that language, the general term is Education. It is not important at present to consider the more or less precise notions attached to this or any other equivalent word, but it is enough to observe, that, as the language of every nation possesses such a term, it is a universal truth that all nations or societies of men admit that there is something which is expressed by the comprehensive term Education, or by some equivalent term. But like all other general terms which have been long in use, this term Education comprehends within the general meaning already assigned to it a great number of particulars, which are conceived by various people in such different modes and degrees and in such varying amount as to the number of the particulars, some nations or individuals conceiving a certain set of particulars as essential to the term, others conceiving a different set of particulars as essentials, and others again conceiving the same particulars in such different ways, that two or more persons agreeing in their general description of the term might very probably, in descending into the enumeration of the particulars, find themselves completely at variance with one another. This remark possesses no claim to novelty, but it is not on that account the less important. The discrepancy just stated is apparent not only as to such general terms as education, government, right, duty, and numerous other such words, the analysis of which can only be successfully attempted by those who are accustomed to that kind of inquiry, but it is perceived and occurs even in things obvious to the senses, which consist of a number of parts, such as a machine, or any other compound thing. The general use of a machine, as a mill, for instance, is conceived in the same way by all, by the miller and by persons who know nothing more about the mill than that it is used for grinding corn. As to the particulars, there may be all imaginable discrepancies among the persons who are only acquainted with the general purpose of the mill. But discrepancies as to the mode in which the several parts of a thing and the uses of the several parts are conceived, are generally discrepancies to be referred to the *inaccuracy* of the conceptions; they are, in fact, only errors, not the same but about the same thing. The more completely a large number of persons approach to harmony in their whole views as to this machine, the nearer, as a general rule, do their several views approach to accuracy; it being of the nature of truth to produce a harmony of opinion, the truth being one and invariable; and it being of the nature of error to admit of more varieties than man has yet conceived, inasmuch as men yet unborn will conceive errors never conceived before.

The same holds good as to Education which holds good of the machine. The *general* use, the *general* object of Education is roughly and rightly conceived by all persons to whom the name is familiar; but the great contrariety which exists among mankind as to the particulars which they conceive as entering into and forming a part of this term, and as to their mode of conceiving the same, proves either that all are still wrong as to their particular conceptions of this term, or that hitherto no means have been discovered of producing a general harmony of opinion, or in other words, of approaching to the truth. And here there is no person, or class of persons, who, as in the case of the miller, is or are allowed to be an authority competent to decide between conflicting opinions.

In every society, Education (in what particular manner conceived by any particular society is of no importance to our present inquiry) is, as a *general* rule, and must necessarily be, subjected to the positive law of the society, and to that assemblage of opinions, customs, and habits which is not inappropriately called by some writers the Positive Morality of Society, or the Law of Opinion. This truth, or truism, as some may call it, is the basis of every inquiry into Education. In no country can there exist, as a *general* rule, an Education, whether it be good or bad, not subordinate to the law as above explained: for if such Education did exist, the form of that society or political system could not co-exist with it. One or the other must be changed, so that on the whole there must at last result a harmony, and not a discord. In every country then there does exist Education, either directed by and subordinate to the Positive Law and Positive Morality of that country, or there is an Education not so directed and subordinate, and consequently inconsistent with the continuance of that political system in which it exists. But such an anomaly, if found anywhere, should not be allowed to exist, because it is inconsistent with the continued existence of the society in which it has established itself; and if such an Education does exist, and can maintain itself in a society, against the will of that society, such a society is not a sovereign and independent society, but is in a state of anarchy. Education then should be in harmony with and subordinate to the political system: it should be part of it; and whether the political system is called by the name good or bad, if that political system is to continue, Education must not be opposed to it, but must be a part of it. From this it follows that the question, What is the best Education? involves the question, What is the best political system? and that question again cannot be answered without considering what are the circumstances of the particular nation or society as to which we inquire what is the best political system. Recollecting however that the question of the best Education and of the best political system cannot be discussed apart, because, as we have shown, Education is a part of the system, still we can consider several important questions quite as fully as if the former question were out of the way.

One is, the political system being given, what ought the Education to be?

And, how far is it the business of the state to direct, control, and encourage that Education?

A man (under which term we include woman) has two distinct relations or classes of relations towards the state: one comprehends his duties as a citizen, wherein he is or ought to be wholly subordinate to the state; the other comprehends all his functions as a producer and enjoyer of wealth, wherein he has or ought to have all freedom that is not inconsistent with the proper discharge of his duties as a citizen. It is barely necessary to state this proposition in order to perceive that his Education as a citizen should be directed by the state. To suppose any other directing power, any power for instance which may educate him in principles opposed to the polity of which he is to form a part, is to suppose an inconsistency which, in discussing any question involving principles, we always intend to avoid.

His Education then as a citizen, it must be admitted, ought to be under the superintendence of the state; but *how* ought the state to exercise this superintendence?

It is not our purpose to attempt to answer this question, which involves the consideration of some of the most difficult questions in legislation. It is our object here to present the questions which it belongs to the civilization of the present and future ages to solve; to show *what* is to be done, not *how* it is to be done.

But we may answer the question so far as this: the state having the superintendence of the citizen's Education, must have the superintendence of those who direct that Education; in other words, must direct those who are to carry its purposes into effect. The body of teachers therefore must be formed by, or, at least, must be under the superintendence of the state. Unless this fundamental truth is admitted and acted on, the state cannot effectually direct or superintend the Education of its citizens.

Every branch of this inquiry into Education runs out into other branches almost innumerable, till we find that the solution of this important question involves the solution of the greater part of those questions which occupy or ought to occupy a legislative body. For this reason, as above stated, we cannot attempt to answer in its full extent, *how* the state must direct the Education of its citizens, because this question involves the consideration of how far the direction and control of the state should be a matter of positive law imperative on all, how far and with respect to what particular matters it should encourage and give facilities only, how far it should act by penalties or punishment, how far it should allow individuals or associations of individuals to teach or direct teaching according to their own will and judgment, or, to express the last question in other words, whether and to what extent the state should allow competition in Education?

To these questions, and more especially to the last, the answer is in general terms, that the *general* interest, considered in all its bearings, must determine what and how much the state must do. This answer may be said to determine nothing. It is true it determines no particular thing, but it determines the principle by which all particular measures must be tested; and it would not be difficult to select instances even from our legislation, where enactments relating to places of education have been made with a view to particular interests only, without a reference to all the bearings of the question, and which, consequently, if tried by the test above given, would be found to be mischievous. As to the last question the answer more particularly is,—that individual competition must not be destroyed. It is possible to reconcile the two principles of state direction and control and individual competition. The state may allow no person to teach without being examined and registered such register will show if he has been trained under the superintendence of the state or not. This fact being established, it may be left to individuals or associations of individuals to employ what teachers they please. In all the schools founded by the state, in all schools under the superintendence of the state (to which latter class belong nearly all charitable foundations, and all such foundations which are not under the superintendence of the state ought, consistently with the general principles already laid down, to be brought under that superintendence), it follows as a matter of course that none but teachers trained by the state should be appointed. The selection of the teachers, out of the whole authorized body, for any particular school of the class just described, may be safely left to the local authorities who have the immediate superintendence of these schools.

If the principle that a state ought to exercise the superintendence of the Education of its citizens as citizens be admitted, it may be asked, how far and to what branches of knowledge does this extend? To this we reply that a precise answer can only be given by the legislature of each country, and the question cannot be answered without many years of labour and perhaps without many experiments. But it follows from the principles already laid down that no citizen ought to exercise any function of government, or be intrusted with the exercise of any power delegated by the state, without having received *some* (*what*, we cannot here say) Education under the superintendence and direction of the state.

When the sovereign is one, it is clear how he will and ought to direct the Education of his people. His first object must be to maintain the stability of his own power. It is an absurdity to suppose any Education permitted in any state which shall be *inconsistent* with the existence of that state; and consequently in a monarchy, the first object is and must be the preservation of the monarchy. It is unnecessary to show that the attainment of this object is by no means inconsistent with good Education, and Education which is good when considered with reference to other objects than the conservation of the monarchy.

In a democracy [DEMOCRACY] the business of the state is also plain and easy. It is not plain *how* far and to *what* classes of subjects the superintendence of the state should extend, for that may be as difficult to determine in a democracy as in any other form of government; but it *is* plain to what objects the superintendence of the state in such a community should extend. Its objects should be to maintain in all its purity the principle of individual political equality, that the sovereign power is in all and every person, that the will of the majority is the rule which all must obey, and that the expression of opinion on all subjects, by speaking or writing, should be perfectly free. If any checks are wanting on the last head, they will always be supplied in a democracy by the positive morality of the society in a degree at least as great as is required, and certainly in a greater degree than in any other form of government.

What must the state do in a political system which is neither a monarchy nor a democracy; in a system where there are contending elements, and none has yet obtained the superiority? The answer is, it must do what it can, and that which it does, being the will of the stronger part for the time, must be considered right. But such a political system, though it may continue for a long time, is always moving (at least it is only safe when it is moving) in the direction impressed upon it by one or other of the contending powers which exist in the state. Still, so long as the struggle continues, there can be no Education in the sense which we are considering, no education which has the single, clear, and undivided object proposed to it in a monarchy and in a democracy. Such a political system then would appear to be wanting in one of the chief elements of a political system, which we have explained to be the bringing up of the citizens in such a manner as to secure the stability of that system under which they live. In such a system as we here imagine, there being no *unity* in the object, there can be no unity of means with reference to any object; and such a system might be more properly called an aggregation of political societies, than one political society; what is implied by the word aggregation being the existence of something just strong enough to keep the whole together. Such a society, in spite of its incongruity, may be kept together by several things: one may be, that the positive morality of the whole society is favourable to order, as characterized by a love of wealth, and impressed with a profound conviction of the necessity of leaving free to every individual the pursuit of wealth and the enjoyment of it when it is acquired. Another may be, that in this same society, though there are contending elements, there may be a slow and steady progress, and a gradual change, tending in one direction only: such a gradual progress in such a system may be regarded as the only security against its destruction.

If the history of the world has ever presented, or if it now presents, such a phænomenon as we have attempted to describe; further, if such a society contains the greatest known number of instances of enormous individual wealth opposed to the greatest amount of abject poverty; the highest intellectual cultivation and the greatest freedom of thought, side by side with the grossest ignorance and the darkest superstition; thousands in the enjoyment of wealth for which they never laboured, and tens of thousands depending for their daily bread upon the labour of their hands and the sensitive vibrations of the scale of commerce; political power in appearance widely diffused, in effect confined to the hands of a few; ignorance of the simplest elements of society in many of the rich and those who have power; ignorance not greater in those who are poor and have none—such a society, if it exists, is a society in which every reflecting man must at moments have misgivings as to its future condition and as to the happiness of those in whom he is most nearly interested. But if such a society contains a class, properly and truly denominated a middle class, a class neither enervated by excessive wealth and indolence nor depressed by poverty; a class that is characterized by industry and activity unexampled; a class that considers labour as the true source of happiness, and free inquiry on all subjects as the best privilege of a free man—such a society may exist and continue to be indefinitely in a state of progressive improvement. Such a society, with its monstrous anomalies and defects, offers to a statesman of enlarged mind and vigorous understanding the strongest motive, while it supplies him with all the means, to give to the political system an impulse that shall carry it beyond the region of unstable equilibrium and place it at once in a state of security.

In such a society the simple enunciation by one possessed of power, that Education is a part of the business of the state, would be considered as the forerunner of some measure which should lay the foundation of that unity without which the temporary prosperity of the nation can never become permanent and its real happiness can never be secured.

The particular questions that the philosophic legislator has then to solve with respect to the education of the citizens, are—1. How are teachers to be taught, and what are they to be taught? 2. How is the body of teachers to be directed, superintended, rewarded, and punished? 3. What schools and what kinds of schools are to be established and encouraged for the Education of the people? 4. What are the teachers to teach in those schools? 5. Where is the immediate government of such schools to be placed? 6. And where the ultimate and supreme direction and control of such schools? The word Schools is here used as comprehending *all* places of Education.

It remains to consider those other relations of a man to the state in which we view him as a producer of wealth for his own enjoyment. Here the general principle is, that the pursuit and enjoyment of wealth must be left as free as the public interest requires; and this amount of freedom will not depend in any great degree on the form of government. To this head, that of the production of wealth, belong all the divisions of labour by which a man, to use a homely but expressive phrase, gets his living, or what in other words are called the professions, trades, and arts of a country. The only way in which the state can with any advantage direct or control the exercise of any profession, trade, or art, is by requiring the person who undertakes to exercise it to have been trained or educated for the purpose. Whether this should be done in all cases, or in some and what cases, and to what extent, and how, are questions for a legislature guided by a philosopher to answer.

In all countries called civilized this has been done to a certain extent. The legislation of our own country offers instances of great errors committed by legislating where no legislation was wanted, or by legislating badly. Perhaps instances may also be noted in all countries where evil has arisen for want of legislation on the subject. We may explain by example.

Perhaps it is unnecessary for a state to require that a shoemaker, or a tailor, or a painter, or a sculptor, should be required to go through a certain course of training before he exercises his art. The best shoemaker and best tailor will be sure to find employment, and individual shoemakers and tailors have as ample means of giving instruction in their craft as can be desired. It may be true or not true, that the best painters and sculptors will meet with most employment: but is it unnecessary or is it necessary for a state to offer facilities and encouragement to those who design to educate themselves as painters and sculptors? Most civilized nations have decided this question by doing so, and there are many reasons in favour of such a policy.

Ought the state to require the professor of law, of medicine, or of religious teaching, to undergo some kind of preliminary Education, and to obtain a certificate thereof? Nearly all civilized countries have required the lawyer and physician to go through some course of Education. There are strong reasons in some countries, our own for instance, both for and against such a requisition; but on the whole, the reasons seem to preponderate in favour of requiring such Education from him who designs to practise law, and still more from him who designs to practise the art of healing. Most civilized countries, perhaps all, except two (so far as we know), require *all* persons who profess the teaching of religion to have received some Education, to be ascertained by some evidence. But in both the nations excepted, any person, however ignorant, may preach on subjects which the mass of the community believe or affect to believe to be of greater importance both for their present and future welfare than any other subjects. Professing to maintain, as we hope they always will do, the principle of religious freedom, these two nations have fallen into the greatest inconsistencies. They have checked the free expression of individual opinion by word of mouth, and fettered it in the written form, in the one country by the severe penalties of positive law and the no less severe penalties of positive morality; and in the other by the penalties of positive morality carried to an excess which is destructive to the interests of the society itself. (See Attorney-General v. Pearson, 3 Merivale, 353.) But both nations allow any person, if he professes to be a teacher of religion, however ignorant he may be, to become the weekly, the daily instructor of thousands, including children, who derive and have derived no instruction of any kind except from this source. Such a teaching or preaching, if it only assumes the name and form of religious teaching, is permitted to inculcate principles which may be subversive of the political system; and it may and often does inculcate principles the tendency of which is to undermine the foundations of all social order; for it should never be forgotten that all religious teaching must include moral teaching, though moral teaching is quite distinct from religious teaching. And though it must be admitted that no teacher of religion recommends a bad thing *as* bad, he may recommend a bad thing as good, solely because he knows no better. We have endeavoured to point out an anomaly which exists in certain political institutions, and which can only be allowed to exist so long as it protects itself under a specious and an honoured but misunderstood name. For though it be admitted that such anomaly exist, it may be said that it cannot be remedied without interfering with the important principle of religious freedom. But what is religious or any other freedom? Is it the individual power of doing or saying what a man likes? Certainly not. It means no more than a freedom not inconsistent with the public welfare. Still it may be urged that this is precisely the kind of freedom with which no state, where the principle of religious freedom is admitted, can safely interfere. But this is only bringing us round again to the question, What is religious freedom? To say that it cannot be interfered with is to assume an answer to the question. Does what is called religious freedom, as the same is now understood, admitting it to produce much good, produce also any evil? If it does, can the evil be remedied? Is the free practice of any art or profession, medicine or law, for instance, or the art of instructing children in general knowledge, or perfect freedom in teaching and expounding religious doctrines, inconsistent with the condition of *qualification*?[*] How the *qualification* is to be ascertained, and what it is to be, is the question; and it is a question which may be answered.

In all that we have said on Education as a subject of legislation, it is assumed either that the state can enforce, if necessary, that which it enacts; or that the enactments of the state will be only the expression of the public will; or that they will be founded on reasons so clear and convincing as to receive, when promulgated, the assent and support of a majority large enough to secure their being carried into effect. If some one of these conditions cannot be fulfilled, the legislation is premature, and will probably be injurious.

The extent of that department of Education with which the legislature should not interfere can only be fixed with precision by ascertaining the extent of its proper, that is, its useful interference. We may state, however, in general terms, that the early and domestic Education of the young of both sexes is in nearly all, perhaps all, modern political systems, placed beyond the reach of direct legislative control by the constitution of modern society. But inasmuch as one of the great functions of government is the instruction, direction, and superintendence of the teaching body, even the domestic Education is not beyond its influence, but will be subjected to it in precisely the same degree as the state shall succeed in forming a body of good teachers. For the importance and value of Education (in some sense or other: it matters not here in what sense) are universally admitted. The objects of Education, it is true, are often misunderstood by parents and those who have the charge of youth, and the means are as often ill-calculated for the end proposed. But this is only a consequence of ignorance, not an indication that Education is undervalued. When better objects and better means are proposed, whether by individual example or by associations of individuals called societies, or by the state, such objects and means will be readily embraced by all who can comprehend them. It being assumed that the objects and means thus presented are desirable in themselves, there can be no obstacle to the reception of them, so far as the state allows the reception to be voluntary, except the ignorance and prejudices (which are, in fact, only ignorance under another name) of those to whom they are proposed. But till this obstacle which ignorance presents is overcome, nothing can be effected in the way of improvement; and it being admitted, that as to the department of education under consideration, direct legislation is not the proper means, some other means must be adopted. Individuals and societies often effect their benevolent objects by example and by the authority of their name and character. The state may do the same. The influence of authority and example is in all countries most efficient when the sovereign power calls them in to its aid. Individuals may do much; societies have done more; but Society (the whole, in its collective power) is the body from which all improvements must come that are calculated to operate on the mass. From these considerations we conclude that if any state seriously and anxiously apply itself to the business of forming a body of teachers, it is impossible to foresee how far the beneficial influence of such a body, well organized, may extend. It may penetrate into the house of the wealthy, where the child who is born to the possession of wealth is not thereby secured in the enjoyment of it, or against any one calamity of human life. His wealth may be wasted by improvidence; his health may be enfeebled by indolence and debauchery; his understanding may be cramped and corrupted by vicious Education and bad example; and he may become an object of detestation and contempt, though born to the command of wealth sufficient to purchase all that society has to offer. This influence may also reach, and perhaps sooner and more effectually reach, the hovels and the garrets of the poor, where thousands of children are now brought up under such circumstances, that to be unhealthy, vicious, criminal, and unhappy, are the only results which, as a general rule, can follow from the given conditions of their existence. When the unhappy wretch, who cannot be other than what he is, has at last transgressed the limits of the positive morality of society, and got within the verge of the penalties of the law, his crimes are blazoned forth by thousands, the respectable part of society are shocked at the disclosures, and are only relieved from their pain when the criminal is hid in a prison, or his life is taken by the executioner. But the example is soon forgotten, and misery and vice fester in the very heart of society unheeded, till some new warning again startles it from its lethargy.

It may appear almost superfluous to state that the true interest of the sovereign power, considered in all its bearings, must coincide with the interest of the governed; the difference in forms of government or in the distribution of the sovereign power being mainly to be considered a difference in the instruments or means by which an end is to be obtained. Nor is this difference an unimportant one. Where the sovereign power is in all those who as individuals are subject to it, the coincidence of power and of interest is complete; and the nearer any form of government approaches to this distribution of power, the more obvious and the stronger is the principle laid down. The principle may express a common-place truth; but the consequences that flow from it are numerous and important. When it is clear that the state will promote the general good by its regulations, its business is to make regulations. If regulations will not promote the general good, that is a reason for not making them. Now to protect a man in the enjoyment of his property, and to preserve him from the aggressions of others, is a main part of the business of governing. For this purpose restraints and punishments are necessary; immediately, to protect the injured, and give compensation, when it can be given; remotely, to prevent others from being injured, and, so far as it can be done, to reform the offender. But the punishment of any offender, in its extremest shape, can do little more than prevent the same person from offending again. Those who are deterred from crime by his example can at any rate only be those to whom the example is known, and they are a small portion even of the actual society. Generally, then, those who do not offend against the laws, do not offend, either because they have been sufficiently educated to avoid such offence, or because the opportunity and temptation have not been presented to them, or because they know that punishment may follow the crime. But a large class of offenders have not been sufficiently educated to enable them to avoid the commission of crime; a very large number are brought up amidst the opportunities, the temptations, and the example of crime, to oppose all which the single fact of knowing that the crime *may* be punished (and even that amount of knowledge is not always possessed by the criminal) is all the means of resistance that such persons are armed with. In societies which boast of their wealth, their civilization, and their high intellectual cultivation, such is the feeble barrier opposed by those who have the government of a people between thousands of their fellow-citizens and the commission of crimes the penalties of which are always severe and often cruel.

If the general considerations which we have urged are of any weight, there is no branch of legislation which comprehends so many important questions as are comprehended in the word Education, even when taken in its ordinary acceptation; but when viewed in all its bearings, it is of all questions most peculiarly that which it concerns the present age and the present state of society to determine. That Education was an integral, an essential part of legislation, was clearly seen by the Greeks, to whom belongs the merit of having approached, and often having solved, nearly all the important questions that affect the constitution of society. It was their good fortune to contemplate many truths from a nearer point of view and in a clearer light than we can do now. The relations of modern society are so numerous and complicated, that the mind is bewildered amidst the multiplicity and variety of facts, the claims of opposing interests, and the number and magnitude of the objects which are presented for its consideration. It is only by keeping ourselves as free as possible from mere party influences, and steadily looking to the general welfare as the end to be attained by and the true test of all politica institutions, that we can hope to discover and apply the principles which shall secure, so far as such a thing can be secured, the universal happiness of a nation.

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[*] In discussing a subject of this kind in a limited space, it is not possible to anticipate objections that may be fairly urged, or to state and answer them. For example, it may be said, if a man ought not to preach without some evidence of qualification, why should a man print a book on religious subjects without some evidence of qualification? The answer is not difficult; but we have not space to answer either this or numerous other objections that may be made.

'That the legislator should especially occupy himself with the education of youth, no one can dispute; for when this is not done in states, it is a cause of damage to the polity (form of government). For a state must be administered with reference to its polity; and that which is the peculiar characteristic of each polity is that which preserves and originally constitutes it; as, for instance, the democratical principle in a democracy, and the oligarchal in an oligarchy; and that which is the best principle always constitutes the best polity. Further, in every occupation and art a person must receive previous instruction and discipline, in order to the exercising of the occupation or art; consequently also to the enabling him to the exercise of virtue. Now, since the end of every state is one, it is evident that the education must be *one*, and of necessity the same for all, and that the superintendence of the education must be with the public and not with individuals, as it now is, when each individual superintends his own children singly, and teaches them what he chooses. But when things are matter of public concern, the discipline pertaining to them must also be matter of public concern; and we must not consider any citizen as belonging to himself, but all as belonging to the state; for each is a part of the state, and the superintendence of each part has naturally a reference to the superintendence of the whole. In the matter of education, as well as in other matters, the Lacedæmonians deserve praise; for they take the greatest pains about the education of their children, and that, too, as a public concern. That then a state ought to legislate on education and make it a public concern, is clear; but what education is, and how education must be conducted, is a subject for consideration.' (Aristotle, *Politik*, book viii.)

EDWARD I., surnamed the Elder, king of the West Saxons, and with some pretensions to be regarded as king of all England, was the eldest son of Alfred the Great, by his queen Alswitha, the daughter of Earl Æthelred. On the death of his father, 26th October, 901, Edward was recognized by the Witenagemote as his successor; but the throne was contested by his cousin Ethelwald, who was the son of one of the three elder brothers and predecessors of Alfred, but whether of Ethelbald, Ethelbert, or Ethelred, is uncertain. The cause of Ethelwald received from the first the support of the Danes of the north, and by their assistance in 904 he compelled the submission of the people of Essex, and in the following year that of the East Anglians. The contest however was at length terminated, in 906 or 907, by the death of Ethelwald, in a battle fought between his forces and those of Edward. The people of East Anglia returned on this under submission to the king of Wessex, and the Northumbrian Danes concluded a peace with him: but three or four years afterwards we find the Danes breaking this pacification; nor do they appear to have been quieted, or the people of Essex finally brought back to their obedience, till the year 920 or 921. Mercia in the mean time had continued to be governed as a separate state, though subject to the supremacy of Wessex, first by the caldorman Ethered or Ethelred, to whom it had been entrusted by Alfred, and, after his death in 912, by his widow Ethelfleda, the sister of Edward. The Lady Ethelfleda survived till 920, conducting the affairs of her government with distinguished ability, and all along acting in concert with her brother in his efforts against the Danes and his other enemies. On her death, Edward took the government of Mercia into his own hands. After this, if we may believe the old historians, not only did all the Danes, including even those of Northumbria, make full submission to Edward, but their example was followed by the Welsh and the people of Strathclyde, and the king of the Scots and all his subjects also chose the English monarch as their lord. The military successes however, which must have been achieved to compel the submission of all these neighbouring powers, if such submission actually took place, are not recorded.

Some of the laws of Edward the Elder are preserved; but they do not demand any particular notice. He died in 925, and was succeeded by his eldest son Athelstane, born to him by a shepherd's daughter named Egwina, who is stated by some of the old writers to have been his wife, by others only his mistress. He had also another son and a daughter by Egwina. By another lady, to whom he is allowed to have been married, but whose name is unknown he had two sons and six daughters; and by another wife, Edgiva, he had two sons, Edmund and Edred, both of whom were afterwards kings of England, and two daughters.

EDWARD II., king of the Anglo-Saxons, surnamed the Martyr, was the eldest son of Edgar the Peaceable, by his first wife, Elfleda. On the death of Edgar, in 975, the accession of Edward was opposed by a faction headed by his father's widow, Elfrida, who on the pretence that the elder brother was excluded by the circumstance of having been born before his father had been crowned, maintained that the right to the vacant throne lay with her own son Ethelred. To create for herself the appearance of a national party she and her associates proclaimed themselves the patrons of the cause of the married clergy in opposition to Dunstan and the monks; but after a short period of confusion, the latter prevailed in the Witenagemote, and Edward was formally accepted as king by that assembly. Elfrida however seems still to have continued her intrigues; and her unscrupulous ambition at last led her to the perpetration of a deed, which has covered her name with infamy. This was the murder of her step-son by a hired assassin, as he stopped one day while hunting at her residence, Corfe Castle, in Dorsetshire; he was stabbed in the back as he sat on his horse at the gate of the castle drinking a cup of mead. The 18th of March, 978, is the date assigned to the murder of King Edward, who was only in his seventeenth year when he was thus cut off. He was never married, and leaving no children, was succeeded by his half-brother, Ethelred, the only individual then remaining whose birth gave him any pretensions to the throne.

It was in the reign of Edward that the national council was held at Calne which is so famous for the catastrophe of the floor giving way, with the exception of the part on which Dunstan and his friends stood. [DUNSTAN.]

EDWARD III., king of the Anglo-Saxons, surnamed the Confessor, was the eldest of the two sons of Ethelred II. by his second wife Emma, the daughter of Richard I., duke of Normandy. He was born at Islip, in Oxfordshire, probably in the year 1004. In the close of 1013, when the successes of Sweyn, the Dane, drove Ethelred from his throne, and compelled him to retire to the Isle of Wight, he sent over his wife, with Edward and his younger brother Alfred, to Normandy, to the care of their uncle Duke Richard II. Hither Ethelred himself, being assured of a favourable reception, followed his family, about the middle of January, 1014. When, on the death of Sweyn, within three weeks after, Ethelred was recalled by the Witenagemote, he sent back his son Edward along with the plenipotentiaries, whom he despatched previously to setting out himself to complete the arrangements for his restoration. On the death of Ethelred in 1016, Emma and her two sons returned to Normandy. When Canute the Dane obtained the throne in the latter part of the same year by the death of Edmund Ironside, it is affirmed that Duke Richard either fitted out a naval force or threatened to do so, with a view of supporting the claims of his nephew Edward; but this intention, if it ever was entertained, was effectually diverted before it led to any thing by the proposals which now proceeded from Canute for the hand of the widowed Emma. Canute and Emma were married in July, 1017. From this time till the death of Canute in 1035, Edward appears to have remained quiet in Normandy. He is said to have spent his time chiefly in the performance of the offices of religion and in hunting, which continued to be his favourite occupations to the end of his days. On Canute's death, and the disputes for the succession between his sons Harold and Hardicanute, Edward was induced to make a momentary demonstration in assertion of his pretensions: he crossed the channel with a fleet of forty ships, and landed at Southampton; but finding that instead of being supported, he would be vigorously opposed by his mother, who was exerting all her efforts for her son Hardicanute, he gave up the attempt, and returned to Normandy after merely plundering a few villages. In 1037 his younger brother Alfred was tempted by an invitation purporting to come from Emma to proceed to England at the head of another expedition, which terminated in his destruction, brought about apparently by treachery, though there does not seem to be any sufficient ground for the horrid suspicion, which some writers have been disposed to entertain, that the contriver of the plot was his own mother. When Hardicanute became undisputed king of all England by the death of Harold in 1040, he sent for his half-brother Edward, who immediately came to England, where he was allowed a handsome establishment, and appears to have been considered as the heir to the crown in default of issue of the reigning king. Hardicanute died on the 4th of June, 1042, and Edward was immediately recognized as king by the assembled body of the clerical and lay nobility; the former, it is said, having been chiefly swayed by Livingus, bishop of Worcester, the latter by the powerful Earl Godwin.

A menace of opposition to this settlement of the English crown by Magnus, king of Norway, was defeated, after it had put Edward to the expense of fitting out a fleet to maintain his rights, first by the occupation which Magnus found at home in defending himself against another claimant to the Danish throne, Sweyn, the nephew of Canute, and soon after, more effectually, by the death of Magnus. In 1044, Edward, probably in compliance with a promise which he had made to Godwin, married Editha, the only daughter of that earl, having previously informed her, however, that although he would make her his queen, she should not share his bed. This unnatural proceeding, by which Edward gained from his church the honour of canonization and the title of Confessor, and by which, to pass over his treatment of his wife and his violation of his marriage vows, he involved his country in the calamities of a disputed succession, and eventually of a foreign conquest, has been usually attributed to religious motives. The Confessor seems to have been without human affections of any kind. His first act after coming to the throne was to proceed to the residence of his mother at Winchester, and to seize by force not only all her treasures, but even the cattle and corn upon her lands. One account further states that he endeavoured to destroy her by an accusation from which she freed herself by the ordeal; and though this part of the story has been generally rejected by modern writers, its falsehood is by no means clearly established. The circumstance of Emma (who lived for ten years after this) having, as it would appear, retained her dower, which has been urged in disproof of any criminal charge having been brought against her, is rather a confirmation of the truth of the old account, inasmuch as it is not likely her son would have allowed her to remain thus undisturbed after his first treatment of her, unless her triumphant escape from the ordeal had enabled her for the rest of her life to defy his power.

The public events that form the history of the reign of the Confessor resolve themselves for the most part into a contest between two great parties or interests which divided the court and the country. The connexion between England and Normandy had commenced forty years before the accession of this king by the marriage of Ethelred; but it became very intimate after the accession of Edward, who had spent in Normandy all his life since his childhood, whose tastes and habits had been formed in that country, and all whose oldest personal friends were necessarily Normans. In fact Edward himself, when he came to the throne, was much more a Norman than an Englishman; and he not unnaturally surrounded himself with persons belonging to the nation whose language and manners and mode of life were those with which he had been so long familiar, rather than with his less polished fellow-countrymen. Many Normans came over to England as soon as he became king, and some of the highest preferments in the kingdom were bestowed upon these foreigners. But while the inclinations of Edward were probably from the first with the Normans, he was to a great extent in the hands of the opposite, or English party, from his connexion with Earl Godwin, its head. Besides the influence which he derived from having his daughter on the throne, this powerful nobleman held in his own hands, and in those of his sons, the government of more than the half of all England. The eldest of these sons, Sweyn, very early in the reign of Edward, had been obliged to fly from the vengeance of the law for the daring crime of violating the person of an abbess; but after some time Edward consented, or found himself obliged, to pardon him, and to restore him to all his estates and honours. It was not till the year 1051 that the strength of the English and Norman parties was tried in any direct encounter; but that year, on occasion of a broil which arose out of the visit to England of Edward's brother-in-law, Eustace, count of Boulogne, their long-accumulated enmity broke forth into a violent collision. The first effect was the banishment of all the Godwin family, and the degradation and imprisonment of the queen. At this crisis William, the young duke of Normandy, afterwards king of England, came over with a powerful fleet, and prepared to render Edward what assistance he might have needed. The following summer however witnessed the complete overthrow of all that had been thus accomplished. Godwin and his son Harold forced their way back to the country at the head of armaments which they had prepared, the former in Flanders, the latter in Ireland; a negotiation was entered into with the king, and the issue was, that the earl and his party were restored to greater power than ever; the queen was re-established in her possessions and her place, and the Normans were all expelled from the kingdom.

Earl Godwin only survived this counter-revolution a few months: he died suddenly as he sat at the royal table, on the 15th April, 1053. His son Harold, however, inherited his possessions and his power, and the ascendancy of the family under its new head continued as great as ever during the remainder of the Confessor's reign. In 1055 a dispute arose between Harold and the rival family of Leofric, earl of Leicester, which disturbed the kingdom for nearly two years. Leofric died in 1057; but the feud was continued by his son Alfgar, who called in to his assistance Griffith or Griffin, king of the Welsh. This drew down the vengeance of Harold upon that prince and his subjects; and the issue was, that, after some fighting, Griffin consented to swear fealty to Edward. This event is assigned by the Saxon Chronicle to the year 1056. The war with the Welsh was renewed in 1063; Harold had again the command, and prosecuted hostilities with so much success, that king Griffin's head was cut off by his own subjects, and sent by them to the English king in token of their submission. In 1065 the public tranquillity was for a short time disturbed by an insurrection of the Northumbrians; but this was quelled without bloodshed. Edward died on the 5th of January, 1066, and was buried the following day in the new Abbey of Westminster, which had just been finished and consecrated with great pomp about a week before. On the same day Earl Harold was solemnly crowned king of England. [EDGAR ATHELING; HAROLD II.]

England undoubtedly made a considerable advance in civilization during the reign of the Confessor. For this it was indebted partly to the intercourse which Edward's accession opened with Normandy and France, but perhaps in a still greater degree to the freedom which the kingdom enjoyed from those foreign invasions and internal wars which had distracted it, with the exception of some short intervals of tranquillity, for the greater part of a century preceding. The only events, as we have seen, which disturbed the public peace during the reign of Edward, were one or two border wars and local insurrections, none of which occasioned any general disquiet, or lasted for any considerable time. This period accordingly was long traditionally remembered as the happiest that England had known. It formed in the national imagination the bright spot between the time of the Danish rule on the one hand, and that of the Norman on the other; the age of English freedom and independence which succeeded the deliverance of the country from the one foreign conquest, and preceded its subjection to the other. For many generations after the establishment of the Norman power in the island, the constant demand of the great body of the people to their rulers was for the restoration of the laws and customs of the Confessor. But we have no reason to suppose that this king was the author of any entirely new code of laws, or even that he made any material additions to the laws that had been in force before his time. On coming to the throne he was required by the Witenagemote to promise to observe the laws of King Canute, which seem to have been then universally held to be the fairest and the best the nation had known. Edward took an oath in conformity with this demand at his coronation. No laws attributed to Edward remain in Saxon; but there has been preserved, both in Latin and in Romance, or Romanic French, a body of laws and constitutions which the Conqueror is said to have granted at an assembly of the most distinguished of his English subjects, held about four years after his seizure of the crown, and they are described in the title as the same which his predecessor and cousin, King Edward, had before observed. The French text, preserved in Ingulphus, has generally been held to be the original; but Sir Francis

Palgrave has stated reasons which throw considerable doubt upon this supposition. Both versions are given in the most correct form, and accompanied with a learned and valuable commentary, in the Proofs and Illustrations appended to Sir Francis Palgrave's Rise and Progress of the English Commonwealth, pp. lxxxviii.—cxl.

Edward the Confessor has the credit of being the first of our kings who touched for the king's evil. He was canonized by Pope Alexander III. about a century after his death, and the title of the Confessor was first bestowed upon him in the bull of canonization. It may also be mentioned, that the use of the Great Seal was first introduced in this reign.

EDWARD I., king of England, surnamed Long-shanks, from the excessive length of his legs, was the eldest son of King Henry III. by his wife Eleanor, second daughter of Raymond, count of Provence. He was born at Westminster, June 16, 1239. In 1252 he was invested by his father with the duchy of Guienne; but a claim being set up to this territory by Alphonso X., king of Castile, who pretended that it had been made over to his ancestor Alphonso VIII. by his father-in-law, Henry II., it was arranged the following year that the dispute should be settled by the marriage of Prince Edward with Eleanor, the sister of Alphonso, who thereupon resigned whatever right he had to the duchy to his brother-in-law. After this, by letters patent, dated February 14, 1254, we find the lordship of Ireland, and by others dated February 18, in the same year, all the provinces which had been seized from his father, John, by the king of France, granted by Henry III. to his son Prince Edward. (Rymer, I.)

Edward early manifested a character very unlike that of his weak and imprudent father. While yet only entering upon manhood, we find him taking part in important affairs of state. Thus the agreement which Henry made in 1256 with Pope Alexander IV. in relation to the kingdom of Sicily, which the pope granted to Henry's second son Edmund, was ratified by Prince Edward in a letter to his Holiness, still preserved. In 1258 he signed, along with his father, the agreement called the Provisions or Statutes of Oxford, by which it was arranged that the government of the country should be put into the hands of twenty-four commissioners, appointed by the barons; and two years after, when Henry violently broke through this engagement, Edward came over from Guienne, where he was resident, and publicly expressed his disapprobation of the king's conduct. For the next two or three years Edward may be regarded as placed in opposition to his father's government. In 1262, however, Henry, in a visit which he paid him in Guienne, succeeded in gaining him over to his side, and from this time the prince became the king's most efficient supporter. In the summer of 1263, the quarrel between Henry and his barons came to a contest of arms, which lasted, with some brief intermissions, for four years. During this period the military operations on the king's side were principally conducted by Prince Edward. In the beginning he was unfortunate, having been driven first from Bristol and then from Windsor, and having been finally defeated and taken prisoner with his father at the battle of Lewes, fought May 14, 1264. After being detained however about a twelvemonth, he made his escape out of the hands of the earl of Leicester; and on the 4th August, 1265, his forces having encountered those of that nobleman at Evesham, the result was that Leicester was defeated and lost his life, and the king was restored to liberty. From this time Edward and his father carried everything before them till the war was concluded, in July, 1267, by the surrender of the last of the insurgents, who had taken up their position in the Isle of Ely.

Soon after this, at a parliament held at Northampton, Prince Edward, together with several noblemen and a great number of knights, pledged themselves to proceed to join the crusaders in the Holy Land. The Prince accordingly, having first, in a visit to Paris, in August, 1269, made his arrangements with St. Louis, set sail from England to join that king in May, the year following. St. Louis died on his way to Palestine; and Edward, having spent the winter in Sicily waiting for him, did not arrive at the scene of action till the end of May, 1271. Here he performed several valorous exploits, which however were attended with no important result. His most memorable adventure was an encounter with a Saracen, who attempted to assassinate him, and whom he slew on the spot, but not before he had received a wound in the arm from a poisoned dagger, from the effects of which he is said to have been delivered by the princess, his wife, who sucked the poison from the wound. At last, having concluded a ten years' truce with the Saracens, he left Palestine in August, 1272, and set out on his return to England. He was at Messina, on his way home, in January, 1273, when he heard of the death of his father on the 16th of November preceding. He proceeded on his journey, and landed with his queen in England 25th July, 1274. They were both solemnly crowned at Westminster on the 19th of August following. The reign of Edward I., however, appears to have been reckoned not from the day of his coronation, according to the practice observed in the cases of all the preceding kings since the Conquest, but, according to the modern practice, from the day on which the throne became vacant, or at least from the 20th of November, the day of his father's funeral, immediately after which the clerical and lay nobility who were present in Westminster Abbey on the occasion had sworn fealty to the new king at the high altar of that church.

The first military operations of Edward's reign were directed against the Welsh, whose prince Llewellyn, on being summoned to do homage, had contemptuously refused. Llewellyn was forced to sue for peace in November, 1277, after a single campaign; but in 1281 he again rose in arms, and the insurrection was not put down till Llewellyn himself was slain at Llanfair, 11th December, 1282, and his surviving brother Prince David was taken prisoner soon after. The following year the last-mentioned prince was barbarously put to death by drawing, hanging, and quartering, and Wales was finally united to England.

The conquest of Wales was followed by the attempt to conquer Scotland. By the death of Alexander III., in 1285, the crown of that country had fallen to his granddaughter Margaret, called the Maiden of Norway, a child only three years old. By the treaty of Brigham, concluded in July, 1290, it was agreed that Margaret should be married to Edward, the eldest surviving son of the English king; but the young queen died in one of the Orkney Islands on her voyage from Norway in September of the same year. Edward made the first open declaration of his designs against the independence of Scotland at a conference held at Norham on the Tweed with the clergy and nobility of that kingdom on the 10th of May, 1291. Ten different competitors for the crown had advanced their claims; but they were all induced to acknowledge Edward for their lord paramount and to consent to receive judgment from him on the matter in dispute. His decision was finally pronounced in favour of John Balliol, at Berwick, on the 17th of November, 1292; on the next day Balliol swore fealty to him in the castle of Norham. [BALLIOL.] He was crowned at Scone under a commission from his liege lord on the 30th of the same month; and on the 26th of December he did homage to Edward for his crown at Newcastle. The subject king, however, was soon made to feel all the humiliation of his position; and the discontent of his countrymen equalling his own, by the summer of 1294 all Scotland was in open insurrection against the authority of Edward. Meanwhile, Edward had become involved in a war with the French king Philip IV. The first act of the assembled estates of Scotland was to enter into a treaty of alliance with that sovereign. But although he was farther embarrassed at this inconvenient moment by a revolt of the Welsh, Edward's wonderful energy in a few months recovered for him all that he had lost. In the spring of 1296 he laid a great part of Scotland waste with fire and sword, compelled Balliol to resign the kingdom into his hands, and then made a triumphant progress through the country as far as Elgin in Murray, exacting oaths of fealty from all classes wherever he appeared. It was on his return from this progress that Edward, as he passed the cathedral of Scone in the beginning of August, carried away with him the famous stone, now in Westminster Abbey, on which the Scottish kings had been accustomed to be crowned. He now placed the government of Scotland in the hands of officers appointed by himself, and bearing the titles of his ministers. But by the month of May in the following year Scotland was again in flames. The leader of the insurrection now was the celebrated William Wallace. He and his countrymen had been excited to make this new attempt to effect their deliverance from a foreign domination, partly by the severities of their English governors, partly by the circumstances in which Edward was at this time involved. The expenses of his Scottish and French wars had pressed heavily upon the resources of the kingdom; and when he asked for more money, both clergy and laity refused him any farther grant without a redress of grievances and a confirmation of the several great national charters. After standing out for some time, he was obliged to comply with these terms: Magna Charta and the Charter of Forests were both confirmed, with some additional articles, in a parliament held at Westminster in October of this year.

Meanwhile, although he had got disencumbered for the present of the war on the Continent, by the conclusion of a truce with King Philip, the rebellion in Scotland had already gained such a height as to have almost wholly cleared that country of the English authorities. The forces of the government had been completely put to the rout by Wallace at the battle of Stirling, fought on the 11th September, and in a few weeks more not a Scottish fortress remained in Edward's hands. Wallace was now appointed Governor of Scotland, in the name of King John (Balliol). In this state of things Edward, about the middle of March 1298, returned to England from Flanders where he had spent the winter. He immediately prepared to march for Scotland. The great battle of Falkirk followed on the 22nd of July, in which Wallace sustained a complete defeat. But although one consequence of this event was the resignation by Wallace of his office of governor, it was not followed by the general submission of the country. The next five years were spent in a succession of indecisive attempts on the part of the English king to regain possession of Scotland; the military operations being frequently suspended by long truces. At length, having satisfied his barons by repeated renewals of the charters, and having finally relieved himself from all interference on the part of the king of France by a definitive treaty of peace concluded with him at Amiens on the 20th May, 1303, Edward once more set out for Scotland at the head of a force too numerous and too well appointed to be resisted by any strength that exhausted country could now command. The result was again its temporary conquest, and merciless devastation from the Tweed to the Murray Frith. The Castle of Stirling was the last fortress that held out; it did not surrender till the 20th of July in the following year. Edward meanwhile had wintered in Dunfermline; he only returned to England in time to keep his Christmas in Lincoln. Wallace fell into his hands in a few months afterwards, and was hanged, drawn, and quartered as a traitor, at Smithfield in London, on the 23rd August, 1305. But another champion of the Scottish independence was not long in appearing. Robert Bruce, Earl of Carrick, whose grandfather had been the chief competitor for the crown with Balliol, had resided for some years at the English court; but he now, in the beginning of February, 1306, suddenly made his escape to Scotland; and in a few weeks the banner of revolt against the English domination was again unfurled in that country, and the insurgent people gathered around this new leader. Bruce was solemnly crowned at Scone on the 27th March. On receiving this news Edward immediately prepared for a new expedition to Scotland; and sent the Earl of Pembroke forward to encounter Bruce, intending to follow himself as soon as he had completed the necessary arrangements. The army of Bruce was dispersed at Perth on the 19th June by Pembroke, who had thrown himself into that town; and the king of the Scots became for a time a houseless fugitive. But the great enemy of that unfortunate people had now reached the last stage of his destructive career. Edward got no farther than a few miles beyond Carlisle in his last journey to the north. After spending the winter months at Lanercost, where he was detained by a severe illness, he appears to have arrived in that city in the beginning of March, 1307; here he was again taken ill, but his eagerness to advance continued unabated: having somewhat recovered he again set out, although he was still so weak and suffered so much pain that he could accomplish no more than six miles in four days. On the 6th of July he reached the village of Burgh-upon-Sands, 'and next day expired,' to copy the words of Lord Hailes, 'in sight of that country which he had devoted to destruction.' On his death-bed he is said to have enjoined his son and successor to prosecute the design which it was not given to himself to finish: according to Froissart, he made him swear that after the breath had departed from the royal body he would cause it to be boiled in a cauldron till the flesh fell off, and that he would preserve the bones to carry with him against the Scots as often as they should rebel. This oath, however, if it was taken, was not kept. The corpse of King Edward was interred in Westminster Abbey on the 28th of October.

Edward I. was twice married. By his first wife Eleanor, daughter of Ferdinand III., king of Castile and Leon, he had four sons: John and Henry, who both died in infancy while their father was in the Holy Land; Alphonso, born at Maine in Gascony, 23rd November, 1273, who died at Windsor, 4th August, 1285; and Edward, who succeeded him. He had also by Eleanor nine daughters: Eleanor, born in 1266, married to Henry earl of Bar; Joanna of Acre, born in that town in 1272, married first to Gilbert de Clare, earl of Gloucester and Hereford, and secondly to Sir Ralph Monthermer; Margaret, born 1275, married to John duke of Brabant; Berengera, born in 1276; Alice; Mary, born 22nd April, 1279, who at ten years of age took the veil in the monastery of Ambresbury; Elizabeth, born in 1284, married first, to John earl of Holland and Zealand, secondly, to Humphrey Bohun earl of Hertford and Essex; Beatrice; and Blanch. Queen Eleanor died 28th November, 1291, at Grantham, or, according to another account, at Hardeby, in Lincolnshire: her body was brought to Westminster Abbey to be interred, and crosses were afterwards erected on the several spots where it rested on the way, namely, at Lincoln, Grantham, Stamford, Goddington, Northampton (near which town one exists), Stoney Stratford, Dunstable, St. Albans, Waltham, (where the cross, a very beautiful one, still stands, and has been lately restored,) and Charing, then a village near London, but now the centre of the metropolis, under the name of Charing Cross. Edward's second wife was Margaret, eldest daughter of Philip III., and sister of Philip IV., kings of France. He was married to her on the 10th of September, 1299, she being then in her eighteenth year. By Queen Margaret he had two sons: Thomas, born at Brotherton in Yorkshire, 1st June, 1300, afterwards created earl of Norfolk and earl marshal; and Edmund, born 5th August, 1301, afterwards created earl of Kent; and one daughter, Eleanor, born at Winchester, 6th May, 1306, who died in her childhood. Queen Margaret died in 1317.

The rapid narrative that has been given of the acts of his reign sufficiently indicates the main constituents of the character of this king. He had his full share of the ability and the daring of the vigorous line from which he was sprung; a line that (including himself) had now given nine kings to England, and only two of them not men of extraordinary force of character. With all his ambition and stern determination, however, Edward neither loved bloodshed for itself, nor was he a professed or systematic despiser of the rules of right and justice. It is probable that in his persevering contest with the Scots he believed that he was only enforcing the just claims of his crown; and his conduct, therefore, ferocious and vindictive as in many respects it was, may be vindicated from the charge of want of principle, if tried by the current opinions and sentiments of his age. Putting aside considerations of morality, we perceive in him an ample endowment of many of the qualities that most conduce to eminence—activity, decision, foresight, inflexibility, perseverance, military skill, personal courage and power of endurance; and, united with boldness in conceiving and executing his designs, great patience and sagacity in preparing and managing his instruments, and bending circumstances to his will. Engaged as he was during the greater part of his reign in war, he was not advantageously placed for the full application of his talents to the business of civil government; but his reign is notwithstanding one of the most remarkable in our history, for the progress which was made in it towards the settlement of the laws and the constitution. On this account Edward I has often been styled (though, as is obvious to any one who knows what Justinian's legislation was, not with any propriety) the English Justinian; and Sir Matthew Hale (*Hist. of the Common Law of England*, chap. 7) has remarked that more was done in the first thirteen years of his reign to settle and establish the distributive justice of the kingdom than in all the next four centuries. Blackstone has enumerated under fifteen heads the principal alterations and improvements which the law underwent in the reign of Edward I.: we can only here notice the confirmation and final establishment of the two great charters; the definition and limitation of the bounds of ecclesiastical jurisdiction; the ascertainment and distribution of the powers and functions both of the supreme and the inferior courts; the abolition of the practice of issuing royal mandates in private causes; the establishment of a repository for the public records of the kingdom, 'few of which,' as Blackstone remarks, 'are antienter than the reign of his father, and those were by him collected:' the improvement of the law and process for the recovery of debts by the Statutes Merchant and Elegit [Elegit]; and the check imposed on the encroachments of the church by the passing of several statutes of mortmain. The object of the statute De Donis was to render lands which were the subject of this particular form of grant inalienable, and so far to put restraints upon the disposal of landed property, which however were soon evaded. [Condition; Estate.] 'Upon the whole, we may observe,' concludes Blackstone after Hale, 'that the very scheme and model of the administration of common justice between party and party was entirely settled by this king.' The forms of writs by which actions are commenced, it is added, were perfected in this reign. While the English laws were fully extended to Ireland and Wales, it was under Edward I., also, that the foundations of the constitution of the kingdom may be considered to have been laid by the new form and the new powers which were then assumed by the parliament. The earliest writs that have been preserved for summoning knights, citizens, and burgesses to parliament, are, as is well known, those that were issued by Simon de Montfort, earl of Leicester, the leader of the barons, in 1264, in the name of king Henry III., who was then a prisoner in his hands. Whether this representation of the commons was then first introduced or not, it was in the course of the succeeding reign that it first became regular and influential. The division of the legislature into two houses, in other words the institution of our present House of Commons, appears to be clearly traceable to the time of Edward I. It was in his time also that the practice began fairly to take root of the king refraining from arbitrary exactions and coming to parliament for supplies, and that the earliest effective examples were afforded of the grant of supplies by that assembly being made dependent upon the redress of grievances. Edward I., with all his military habits and genius, had at length the good sense to perceive that the time was come for abandoning the attempt to govern by the prerogative alone, which had been clung to by all his predecessors from the conquest: in his disputes with the barons he never allowed matters to come to a contest of force, as his father and grandfather had done; and in the latter part of his reign, although more than once compelled to stop short in his most favourite designs by the refusal of the national representatives to furnish him with the necessary means, he seems to have kept to the system of never resorting to any other weapons than policy and management to overcome the opposition with which he was thus thwarted. It was in the last year but one of this reign that the royal assent was given to the famous enactment commonly called the 'Statute de Tallagio non Concedendo,' by which the right of taxation was first distinctly affirmed to reside in the parliament: 'no tallage or aid,' the first chapter runs (in the old English translation), 'shall be levied by us or our heirs in our realm, without the good will and assent of Archbishops, Bishops, Earls, Barons, Knights, Burgesses, and other Freemen of the land.' The same principle had been conceded ten years before (by the 25th Edward I., c. 6), but not in such explicit terms.

The trade and foreign commerce of England appear to have advanced considerably during the reign of Edward I.; but rather owing to the natural progress of the civilization of this country and of Europe, than from any enlightened attention which the king showed to these interests. He seems to have been principally solicitous to turn the increasing intercourse of the country with foreign parts to his own particular profit by the increase of the customs. A few of his laws, however, were beneficial to the trading community, and were made with this express object, especially the act for the better recovery of debts, commonly called the Statute of Merchants, passed at Acton-Burnell in 1283; and the extension of the same by a subsequent act; and the Elegit above mentioned. On the other hand, he lowered, though slightly, the real value of the coin, thereby setting the first example of a most pernicious process, which was afterwards carried much farther. He also cruelly pillaged and oppressed the Jews; and finally, in 1290, expelled the entire body of that people from England, and seized all their houses and tenements. Before this (in 1275) a law had been passed prohibiting the Jews from taking interest for money on pain of death.

The most distinguished names in literature and science that belong to the reign of Edward I. are Duns Scotus, his disciple William Occam, and the illustrious Roger Bacon. Among the historical writers or chroniclers who flourished at this time, may be mentioned Thomas Wikes, Nicolas Trivet, Walter de Hemmingford, and, according to one account, Matthew of Westminster, though he is placed by some considerably later. The law writers of this reign are the author of the work entitled Fleta, Britton (if that be not a corruption of Bracton), Hengham, and Gilbert de Thornton, chief justice of the King's Bench, the author of an abridgment of Bracton, which has not been printed.

EDWARD II., the eldest surviving son of Edward I., was born at Caernarvon 25th April, 1284, and became the heir apparent to the crown by the death of his elder brother, Alphonso, a few months after. In 1289 he was affianced to the young queen of Scotland, who died the following year. On the 1st of August, 1297, his father, before setting out for Flanders, assembled a great council at London, and made the nobility swear fealty to the prince, whom he then appointed regent of the kingdom during his absence. The parliament in which the first statute De Tallagio non concedendo received the royal assent was held at Westminster by prince Edward a few months after his father's departure. In the summer of 1300 we find him accompanying his father in a military expedition to Scotland, and he is particularly mentioned as leading one of the divisions of the army, called the Shining Battalion, in an encounter with the Scottish forces on the banks of the river Irvine. As he grew towards manhood, however, he appears to have begun to form those vicious associations which were the chief source of the calamities of his life. It is recorded by Stow and Fabyan that in October of this same year the notorious Piers Gaveston was banished by the king from about the person of prince Edward, who, through his persuasion, had been guilty of several outrages against the bishop of Lichfield, and the prince himself was ordered to prison for stealing the bishop's deer. Gaveston was the son of a knight of Gascony, and is admitted to have been distinguished by his wit and accomplishments as well as by his personal advantages, but he is affirmed to have, as the prince's minion, carried himself to men of all ranks with unbearable insolence. In 1301 Edward was created Prince of Wales and Earl of Chester. He was again in Scotland with his father in the expedition in the summer of 1303: while the king proceeded along the east coast, the prince marched westward, and the latter afterwards wintered in Perth, while his father remained in Dunfermline. When Edward was preparing for his last Scottish expedition after the insurrection under Robert Bruce, he knighted his eldest son at Westminster on the morrow of Whitsuntide, 1306; after which the prince bestowed the same honour on three hundred gentlemen, his intended companions in arms. He was at the same time invested by his father with the duchy of Guienne. The royal banquet that was given on this occasion is celebrated for what is called the Vow of the Swans, an oath taken by the king to God and to two swans, which were brought in and set upon the table, that he would take vengeance on Robert Bruce and punish the treachery of the Scots. The prince also vowed that he would not remain two nights in the same place until he reached Scotland. He set out accordingly before his father, and as soon as he had crossed the borders he began to signalize his march by such unsparing devastation that even the old king is said to have reproved him for his cruelty. While king Edward was at Lanercost in February, 1307, he found it necessary, with the consent of the parliament there assembled, to issue an order banishing Gaveston for ever from the kingdom, as a corrupter of the prince. It is doubtful, notwithstanding the story told by Froissart [Edward I.] if the prince of Wales was with his father when he died on the 7th of July following; but he was at any rate at no great distance, and he was immediately recognized as king. His reign appears to have been reckoned from the day following.

The new king obeyed his father's injunctions to prosecute the war with Scotland, by proceeding on his march into that country as far as Cumnock, in Ayrshire. But here he turned round without having done anything, and made his way back to England. Meanwhile his whole mind seems to have been occupied only with one object—

the advancement of the favourite. A few dates will best show the violence of his infatuation. His first recorded act of government was to confer upon Gaveston, now recalled to England, the earldom of Cornwall, a dignity which had hitherto been held only by princes of the blood, and had a few years before reverted to the crown by the death, without issue, of Edmund Plantagenet, the late king's cousin: the grant, bestowing all the lands of the earldom as well as the dignity, is dated at Dumfries, the 6th of August, 1307. About the same time Walter de Langton, bishop of Lichfield, who was lord high treasurer, was imprisoned in Wallingford castle, as having been the principal promoter of Gaveston's banishment. In October the new earl of Cornwall married the king's niece, Margaret de Clare, the daughter of his sister, Joanna, countess of Gloucester. He was also made guardian during his minority to her brother, the young earl. The grant of several other lordships followed immediately, and it is even said that the reckless prodigality of the weak king went the length of making over all the treasure his father had collected for the Scottish war, amounting to nearly a hundred thousand pounds, to the object of his insane attachment. Finally, he left him guardian of the realm while he set out for Boulogne in January, 1308, to marry Isabella, the daughter of the French king, Philip V., to whom he had been affianced ever since the treaty concluded between Philip and his father in 1299. The marriage took place on the 25th of January, and on the 25th of February the king and queen were crowned at Westminster.

The history of the kingdom for the next five years is merely that of a long struggle between the king and his disgusted nobility about this Gaveston. The banishment of the favourite being insisted upon by a formidable league of the barons, Edward was obliged to give in; but instead of being ignominiously sent out of the country, Gaveston was merely appointed to the government of Ireland. In June his royal master accompanied him as far as Bristol on his way to that country. Even from this honourable exile, however, he returned in October following. The barons immediately again remonstrated, and in March, 1310, the king found himself compelled to sign a commission by which he resigned the government of the kingdom for the ensuing year into the hands of a committee appointed by the parliament. A sentence of banishment was soon after passed upon Gaveston, and he retired to France; but by the close of the year 1311 we find him again in England. The earl of Lancaster, the king's cousin, now placed himself at the head of the malecontents: finding petitions and remonstrances unattended to, he and his associates at length openly rose in arms: Gaveston was besieged in Scarborough castle, and having been forced to surrender, his career was ended by his summary execution at Warwick on the 19th of June, 1312. Having thus attained their main object, the insurgent barons made their submission to the king, and a peace was finally concluded between the parties in December.

In the course of the last two or three years Robert Bruce, left unmolested in Scotland, had not only nearly recovered every place of strength in that country, but had been accustomed to make an annual plundering inroad across the borders. It was now determined to take advantage of the cessation of domestic dissensions to effect the re-conquest of the northern kingdom; and in June, 1314, Edward set out for that purpose at the head of the most numerous army that had ever been raised in England. The issue of this expedition was the signal defeat sustained at the battle of Bannockburn, fought the 24th of June, at which the magnificent host of the English king was completely scattered, he himself narrowly escaping captivity. After this the few remaining fortresses in Scotland that were still held by English garrisons speedily fell into the hands of Bruce; the predatory and devastating incursions of the Scots into England were renewed with more audacity than ever; and Bruce and his brother Edward even made a descent upon Ireland, and for some time contested the dominion of that island with its English masters. At length, in September, 1319, a truce for two years with the Scots was arranged with difficulty. Nor was it long observed by the party most interested in breaking it. The Scots easily found pretences on which to renew their attacks, and Edward's efforts to check them proved as impotent as before.

Meanwhile, a new favourite began to engross him, Hugh le Despencer, the son of a nobleman of the same name. Upon him Edward now bestowed another daughter of his sister, the countess of Gloucester, in marriage, and many large possessions. Another armed insurrection of the barons was the consequence; and in July, 1321, the Despencers, father and son, were both banished by act of parliament. Before the end of the same year, however, they were recalled by the king; and now for a short time the fortune of the contest changed. The earl of Lancaster was taken and beheaded at Pontefract, 23rd March, 1322; and the sentence against the Despencers was soon after formally revoked by parliament. About twenty of the leaders of the insurrection in all were put to death; but the estates of many more were forfeited; and most of the immense amount of plunder thus obtained by the crown was at once bestowed upon the younger Spencer. Edward imagining that he had now an opportunity of which he might take advantage, set out once more for the conquest of Scotland in August, 1322; but after advancing as far as Culross, in Fife, he returned without having accomplished anything more than the destruction of a few religious houses; and on the 30th of March, 1323, he concluded another truce with the Scots, to last for thirteen years.

New storms, however, were already rising against the unhappy king. Charles IV., called the Fair, the youngest brother of Edward's queen, had recently succeeded to the French throne, and had begun his reign by quarrelling on some pretence with his brother-in-law, and seizing Guienne and Edward's other territories in France. After some other attempts at negotiation, it was resolved that queen Isabella should herself go over to France to endeavour to bring about an arrangement. The queen had been already excited against the Despencers; she had long probably despised a husband who was the object of such general contempt, and who besides openly preferred his male favourites to her society. At the French court she found collected many English nobles and other persons of distinction, whom their dissatisfaction with the state of affairs, or the enmity of the Despencers, had driven from their country. All these circumstances considered, it is easy to understand how she might naturally become the centre and head of a combination formed by the discontented exiles among whom she was thrown, and their connexions still in England, for the professed object of compelling her husband to change his system of government and of removing the pernicious power that stood between the nation and the throne. Among the foremost figures of the association with which she thus became surrounded was the young Roger de Mortimer, a powerful baron, who had made his escape from England after having been condemned, for taking part in the former confederacy against the Despencers, to imprisonment for life. There is no doubt that the connexion between Queen Isabella and Mortimer became eventually a criminal one. The plot against the king was begun by the conspirators contriving to get the heir-apparent, Prince Edward, into their power. It was arranged that King Charles should restore Guienne upon receiving from the prince the homage which his father had refused to render. On this Prince Edward, now in his thirteenth year, was sent over to France to his mother. The first use Isabella made of this important acquisition was to affiance the boy to Philippa, the daughter of the earl of Hainault, who in return agreed to assist her and the confederates with troops and money. Thus supported, she set sail from Dort with a force of 3000 men, under the command of the earl's brother, and landed at Orwell in Suffolk, the 22nd of September, 1326. She was immediately joined by all the most distinguished persons in the kingdom, including even the earl of Kent, the king's own brother. Edward, deserted by all except the two Despencers and a few of their creatures, left London, and took refuge at first in Bristol; he then embarked for Ireland, or, as another account says, with the design of making for the small isle of Lundy, at the mouth of the Bristol Channel; but being driven back by contrary winds, he landed again in Wales, and shut himself up in Neath Abbey, in Glamorganshire. Meanwhile, the queen's forces attacked the castle of Bristol, where the elder Despencer, styled earl of Winchester, had been left governor by the king. When the siege had lasted only a few days, the garrison rose in mutiny and delivered up the old man. He was ninety years of age; but his grey hairs did not save him; he was immediately executed with every circumstance of barbarous insult the ingenuity of his captors could devise. The next day (26th

October) the prelates and barons in the queen's camp declared Prince Edward guardian of the kingdom. The king was discovered in his place of concealment about three weeks after, and was conducted in custody first to the castle of Monmouth, and then to that of Kenilworth. The younger Despencer was also taken; he was hanged and quartered at Hereford on the 24th of November. The parliament assembled on the 1st of January, 1327; and after going through some forms of negotiation with the imprisoned king, it was resolved, on the 25th of that month, that the crown should be taken from him and conferred upon his son Prince Edward. A deputation announced this resolution to the deposed monarch. He remained for some months longer at Kenilworth: he was then transferred successively to Corfe, Bristol, and Berkeley Castles. At length, when it was found that mere insult would not kill him, he was, on the night of the 20th of September, murdered in the last-mentioned place by his keepers Sir Thomas Gournay and Sir John Maltravers, who with detestable brutality thrust a red-hot iron into his bowels through a pipe, thus contriving to destroy him without leaving any external marks of their atrocious operation.

Edward II. left by his Queen, Isabella of France, two sons, Edward, who succeeded him, and John, born at Eltham 15th August, 1316, created earl of Cornwall, in 1327, who died at Perth in October, 1336; and two daughters, Joanna, married 12th July, 1328, to Prince David, eldest son of Robert Bruce, afterwards King David II. of Scotland, and Eleanor, who became the wife of Reginald Count of Guelders.

Some attempts have been made in modern times to dispute the justice of the character which has been generally given of this king, and to throw the blame of the civil distractions which rendered his reign so unhappy and so ignominious a one, rather upon his turbulent nobility than himself. Hume, whose good nature and indolent generosity of feeling inclined him in this as well as in other cases to side with the unsuccessful party, while his quiet temper made him also constitutionally averse to that revolt against established authority and those other irregular proceedings with which the barons are chargeable in their contest with Edward II., has written the history of the reign with a studied endeavour to put the former in the wrong throughout, and to represent Edward as the victim, not of his own weaknesses and vices, but rather of the barbarism of the age. The facts, however, on which the common verdict rests cannot be thus explained away. It may be admitted that among the motives which excited and sustained the several confederacies against the king, and in the conduct of some of those who took the lead in them, there was violence and want of principle enough; it is of the nature of things that the baser passions should mix themselves up and even act an important part in all such conflicts, however righteous in their origin and general object; but nothing that can be alleged on this head can affect the question of Edward's unfitness to wear the crown. That question must be considered as settled, if not by the course of outrage against all decency manifested by his conduct in the matter of Gaveston, certainly by his relapse into the same fatal fatuity a few years after, when he fell into the hands of his second favourite Despencer. Hume has spoken of the acts of maladministration objected to the king and his minions as 'of a nature more proper to excite heart-burnings in a ball or assembly than commotions in a great kingdom.' The admitted fact of the universal indignation which the acts in question did excite is a sufficient answer to this statement of the case.

To the reign of Edward II. belongs the memorable event of the suppression in England, as in the other countries of Europe, of the great order of the Knights-Templars. Their property was seized all over England in 1308; but the suppression of the order in this country was not accompanied by any of that cruel treatment of the persons of the members which they experienced in France. In 1324 the lands which had belonged to the Templars were bestowed upon the order of St. John of Jerusalem.

The most important legal innovation of this reign was that made by the statute of sheriffs (9 Edward II., st. 2), by which the right of appointing those officers was taken from the people and committed to the chancellor, the treasurer, and the judges. Several of the royal prerogatives, relating principally to tenures, were also defined by the statute entitled 'Prærogativa Regis' (17 Edward II., st. 1). The statutes down to the end of the reign of Edward II. are commonly distinguished as the 'Vetera Statuta.' Pleading now began to assume a scientific form. The series of year-books, or reports by authority of adjudged cases, is nearly perfect from the commencement of this reign. The only law treatise belonging, or supposed to belong, to the reign of Edward II. is Horne's *Miroir des Justices*.

The circumstances of the reign were as little favourable to literature as to commerce and the arts. Warton observes that though much poetry now began to be written, he has found only one English poet of the period whose name has descended to posterity; Adam Davy or Davie, the author of various poems of a religious cast, which have never been printed. Among these, however, is not to be reckoned the long work entitled 'The Life of Alexander,' which is erroneously attributed to him by Warton, but which has since been conclusively shown not to be his. It is printed for the first time in Weber's Metrical Romances. There is still extant a curious Latin poem on the battle of Bannockburn, written in rhyming hexameters by Robert Baston, a Carmelite friar, whom Edward carried along with him to celebrate his anticipated victory, but who, being taken prisoner, was compelled by the Scotch to sing the defeat of his countrymen in this jingling effusion. Bale speaks of this Baston as a writer of tragedies and comedies, some of which appear to have been English; but none of them are now known to exist.

EDWARD III., king of England, the eldest son of Edward II. and Isabella of France, was born at Windsor (whence he took his surname), 13th November, 1312. In the first negotiations with the court of France after the breaking out of the quarrel about Guienne in 1324, a proposal seems to have been made by the French king, Charles IV., for a marriage between a daughter of his uncle, the count de Valois, and the young prince of Wales, as Edward was styled; but it was coolly received by the king of England, and ended in nothing. In September of the year following Prince Edward proceeded to Paris, where his mother now was, and did homage to his uncle, king Charles, for the duchy of Guienne and the earldom of Ponthieu, which his father had previously resigned to him. He was induced by his mother to remain with her at the French court, notwithstanding the most pressing letters from his father (Rymer, iv.), begging and commanding him to return. Meanwhile Isabella, having previously solicited from the pope a dispensation (which however she did not obtain) to permit her to marry her son without his father's knowledge, had arranged a compact with William earl of Hainault, by which the prince was affianced to Philippa the second of the earl's four daughters. Edward was soon after carried by his mother to Valenciennes, the residence of the earl of Hainault, where he met Philippa, and, it is said, fell ardently in love with her. He landed with his mother in England in September, 1326; was declared guardian or regent of the kingdom about a month after; and was proclaimed king on the deposition of his father, 25th January, 1327. [EDWARD II.] He was crowned at Westminster the following day.

The government of the kingdom during the king's minority was placed by the parliament in the hands of a regency, consisting of twelve noblemen and bishops, with Henry earl of Lancaster (the brother of Thomas, executed in the preceding reign) at their head. The queen however and Mortimer (now created earl of March) from the first assumed the chief management of affairs, and soon monopolized all power. They must be considered as having been the real authors of the murder of the deposed king. Their authority seemed for the moment to be rather strengthened than otherwise by the failure of a confederacy formed among the nobility to effect their overthrow in the winter of 1328-9. In March, 1329, signal proof was given of their determination and daring in the maintenance of their position, by the fate of the king's uncle, the earl of Kent, who having become involved in what was construed to be a plot against the government, was put to death on that charge.

Meanwhile the king, young as he was, and although thus excluded from the government, had not passed his time in inactivity. He was married to Philippa of Hainault, 24th January, 1328. A few months after his accession he had marched at the head of a numerous army against the Scotch, who had again invaded and ravaged the northern counties; but they eluded all his attempts to come up with them, and after a campaign of three weeks this expedition ended in nothing. Soon after this a treaty of peace was concluded between the two kingdoms, on the basis of the recognition of the complete independence of Scotland. This important treaty was signed at Edinburgh, the 17th of March, 1328, and confirmed in a parliament held at Northampton on the 4th of May following. One of the articles was, that a marriage should take place between prince David, the only son of the king of Scotland, and the sister of the king of England, the princess Joanna; and, although the bride was only in her seventh, and the bridegroom in his fifth year, the marriage was celebrated accordingly at Berwick on the 12th of July. The illustrious Bruce just lived to see this truly epic consummation of his heroic labours. He was able to receive the youthful pair on their arrival at Edinburgh after the nuptials; but he was now worn out by a disease which had for some time preyed upon him, and he returned immediately to his country-seat at Cardross, where he expired on the 7th of June, 1329.

The settlement of the dispute between the two countries which thus seemed to be effected, proved of very short duration. In a few months a concurrence of important events altogether changed both the domestic condition and the external relations of England. In the close of the year 1330, Edward at length determined to make a bold effort to throw off the government of Mortimer. The necessary arrangements having been made, the earl and the queen-mother were seized in the castle of Nottingham on the 19th of October; the execution of Mortimer followed at London on the 29th of November; many of his adherents were also put to death; Isabella was placed in confinement in her house at Risings (where she was detained for the remaining twenty-seven years of her life); and the king took the government into his own hands. In the course of the following year Edward seems to have formed the design of resuming the grand project of his father and his grandfather—the conquest of Scotland. For this design he found an instrument in Edward Balliol, the son of the late king John, who, in April, 1332, landed with a small force at Kinghorn, in Fife, and succeeded so far, in the disorganized state of the Scottish kingdom under the incompetent regency of the earl of Mar, and by the suddenness and unexpectedness of his attack, as to get himself crowned at Scone on the 24th of September. Edward, on this, immediately came to York; and on the 23rd of November Balliol met him at Roxburgh, and there made a solemn surrender to him of the liberties of Scotland, and acknowledged him as his liege lord. The violation of his late solemn engagements committed by Edward in this affair was rendered still more dishonourable by the caution and elaborate duplicity with which he had masked his design. Only a few weeks after doing his homage, Balliol found himself obliged to fly from his kingdom; he took refuge in England; various military operations followed; but at last Edward advanced into Scotland at the head of a numerous army: on the 19th of July, 1333, a great defeat was sustained by the Scotch at the battle of Halidon Hill, near Berwick; the regent Douglas himself was mortally wounded and taken prisoner; and every thing was once more subjected to Edward Balliol. King David and his queen were conveyed in safety to France. On the 12th of June, 1334, at Newcastle, Balliol, by a solemn instrument, made an absolute surrender to Edward of the greater part of Scotland to the south of the Forth. But within three or four months the puppet king was again compelled to take flight to England. Two invasions of Scotland by Edward followed; the first in November of this year; the second in July, 1335; in the course of which he wasted the country with fire and sword almost to its extreme northern confines, but did not succeed in bringing about an engagement with the native forces, which, notwithstanding, still kept the field. In the summer of 1336 he took his devastating course for the third time through the northern counties, with as little permanent effect. On now retiring to England he left the command to his brother John, styled earl of Cornwall, who soon after died at Perth.

From this time, however, the efforts of the English king were, in great part, drawn off from Scotland by a new object. This was the claim which he had first advanced some years before to the crown of France, but which he only now proceeded seriously to prosecute, determined probably by the more open manner in which the French king had lately begun to exert himself in favour of the Scots, whom, after repeated endeavours to serve them by mediation and intercession, he had at length ventured to assist by supplies of money and warlike stores. Charles IV. of France had died in February, 1328, leaving a daughter who was acknowledged on all hands to have no claim to the crown, which it was agreed did not descend to females. In these circumstances Philip of Valois mounted the throne, taking the title of Philip VI. He was without dispute the next in the line of the succession if both females and the descendants of females were to be excluded. Edward's claim rested on the position that although his mother, Isabella, as a female, was herself excluded, he, as her son, was not. If this position had been assented to he would undoubtedly have had a better claim than Philip, who was only descended from the younger brother of Isabella's father. But the principle assumed was, we believe, altogether new and unheard of—and would besides, if it had been admitted, have excluded both Philip and Edward, seeing that the true heir in that case would have been the son of Joanna Countess d'Evreux, who was the daughter of Louis X., Isabella's brother. It would also have followed that the two last kings, Philip V. and Charles IV., must have been usurpers as well as Philip VI.; the son of Joanna, the daughter of their predecessor and elder brother, would, upon the scheme of succession alleged by the king of England, have come in before both. Undeterred by these considerations, however, or even by the circumstance that he had himself in the first instance acknowledged Philip's title, and even done homage to him for the Duchy of Guienne, Edward, having first entered into an alliance with the earl of Brabant, and taken other measures with the view of supporting his pretensions, made an open declaration of them, and prepared to vindicate them by the sword. The earliest formal announcement of his determination to enforce his claim appears to have been made in a commission which he gave to the earl of Brabant and others to demand the crown of France and to take possession of it in his name, dated 7th October, 1337.

We cannot here pursue in detail the progress of the long war that followed. Edward embarked for the continent on the 16th July, 1338, and arrived at Antwerp on the 22nd. Of his allies the chief were the emperor and the free towns of Flanders, under nominal subjection to their earl, but at this time actually governed by the celebrated James Van Arteveldt. The emperor made him his vicar, and at Arteveldt's suggestion he assumed the title of king of France. The first important action that took place was the sea-fight off Sluys, on the 22nd June, 1340, in which the English were completely victorious. It was followed by long truces, which protracted the contest without any decisive events. Meanwhile, in Scotland, the war proceeded, also with occasional intermissions, but on the whole to the advantage of the national cause. Balliol left the country about the close of 1338; and in May, 1341, King David and his consort Joanna returned from France. In 1342 the Scots even made several inroads into the northern counties of England. A suspension of hostilities however took place soon after this, which lasted till the close of 1344.

In 1345 Edward lost the services of his efficient ally Van Arteveldt, who was murdered in an insurrection of the populace of Ghent, excited by an attempt, which he appears to have made somewhat too precipitately, to induce the free towns to cast off their sovereign, the earl of Flanders, and to place themselves under the dominion of the son of the king of England, Edward, prince of Wales. Edward, afterwards so distinguished under the name of the Black Prince (given to him from the colour of his armour), was born at Woodstock, 15th June, 1330, and was consequently only yet in his sixteenth year. His father nevertheless took him along with him to win his spurs, when in July 1346, he set out on another expedition to France with the greatest army he had yet raised. After reducing Caen and Lower Normandy, he proceeded along the left bank of the Seine till he reached the suburbs of the capital, and burnt the villages of St. Germains and St. Cloud. The memorable battle of Crecy followed on the 26th of August, in which the main division of the English army was commanded by the prince. Between thirty and forty thousand of the French are said to have been slain in this terrible defeat. Among those who fell was John of Luxemburg, king of Bohemia; he fell by the hand of Prince Edward, who thence assumed his armorial ensign of three ostrich feathers and the motto *Ich Dien* (I serve), and transmitted the badge to all succeeding princes of Wales.

The defeat of the French at Crecy was followed on the

17th October, in the same year, by the equally signal defeat of the Scots at the battle of Nevil's Cross, near Durham, in which the greater part of the nobility of Scotland were either taken prisoners or slain, and the king himself, after being wounded, fell into the hands of the enemy. Froissart says that Queen Philippa led the English army into the field on this occasion; but no native contemporary or very antient writer mentions this remarkable circumstance.

Three days after the battle of Crecy, Edward sat down before the town of Calais. It did not however open its gates to him till after a glorious defence of nearly eleven months. On its surrender the English king was prevented, by the intercession of Queen Philippa, from making his name infamous for ever by taking the lives of the six burgesses whom he commanded to be given up to his mercy as the price for which he consented to spare their fellow-citizens. The reduction of Calais was followed by a truce with France, which lasted till 1355. When the war was renewed, Philip VI. had been dead for five years, and the throne was occupied by his son John. On the 19th of September, 1356, the Black Prince gained the battle of Poictiers, at which the French king was taken prisoner. The kings both of France and Scotland were now in Edward's hands; but neither country was yet subjugated. At last, after many negotiations, David II. was released, in November, 1357, for a ransom of 100,000*l.*, to be discharged in ten yearly payments. King John was released on his parole in 1360, when a treaty of peace was concluded between the two countries at Bretigny, confirming to the English the possession of all their recent conquests. But after remaining in France for about four years, John returned to captivity on finding that he could not comply with the conditions on which he had received his liberty, and died in London, 8th April, 1364. He was succeeded by his son, Charles V., who had acted as lieutenant of the kingdom during his absence.

It would appear that during the Scottish king's long detention in England he had been prevailed upon to come into the views of Edward, at least to the extent of consenting to sacrifice the independence of his country after his own death; and it is probable that it was only upon a secret compact to this effect that he obtained his liberty. Joanna, the consort of David, died childless in 1362; and in a parliament held at Scone the following year the king astounded the estates by proposing that they should choose Lionel, duke of Cambridge, the third son of the king of England, to fill the throne in the event of his death without issue. At this time the next heir to the throne in the regular line of the succession was the Stewart of Scotland, the son of David's elder sister Marjory; and a wish to exclude his nephew, against whom he entertained strong feelings of dislike, is supposed to have had a considerable share in influencing the conduct of the king. The proposal was rejected by the parliament unanimously and with indignation. A few months after this the death of Edward Balliol without issue removed all chance of any competitor arising to contest David's own rights; and he became of course a personage of more importance than ever to the purposes of the ambitious and wily king of England. David now repaired to London; and here it was agreed in a secret conference held between the two kings on the 23rd of November, that in default of the king of Scots and his issue male, the king of England for the time being should succeed to the crown of Scotland. In the mean time, the king of Scots was to sound the inclinations of his people and to inform the English king and his council of the result. (See the articles of the agreement, twenty-eight in number, in the sixth volume of Rymer's 'Fœdera.') From this time David acted with little disguise in the interests of the English king, and even spent as much of his time as he could in England. One effect of this policy was, that actual hostilities between the two countries ceased; but no public misery could exceed that of Scotland, distracted as it was by internal convulsions, exhausted by the sufferings and exertions of many preceding years, and vexed by the exactions necessary to defray the ransom of the king, his claim to which Edward artfully took advantage of as a pretext for many insults and injuries, and a cover for all sorts of intrigues. In 1365, however, it was agreed that the truce (for the cessation from hostilities was as yet nothing more) should be prolonged till 1371.

In 1361 the prince of Wales had married Joanna, styled the Fair, the daughter of his great uncle the earl of Kent, who had been put to death in the beginning of the present reign. This lady had been first married to William de Montacute, earl of Salisbury, from whom she had been divorced; and she had now been about three months the widow of Sir Thomas Holland, who assumed in her right the title of earl of Kent, and was summoned to parliament as such. Soon after his marriage the prince of Wales was raised by his father to the new dignity of prince of Aquitaine and Gascony (the two provinces or districts of Guienne); and in 1363 he took up his residence, and established a splendid court in that quality, at Bordeaux. Edward's administration of his continental principality was very able and successful, till he unfortunately became involved in the contest carried on by Pedro surnamed the Cruel with his illegitimate brother Henry of Trastamare for the crown of Castile. Pedro having been driven from his throne by Henry, applied to the Black Prince for aid to expel the usurper. At this call Edward, forgetting everything except the martial feelings of the age and what he conceived to be the rights of legitimacy, marched into Spain, and defeated Henry at the battle of Najera, fought on the 3rd of April, 1367. He did not, however, attain even his immediate object by this success. Pedro had reigned little more than a year when he was again driven from his throne by Henry, by whom he was soon after murdered. Henry kept possession of the throne which he had thus obtained till his death, ten years after. Prince Edward, meanwhile, owing to Pedro's misfortunes, having been disappointed of the money which that king had engaged to supply, found himself obliged to lay additional taxes upon his subjects of Guienne, to obtain the means of paying his troops. These imposts several of the Gascon lords refused to submit to, and appealed to the king of France as the lord paramount. Charles on this summoned Edward to appear before the parliament of Paris as his vassal; and on the refusal of the prince, immediately confiscated all the lands held by him and his father in France. A new war forthwith broke out between the two countries. For a time the wonted valour of Prince Edward again shone forth; but among the other fruits of his Spanish expedition was an illness caught by his exposure in that climate, which gradually undermined his constitution, and at length compelled him, in January, 1371, to return to England. He had just before this lost his eldest son, Edward, a child of six years old. King Edward's consort, Queen Philippa, had died on the 15th of August, 1369.

On his departure from Guienne, Prince Edward left the government of the principality in the hands of his brother John of Gaunt, duke of Lancaster. The duke shortly after married a daughter of Pedro the Cruel, in whose right he assumed the title of king of Castile, and before the end of the year followed his brother to England. Affairs on the continent now went rapidly from bad to worse. The great French General Duguesclin drove the English everywhere before him. In the summer of 1372 two expeditions were fitted out from England, the first commanded by the earl of Pembroke, the second by King Edward in person, accompanied by the Black Prince; but both completely failed. The forces of the earl of Pembroke were defeated while attempting to land at Rochelle by the fleet of Henry King of Castile; and those conducted by the king and his son, which were embarked in 400 ships, after being at sea for six weeks, were prevented from landing by contrary winds, and obliged to put back to England. At last, in 1374, when he had lost everything that had been secured to him by the treaty of Bretigny, Edward was glad to conclude a truce for three years.

Thus ended the French wars of this king, which had cost England so much blood and treasure. Those which he waged against Scotland equally failed of their object. David II. had died in February, 1371, and the Stewart of Scotland immediately ascended the throne without opposition under the title of Robert II. No serious attempt was ever made by Edward to disturb this settlement, though he at one time seemed inclined to threaten another Scottish war, and he never would give Robert the title of king, he contented himself with styling him 'the most noble and potent prince, our dear cousin of Scotland.'

The latter years of Edward's long reign presented in all respects a melancholy contrast to its brilliant commencement. The harmony which had hitherto prevailed between the king and his parliament gave way under the public misfortunes, and the opposition to the king's government was headed by his eldest son. The Black Prince, however, died in his 46th year, on the 8th of June 1376. He was in the popular estimation the first hero of the age, and to this reputation his military skill, his valour, and other brilliant and noble qualities, may be admitted to have entitled him; but, with all his merits, he was not superior to his age, nor without his share of some of the worst of its faults. He left by his wife Joanna one son, Richard, a child in his tenth year; and he appears also to have had a daughter, who became the wife of Waleran de Luxemburg, count de Ligny; his illegitimate sons were Sir John Sounder and Sir Roger de Clarendon. King Edward, in the weakness of old age, had now for some time given up the entire management of affairs to his second son the unpopular Duke of Lancaster, and fears were entertained that he intended the duke to inherit the crown; but these apprehensions were removed by his creating Richard of Bordeaux prince of Wales, duke of Cornwall, and earl of Chester, and declaring him in parliament his heir and successor. Since the death of his queen also he had attached himself with doting fondness to Alice Perers, one of the Ladies of her Bedchamber, and had excited great public disgust by the excesses to which this folly carried him. The last fortnight of his life he spent at his manor of Shene, now Richmond, attended only by this lady. But even she deserted him on the morning of his death; and no one save a single priest was by his bed-side, or even in the house, when he breathed his last. This event happened on the 21st of June, 1377, in the 65th year of his age and the 51st of his reign.

Edward III. had by his queen, Philippa of Hainault, seven sons: 1. Edward prince of Wales; 2. William of Hatfield, born 1336, who died young; 3. Lionel, duke of Clarence, born at Antwerp 29th November, 1338; 4. John, duke of Lancaster, called of Gaunt, or Ghent, where he was born in 1340; 5. Edmund, duke of York, born at Langley, near St. Alban's, in 1341; 6. William, born at Windsor, who died young; 7. Thomas, duke of Gloucester, born at Woodstock, 7th January, 1355; and five daughters: 1. Isabella, married to Ingelram de Courcy, earl of Soissons and Bedford; 2. Joanna, born in August, 1334, who was contracted, in 1345, to Pedro the Cruel, afterwards king of Castile, but died of the plague at Bordeaux, in 1349, before being married; 3. Blanche, called De la Tour, from having been born in the Tower of London, who died in infancy; 4. Mary, married to John de Montford, duke of Bretagne; and 5. Margaret, married to John de Hastings, earl of Pembroke.

It has been observed, in regard to Edward III., by Sir James Mackintosh, that 'though his victories left few lasting acquisitions, yet they surrounded the name of his country with a lustre which produced strength and safety; which perhaps also gave a loftier tone to the feelings of England, and a more vigorous activity to her faculties.' 'During a reign of fifty years,' it is added, 'Edward III. issued writs of summons, which are extant to this day, to assemble seventy parliaments or great councils: he thus engaged the pride and passions of the parliament and the people so deeply in support of his projects of aggrandisement, that they became his zealous and enthusiastic followers. His ambition was caught by the nation, and men of the humblest station became proud of his brilliant victories. To form and keep up this state of public temper was the mainspring of his domestic administration, and satisfactorily explains the internal tranquillity of England during the forty years of his effective reign. It was the natural consequence of so long and watchful a pursuit of popularity that most grievances were redressed as soon as felt, that parliamentary authority was yearly strengthened by exercise, and that the minds of the turbulent barons were exclusively turned towards a share in their sovereign's glory. Quiet at home was partly the fruit of fame abroad.'

The two great charters were repeatedly confirmed in this reign, and a greater number of important new laws were passed than in all the preceding reigns since the Conquest. Among them may be particularly noticed the celebrated statute (25 Ed. III., st. 5, c. 2) defining and limiting the offence of high treason; the numerous provisions made to regulate the royal prerogative of purveyance, and diminish the grievances occasioned by it; the law (1 Ed. III., c. 12) permitting tenants in chief to alienate their lands on payment of a reasonable fine; the several prohibitions against the payment of Peter's Pence; and the first statute (the 27th Ed. III., st. 1, c. 1) giving a writ of præmunire against such as should presume to cite any of the king's subjects to the court of Rome. In this reign also began the legislation respecting the poor, by the enactment of the statute of Labourers (23 Ed. III., c. 1), which was followed by several other acts of the same kind, setting a price upon labour as well as upon provisions. Trial by Jury also now began to acquire a decided ascendancy over the old modes of trial and various regulations were made for improving the procedure of the courts and the administration of justice. Justices (at first called keepers) of the peace were established by the statute 34 Ed. III., c. 1. In 1362 was passed the important act (36 Ed. III., st. 5, c. 15) declaring that henceforth 'all pleas should be pleaded, showed, defended, amended, debated, and judged in the English tongue,' and no longer in the French, which is described as 'much unknown in the realm.' They were ordered still however to be entered and enrolled in Latin. The acts of parliament continued to be written sometimes in Latin, but most generally in French, long after this time. The science of legal pleading is considered by Coke to have been brought to perfection in this reign. The only law treatises which belong to this reign are those entitled the Old Tenures, the Old Natura Brevium, the Novæ Narrationes, and the book on the Diversity of Courts. They are all in Norman French.

The commerce and manufactures of the country made some advances with the general progress of the age in the course of this reign; but they certainly were not considerable for so long a space of time. The woollen manufacture was introduced from the Netherlands, and firmly rooted in England before the close of the reign. Some augmentation also seems to have taken place in the shipping and exports of the country. On the other hand, the king's incessant wars operated in various ways to the discouragement of commerce. Sometimes foreign merchants were afraid to send their vessels to sea lest they should be captured by some of the belligerents. On one occasion at least (in 1238), Edward made a general seizure of the property belonging to foreign merchants within his dominions, to supply his necessities. At other times he resorted to the ruinous expedient of debasing the coin. Many acts were passed by the parliament on the subject of trade, but they involved for the most part the falsest principles; some prohibiting the exportation of money, of wool, and of other articles; others imposing penalties for forestalling; others attempting to regulate wages, prices, and expenditure. Of course such laws could not be executed; they only tormented the people, and aggravated the mischiefs they were intended to cure; but in consequence of being thus inefficient, they were constantly renewed. The most memorable invention of this age is that of gunpowder, or rather its application in war. It appears to be certain that cannons were used at the battle of Crecy in 1346; but there is reason to believe that they were in use about twenty years earlier. They were certainly familiarly known before the close of the reign.

Among the more elegant arts, architecture was that which was carried to the greatest height. Edward III. nearly rebuilt the Castle of Windsor, which however has undergone great improvements and alterations since his time· the beautiful chapel of St. George, at Windsor, was also built, or at least finished, by this king. But splendour and luxury generally made undoubtedly great advances among the wealthier classes, although it may be questioned if wealth was more generally diffused throughout the community, or if the poverty and wretchedness of the great body of the people were not rather increased than diminished. The increase of licentiousness of manners among the higher ranks appears to have kept pace with that of magnificence in their mode of living. This was the age of tournaments, and of the most complete ascendancy of the system of chivalry; but all this, at least in its direct and immediate effects, was more favourable to the improvement of the outside polish and formal courtesies of life within a narrow circle, than to the diffusion of any humanizing influences throughout the mass of society. The Order of the Garter was instituted by Edward III., it is generally supposed in the year 1349.

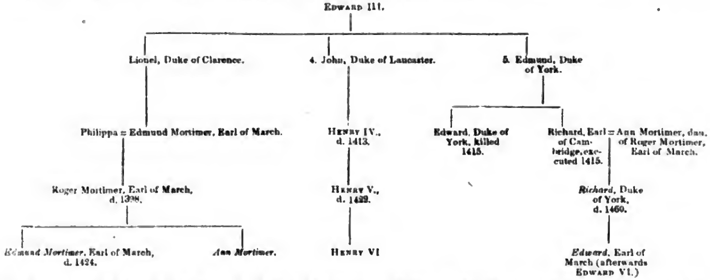
In literature, this was the age of Chaucer, the Morning Star of our poetry, and of his friend Gower, and also of Wicliffe, who first translated the Scriptures into English, and who has been called the Morning Star of the Reformation. The principal chroniclers of the time of Edward III. are Thomas Stubbs, William Thorn, Ralph

Higden, Adam Merimuth, Henry de Knighton, and Robert de Avesbury.

The convulsion in the church excited by Wicliffe began in the last years of Edward III., but the history of it more properly belongs to the next reign, that of his grandson Richard II.

EDWARD IV., king of England. During the reign of Richard II. the heir presumptive to the crown was Roger Mortimer, earl of March, the son of Philippa Plantagenet, who was the only child of Lionel duke of Clarence, the second of the sons of Edward III. that left any descendants. Roger earl of March died in Ireland, where he was lord-lieutenant, or governor, in 1398. His son Edmund Mortimer, earl of March, was a child of only ten years of age at the deposition of Richard II. in 1399; but in his person resided the right to the crown by lineal descent so long as he lived. Although however his name was mentioned on several occasions in connexion with his dangerous pretensions, and he more than once ran the risk of being made a tool of in the hands of persons more ambitious than himself, he never made any attempt against the house of Lancaster. We may here remark, that much confusion has been introduced into the common accounts of Edmund Mortimer by his being confounded with his uncle Sir Edmund Mortimer. It was the latter personage, for instance, who, having married the daughter of Owen Glendower, engaged with the Percies in their insurrection in 1403, and performed the rest of the part assigned to the Lord Mortimer in Shakspeare's play of the First Part of Henry the Fourth. It is to him also we suppose that we are to attribute the pun put by the common histories into the mouth of his nephew the earl of March at the coronation of Henry IV., when, on that king claiming the crown as the heir male of Henry III., he said that he was indeed *Hæres Malus.* 'But Edmund had his jest and Henry his crown,' observes Bishop Kennet in telling this story (*Complete History of England*, i. 274). The young earl of March, with the other children of his father, was detained in a sort of imprisonment at Windsor during all the reign of Henry IV., but on the accession of Henry V. he was set at liberty. In 1415 he became involved in the conspiracy planned against Henry V. by Richard earl of Cambridge; but it is most probable that he was not answerable for the use which was made, or rather intended to be made, on this occasion, of his name. Indeed the common account makes him to have been the person who gave Henry information of the conspiracy, after he had been applied to by the earl of Cambridge, who had married his sister, to join it. After the accession of Henry VI. he was sent as lord lieutenant to Ireland; and he died there in the castle of Trim in 1424. He left no issue, nor did his brother Roger, nor his sister Eleanor; but his sister Ann, married to the earl of Cambridge, had a son named Richard, who consequently became his uncle's representative, and (at least after the death of his mother) the individual on whom had devolved the claim by lineal descent to the crown. This Richard was also the representative of Edward III.'s fifth son, Edmund duke of York, his father the earl of Cambridge having been the second son of that prince, whose eldest son and heir, Edward duke of York, had fallen at the battle of Agincourt, leaving no issue, only a few months after his brother had been executed for the conspiracy mentioned above. At the time of his uncle's death, Richard, in consequence of his father's forfeiture, had no title; but he seems to have immediately assumed that of Earl of March, at least he is so called by some of the chroniclers, and the same title was also afterwards borne by his son, although the right of either to it may be questioned, inasmuch as it appears to have been only descendible to heirs male. Richard however is best known by his title of duke of York, which he took in 1425, on being restored in blood and allowed to inherit the honours both of his father and uncle. But it is important to recollect that the claim of the house of York to the crown in opposition to the house of Lancaster was not derived from Edward III.'s fifth son Edmund duke of York, who was younger than John of Gaunt, the founder of the house of Lancaster, but from Lionel duke of Clarence, who was that king's third son, John of Gaunt being his fourth.

As a clear notion of the above genealogical statement is important to the understanding of a considerable portion of English history, it may be proper once for all to exhibit it in the form most convenient for its ready apprehension and for future reference to it. The line of the eldest son of Edward III. having failed in Richard II., and his second son having died without issue, the contest for the crown in the fifteenth century lay among the descendants of his third, fourth, and fifth sons, whose connexion with him and among themselves stood thus:—


EDWARD III.
Lionel, Duke of Clarence.
4. John, Duke of Lancaster.
5. Edmund, Duke of York.
Philippa = Edmund Mortimer, Earl of March.
HENRY IV., d. 1413.
Edward, Duke of York, killed 1415.
Richard, Earl of Cambridge, executed 1415.
= Ann Mortimer, dau. of Roger Mortimer, Earl of March.
Roger Mortimer, Earl of March, d. 1398.
HENRY V., d. 1422.
Richard, Duke of York, d. 1460.
Edmund Mortimer, Earl of March, d. 1424.
Ann Mortimer.
HENRY VI
Edward, Earl of March (afterwards EDWARD VI.)

The persons whose names are printed in Italics are those in whom successively the hereditary right vested. We cannot discover however how long Ann Mortimer survived her brother, or even that she survived him at all, although it seems to be usually assumed that she did.

Richard, duke of York, first makes his appearance in public affairs in the end of the year 1435, when he was appointed by Henry VI. to the regency of France on the death of the duke of Bedford. By the time he entered upon his office, however, Paris had been evacuated, and their French dominion was fast passing out of the hands of the English. He was recalled in 1437, but was reappointed on the death of his successor, the earl of Warwick, in July, 1440. On the 29th of April, 1441 (or, according to another account, in September, 1442), his son Edward, earl of March, afterwards Edward IV., was born at Rouen. The duke of York remained in France till after the conclusion of the king's marriage with Margaret of Anjou, in 1446; and his government was then prolonged for another term of five years; but in 1447 he was recalled, through the influence of the queen and the favourite, the marquess of Suffolk, and Edmund Beaufort, earl (afterwards duke) of Somerset, the chief of the younger branch of the Lancaster family, appointed his successor. It is understood that before this the unpopular government of the queen and the favourite had turned men's minds to the claims of the duke of York; and it is said that he himself, though he moved warily in the matter, was not idle by his emissaries in encouraging the disposition that began to grow up in his favour. The progress of events in course of time enabled him to take a bolder part in the promotion of the design he had already in all probability formed, of securing the crown for himself and his family. In 1449 he gained additional popularity by the able and conciliatory manner in which he suppressed an insurrection in Ireland. In the rising of the people of Kent the next year, their leader, Jack Cade, assumed the name of Mortimer as a sort of title. When he rode in triumph through the streets of the metropolis, he called out, as he struck London Stone with his sword, 'Now is Mortimer lord of the city!' When the duke returned from Ireland, in August, 1451, some steps seem to have been taken by the court to oppose his landing; but he made his way to London, and immediately entered there into consultations with his friends. It was determined to demand the dismissal and punishment of the duke of Somerset, now the king's chief minister; but although this attempt was supported by an armed demonstration, it ended after a few months in the duke of York dismissing his followers, returning to his allegiance, and agreeing to retire to his estate. The king had now been married for several years without having any children, and it appears to have been generally expected that the duke, by merely waiting for his death, would obtain the crown without any risk or trouble. On the birth of the prince of Wales, however, in October, 1453, it became necessary to adopt another course. The spirit that showed itself in the parliament the following year forced the court to admit the duke of York and his chief friends and confederates, the two Nevilles (father and son), earls of Salisbury and Warwick, into the council, where their first act was to arrest the duke of Somerset and send him to the Tower. A few weeks after this (on the 3rd April, 1454), the duke of York was appointed by the parliament protector and defender of the kingdom during the illness of the king, who had fallen into a state of mental as well as bodily imbecility. In the following spring however Henry partially recovered, and resuming the management of affairs, released Somerset. This brought matters to a crisis. The duke of York now withdrew from court, and both parties collected their forces to decide their quarrel by the sword. The two armies met at St. Alban's on the 23rd of May, 1455, when the king was defeated, he himself being wounded and taken prisoner, and the duke of Somerset and others of the royal leaders slain. Henry, detained in the hands of the victor, was obliged to call a parliament, which met at Westminster on the 9th of July; and here the helpless king declared the duke and his friends to be innocent of the slaughter at St. Alban's, and greeted them as his 'free and faithful liegemen.' The parliament met again, after prorogation, on the 12th November, when the duke was a second time appointed protector. He was removed however by the king on the 23rd February, 1456; on which he again retired from court with his friends. The next two years passed without any further encounter, each party hesitating to attack the other. At last, in the spring of 1458, York and his friends were invited by the queen to London, to be reconciled to the Lancastrian party; an agreement to live for the future in peace was made with much solemnity; and the duke of York and the earls of Salisbury and Warwick were again admitted into the council. All this however seems to have been merely a stratagem of the queen's to get them into her power: their danger soon became apparent; and before the end of the year they all again withdrew from court. The resort to the final arbitrament could not now be much longer deferred. Both parties again collected their armed strength. Their first meeting took place at Blore-heath, near Drayton, in Shropshire, on the 23rd September, 1459, when the royal forces under Lord Audley were defeated by the earl of Salisbury, Audley himself being slain. On the 12th of October however the king's army met that of York and Warwick near Ludlow: ample offers of pardon were made to all who would come over to the royal side; and the consequence was, that so many of the insurgents deserted, that, almost without striking a blow, the rest threw down their arms, and their leaders were obliged to save themselves by flight. The duke of York and his adherents were attainted and their estates confiscated, at a parliament which met at Coventry a few weeks after. By June, 1460, however, the dispersed insurgents were again in arms. York landed from Ireland and Warwick from France nearly at the same time; the latter, whose numbers had now increased to 40,000 men, entered London on the 2nd of July; and on the 9th the royal forces, advancing from Coventry, were met near Northampton, by York's son Edward, the young earl of March, and signally defeated, the king being taken prisoner, and the queen and her son obliged to fly for their lives. This is the first appearance of Edward on the scene. Up to this time also the duke of York had never disputed Henry's title to the crown; he professed to have taken arms only to compel the king to dismiss his evil counsellors and to govern according to the laws. Even now Henry's name was still made use of by the victorious party. He was made to call a parliament, which met at Westminster on the 2nd October, and immediately annulled every thing that had been done by the late parliament of Coventry. But at this point the duke at last threw off all disguise. On the 16th he delivered to the parliament by his counsel a written claim to the crown. The question was formally discussed, and it was at length determined that Henry should be allowed to remain king during his life, but that the duke of York should be immediately declared his successor. Richard was accordingly, on the 1st of November, solemnly proclaimed heir apparent and protector of the realm; being in the latter capacity invested with rights and powers which already threw into his hands all of royalty except the name. But his dignity and authority were soon brought to an end. The queen found means to assemble an army in the north; on hearing which news the duke, on the 2nd of December, marched from London to give her battle. They met on Wakefield Green on the 31st, and the issue of their encounter was the complete defeat of York. He himself and one of his younger sons were slain, and the earl of Salisbury was taken prisoner, and executed the next day at Pomfret, with twelve of his associates. Edward, now duke of York, was at Gloucester when he heard of this disaster. A formidable royal force, commanded by the earls of Pembroke and Ormond, hung on his rear; this he attacked on the 2nd February, 1461, at Mortimer's Cross, near Hereford, and completely routed. He then set out for London, upon which the queen also was now directing her march. The next engagement that took place was at Bernard's Heath, near St. Alban's, where the queen was met on the 17th by the earl of Warwick: the earl, who had the king with him in the field, was defeated, and his majesty regained his liberty. The approach of the duke of York however deterred Margaret from continuing her advances upon the capital; she retired to the north, while he entered London on the 28th, amid the congratulations of the citizens. On the 2nd of March he laid his claim to the crown, founded on King Henry's alleged breach of the late agreement, before an assembly of lay and clerical lords; on the same afternoon an assembly of the people was held in St. John's Fields, at which his nomination as king was received with unanimous acclamations of assent; and two days after he was solemnly proclaimed by the name of Edward the Fourth. The 4th of March was considered as the day of his accession.

The first three years of the reign of Edward IV. were occupied by a prolongation of the contest that raged when he mounted the throne. The Lancastrians sustained a severe defeat from the king in person at Towton in Yorkshire, on the 29th of March, 1461; but Queen Margaret was unwearied in her applications for assistance to France and Scotland, and she was at last enabled to take the field with a new army. That too however was routed and dispersed at Hexham by the forces of Edward under the command of Lord Montagu, on the 17th of May, 1464. This victory, and the capture of Henry, which took place a few days after, put an end to the war. An event however occurred about the same time out of which new troubles soon arose. This was the marriage of the king with Elizabeth Woodville, the young and beautiful widow of Sir Thomas Gray, and the daughter of Sir Richard Woodville (afterwards created Earl Rivers) by Jacquetta of Luxemburg, whose first husband had been the late duke of Bedford. The connexions of the lady, both by her birth and by her first marriage, were all of the Lancastrian party; but Edward's passion was too violent to allow him to be stopped by this consideration; he was privately married to her at Grafton, near Stoney Stratford, on 1st May, 1464: she was publicly acknowledged as his wife in September; and she was crowned at Westminster on Ascension Day in the following year. The first effect of this marriage was to put an end to a negotiation, in which some progress had been made, with the French King Louis XI. for Edward's marriage with his sister-in-law the Princess Bonne of Savoy, any alliance which it was hoped might have proved a bond of amity betwixt the two kingdoms. It at the same time alienated from the king the most powerful of his supporters, the earl of Warwick, by whom the French negotiation had been conducted, and whose disapprobation of the king's conduct in a political point of view was consequently sharp ened by the sense of personal ill usage. Above all, the honours and bounties lavished by Edward upon the obscure family of his queen disgusted the old nobility, and raised even a national feeling against him. It was some time before matters came to extremities; but at last, Warwick and Queen Margaret having entered into close alliance, England was once more, in 1469, deluged with the blood of a civil war. Nearly the whole of that and the following year was a season of confusion, of which it is scarcely possible to derive any consistent or intelligible account from the imperfect documents of the time that remain, and the ill-informed chroniclers who have attempted to describe the course of occurrences. At last, in the beginning of October, 1470, Edward found himself obliged to embark and fly to Holland. King Henry was now released from the Tower, in which he had been confined for the preceding six years, and the royal authority was again exercised in his name. This revolution earned for Warwick his well-known title of the King-maker. Henry's restoration however was a very short one. On the 14th March, 1471, Edward landed, with a force which he had raised in the Low Countries, at the mouth of the Humber, made his way to London, was received with acclamations by the citizens, again obtained possession of the imbecile Henry, and shut him up in his old prison. He then, on the 14th April, went out to meet Warwick, who was advancing from St. Alban's: the two armies encountered at Barnet; and the result was that the forces of the earl were completely defeated, and both he and his brother Lord Montagu were left dead on the field. The war was finished by the second defeat of the Lancastrians on the 14th May, at the great battle of Tewkesbury, where both Queen Margaret and her son Prince Edward fell into the hands of their enemies. Margaret was sent to the Tower, and was detained there till she was set at liberty in conformity with one of the articles of the treaty of Pecquigny, concluded with France in 1475, the French king paying for her a ransom of 50,000 crowns. Her unfortunate son was brought before Edward on the day after the battle, and brutally put to death in his presence by the hands of the dukes of Clarence and Gloucester (the king's brothers), assisted by two other noblemen. King Henry terminated his days in the Tower about three weeks after; and it has generally been believed that he was also violently taken off, and that his murderer was the duke of Gloucester. Many executions of the members of the Lancastrian party followed, and confiscations of their property in all parts of the kingdom.

The remainder of the reign of Edward IV. was marked by few memorable events. One that may deserve to be noticed is the fate of the king's next brother, George duke of Clarence, who was attainted of treason by a parliament which met in January, 1478, and immediately after privately put to death, being drowned, it was generally believed, in a butt of malmsey. He had at one time taken part with Warwick against his brother, and had sealed his alliance with the earl by marrying his daughter; nor, although he afterwards saw it prudent to break this connexion, had he and Edward ever probably been cordially reconciled. It seems to have been chiefly his nearness to the throne that at last fixed his brother in the determination of getting rid of him. Edward was at war both with Scotland and with France during the greater part of his reign; but the military operations that took place were unimportant, and are not worth relating: they were never carried on with any vigour, and were frequently suspended by long truces, which however, in their turn, were generally broken by the one nation or the other before the proper term. In June, 1475, Edward having previously sent a herald to King Louis to summon him to surrender the whole kingdom of France, embarked with a large force, and landed at Calais; but the expedition ended within three months in the treaty of Pecquigny, or Amiens, already mentioned. By one of the articles it was agreed that the dauphin, Charles, should marry Elizabeth, the king of England's eldest daughter; and Louis also engaged to pay Edward an annuity of 50,000 crowns a year as long as they both lived. It appears that Edward's ministers as well as their royal master consented to receive pensions from the French king: large amounts of money were distributed among them from time to time; and in their case at least this foreign pay was a mere bribe to engage them in the interests of the power from which they received it. Edward however is asserted to have himself shared in their gains; indeed his own acknowledged annuity, though it might bear the appearance of a compensation for advantages which he had given up, was itself in reality nothing else than a bribe; it was a supply obtained independently of parliament and the country. He was driven indeed to many other shifts and illegal methods, as well as this, to raise money for his wasteful debaucheries and extravagant expenditure on the mistresses, favourites, and others that ministered to his personal pleasures. Louis however appears never to have had any intention of fulfilling his engagement as to the marriage; for some years he evaded Edward's importunities as well as he could; till at length, in 1482, he contracted the dauphin in another quarter Edward, incensed in the highest degree, was preparing to avenge this affront by a new descent upon France, in which the parliament had eagerly promised to assist him with their lives and fortunes, when he was suddenly cut off by a fever, on the 9th of April, 1483, after a reign of twenty-two years.

Edward IV. had by his wife Elizabeth three sons; Edward, who succeeded him; Richard, duke of York, born in 1474; and George, duke of Bedford, who died in infancy; and seven daughters; Elizabeth, born 11th of February, 1466, contracted to the dauphin, and afterwards married to Henry VII.; Cecilia, contracted to Prince James (afterwards James IV.) of Scotland, and afterwards married first to John Viscount Wells, secondly to Mr. Kyme, of Lincolnshire; Anne, contracted to Philip, son of the archduke Maximilian of Austria and his wife the duchess of Burgundy, and afterwards married to Thomas Howard, duke of Norfolk; Bridget, born at Eltham, 10th November, 1480, who became a nun at Dartford; Mary, contracted to John I., king of Denmark, Norway, and Sweden, but who died at Greenwich, in 1482, before the marriage was solemnized; Margaret, born 19th April, 1472, who died 11th December following; and Catherine, contracted to John, elder son of Ferdinand and Isabella of Spain, and afterwards married to William Courtenay, earl of Devonshire. By one of his many mistresses, Elizabeth Lucy, he had two natural children; Arthur, surnamed Plantagenet, created Viscount Lisle by Henry VIII.; and Elizabeth, who became the wife of Thomas lord Lumley.

Edward IV. has the reputation of having been zealous and impartial in the administration of justice; but with the exception of some statutes abridging the antient jurisdiction of sheriffs, and transferring part of the powers of those officers to the quarter-sessions, no important innovations were made in the law during this reign. It is from this period however that the rise of what is called indirect pleading is dated. In this reign also the practice of suffering common recoveries by a tenant in tail, as a means of barring his estate tail, and also all the estates in remainder and reversion, was fully established by judicial decision (in the 12th year of this king) after it had been interrupted for some time by the statute of Westminster 2, 13 Ed. I., c. 32. The reduction of the law and its practice to a scientific form is considered to have made great progress in the latter part of the reign of Henry VI., and in that of Edward IV. To the latter belong the treatise 'De Laudibus Legum Angliæ' of Sir John Fortescue, the celebrated treatise on Tenures of Sir Thomas Littleton, and the work called Statham's Abridgment of the Law. The Year Books also began now to be much more copious than in former reigns.

Many laws relating to trade and commerce passed in the reign of Edward IV. attest the growing consequence of those interests, but are not in other respects important, and do not show that more enlightened views began to be entertained than had heretofore prevailed. The manufacture of articles of silk, though only by the hand, was now introduced into this country; and we find the parliament endeavouring to protect it by the usual method of prohibiting the importation of similar articles made abroad. This reign is illustrious as being that in which the art of printing was introduced into England. [CAXTON.]

The testimony of historians concurs with the probabilities of the case in assuring us that the country must have been subjected to much devastation and many miseries during the bloody and destructive wars of York and Lancaster; but this contest was undoubtedly useful in shaking the iron-bound system of feudalism, and clearing away much that obstructed the establishment of a better order of things. The country seems to have very soon recovered from the immediate destruction of capital and property occasioned by these wars.

EDWARD V., the eldest son of Edward IV., was born 4th of November, 1470, in the Sanctuary of Westminster Abbey, where his mother had taken shelter when her husband was obliged to fly to the Continent on the return of Queen Margaret and the earl of Warwick. He was consequently only in his thirteenth year when his father died. His reign is reckoned from the 9th of April, 1483, the day of his father's decease; but during the few weeks it lasted he never was a king in more than name. The public transactions of his reign all belong properly to the history of his uncle, Richard III. Edward was at Ludlow in Shropshire at the time of his father's death, and possession of his person was obtained at Northampton by Richard (then duke of Gloucester) as he was on his way to London in charge of his maternal uncle Anthony earl Rivers. He appears not to have been brought to London till the beginning of May. In the course of that month, and probably between the 24th and 27th, Richard was declared at a great council protector of the king and the kingdom. On the 16th of June he contrived to obtain Edward's younger brother, the duke of York, out of the hands of the queen his mother, who had taken refuge in Westminster Abbey with him and his sister. The two boys were forthwith removed to the Tower, then considered one of the royal palaces, there to remain, as was pretended, till the coronation of the young king, which was appointed to take place on the 22nd. Before that day arrived however Richard had completed his measures for placing the crown on his own head. The 26th of June is reckoned the commencement of his reign, and the close of that of his nephew. After this Edward and his brother were seen no more. They were however universally believed to have been made away with by Richard. The account which has been generally received is that given by Sir Thomas More, whose testimony may be regarded as that of a contemporary, for he was born some years before the death of Edward IV. His statement is in substance that Richard, while on his way to pay a visit to the town of Gloucester after his coronation, sent one John Green, 'whom he specially trusted,' to Sir Robert Brackenbury, the constable of the Tower, with a letter desiring Sir Robert to put the children to death; that Brackenbury declared he would not commit so dangerous a deed; that Sir James Tyrrel was then despatched with a commission to receive the keys of the Tower for one night; and that under his directions the children were about midnight stifled in bed with their feather-beds and pillows, by Miles Forest, 'one of the four that kept them, a fellow fleshed in murder beforetime,' and John Dighton, Tyrrel's own horse-keeper, 'a big, broad, square, and strong knave.' The relation is given in the fullest and most particular form, not in the Latin translation of More's History, or in the re-translation of that into English, published (with a strange ignorance that the work already existed in English) in Bishop Kennet's Collection of Histories (3 vols., folio, 1706); but in the English work, which we believe is the original. It is printed in full from More's works in Holinshed, who describes it as written about the year 1513. More does not give the story as merely 'one of the various tales he had heard concerning the death of the two princes' (Henry's *Hist. of Great Britain;* and Walpole's *Historic Doubts on the Life and Reign of Richard III.*); he introduces it by saying, 'I shall rehearse you the dolorous end of those babes, not after every way that I have heard, but after that way that I have so heard by such men and by such means, as methinketh it were hard but it should be true;' and he closes the narrative by repeating that it is what he had 'learned of them that much knew, and little cause had to lie.' It is perfectly evident that he had not himself a doubt of its truth 'Very truth it is,' he says moreover, 'and well known, that at such time as Sir James Tyrrel was in the Tower, for treason committed against the most famous prince, king Henry VII., both Dighton and he were examined, and confessed the murder in manner above written.' The common story seems to be supported by the honours and rewards which were immediately bestowed by Richard upon Tyrrel, Brackenbury, Green, and Dighton. (See these stated in Strype's *Notes on Sir George Buck's Life and Reign of Richard III.*, book 3rd.) Symnel, or Sulford, who in the reign of Henry VII. assumed the character of Edward Plantagenet, son of George duke of Clarence, seems to have originally intended to pass himself as Edward V. Perkin Warbeck, who appeared some years after, called himself Edward's brother, Richard duke of York.

Buck and others, who have endeavoured to disprove King Richard's guilt, have rested much of their argument on the fact that the remains of Edward and his brother never could be found in the Tower, although much search had been made for them; but on the 17th of July, 1674, in making some alterations, the labourers found covered with a heap of stones at the foot of an old pair of stairs a quantity of partially consumed bones, which, on examination appeared to be those of two boys of the ages of the two princes They were removed by order of Charles II. to Henry VII.'s chapel in Westminster Abbey, where the inscription placed over them recites that they appeared by undoubted indications to be those of Edward V. and his brother. (Ossa desideratorum diu et multum quæsita, &c., scalarum in ruderibus (scalæ istæ ad sacellum Turris Albæ nuper ducebant) alte defossa, indiciis certissimis sunt reperta, &c.) This discovery is sufficiently in conformity with More's account, who tells us that Tyrrel caused the murderers to bury the bodies 'at the stair foot, meetly deep in the ground under a great heap of stones.' It is true he mentions a report that Richard 'allowed not the burying in so vile a corner, saying that he would have them buried in a better place, because they were a king's sons; whereupon they say that a priest of Sir Robert Brackenbury's took up the bodies again, and secretly interred them in such place as, by the occasion of his death which only knew it, could never since come to light.' This however is evidently a story both improbable in itself, and one which, although it might naturally enough arise and get into circulation, could never have rested on any trustworthy authority. More gives it as a mere rumour, and we may fairly infer, from the words ('as I have heard') with which it is introduced, that he did not himself believe it. He carefully adds, in his notice of the examination of Tyrrel and Dighton, 'but whither the bodies were removed they could nothing tell. Tyrrel was executed for his treason; but Dighton still lived when More wrote. He says of him, 'Dighton indeed yet walketh on alive, in good possibility to be hanged ere he die.' According to Grafton, 'Dighton lived at Calais long after, no less disdained and hated than pointed at.' The reader may also compare upon this subject the account of the examinations of Tyrrel and Dighton given by Bacon in his History of King Henry VII. (Montagu's edition of Bacon's Works, iii., 287, 288.) It agrees very closely with the story told by More. Bacon says that Dighton, who was set at liberty after the examinations, 'was the principal means of divulging this tradition;' and from the use of that expression it has been inferred that Bacon regarded the whole as an idle tale. But he has in several places in this work distinctly expressed his belief of the guilt both of Richard and Tyrrel; especially in his notice (p. 385) of the execution of Tyrrel, 'against whom,' he says, 'the blood of the innocent princes, Edward V. and his brother, did still cry from under the altar.' Tyrrel's examination, we may observe, appears to have taken place in 1493; but he was not executed till 1503. He was committed to the Tower in the first of these years on the appearance of Perkin Warbeck, expressly that he might be examined touching the murder; and it was on quite another charge that he was executed ten years after. More's account therefore of the circumstances of his confession is slightly inaccurate. He does not however expressly say, as Sir James Mackintosh makes him do (*Hist. Eng.*, ii., 59), that Tyrrel 'confessed his guilt *when he was executed twenty years after* for concealing the murder of the earl of Suffolk.' Bacon himself, who relates, in their proper places, both his first imprisonment and his execution, says inaccurately that he was beheaded 'soon after' the examinations. [RICHARD III.]

EDWARD VI., the only son of Henry VIII. who survived him, was born at Hampton Court 12th October, 1537. His mother, Queen Jane Seymour, died on the twelfth day after giving him birth. The child had three stepmothers in succession after this; but he was probably not much an object of attention with any of them. Sir John Hayward, who has written the history of his life and reign with great fulness, says that he 'was brought up among nurses until he arrived to the age of six years.' He was then committed to the care of Dr. (afterwards Sir Anthony) Cooke, and Mr. (afterwards Sir John) Cheke, the former of whom appears to have undertaken his instruction in philosophy and divinity, the latter in Greek and Latin. The prince made great proficiency under these able masters. Henry VIII. died at his palace at Westminster early in the morning of Friday the 28th of January, 1547; but it is remarkable that no announcement of his decease appears to have been made till Monday the 31st, although the parliament met and transacted business on the intervening Saturday. Edward, who was at Hatfield when the event happened, was brought thence in the first instance to the residence of his sister Elizabeth at Enfield, and from that place, on the 31st, to the Tower at London, where he was proclaimed the same day. The council now opened the will of the late king (executed on the 30th of December preceding), by which it was found that he had (according to the powers granted him by the acts 28 Hen. VIII. ch. 7, and 35 Hen. VIII. ch. 1) appointed sixteen persons under the name of executors, to exercise the powers of the government during the minority of his son. One of these, the king's maternal uncle, Edward Seymour, earl of Hertford, was immediately elected by the rest their president, and either received from them in this character, or assumed of his own authority, the titles of governor of his majesty, lord protector of all his realms, and lieutenant-general of all his armies. He was also created duke of Somerset, and soon after took to himself the office of lord high treasurer, and was further honoured by being made earl marshal for life. About the same time his brother, Sir Thomas Seymour, was created Baron Seymour of Sudley, and appointed lord high admiral. The elevation of Somerset had been opposed by the lord chancellor Wriothsley (now earl of Southampton); but the protector in a few weeks got rid of his further interference by taking advantage of an informality into which the earl had fallen in the execution of his office of chancellor, and frightening him into a resignation both of the seals and of his seat in the executive council.

The period of the administration of the protector Somerset forms the first of the two parts into which the reign of Edward VI. divides itself. The character of the protector has been the subject of much controversy; but opinions have differed rather as to the general estimate that is to be formed of him, or the balance of his merits and defects, than as to the particular qualities, good and bad, by which he was distinguished. It may be said to be admitted on all hands that he was a brave and able soldier, but certainly with no pretensions in that capacity to a humanity beyond his age; that as a statesman he was averse to measures of severity, and fond of popular applause, but unstable, easily influenced by appeals either to his vanity or his fears, and without any fertility of resources, or political genius of a high order. It must be admitted also that he was both ambitious and rapacious in no ordinary degree. Add to all this, that with one of the two great parties that divided the country he had the merit, with the other the demerit, of being a patron of the new opinions in religion—and it becomes easy to understand the opposite feelings with which he was regarded in his own time, and the contradictory representations that have been given of him by party writers since.

One of the first acts of his administration was an expedition into Scotland, undertaken with the object of compelling the government of that country to fulfil the treaty entered into with Henry VIII. in 1543 for the marriage of the young Queen Mary to Edward. The Scottish forces were signally defeated by the English protector at the battle of Pinkey, fought 10th September, 1547; but the state of politics, as bearing upon his personal interests in England, compelled Somerset to hasten back to the south without securing any of the advantages of his victory. He returned to Scotland in the summer of the following year; but he wholly failed in attaining any of the objects of the war. The young queen was conveyed to France; and the ascendency of the French or Catholic party in the Scottish government was confirmed, and continued unbroken during all the rest of the reign of Edward.

Meanwhile great changes were effected in the domestic state of England. The renunciation of the supremacy of the pope, the dissolution of the religious houses, and the qualified allowance of the reading of the Scriptures in English, were the principal alterations in religion that had been made up to the death of the late king. Only a few months before the close of the reign of Henry, Protestants as well as Catholics had been burned in Smithfield. Under Somerset and the new king measures were immediately taken to establish Protestantism as the religion of the state. Even before the meeting of parliament, the practice of reading the service in English was adopted in the royal chapel, and a visitation, appointed by the council, removed the images from the churches throughout the kingdom. Bishops Gardiner of Winchester and Bonner of London, who resisted these measures, were committed to the Fleet. The parliament met in November, when bills were passed allowing the cup to the laity, giving the nomination of bishops to the king, and enacting that all processes in the ecclesiastical courts should run in the king's name. The statute of the Six Articles, commonly called the Bloody Statute, passed in 1539, was repealed, along with various other acts of the preceding reign for the regulation of religion. By the parliament of 1548 the use of the Book of Common Prayer was established, and all laws prohibiting spiritual persons to marry were declared void. At the same time an act was passed (2 and 3 Ed. VI. c. 19) abolishing the old laws against eating flesh on certain days, but still enforcing the observance of the former practice by new penalties, 'the king's majesty,' says the preamble, 'considering that due and godly abstinence is a mean to virtue, and to subdue men's bodies to their soul and spirit, and considering also specially that fishers, and men using the trade of living by fishing in the sea, may thereby the rather be set on work, and that by eating of fish much flesh shall be saved and increased.'

But Somerset's path was now crossed by a new opponent, in the person of his own brother, Lord Seymour. That nobleman, equally ambitious with the protector, but of a much more violent and unscrupulous temper, is supposed to have, very soon after the king's accession, formed the design of disputing the supreme power with his brother. It is said to have been a notice of his intrigues that suddenly recalled Somerset from Scotland after the battle of Pinkey. The crime of Seymour does not appear to have gone farther than caballing against his brother; but Somerset contrived to represent it as amounting to high treason. On this charge he was consigned to the Tower; a bill attainting him was brought into the House of Lords, and read a first time on the 25th of February, 1549; it was passed unanimously on the 27th. The accused was not heard in his own defence, nor were any witnesses examined against him; the House proceeded simply on the assurance of his brother, and of other members of the council, that he was guilty. The bill was afterwards passed, with little hesitation, by the House of Commons; it received the royal assent on the 14th of March; and on the 20th Lord Seymour was beheaded on Tower-hill, with his last breath solemnly protesting his innocence.

During the summer of this year the kingdom was disturbed by formidable insurrections of the populace in Somerset, Lincoln, Kent, Essex, Suffolk, Devon, Cornwall, and especially in Norfolk, where a tanner of the name of Kett opposed the government at the head of a body of 20,000 followers. The dearness of provisions, the lowness of wages, the enclosure of common fields, and in some places the abolition of the old religion, with its monasteries where the poor used to be fed, and its numerous ceremonies and holidays that used to gladden labour with so much relaxation and amusement, were the principal topics of the popular clamour. It is worth noticing that the agency of the press was on this occasion employed, probably for the first time, as an instrument of government. Holinshed records that 'while these wicked commotions and tumults, through the rage of the undiscreet commons, were thus raised in sundry parts of the realm, sundry wholesome and godly exhortations were published, to advertise them of their duty and to lay before them their heinous offences.' Among them was a tract by Sir John Cheke, entitled 'The Hurt of Sedition, how grievous it is to a Commonwealth,' which is a very able and vigorous piece of writing. It was found necessary however to call another force into operation: the insurgents were not put down without much fighting and bloodshed; and many of the rebels were executed after the suppression of the commotions. The institution of lords lieutenants of counties arose out of these disturbances.

A few months after these events brought Somerset's domination to a close. His new enemy, John Dudley, formerly Viscount Lisle, and now Earl of Warwick, the son of that Dudley whose name is infamous in history for his oppressions in the reign of the seventh Henry, had probably been watching his opportunity, and carefully maturing his designs against the protector, for a long time. It is supposed to have been through his dark and interested counsel that Somerset was chiefly impelled to take the course which he did against his brother; Warwick's object was to destroy both, and he probably counted that by the admiral's death, and the part which the protector was made to take in it, he both removed one formidable rival, and struck a fatal blow at the character and reputation of another. He himself meanwhile had been industriously accumulating popularity and power. He had greatly distinguished himself at the battle of Pinkey, and in other passages of the Scotch war; and it had been chiefly by him that the late insurrection in Norfolk had been so effectually quelled. The energy which he showed on this occasion was contrasted by the enemies of the protector with what they represented as the feebleness of the latter, who had, they contended, encouraged the insurrection by the hesitation and reluctance which he manifested, on the first threatenings of it, to take the necessary measures for putting it down. The protector had at this time incurred considerable odium by his lavish expenditure (out of the spoils, as as it was said, of the church) on his new palace of Somerset House, and certain violations both of public and of private rights of which he was accused of having been guilty in procuring the space and the materials for that magnificent structure. A cry was also raised against him on account of a proposition he had made in the council for a peace with France on the condition of resigning Boulogne for a sum of money. In the beginning of October he learned that measures were about to be immediately taken against him. In fact Warwick and his associates in the council had collected their armed retainers, and were now ready to employ force if other means should fail. They had retired from Hampton Court, where the king resided, and fixed themselves in London, where they had contrived to obtain possession of the Tower. Somerset, on the first notice of their proceedings, carried off the king to Windsor Castle, and shut himself up there as if with the intention of holding out; but he soon found himself nearly deserted by all; and after a few days the king himself was obliged to sanction the vote for his deposition passed by the majority of the council. On the 14th he was brought to London in custody, and sent to the Tower. From this moment Warwick, though without his title of protector, enjoyed his power. Somerset, reduced to insignificance by this usage, but especially by an abject submission which he made in the first moments of danger, was some time after this released from confinement, and was even allowed again to take his seat at the council-table; but he either engaged in designs to regain his lost place, or Warwick, now duke of Northumberland, and possessed almost of undivided power in the state, felt that he should not be quite secure so long as his old rival lived. An apparent reconciliation had been effected between the two, and ratified by the marriage of Warwick's eldest son to Somerset's daughter; but this connexion was no shelter to the overthrown protector: on the 1st of December, 1551, he was brought to trial before the high steward and a committee of the House of Lords, on charges both of high treason and of felony; he was convicted of the latter crime; and was executed on Tower Hill, the 22nd January, 1552. He met his death with great manliness, and the popular sympathy was deeply excited in his favour, both by the feeling that, with some faults, he had fallen the victim of a much worse man than himself, and by the apprehension that in his destruction the great stay which had hitherto supported the Reformation in England was thrown down.

Warwick however (although at his death, a few years after this, he declared that he had always been a Catholic) did not feel himself strong enough to take any measures openly in favour of the antient faith, opposed as he knew he would be in that course by the great mass of the nation. It is probable that he cared little which religion prevailed so that he remained at the head of affairs. The government accordingly continued to be conducted in all respects nearly as it had heretofore been. In March, 1550, a peace had been concluded with France, one of the articles stipulating for the surrender of Boulogne, the support of which very proposition had been made the principal charge against Somerset a few months before. In the following July another treaty between the two countries was signed at Angers, by which it was agreed that the king of England should receive in marriage Elizabeth, the daughter of the king of France. Meanwhile at home the matter of religion continued to be treated by the new government much as it had been by the old. No Roman Catholics were put to death during this reign, though many were fined, imprisoned, and otherwise not capitally punished; but on the 2nd of May, 1550, an unfortunate fanatic, Joan Becher, commonly called Joan of Kent, was burnt for certain opinions considered to be neither Catholic nor Protestant, in conformity with a warrant extorted by Cranmer from the king about a year before; and on the 2nd of May, 1551, an eminent surgeon, named Von Panis, of Dutch extraction, but resident in London, paid the same penalty for his adherence to a similar heresy. Bishop Bonner was deprived of his see in September, 1549; Gardiner, in January, 1551; and Day of Chichester, and Heath of Worcester, in October of the same year. The forty-two articles of belief, afterwards reduced to thirty-three, were promulgated in the early part of this year.

In April, 1552, Edward was attacked by small-pox; and, although he recovered from that disease, the debility in which it left him produced other complaints, which ere long began to assume an alarming appearance. By the beginning of the following year he was very ill. Northumberland now lost no time in arranging his plans for bringing the crown into his own family. In May his son Lord Guilford Dudley married the Lady Jane Grey, the eldest daughter of the duchess of Suffolk, who was herself the eldest daughter, by her second marriage with Charles Brandon, duke of Suffolk, of Mary Tudor, the ex-queen of France, and the daughter of Henry VII., upon whose descendants Henry VIII. had by his will settled the crown on failure of the lines of his son Edward and of his daughters Mary and Elizabeth. This settlement, it is to be remembered, had been made by Henry under the express authority of an act of parliament, which empowered him to dispose of the kingdom to whomsoever he chose, on failure of his three children. Northumberland now applied himself to induce Edward to make a new settlement excluding Mary and Elizabeth, who had both been declared illegitimate by parliament, and to nominate Lady Jane Grey (in whose favour her mother the duchess of Suffolk, still alive, agreed to renounce her claim) as his immediate successor. The interest of the Protestant religion, which it was argued would be more secure with a sovereign on the throne whose attachment to the principles of the Reformation was undoubted, and upon whose birth there was no stain, than if the succession were left to be disputed between the king's two sisters, one of whom was a bigoted Catholic, and the legitimacy of either of whom almost implied the illegitimacy of the other, is believed to have been the chief consideration that was urged upon the dying prince. Edward at all events was brought over to his minister's views. On the 11th of June, Montague, the chief justice of the Common Pleas, and two of his brethren, were sent for to Greenwich, and desired to draw up a settlement of the crown upon the Lady Jane. After some hesitation they agreed, on the 14th, to comply with the king's commands, on his assurance that a parliament should be immediately called to ratify what was done. When the settlement was drawn up, an engagement to maintain it was subscribed by fifteen lords of the council and nine of the judges. Edward sunk rapidly after this, and lived only till the evening of the 6th of July, when he expired at Greenwich. His death, however, was concealed for two days, and it was not till the 9th that Lady Jane Grey was proclaimed.

Edward VI. is stated by the famous Jerome Cardan, who was brought to see him in his last illness, to have spoken both French and Latin with perfect readiness and propriety, and to have been also master of Greek, Italian, and Spanish. In his conversation with Cardan, which the latter has preserved, he showed an intelligence and dexterity which appear to have rather puzzled the philosopher. Walpole has set him down among his royal authors on the strength of his 'Diary,' printed by Burnet in his History of the Reformation, and the original of which is still preserved among the Cottonian manuscripts; a lost comedy which is attributed to him, called 'The Whore of Babylon,' some Latin epistles and orations, of which specimens are given by Strype; a translation into French of several passages of scripture, preserved in the library of Trinity College, Cambridge; a tract in French against popery, entitled 'L'Encontre des abus du monde;' and a few other productions of a similar kind which have not been printed.

The act of the 1st Edward VI. gave to the king all the colleges, free-chapels, chauntries, hospitals, &c., which were not in the possession of his father by the act passed in the 37th year of Henry's reign. This act was much abused; for though one professed object of it was the encouragement of learning, many places of learning were actually suppressed under it. The king, however, afterwards founded a considerable number of grammar-schools, which still exist and are popularly known as King Edward's Schools. [BIRMINGHAM, &c.] (Strype's *Ecclesiastical Memorials*, vols. ii. iii.; *Journal of Education*, No. 19.)

In 1556, in the reign of Queen Mary, a boy of the name of William Fetherstone, or Constable, a miller's son, was hanged at Tyburn for giving himself out to be Edward VI.

EDWARD THE BLACK PRINCE. [EDWARD III.]

EDWARDS, JONATHAN, was born at East Windsor, in the province of Connecticut, on the 5th of October, 1703. He was the only son, among eleven children, of Timothy Edwards, who was minister of East Windsor, or (as it was then) the eastern parish of Windsor, during a period of sixty-three years, and who, being a learned, exemplary, and devout man, was much beloved and respected by his flock. Until the age of thirteen, Jonathan was educated at home. He began to learn Latin when six years old, under the care of his father and elder sisters, all of whom the father had made proficients in that language. He seems to have begun writing letters and essays at a very early age; and such of his early compositions as are preserved show a remarkable inquisitiveness concerning both mental and natural phenomena, and a by no means contemptible skill in explaining them. President Dwight, his biographer, has given a fragment written by him in the bantering style, when he could not have been more than twelve years old, against some one who had contended for the materiality of the soul, which shows considerable wit, reach of thought, and power of expression. There is also preserved an entertaining and instructive account of the habits of spiders, as observed by himself, which was written before he was thirteen. He was also led very early to religious meditation, and imbued with a deep sense of religion. He says of himself, in an account of his religious progress, written later in life for the benefit of his children:—'I had a variety of concerns and exercises about my soul from my childhood; but had two more remarkable seasons of awakening before I met with that change by which I was brought to those new dispositions, and that new sense of things, that I have since had. The first time was when I was a boy, some years before I went to college, at a time of remarkable awakening in my father's congregation. I was then very much affected for many months, and concerned about the things of religion, and my soul's salvation; and was abundant in religious duties. I used to pray five times a-day in secret, and to spend much time in religious conversation with other boys. . . . . I, with some of my schoolfellows, joined together, and built a booth in a swamp, in a very retired spot, for a place of prayer. And besides I had particular secret places of my own in the woods, where I used to retire by myself, and was from time to time much affected.'

He went to Yale College, in Newhaven, at the age of thirteen. In the second year of his residence at the college, when only fourteen, he read through Locke's 'Essay on the Human Understanding;' and President Dwight has published some of his notes on the topics treated of in the essay, which show that he could then understand and appreciate it. The same biographer has published notes on the natural sciences and on theology, which were collected by Edwards during his stay at college. It was in the fourth and last year of his collegiate life that his second 'awakening' took place, an awakening which was speedily followed by a second relapse. 'But in process of time,' he observes in continuation of what has been already quoted, 'my convictions and affections wore off: and I entirely lost all those affections and delights, and left off secret prayer, at least as to any constant performance of it; and returned like a dog to his vomit, and went on in the ways of sin. Indeed I was at times very uneasy, especially towards the latter part of my time at college; when it pleased God to seize me with a pleurisy, in which he brought me nigh to the grave, and shook me over the pit of hell. And yet it was not long after my recovery before I fell again into my old ways of sin. His final and entire conversion took place shortly after his taking his B.A. degree, in September, 1720. The chief symptom of his 'conversion' is thus described by him:—'From my childhood up, my mind had been full of objections against the doctrine of God's sovereignty in choosing whom he would to eternal life, and rejecting whom he pleased; leaving them eternally to perish, and be everlastingly tormented in hell. It used to appear like a horrible doctrine to me; but I remember the time very well when I seemed to be convinced, and fully satisfied, as to this sovereignty of God, and his justice in thus eternally disposing of men according to his sovereign pleasure. . . . . . And there has been a wonderful alteration in my mind with respect to the doctrine of God's sovereignty, from that day to this; so that I scarce ever have found so much as the rising of an objection against it in the most absolute sense, in God showing mercy to whom he will show mercy, and hardening whom he will. God's absolute sovereignty and justice, with respect to salvation and damnation, is what my mind seems to rest assured of, as much as of anything that I see with my eyes; at least it is so at times.'

Edwards stayed at college two years after taking his B.A. degree, preparing for the ministry. In August, 1722, he went to New York, having been invited by the English Presbyterians in that town to come among them as their minister. His diary records constant religious meditations during his eight months' stay at New York; and on the 12th of January, 1723, he relates that he solemnly dedicated himself to God. 'I made a solemn dedication of myself to God, and wrote it down, giving up myself, and all that I had, to God; to be for the future in no respect my own; to act as one that had no right to himself in any respect.' He left New York in April, 1723, and returned home. In September of the same year he took his M.A. degree, and shortly after he was chosen tutor of Yale College. Two years after he accepted an invitation from Northampton, in Massachusetts, to assist his maternal grandfather, the Rev. Solomon Stoddard, in the ministry; and, having resigned his tutorship, he was ordained colleague to his grandfather at Northampton in February, 1727, in the twenty-fourth year of his age. Shortly after, he married.

Between the time of his going to New York and his settlement at Northampton, Edwards wrote out seventy resolutions, which he kept before him as his guides through the remainder of his life. They are published in President Dwight's Life. They mostly refer to the governing of his morals and the performance of religious exercises.

He remained at Northampton, first as assistant to his grandfather, and, after his grandfather's death, as sole minister, for twenty-three years. He was, all this while, indefatigable in the discharge of his duties as minister, and diligent in self-improvement. He was an effective preacher, and acquired much fame on the occasion of a very general revival in the years 1740 and 1741: ministers and congregations from all parts of New England applied to Edwards for assistance, and solicited him to come among them and preach. It was at the time of this revival, and in order to moderate men's zeal, that he wrote his treatise on 'Religious Affections.' A revival had previously taken place in his own parish of Northampton, in 1734; an account of which was at the time published by himself under the title, 'A faithful narrative of the surprising work of God, in the conversion of many hundred souls in Northampton.'

On the 22nd of June, 1750, Edwards was dismissed ignominiously from his charge at Northampton. He had offended a large and influential part of his congregation, no less than six years previously, by taking some very active and, as they appeared, arbitrary measures in consequence of a reported circulation of obscene books among the younger members of his flock. He was openly resisted in his attempts to make a public example of the offenders; and from that time his influence over his flock was greatly weakened. But the cause of the final rupture between himself and his flock, and of his dismissal, was a different one. It was a refusal to admit 'unconverted' persons, or (in other words) persons who either could or would not say that they had really embraced Christianity, to a participation in the sacrament. The custom of admitting such persons had been introduced by his predecessor, and not without opposition; and now, after the custom had been established some time, a fiercer opposition was raised by an attempt to get rid of it. On Edwards's first announcement of his disapprobation of the custom, and of his determination to end it, his dismissal was immediately clamoured for. This was in the spring of 1744; and the six intervening years having been spent in continual disputes, and fruitless attempts to effect a reconciliation, he was dismissed in 1750. A council had been appointed, consisting of ten neighbouring ministers, to adjudicate between Edwards and his flock; and this council determined by a majority of one, 'that it is expedient that the pastoral relation between Mr. Edwards and his church be immediately dissolved, if the people still persist in desiring it.' On its being put to the people, more than two hundred voted for his dismissal, and only twenty against it.

In August, 1751, Edwards went as missionary to the Indians at Stockbridge, a town in the western part of Massachusetts Bay, having been applied to for the purpose by the Boston Commissioners for Indian Affairs, and having also received an invitation from the inhabitants of Stockbridge. Here he had much leisure; and it was during his stay at Stockbridge that he wrote his Inquiry into the Freedom of the Will, and his Treatise on Original Sin. The first of these works, and that on which his fame chiefly rests, was written in nine months, and was published in 1754. In 1757 he was chosen, without any solicitation on his part, and much to his surprise, president of Princeton College, New Jersey. Having after some deliberation accepted the appointment, he went to Princeton in January, 1758, and was installed president. He died of the smallpox on the 22nd of the following March.

It may be inferred, from the account which we have given of his life, that the character of Jonathan Edwards was eminently estimable. He was an industrious, meek, conscientious, kind, and just man. In religion he was a Calvinist; and his principal work, that on the Will, was written in defence of the Calvinistic views on that subject and against those entertained by Arminians.

Edwards's chief works are, 1. 'A Treatise concerning Religious Affections;' 2. 'An Inquiry into the modern prevailing notions respecting that Freedom of the Will which is supposed to be essential to Moral Agency, Virtue and Vice, Reward and Punishment, Praise and Blame;' 3. 'The Great Christian Doctrine of Original Sin defended; containing a Reply to the Objections of Dr. John Taylor;' 4. 'The History of Redemption;' 5. 'A Dissertation concerning the end for which God created the World;' and 6. 'A Dissertation concerning the true nature of Christian Virtue.' The three last works were published after his death.

The best and most complete edition of Edwards's works is that edited by President Dwight, in 10 volumes. There is also an edition in 8 volumes, published in London, 1817. The 'Inquiry into the Freedom of the Will' has lately been published separately, with an Introductory Essay by Mr. Taylor, the author of 'The Natural History of Enthusiasm.'

EDWARDS, BRYAN, the historian of the British West India colonies, was born at Westbury, in Wiltshire, May 21, 1743. Family distresses caused him, towards the end of 1759, to go to Jamaica, where he was most kindly received by his mother's brother, Zachary Bayly, a rich, generous, and enlightened planter, who, seeing the young man's fondness for books, and thinking well of his talents, engaged a tutor to reside with him. His early instruction had been confined to reading, writing, and the French and English languages; and his studies in Jamaica, by his own account, were slight and desultory: still we may fairly ascribe to them no small share in preserving him from that intellectual listlessness into which Europeans sent out in early life to tropical climates are apt to fall. At this period the autobiography prefixed to the second and later editions of his 'History of the West Indies' ends; and the accounts given of his remaining life are extremely scanty. It appears, however, that in due time he succeeded to his uncle's estate, became a wealthy merchant, and an active member of the House of Assembly. In 1784 he published a pamphlet in opposition to the government policy of limiting the trade between the West Indies and the United States to English bottoms, in which he maintains that 'even the welfare of the planter concurs with the honour of government and the interests of humanity, in wishing for the total abolition of the slave-trade:' an opinion which he recanted after the subject of the slave-trade had been brought before parliament. In 1791 he went to St. Domingo, on the breaking out of the insurrection of the negroes, and acquired the materials for his 'Historical Survey' of that island, published in 1797. Afterwards he removed to England, where, in 1796, we find him M.P. for Grampound, which he represented until his death, July 15, 1800.

His principal work, the 'History, Civil and Ecclesiastic, of the British Colonies in the West Indies,' was published in 1793. It treats of the history, constitution, and political relations towards Britain, of these colonies; the manners and dispositions of the inhabitants, especially the negroes; the mode of agriculture, and produce. It is a valuable contribution to our literature. The style is somewhat ambitious, but lively and attractive; the matter varied and interesting. The author enters largely into the question of the slave-trade, the cruelty of which he does not attempt to deny, though he is warm in defence of the planters against the charges of cruelty brought against them in England; but his arguments are evidently tinctured by the feeling that, lamentable as it may be, slaves must be had. Mr. Edwards has the merit of having carried a law to prevent cruelties to which slaves in Jamaica were at least legally exposed, whatever the practice might be.

The edition of 1819 contains also the history of St. Domingo, proceedings of the governor, &c., in regard to the Maroon negroes (1796), a continuation of the history down to that time, and one or two other pieces by other hands.

EDWIN, king of Northumbria, was the son of Ella, who appears to have reigned in that kingdom from about A.D. 559 to 589. On the death of Ella, the throne was seized by Edilfrid, or Ethilfrith, the husband of his daughter Acca, and Edwin, an infant, of only three years old, was conveyed to the court of Cadvan, the king of North Wales. Edilfrid on this made war upon Cadvan, and defeated him near Chester, on which occasion it is said that 1200 monks of the monastery of Bangor, who had assembled on a neighbouring hill to offer up their prayers for the success of Cadvan, were put to death by the pagan victor. After this Edwin wandered about for some years till he was, at last, received and protected by Redwald, king of the East Angles. It appears to have been while resident here that he married Cwenburgha, the daughter of Ceorl, king of Mercia. Edilfrid, however, who had made himself by his military success very formidable to all the neighbouring princes, still pursued him, and partly by threats, partly by promises, had nearly induced Redwald to give him up, when (by a miraculous interposition, as Bede would have us believe) more generous counsels prevailed, and the East Anglian king determined to brave the hostility of Edilfrid. Redwald is the fifth in the list of the Bretwaldas, or supreme kings of Britain, as given by Bede; and as he succeeded Ethelbert of Kent, who died in A.D. 616, he probably now held that dignity. The consequence of his refusal to deliver up Edwin was a war with Edilfrid; they met on the right bank of the Idel in Nottinghamshire in A.D. 617, and in a great battle which was there fought Edilfrid was defeated and slain. His children, of whom the names of six are recorded, fled, and Edwin ascended the throne of Northumbria. His valour and abilities eventually acquired for him great power. On the death of his friend Redwald, A.D. 624, he was acknowledged as his successor in the dignity of Bretwalda; and two years after he made war upon the powerful state of Wessex, whose king Cuichelm is accused of having attempted to take him off by assassination, and reduced it for the moment to subjection, though it does not appear that he retained his conquest. Bede affirms that his sovereignty extended over all the English, excepting only the people of Kent, and that he also subjected to his dominions all the Britons, and the Islands of Man and Anglesey. It is probable that he was accounted the leading power among the sovereigns of Britain in his time. Bede says that he was addressed by Pope Boniface as 'Rex Anglorum.' The event for which his reign in Northumbria is chiefly memorable is the introduction of Christianity into that kingdom. The legend is related at great length by Bede in the second book of his History. Of the dreams or visions, the prophecies, and the supernatural visitations, which constitute the greater part of it, it is impossible to make anything in the absence of all other testimony except that of the credulous historian; but the result appears to have been brought about by the exertions of Edwin's second wife, Edilberga, the daughter of Augustine's patron, Ethelbert king of Kent, and of Paulinus, a Roman missionary whom she had been allowed to bring with her from her father's court. Edwin had long stood out against the persuasions of his queen and Paulinus; but his escape from the attempt against his life by the king of Wessex, and the birth of a daughter, happening simultaneously, powerfully affected him, and Edilberga and her chaplain, taking advantage of the moment of emotion, prevailed with him to call a meeting of his witan to discuss the question of the two religions. When the nobility of Northumbria assembled, Coiffi, the high priest, was himself the first to profess his disbelief in the deities he had been accustomed to serve. This ended the dispute; the chief temple of the idols, which stood at a place still called Godmundham (that is, the hamlet of the enclosure of the God), was profaned and set fire to by the hand of Coiffi; the king and all the chief men of the country offered themselves to be baptized, and the commonalty soon followed their example. Paulinus was made bishop of Northumbria, his residence being established at York, in conformity with the design of Gregory the Great, when the original mission to England was arranged. The archiepiscopal dignity was soon after conferred upon Paulinus by Pope Honorius. Edwin however did not long survive these events. The Mercians, under their King Penda, revolted against the supremacy claimed by Northumbria; and a war which arose in consequence was ended on the 12th of October, 633, by a battle fought at Heathfield, or Hatfield, in Yorkshire, in which Edwin was defeated by Penda and his ally Ceadwalla, king of North Wales, and lost at once his kingdom and his life. His eldest son was slain at the same time; another, whom he also had by his first wife, was afterwards put to death by Penda; and Edilberga, with her children and Paulinus, was compelled to fly to the court of her brother in Kent. One of Edwin's daughters, Eanfled, afterwards married Oswio, a son of Edilfrid, who mounted the throne of Northumbria in 642 and reigned till 670. He defeated Penda, and regained the title of Bretwalda, which Edwin had first brought into his house.

EDWY, called the Fair, king of the Anglo-Saxons, was the eldest of the two sons of Edmund I., but, being only in his seventh or eighth year at his father's death in 946, he and his brother Edgar were set aside for the present in favour of their uncle Edred. On Edred's death in 955, Edwy became king, and his brother appears to have been at the same time appointed subregulus of Mercia. About two years after, the Mercians and Northumbrians rose in revolt, with Edgar as their leader, and a war ensued, which terminated in an agreement between the two brothers that Edwy should retain the country to the south of the Thames, and that Edgar should be acknowledged king of all England to the north of that river. In this revolt Edgar, a mere boy, seems to have been an instrument in the hands of the clerical party, whom Edwy had made his enemies almost from the moment of his accession. In whatever it was that the quarrel began, it soon led to the dismissal of Dunstan and his friends, who had acquired so great an ascendancy in the government in the reign of the preceding king. The writers upon whom we are dependent for the history of this period were all monks, and their testimony is to be cautiously received; but still it is probable enough that they had too much ground for their accounts, which all concur in representing Edwy as a prince of the most dissolute manners, and the kingdom as given up to oppression and anarchy under his rule. The tragical story of Elgiva, as commonly told, is familiar to most readers. Edwy is said to have married this lady, though they were related within the prohibited degrees, and to have incurred the enmity of the ecclesiastics by that violation of canonical law more than by any other part of his conduct. On the day of his coronation, Dunstan tore him rudely from the arms of Elgiva, to whose apartment he had retired from the drunken revelry of the feast; Dunstan's friend, archbishop Odo, subsequently broke into one of the royal houses with a party of soldiers, and, carrying off the lady, had her conveyed to Ireland, after having disfigured her by searing her face with a red-hot iron; and when some time after she ventured to return to England, some of the archbishop's retainers seized her again, and put her to death by the barbarous process of cutting the sinews of her legs with their swords. This story has lately been the subject of some controversy, and the defence of Dunstan and Odo has been undertaken by Dr. Lingard, who does not however deny the main facts of the conduct imputed to them. 'Ham-stringing,' he says, 'was a cruel but not unusual mode of punishment in that age.' He has however made it probable that the lady, whose name seems to have been Ethelgiva, was not the wife but the mistress of Edwy; and, that being the case, he contends that Odo was justified, first, in sending her to Ireland, by a law of king Edward the Elder, which declared that 'if a known whore-quean be found in any place, men shall drive her out of the realm;' and then in having her put to death on her return, inasmuch as 'he believes that, according to the stern maxims of Saxon jurisprudence, a person returning without permission from banishment might be executed without the formality of a trial.' For the full discussion the reader is referred to Lingard's *Antiquities of the Anglo-Saxon Church*; Lingard's *History of England*; Lingard's *Vindication of his History*, 8vo., 1827; *Letter to Francis Jeffrey, Esq.*, by John Allen, Esq., 8vo., 1827; and the articles on Dr. Lingard's two works in the Edinburgh Review, vol. xxv., pp. 346-354, and vol. xlii., pp. 1-31; both in that letter acknowledged to be by Mr. Allen.

Edwy died in 958, within a year after the pacification with his brother. It is difficult to say whether the expressions of the chroniclers imply that he was murdered, or only that he died of a broken heart. Edgar now became sole king.

EECKHOUT, GERBRANT VANDER, born at Amsterdam in 1621, was a disciple of Rembrandt, whose manner of designing, colouring, and pencilling, he imitated with such felicity, that it is difficult to distinguish some of his paintings from those of his master; and he rather excelled him in the extremities of his figures. His principal employment was for portraits, in which he was admirable, and he especially surpassed all his contemporaries in the power of portraying the mind in the countenance. His masterpiece was the portrait of his own father, which astonished even Rembrandt.

But though his excellence in portraits brought him continual employment in that branch, he greatly preferred painting historical subjects, in which he was equally successful. His composition is rich and judicious; and his distribution of light and shade excellent. His back-grounds are in general clearer and brighter than those of Rembrandt; and he was by far the best disciple of that master on the other hand, it must be allowed that he shared in his defects, being incorrect in his drawing, deficient in elegance and grace, and negligent of costume. He died in 1674.

EECKHOUT, ANTHONY VANDER, was born at Brussels in 1656. It is not known under whom he studied; but he went to Italy with his brother-in-law, Lewis Deyster, a very eminent artist, and painted in conjunction with him during his residence abroad; Deyster painting the figures, and Eeckhout the fruit and flowers: yet there was such a harmony in their style of colouring and touch, that their works appear to be all by one hand. Though he was received with great marks of distinction on his return to Brussels, and appointed to an honourable office, he was resolved to leave his friends and country, and the brilliant prospects which he had before him, in order to return to Italy, intending to spend there the remainder of his days. The vessel however chanced to touch at Lisbon, and he was induced to stop in that city. His pictures sold at excessively high prices; and he had made so many sketches of fine fruit and flowers in Italy, that he had sufficient for all his future compositions, in which he arranged them with infinite variety and great taste. He had not been above two years in Lisbon, when a young lady of quality and large fortune married him. Unhappily his success and his wealth excited the envy of some miscreants, who shot him as he was taking an airing in his carriage. The assassins were never discovered.

EECLOO. A town and commune in East Flanders, situated on the high road between Bruges and Ghent, about nine miles north-west from Ghent. Eecloo is a place of considerable trade, and contains manufactures of woollen and cotton stuffs, of soap, tobacco, and hats, breweries, distilleries, tanneries, oil-mills, and salt refineries. The weekly market for grain is the largest and best frequented in the province. The town contains 980 houses, mostly well built; there are several public squares, and the streets are well paved. It has two churches, a town-hall, an antient convent, and eight schools. The population is 8350.

EEL. [MURÆNIDÆ.]

EFFENDI is a Turkish word, which signifies 'Master, Monsieur,' and is subjoined as a title of respect to the name of persons, especially to those of learned men and ecclesiastics, e.g. *Omar Effendi*, *Ahmed Effendi*, in the same manner in which *Agha* is placed after the names of military and court officers. The word Effendi occurs also as part of some titles of particular officers, as *Reis Effendi*, the title of the principal secretary of state, and prime minister of the Ottoman empire, which is properly an abbreviation of *Reis-al-Kottâb*, *i e.*, 'the head or chief of secretaries or writers.'

EFFERVESCENCE is the rapid disengagement of a gas taking place in a liquid in consequence of chemical action and decomposition; it is most commonly applied to the effect produced by adding an acid to a carbonate, by which numerous bubbles of carbonic acid gas rise to the surface of the liquid, and forming a frothy head burst with a hissing noise. Fermentation is accompanied with a slower kind of effervescence; and when metals are dissolved in acids, gaseous matter is frequently formed and expelled with considerable force. Its nature depends upon that of the acid and metal employed: thus when diluted sulphuric acid is poured upon iron, the effervescence is owing to the escape of hydrogen gas from the decomposition of water; when, on the other hand, dilute nitric acid is poured upon copper, nitric oxide gas is liberated.

EFFLORESCENCE is the property by which certain salts containing water of crystallization lose it, and become opaque by exposure to the air; in some cases, salts which do not contain much water preserve their form, whilst others which contain a large quantity are not only rendered opaque, but lose their crystalline figure, and become powdery by efflorescence: such are sulphate and carbonate of soda.

The efflorescence of some salts may be prevented by varnishing or oiling them. It has also been observed by Professor Faraday that the property of efflorescence appears in some cases to depend upon the superficial fracture of the crystal: thus he found that crystals of carbonate, phosphate, and sulphate of soda, having no parts of their surfaces broken, and carefully preserved from external violence, remained perfect; but upon breaking or scratching their surfaces efflorescence began at that part, and eventually extended all over the crystal.

EGBERT, styled the Great, king of the West Saxons, was, according to the Saxon Chronicle, the son of Alchmond, whose descent is traced up through Esa, or Eata, and Eoppa, to Inigisil, or Ingild, the brother of the great Ina, and the undoubted descendant of Cerdic. The Chronicle states Alchmond to have reigned in Kent; but this point, as well as the whole of the genealogy of Egbert, must be considered as doubtful. All that can be certainly affirmed is, that he was of the blood of Cerdic, and that he eventually came to be regarded as the representative, if not the only remaining male descendant, of that founder of the royal house of Wessex. When Beohrtric, or Brihtric, became king in 786, Egbert, then very young, or his friends for him, had claimed the throne. Brihtric is said to have soon after made an attempt on his life, upon which he took refuge at the court of Offa, the powerful king of Mercia. After a short time however he lost Offa's protection, on Brihtric marrying Eadburga, the daughter of that king. Egbert then fled to France, where he was received by the Emperor Charlemagne, and at his court he abode till the death of Brihtric in 800. He was then recalled, and by the unanimous vote of the witan appointed to the vacant throne. William of Malmsbury, who wrote in the twelfth century, is the only authority for this history of Egbert's early life. He says, that besides other accomplishments he learned the art of war under Charlemagne, in whose armies he served for three years.

At the date of Egbert's accession the Saxon states in England were reduced to three independent sovereignties; Northumbria, comprehending what had occasionally been the separate kingdoms of Deira and Bernicia; Mercia, which had reduced to subjection Kent, Essex, and East Anglia; and Wessex, with which Sussex had become incorporated. Of these three powers, Northumbria was torn by internal dissensions, and probably was indebted for the preservation of its independence chiefly to the rivalry between the other two. The conquests and the able rule of Offa however had raised Mercia to a decided pre-eminence over Wessex; and at this time the Mercian throne was occupied by Cenwulf, who was well qualified to wield the sceptre of Offa, and who had even extended the territory which he had inherited from that king. The two states were at war when Egbert became king; but a peace was soon concluded between them; and so long as Cenwulf lived Egbert made no attempt at conquest over any part of Saxon England. For the first nine years of his reign indeed he seems not to have drawn his sword. He then (A.D. 809) engaged in war against the alien tribes that still remained unsubdued in the west; and between that year and 814 he is recorded to have subjugated, or at least overrun and reduced to temporary submission, all Cornwall (including Devon) and South Wales. But soon after the death of Cenwulf in 819 we find him entering upon a new career In 823 a dispute about the succession to the Mercian crown raised the East Angles in revolt; Egbert's aid, upon being applied for, was readily given to the insurgents; and a great battle took place at 'Ellerdune,' supposed to be Wilton, which ended in the complete defeat of the Mercians. Essex and Kent were immediately seized by Egbert, or voluntarily submitted to him. The East Angles in the mean time he professed to leave independent; and Mercia itself he did not think yet sufficiently weakened to be attacked with effect. A continuance of the dispute about the succession, however, and another revolt of the East Angles (which he probably fomented), soon produced the state of things he waited for. In 827 he marched against Mercia; Wiglaf, the king, fled, on his approach, to the monastery of Croyland; but soon after made his submission, and was permitted to retain his kingdom as the vassal or tributary of Egbert. East Anglia Egbert appears to have now taken under his own immediate government. He is affirmed by Bede to have subjected to his rule all England to the south of the Humber. Without loss of time also he led his army against the Northumbrians; their king Eanred offered no resistance, but, meeting Egbert at a place called Dore, to the north of the Humber, acknowledged him as Bretwalda. He is the eighth Saxon king who is stated to have acquired this dignity; the last was the Northumbrian king Oswio. [EDWIN.]

In the last year of the reign of Egbert several of those descents of the Danes or northern pirates were made upon the English coasts, which produced so much public confusion and calamity when renewed in the times of his son and his grandsons. In 832 they ravaged the Isle of Sheppey; and next year, appearing with a fleet of five-and-thirty sail in the river Dart, they landed and defeated a force that Egbert sent against them. When they returned however in 835, and landed in Cornwall, they and a number of the people of that district whom they had induced to join them, sustained a decisive overthrow from the king of Wessex in person. Egbert died the next year, after a reign of thirty-seven years and seven months; leaving his dominions between his son Ethelwulf and Athelstane, whom some of the chroniclers make the son, others the brother, of Ethelwulf. [ETHELWULF.]

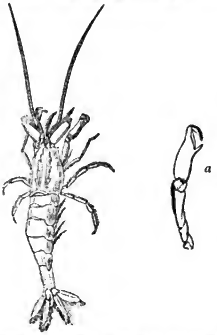
Egbert is commonly said to have been the first Anglo-Saxon king who called himself king of the Angles or of England; but only one charter is known to exist in which he is styled Rex Anglorum. In general both he and his successors down to Alfred inclusive call themselves only kings of the West Saxons. And although Egbert asserted a supremacy over the other states, which remained ever after with his kingdom of Wessex, it is to be recollected that he did not incorporate either Mercia or Northumbria with his own dominions. It does not appear that he even assumed to himself the appointment of the kings of those states. The reigning families seem to have continued in possession, with merely an acknowledgment of his supremacy as Bretwalda. (See Turner's *A. Saxons*, i. 422.)

EGEON (zoology), Risso's name for a genus of macrourous decapods, whose characters are generally like those of *Crangon* (shrimp), but with the following differences. The fourth or last visible joint of the external *jaw-feet* is nearly twice as large as the preceding. The *feet* of the second pair are extremely short, slender, and didactylous; those of the third long, very slender, and terminated by a single nail; those of the fourth and fifth pairs larger, and ending by a compressed nail. The *carapace* elongated, cylindrical, spinous, and terminated anteriorly by a small *rostrum*.

The extreme brevity, observes Desmarest, of the second pair of feet, and the roughness of the carapace, are the most remarkable of these differences; but they do not, in his opinion, present characters sufficient for the establishment of a genus. Example, *Egeon loricatus*, Risso (crust.); *Pontophilus spinosus*, Leach. (See *Trans. Soc. Linn.*, t. xi., p. 346, and *Malac. Brit.*, tab. 37 A.)

Description.—Carapace supporting three longitudinal dentelated carinæ above; *rostrum* very short; total length about an inch and a half. Locality, coasts of England, those of Nice, and the Adriatic Sea.

Tho term *Egeon* is used by Denys de Montfort for one of the *Nummulites—Nummulina*, D'Orbigny.



Egeon loricatus. a, left foot of the first pair magnified

EGER, a river of Bohemia, which, soon after it quits the Fichtelberg, in Bavaria, where it has its source, enters the west of Bohemia at Hohenberg, and flows eastwards until it reaches Theresienstadt, where it joins the Elbe: from tho point of their confluence the Elbe becomes navigable. Tho length of the Eger, from Hohenberg to Theresienstadt, is about 80 miles; it has a fall of 158 ft. between the frontier and tho Elbe; its banks are high, and its bed is hard and stony. The circle of Eger, in the greater circle of Ellbogen, in Bohemia, is the most western point of that kingdom; it contains an area of about 105 square miles, and about 24,000 inhabitants.

EGER (in Bohemian **CHEB** or **CHEBBE**) is situated on a rocky eminence on the right bank of the river of the samo name, in 50° 5′ N. lat. and 12° 24′ E. long. In former days it was strongly fortified; but most of its defences have been levolled, and the ditches have been filled up. It has about 800 houses and 9500 inhabitants. There are several handsomo buildings in the town, among which are the deaconry church, six other churches, the spacious town-hall, a Dominican and a Franciscan monastery, and the barracks, formerly a Jesuits' college. Eger has likewise a high school or gymnasium, a military seminary for boys, a head national school (*haupt-schule*), two hospitals, an infirmary, and an orphan asylum. There is an apartment in the burgomaster's residence, in the market-place, in which the celebrated Austrian commander, Wallenstein, was assassinated in tho year 1634; and in the town-hall are some paintings which depict the violent deaths of that leader and his adherents. The ruins of the 'Steinhaus' (house of stone), the former residence of the margraves of Vohburg, to whom Eger once belonged, are remarkable for an antient square tower of black rusticated freestone. There are several manufactures, principally of woollens and kerseymeres, cottons, leather, soap, meal, alum, and fire-engines; and the town has a transit trade with the neighbouring German states. About 3 miles to the north of Eger are some saline hot-wells, opened in 1793, and called 'The Emperor Francis's Baths;' they are much frequented in the summer season, and rendered attractive by the beauty of the surrounding scenery. About 15,000 dozen bottles of the waters are annually exported.

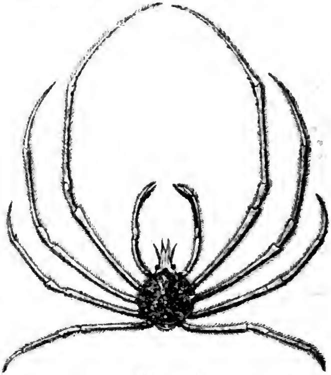
EGE'RIA (zoology), a genus of brachyurous decapod crustaceans established by Leach, and thus characterized.

External *antennæ* short, inserted on the sides of the *rostrum*, having their second joint much shorter than the first. External *jaw-feet* having their third articulation straight on the internal border, and terminated by a point. *Claws* delicate, linear, double the length of the body in the males, nearly equalling it in the females, much shorter in both sexes than the rest of the feet, which are very slender, those of the fifth pair being five times the length of the body. *Carapace* triangular, tuberculated, and spinous, terminated by a rather short rostrum, which is bifid, with diverging points. *Eyes* much larger than their peduncle. *Orbits* having a double fissure on their superior border.

Desmarest observes that this genus, somewhat hastily established by Leach, if the number of articulations of the abdomen in the species which compose it were seven, would be nearly approximated to *Maia*, *Pisa*, *Mithrax*, and *Micippa*, in the form of the body; but the difference lies in the delicacy and disproportioned length of the feet. If the number of articulations composing it be six, as there is room for believing, although neither Latreille nor Leach say so positively, it would bear great relationship to the long-legged genera, *Macropodia*, *Leptopodia*, and *Doclea*, for example. But it has not the long, slender, divided rostrum, as well as the long claws larger than the feet, which characterize the first; nor does it present the very long, very slender, and entire rostrum, as well as the very elongated and linear claws, of tho second; and finally, it has not the globular body and the very short and delicate claws of tho last. It is removed from *Inachus* by the claws, which are proportionally shorter and less thick than those of the last named crustaceans, by the other feet, which are relatively longer than theirs, by tho antennæ, of which the two first joints of the base, and not the third, are longer than the others, and by the double fissure of the bottom of the orbits above.

Example, *Egeria Indica*.

Description. In size, general form of tho body, and length of the feet, bearing a great resemblance to *Inachus Scorpio*; but besides the generic differences pointed out, it is still further removed from it in having a larger rostrum which is deeper incised in the middle, and in having the points with which the elevated and distinct regions of the carapace above are beset, disposed in the following order: 3, 2, 1 and 1. A rather long, sharp, post-ocular point is directed forwards. The arms are rather short and slender. Locality, the Indian Seas.



Egeria Indica.

Egeria is also used by De Roissy for a genus of conchifers which M. Sander Rang considers identical with *Galathea*, Brug., and *Potamophilus*, Sow.

EGERTON, FRANCIS. [Bridgwater, Duke of.]

EGG PLANT, the Solanum Melongena of botanists, is a nativo of the north of Africa, and was introduced to this country in the year 1597.

It grows to the height of two, or two and a half feet, has leaves of an ovate form, which, as well as the stem, are prickly and downy; its flowers are generally of a violet colour, and its fruit is a large ovate or globose berry resembling a hen's egg, or sometimes larger; whence the name of egg-plant, which has been given to it.

There are many varieties of this plant, of which two only are commonly cultivated in gardens, namely the small white and the large purple. They are raised from seed, which should be sown early in spring, in light soil on a hot-bed, and treated in every respect like a tender annual. After the plants are strong enough they must be taken up and potted, and regularly shifted when necessary into pots of a larger size. They may either be allowed to fruit in flower-pots in an airy green-house or vinery; or they may be planted out in June in a warm border on the south side of a wall, where they will have the benefit of the reflected rays of the sun. Of the two varieties above mentioned, which by some botanists are regarded as distinct species, that with white fruit is small, and rather an object of curiosity than of use; the other, with purple fruit, which sometimes attains a pound weight, is a favourite article of food in hot countries; under the name of Brinjal and Begom it is well known in India, and by that of Aubergine in France. The fruit is brought to table boiled or fried, or in stews: and if well cooked is delicate and agreeable; but it is necessary in the first instance to deprive it of a bitter nauseous viscid juice, or it is unfit for food; and as the cooks of this country do not generally understand the art of doing this, the egg-plant is here very seldom seen on the table.

It is said by those who have visited China that the Chinese, on days of festivity, cook this fruit while hanging on the plant, and in that way introduce it to table.

EGHAM. [SURREY.]

EGINHARDT, a native of Austrasia or East France, was instructed by Alcuinus, and by him introduced to Charlemagne, who made him his secretary, and afterwards superintendent of his buildings. His wife Emma, or Imma, is said by some to have been a daughter of that prince, and a curious story is related of their amours previous to the marriage, but the whole seems an invention. Eginhardt himself does not reckon Emma in his enumeration of the children of Charles. After the death of that monarch, Eginhardt continued to serve his successor, Louis le Débonnaire, who entrusted him with the education of his son Lotharius. But after a time Eginhardt resigned his offices, left the court, and withdrew to the monastery of Fontenelle, of which he became abbot: his wife also retired into a nunnery. After remaining seven years at Fontenelle, he left it, about A.D. 823, and went to another monastery, but in 827, having received from Rome the relics of the martyrs Marcellinus and Petrus, he placed them in his residence at Mulinheim, which he converted into an abbey, which took afterwards the name of Seligenstadt, where he fixed his residence. (*De Translatione SS. martyrum Marcellini et Petri*, in the *Acta Sanctorum* of Bollandus. The account is written by Eginhardt.) Eginhardt seems to have still repaired to court from time to time, when his advice was needed, and he appears by his own letters to have endeavoured to thwart the conspiracy of Louis's sons against that unfortunate monarch. He spent his latter years in retirement and study: he was still living in 848, but the time of his death is not ascertained. His wife had died before him, a loss by which he was greatly grieved, although they had lived separately for many years. Eginhardt wrote, 1. 'Vita et Conversatio gloriosissimi Imperatoris Karoli Regis magni,' divided into two parts, one relating to the public and the other to the private life of his hero. It has gone through many editions, and has been also translated into various languages. The style is remarkably good for the times. 2. 'Annales Regum Francorum, Pipini, Karolimagni, et Ludovici Pii, ab anno 741 ad annum 829.' 3. 'Epistolæ,' which are found in Duchesne's 'Historiæ Francorum Scriptores,' vol. ii. These letters, of which only sixty-two have been preserved, show Eginhardt's character to great advantage, and afford considerable information on the manners of that period. 4. 'Breviarium Chronologicum ab orbe condito ad ann. D. 829,' which is an abridgment of Bede's Chronicle. There is a notice of Eginhardt by Duchesne, prefixed to his life of Charlemagne, in the collection already mentioned.

EGLANTINE, the old English name of the Sweet Briar Rose; aiglantier and eglantier in French. Milton misapplies the word to the Honeysuckle in the following lines:—

> Through the Sweet Briar, or the Vine,
> Or the twisted Eglantine.

EGMONT, Count of Lamoral, Prince of Gavre, a descendant of those dukes of Guelders who had signalized themselves against the house of Austria, was born in 1522 in Amsterdam. The fame of his ancestors is celebrated in the annals of his country, one of whom enjoyed, during the reign of Maximilian, the supreme magistracy of Holland.

Egmont's marriage with Sabina, duchess of Bavaria, reflected additional lustre upon his noble birth, and increased his influence by powerful alliances. In the year 1546 Charles V. conferred upon him the order of the Golden Fleece. Under this emperor he learned the art of war, and, being appointed by Philip II. commander of the cavalry, he gathered his first laurels in the fields of St. Quentin and Gravelingen (1557, 1558).

The Flemish people, chiefly occupied with commerce, and indebted for the preservation of their prosperity to these victories, were justly proud of their countryman, whose fame was spread through all Europe. The circumstance of Egmont being the father of a numerous family served also to increase their affection, and they saw with delight the prospect of this illustrious family being perpetuated among them.

Egmont's demeanour was courteous and noble; his open countenance was an index of the singleness of his mind; his religion was one of mercy and philanthropy; far from being a bigotted Romanist, or a reckless reformer, he elevated himself above the contending parties, and laboured to bring about a peaceful reconciliation. It was only towards the close of his life, when all attempts to disarm the fury of the Spaniards against his Protestant countrymen had failed, that he showed himself willing to defend them against their oppressors. His motives however were not any predilection for the Protestant doctrine, but pure love of justice, peace, and humanity.

A man possessed of such qualities, and enjoying so much popular influence, naturally awoke suspicion and jealousy in the heart of the Spanish despots whenever the interests of the Flemish came into collision with those of the crown. Philip however, in order to conceal his dark designs against the supposed protectors of the religion of his rebellious subjects, on visiting Brabant gave to Egmont the government of Artois and Flanders, and exempted his estates from taxation. But upon his return to Madrid the tyrant changed his plans, and sent his favorite, Alva, to Flanders, with instructions to get rid of Egmont and his friend Count Horn.

In order to secure them both Alva invited them to dinner, under the pretence of wishing to consult them on public affairs. When they had entered his private room, they were seized, and thrown into prison in Ghent, where they remained during nine months. At the expiration of this time they were carried to Brussels under an escort of ten companies of Spanish soldiers. Here Alva, invested with the power of captain-general and supreme judge, compelled the criminal court to pronounce Egmont guilty of high treason and rebellion, and to sentence him to be beheaded. This sentence was pronounced on the 4th June, 1568, without any substantial evidence, and was supported only by the depositions of his accusers. His estates were also confiscated. During his imprisonment the emperor of Germany, the knights of the Golden Fleece, the electors, the duchess of Parma, and his wife, used every possible exertion to save his life; but Philip was immovable. The sentence was executed on the 5th of June, 1568, and both Egmont and Horn fell by the sword of the executioner on a scaffold erected in one of the principal squares of Brussels. Egmont died with courage, after having written a dignified letter to the king and a tender one to his wife.

He was but 46 years of age. The people, who assembled in crowds to witness this mournful spectacle, were loud in their lamentations; they rushed towards the scaffold and dipped their handkerchiefs in the blood of the martyrs of Flemish independence. His friend, Count Horn, was executed immediately after him. Egmont's wife died the 19th of June, 1598. It is said that the bishop of Ypres, a most pious and upright prelate, who had been deputed by Alva to prepare the two prisoners for their execution, after hearing the confession of Egmont, was so persuaded of his innocence that he went to Alva and begged him on his knees to suspend the execution. But Alva, besides his natural ferocity, bore a mortal enmity to Egmont on account of his military reputation, and rejected the bishop's intercession with insolent contempt. When Philip II. heard that these two noble lords had been executed he exclaimed, 'I have caused these two heads to fall because the heads of such salmons are worth more than many thousand frogs.'

The death of Egmont has supplied to Goethe an admirable subject for one of the best of his historical tragedies, for which Beethoven composed one of his finest overtures and some beautiful melodies to the songs interspersed through the play.

The latest life of Egmont is that by Clouet, *Éloge historique du Comte d'Egmont*, Bruxelles, 1825.

EGREMONT. [CUMBERLAND.]

EGRIPOS. [EUBŒA.]

EGYPT AND EGYPTIANS. Egypt, Mizr or Mizraim in Hebrew, Masr in Arabic, and Chamî or Chemî in Coptic, is generally reckoned within the limits of Africa, though several geographers have considered it as physically belonging to Asia. It is bounded on the north by the Mediterranean, on the east by the little river of El Arish on the borders of Palestine and the Syrian or Arabian desert, which extends from the Mediterranean to the Gulf of Suez, and from thence southwards by the west coast of the Red Sea, and on the west by the Libyan desert. To the south its boundary from the oldest time has been fixed at the rapids or cataracts of Assouan, the antient Syene, which are formed by a number of granite rocks that lie across the bed of the river. The fall of the water, however, is only a few feet, and boats can easily pass down the rapids. But the political limits of Egypt have extended both in antient and modern times further south along the valley of the Nile into the country known by the general name of Nubia. The length of Egypt from the cataracts of Syene 24° 8′ N. lat. to the most northern point of the Delta on the Mediterranean 31° 25′, measures on the map about 500 English miles. But the length of the cultivated parts of Egypt, or valley of the Nile, is considerably greater, owing to the numerous bends of the river, which give it a course of about 500 miles from Assouan to a few miles north of Kahira or Cairo, where the valley terminates: this estimate is exclusive of the length of the Delta, which is nearly 100 miles more. The breadth of Egypt is difficult to determine. As to its physical boundaries it may be considered to extend from the shores of the Red Sea to the range of hills which bounds the valley of the Nile to the west; it may even be extended over the western desert as far as the Oases which are dependencies of Egypt; or it may be restricted to the breadth of the cultivated land in the valley of the Nile and Delta, which are the only parts, excepting the Oases, where there is a settled population. We may therefore consider Egypt under each of these four great divisions: 1. The valley of the Nile; 2. The Delta; 3. The western desert and the Oases therein inclosed; 4. the Eastern country towards the Red Sea.

1. *Valley of the Nile*. The Nile coming from Nubia runs through a deep and narrow valley, sunk between two ridges of rocky hills which rise in some places above 1000 feet above the level of the river. The breadth of the valley varies considerably, but it is seldom more than ten miles, and in many places, especially in Upper Egypt, it is not two, including the breadth of the river, which varies from 2000 to 4000 feet. In its course within Egypt the Nile contains numerous islands. From Assouan to Selseleh, a distance of about 40 miles, the river runs nearly in the middle of the valley, leaving little cultivable land on each side. As we advance farther north the western ridge recedes from the river, so as to leave a space of several miles between the left bank and the foot of the hills, while the east chain keeps closer to the corresponding or right bank of the Nile. North of Keneh the river forms a great bend to the west and north-west as far as Minyeh, near which it reaches it westernmost point, which is about 120 miles to the west of the longitude of Keneh; it then inclines again to the north-east as far as Benisouef and a few miles beyond it, after which it assumes a course nearly due north as far as the apex of the Delta. From Farshout, half way between Keneh and Girgeh, a canal runs parallel to and west of the course of the Nile, under the different names of Moye Souhadj, Bahr Joussouf, &c., for about 250 miles to Benisouef, where an opening in the western ridge allows a branch of it to pass into the district of Faioum, which it irrigates and fertilizes. Its surplus waters then flow into the Birket-el-Keroun, the antient Mœris lake. [BIRKET-EL-KEROUN and FAIOUM.] Another branch of the Bahr Joussouf continues to follow the course of the Nile northwards as far as the Delta. The Bahr Joussouf, from Ashmounein to Benisouef, runs at the distance of three to six miles from the river; the western ridge being here from eight to ten miles from the Nile, and near Benisouef fifteen miles distant from it. The banks of the Bahr Joussouf, like those of the Nile, are raised higher than the rest of the valley. Consequently between the canal and the Nile there is a kind of depression. On the other or west side of the canal there is a strip of cultivated land as far as the inundation or artificial irrigation extends, beyond which and to the foot of the ridge there is a strip of sand, light and drifting in the neighbourhood of the cultivated ground, upon which it seems to encroach in many places, and coarser and mixed with pebbles near the base of the hills. Consequently the cultivable land along the banks of the Nile, both to the east and to the west of the river, by no means occupies the whole breadth of the valley. The Bahr Joussouf appears to be the same as the Oxyrhynchus canal of antient times, which Strabo, while sailing along it, mistook for the Nile itself, on account of its magnitude. North of Benisouef, the western range, the height of which becomes less and less as it advances northwards, again approaches the river near Sakkarah, and forms in the neighbourhood of Jizeh a kind of natural terrace, on which the great pyramids stand. The ridge then continues to skirt the western or Rosetta branch of the river as far as the neighbourhood of the Canal Bahireh, which once communicated with the lake Mareotis. The ridge here inclines to the west, and may be considered as joining the hills which skirt the valley of the Natron lakes. [BAHR BELA-MA.] The general character of the western ridge which borders the valley of the Nile is a limestone formation which contains numerous fossil shells. The great pyramid is built of this kind of stone. In the neighbourhood of Esneh, in Upper Egypt, a sandstone formation commences, alternating with limestone, but the mountains contain also slate and quartz of various colours. The great slabs used in the construction of the temples of Egypt, with the exception of those of the Delta, were of sandstone, as well as many of the sculptures or statues. In the neighbourhood of Selseleh are extensive quarries of sandstone.

The mountain range on the eastern side differs in some respects in its geological character from the western ridge, and it generally rises more abruptly, and often close to the edge of the river. From Mount Mokattem, near Cairo, the limestone extends southwards, though with many interruptions, as far as on the western side of the Nile. But the serpentine and granite appear to commence earlier, and to characterize the eastern more strongly than the western side. Near Assouan the granite alternates with the decomposed sandstone, exhibiting an irregular and broken appearance, which has sometimes been compared to a ruin. On the east side of the Nile, near Syene, scattered about the foot of the mountains, and occasionally close to the river, are those extensive granite quarries which furnished the antient Egyptians with materials for their colossal statues and obelisks.

The eastern range leaves the banks of the Nile at a higher or more southern point than the west ridge. From Mount Mokattem, near Cairo, it turns off abruptly to the east, and under the name of Jebel Attaka runs to the Red Sea, near Suez. North of it the sands of the desert of Suez spread close to the eastern skirts of the Delta.

2. *The Delta*. The Nile issuing from the valley a few miles north of Cairo, enters the wide low plain which, from its triangular form and its resemblance to the letter Δ, received from the Greeks the name of the Delta. The river divides into two branches, that of Rosetta or old Canopic, and that of Damiat or Phatnitic. The figure of the Delta is now determined by these two branches, although the cultivated plain known by that name extends considerably beyond to the east and west, as far as the sandy desert on each side. In antient times the triangle of the Delta was much more obtuse at its apex, as its right side was formed by the Pelusiac branch, which, detaching itself from the Nile higher up than the Damiat branch, flowed to Pelusium, at the eastern extremity of Lake Menzaleh. This branch is now in great measure choked up, though it still serves partly for the purpose of irrigation. West of the Pelusiac branch the Moes canal corresponds with the Tanitic or Saitic branch of the antients, and the Menzaleh canal with the Mendesian branch; they both enter Lake Menzaleh, a vast salt marsh, forty miles long, which communicates with the sea by several outlets. (Andreossi's *Memoir on Lake Menzaleh*, with *Map* of the same in the great French work on Egypt.) Between the Damiat and the Rosetta branch are numerous canals, large and small,

intersecting the country in every direction. Along the sea-coast is another salt lake or marsh, called Bourlos, communicating with the sea by an outlet, which is probably the same as the Sebennytic mouth of the antient geographers. Proceeding westward we meet with the Rosetta or Bolbitine mouth, which with that of Damiat are now the only two entrances from the sea into the Nile, and they are accessible only to small vessels. The Nile at Rosetta is 1800 feet wide, and at Damiat only 800 feet. West of Rosetta, a salt marsh, called Lake Etko, has been formed, which communicates on one side with the Nile, and on the other with the sea or Aboukir Bay, by an outlet which corresponds to the old Canopic mouth. West of Lake Etko is the lake of Aboukir, which likewise communicates with the sea, and is divided from Lake Mareotis to the south-west of it by an isthmus, along which passes the canal of Alexandria, which has been restored by Mehemet Ali. [ALEXANDRIA; BIRKET EL MARIOUT.] The greatest breadth of the Delta, or cultivated plain of Lower Egypt, is about eighty miles from east to west; its length from the bifurcation of the river to the sea is about ninety. The interior of the country, which is covered with fields, orchards, and plantations, exhibits different aspects according to the various seasons. The rise of the Nile occasioned by the periodical rains of Central Africa, begins in June about the summer solstice, and it continues to increase till September, overflowing the lowlands along its course. The Delta then looks like an immense marsh, interspersed with numerous islands, with villages, towns, and plantations of trees just above the water. Should the Nile rise a few feet above its customary elevation, the inundation sweeps away the mud-built cottages of the Arabs, drowns their cattle, and involves the whole population in ruin. Again, should it fall short of the ordinary height, bad crops and dearth are the consequences. The inundations having remained stationary for a few days, begin to subside, and about the end of November most of the fields are left dry, and covered with a fresh layer of rich brown slime: this is the time when the lands are put under culture. During our winter months, which are the spring of Egypt, the Delta, as well as the valley of the Nile, looks like a delightful garden, smiling with verdure, and enamelled with the blossoms of trees and plants. Later in the year the soil becomes parched and dusty; and in May the suffocating Khamseen begins to blow frequently from the south, sweeping along the fine sand, and causing various diseases, until the rising of the beneficent river comes again to refresh the land. Showers are very rare in Egypt, except on the sea-coast: it rains three or four times in the year at Cairo, and once or twice in Upper Egypt, but perhaps not every year. The nights however are cool, and the dews heavy. Strong winds blow from the north during the summer, at the period of the inundation, and are very useful in propelling vessels up the Nile against the current.

It is generally presumed that the Delta has been formed or at least considerably enlarged by the alluvial soil of the Nile. This was already the belief in the time of Herodotus. The advance of the coast since then does not appear to have been very great, if we may judge from the position of the old towns mentioned by the Greek geographers: on the side of Thamiatis, the old Damietta, the sea has not retired above two miles. The time in which the Delta may be supposed to have been a gulf of the sea must be placed long previous to the historical period. At present it seems ascertained that the coast of the Delta does not advance, and the currents which sweep along the north coast of Africa must prevent any permanent accession of alluvial soil to the Egyptian shore. The gradual elevation of the soil of the Delta and valley of the Nile has also been much exaggerated. It does not appear to have risen above seven or eight feet since the time of the Ptolemies, and the bed of the river has also risen in proportion. The height of the inundation requisite for the irrigation of the land, making allowance for the difference of measures, appears to be nearly the same as in the time of Herodotus. (Wilkinson, ch. vi., pp. 313. 40.) The vertical increase of the cultivated soil must not be confounded with the accumulation of sand in some particular places, as round the great sphinx, &c., which has been in many instances the work of the wind.

3. *The Western or Libyan Desert.*—The nominal limits of Egypt along the sea-coast west of Alexandria are the mountains at Akabah el Soloum, the Catabathmus Magnus of the antients, about 25° E. long., where the nominal limits of the pachalik of Tripoli begin, but this extensive tract of country is occupied by independent tribes of nomadic Arabs. In-land to the south is the oasis of Siwah or of Ammon, described by Hornemann, which is now considered as within the political limits of Egypt, and pays tribute to it. [SIWAH.] Farther to the south-east, and nearer to the valley of the Nile, is a succession of oases, beginning with the Little Oasis, now called Wah el Bahryeh or Wah el Behnesa, having been colonized by people from Behnesa or Oxyrhynchus. The chief town or village is El Kasr, about 28° 16′ N. lat. and 28° 55′ E. long. It is three caravan days' journey south-west of Faioum across the desert. This Wah is fertilized by irrigation from plentiful and never-failing springs; it produces wheat, rice, barley, clover, liquorice, and a variety of fruit trees. It pays a tribute of 20,000 reals, about 643*l.* sterling, and has an armed force of several hundred men for maintaining the peace. A short day's journey to the south of it is the small Wah of El Hayz, and three days further south is that of Farafreh, with about seventy inhabitants, the rest having been kidnapped some years since by a party of roving blacks from the west. About five or six days west of the road to Farafreh, some say three days due west of the oasis of Dakhleh, is another oasis, called Wady Zerzoora, abounding in springs and palms. It was discovered about ten years since by an Arab in search of a stray camel, and from the footsteps of men and sheep he met with is believed to be inhabited. Gerbabo, another Wah, lies six days still farther to the west, and twelve days from Augila; the inhabitants are said to be black, probably Tibboos, and are far removed beyond the dominion of Egypt. Four days south of Farafreh is the Wah el Gharbee, or Wah el Dakhleh, which, although mentioned by Arab writers, was unknown to Europeans till discovered by Sir A. Edmonstone in 1819. It has however a temple of Roman date, with the names of Nero and Titus upon it. The condition and population of this oasis is superior to those of the others already mentioned: it contains eleven villages or towns, and a population of 6000 male inhabitants. It abounds with fruit, particularly olives and apricots; but dates, as in all the oases, form the principal produce of the district. The principal village, El Kasr Dakhel or Dakhleh, is in about 25° 35′ N. lat. and 28° 55′ E. long., nearly three degrees west of Thebes. There is a warm spring, of the temperature of 102 Fahr., which supplies several baths attached to the mosque. The people are hospitable, and neither so ignorant nor so bigoted as those of the Little Oasis. Three days to the eastward of Dakhleh, in the direction of Esneh, is the Great Oasis, or Wah el Khargeh. It extends in length from 24° 30′ to near 26° N. lat., and has many villages and springs, as well as ruins of the antient Egyptian time, of the Roman period, and of the Christian and the Saracenic æras. Several roads lead from the Great Oasis to the Nile, to Esneh, Siout, Farshout, and Thebes. The road to Dar-fur passes through it. This oasis, as well as that of Dakhleh, are nearly on the same level as the valley of the Nile, while the Little Oasis is about 200 feet higher than the Nile in the latitude of Benisouef. (Wilkinson's *Thebes*, ch. vi.) The Great Oasis has been described by Browne, who visited it on his way to Dar-fur.

4. *The Eastern Country.*—The large tract between the valley of the Nile and the Red Sea has a different character from the western or Libyan desert. Its general character is that of a mountainous region, which, although generally rocky and barren, is intersected by numerous wadys or ravines, fertilized by springs and clothed with vegetation. Several Arab tribes divide among themselves the whole tract, which cannot therefore be called properly a desert. These tribes are:—the Maazy, east of Benisouef; the Atooni and the Beni ouasel, south of the Maazy; and the Ababde, further south, towards Nubia. In antient times the roads leading from the valley of the Nile to the shores of the Red Sea passed by regular stations, and villages and towns with a resident population. Mines of various metals and quarries of porphyry and other valuable stones are scattered among the mountains, and were once regularly worked. At present, the only fixed habitations are at the port of Cosseir, and at the Coptic monasteries of St. Anthony and St. Paul. The road to the latter leads from the east bank of the Nile, opposite Benisouef, along an undulating plain or broad valley, called Wady Arabah, which extends nearly due east to the Red Sea, between two ridges of mountains, both called Jebel Kelalla; the south range is also called

Kolzim, and projects into the sea at Zaffarana Point, south of the bay of that name, about 28° 55′ N. lat. The distance from the Nile to the Red Sea is here about 90 miles. The convent of St. Anthony is about 17 miles from the shore of the Mersa, or bay of Zaffarana, which terminates the wady Arabah. The patron and founder of the order is St. Anthony of Thebes, who lived in the time of Constantine. The monks have two very fine gardens, which, as well as the convent, are surrounded by high walls to protect them from the Arabs. From St. Anthony to Deir Bolos, or St. Paul, is a distance of about 14 miles by the road. The Kolzim ridge lies between the two. Deir Bolos is only 9 miles from the sea to the south-east of Deir Antonios, and at Wady Girfi between it and the sea are the remains of houses and catacombs which appear to belong to the Greek period. (Wilkinson's *Notes on a part of the East Desert of Upper Egypt*, with *maps*; in the 2nd vol. of *The Journal of the Royal Geographical Society of London.*) The Convent of Deir Bolos appears to be wealthier and finer than that of Deir Anthony, but the monks are fewer in number: both live chiefly on vegetables and fish. From Deir Bolos Mr. Wilkinson proceeded southwards, between the Kolzim range and the sea, to Jebel Tenesep, about 15 miles south-east of Deir Bolos, where the mountains diverge into the interior to the south and south-west towards the Nile, and are succeeded near the sea by a range of primitive mountains which run down the whole way to Cosseir, at a distance of from about 20 to 30 miles from the coast, the intervening space being occupied in some places by low lime-stone and sand-stone hills. Jebel Ghrarib, about 28° 15′ N. lat., in the primitive range, is described as resembling in its lofty peaks the Aiguilles of Chamouny; its height is estimated at nearly 6000 feet above the sea. About 20 miles farther south, in a range of low hills, are copper mines, which appear to have been once extensively worked. At Jebel Dokhan, lat. 27° 26′ and about 25 miles from the sea, are the ruins of a town, and vast quarries of porphyry with antient roads crossing the mountains in all directions, and two wells cut through a solid porphyry rock. A small temple of red granite, with an inscription of the time of Hadrian, and dedicated to Serapis, has been left unfinished; all the materials are on the spot, but not a column was ever put up, and nothing was completed. A road led from Dokhan to Coptos, now Koft, on the Nile, about 100 miles to the south-west, and another road to the port of Myos Hormos, once a great mart on the Red Sea, but which was already deserted in the time of Pliny. There are some fine valleys in these mountains, but the sea coast is marshy and unwholesome. At Fateereh, about 40 miles south-east of Dokhan, in the old road to Cosseir, are ruins of a Roman station, with a temple of the time of Trajan, and quarries of granite. From Fateereh to Cosseir is three days' distance, according to the Arabs. South of Cosseir the mountains continue to run parallel to the coast as far as Jebel Zabarah or the mountain of emerald, which is about eight hours from the coast, and farther south-east to the ruins of Berenice, which are described by Belzoni. [BERENICE]. The coast of the Red Sea was surveyed in 1830-3 by Commander Moresby and Lieutenant Carless, E.I.C. service.

Antient History.—Egypt was one of the countries earliest civilized, and brought under a fixed, social, and political system. The first king mentioned as having reigned over that country is Menes or Men, who is supposed to have lived above 2000 years B.C., about the time fixed by biblical chronologists for the foundation of the kingdom of Assyria by Nimrod, and corresponding also with the æra of the Chinese emperor Yao, with whom the historical period of China begins. All inquiries concerning the history of nations previous to this epoch are mere speculations unsupported by evidence. The records of the Egyptian priests, as handed down to us by Herodotus, Manetho, Eratosthenes, and others, place the æra of Menes several thousand years farther back, reckoning a great number of kings and dynasties after him, with remarks on the gigantic stature of some of the kings and of their wonderful exploits, and other characteristics of mystical and confused tradition. (See Eusebius, *Chronicorum Canonum libri duo*, edited by A. Mai and Zohrab, Milan, 1818.) It has been conjectured that several of Manetho's dynasties were not successive, but contemporaneous, reigning over various parts of the country. From the time of Menes, however, something like a chronological series has been made out by Champollion, Wilkinson, and other Egyptian archæologists, partly from the list of Manetho and partly from the Phonetic inscriptions on the monuments of the country. (Wilkinson's *Chronology of the Kings of Egypt*, at the end of his *Topography of Thebes.*) The immediate successors of Menes are unknown till we come to Suphis and his brother or brothers, to whom the great pyramid is attributed by some, and who are supposed to be the same as the Cheops and Cephren of Herodotus, although that historian has placed them much later, after Sesostris and Mœris. Abraham visited Egypt about 1920 B.C., and we have the testimony of the Scripture as to the high and flourishing state of that country at that early period. The Scripture calls the kings of Egypt indiscriminately Pharaohs, which is now ascertained to be not the proper name of the individual monarchs, but a prefix like that of Cæsar and Augustus given to the Roman emperors. The word Phra in the Egyptian language meant the sun. Little or nothing is known of several successive dynasties except the names of some of the kings, until we come to Osirtesen I. of the sixteenth dynasty, who began to reign about 1740 B.C. Very few monuments remain of a date prior to his reign. The obelisk of Heliopolis bears the name of Osirtesen. The sixteenth dynasty, which reigned from 1812 to 1650 B.C., was from Lower Egypt, where the kings of this dynasty resided. Memphis however is said to have been built long before this, by King Menes, who diverted the course of the Nile in that neighbourhood, which before ran close to the western ridge, and made it run into a new channel in the middle of the valley. Under the sixteenth dynasty, about 1706 B.C., Joseph, and afterwards Jacob and his family, came to Egypt, where their descendants settled and multiplied in Lower Egypt. Egypt was then the granary of the neighbouring nations, and apparently the centre of a great caravan trade carried on by the Arabs or Ishmaelites, who brought to it the spices and other valuable products of the east. (*Genesis* xxxvii. 25.) Joseph died very old, under the seventeenth dynasty, which was also from Lower Egypt, and which reigned from 1651 to 1575 B.C. About this last period 'there arose a new king who knew not Joseph.' (*Exodus* i. 8.) This was the head of the eighteenth dynasty, from Diospolis, or Thebes, which dynasty reigned 340 years, according to Eusebius and other chroniclers, and which contains the names of the most illustrious sovereigns of antient Egypt. It appears probable that this dynasty was the continuation of the line of the old Diospolitan kings, who are mentioned as having reigned before Osirtesen I., which line may have been dispossessed by some revolution of the throne, or at least of the greater part of the country, which was occupied by a new race from Lower Egypt during the 16th and 17th dynasties. The irruption of the Hyksos, or shepherds, is supposed by some to have occurred during this period. Manetho's seventeenth dynasty consists of shepherd kings, who are said to have reigned at Memphis. These shepherds, who are represented as people with red hair and blue eyes, came from the north-east, perhaps from the mountains of Assyria; they conquered or overran the whole country, committing the greatest ravages, and at last settled in Lower Egypt, where they had kings of their own race. They were finally expelled by Tuthmosis or Thothmes I. of the 18th dynasty, after remaining in the country for more than 100 years. Some have conjectured that the hard task-masters of the Israelites were these same shepherd kings, but all this is involved in great doubt. One thing seems ascertained, namely, that the shepherds destroyed most of the monuments of Egypt raised by the former dynasties; and a remarkable fact is quoted in corroboration of this, that at Karnak and other of the oldest monuments of Thebes, raised under the 18th dynasty, sculptures and painted stones of good workmanship are found used as mere materials in the body of the walls. (Champollion, *Lettres au Duc de Blacas*) The Exodus of the Israelites, 1491 B.C., falls, according to Wilkinson, under the reign of Thothmes III., 430 years after the visit of Abraham to Egypt. The Scripture says that Pharaoh perished in the pursuit of the Israelites, and it is remarkable that Amunoph II., the son and successor of Thothmes III., is represented in a drawing at Thebes as having come to the throne very young and under the tutelage of his mother. (Wilkinson's *Chronology.*) Under Amunoph III., who reigned about 1430 B.C., the emigration of Danaus to Argos is conjectured to have taken place. Osirei I., according to the Phonetic hieroglyphics, appears to have reigned about 1385, and his reign would fall nearly about the time of the Mœris of Herodotus, who lived about 900 years before that historian's visit to Egypt. The name of Mœris however is not found in the Phonetic inscriptions. Remeses II., or the Great, son of Osirei I., ascended the throne about 1350 B.C. and reigned above 40 years. This is supposed to be the Sesostris or Sesoosis of the Greek historians. Manetho places Sesostris much earlier, in the 12th dynasty, but it is thought probable by some that his Sesostris was a mythical personage, one of the early reported Egyptian conquerors, and that the name of Sesostris was afterwards given as a title of honour to other illustrious monarchs. At all events we now know from the monuments of Thebes that Remeses II. was one of the most warlike monarchs of antient Egypt; that his wars extended far, and against many nations. Some of these are represented as of much lighter complexion than the Egyptians, with flowing beards, and dresses evidently Asiatic. It is probable that his campaigns extended to Asia, perhaps against the kings of Assyria. That the old kings of Egypt extended their dominions to the east and north-east, as was done by their Greek and Mohammedan successors, is not only very likely, but it is attested as a fact by the Scripture, 2 *Kings* xxiv. 7, where, at a later period, when the power of Egypt had begun to decline, we are told that the king of that country 'came not again any more out of his land; for the king of Babylon (Nebuchadnezzar) had taken from the river of Egypt unto the river Euphrates all that pertained to the king of Egypt,' which seems to prove that the dominion of Egypt had extended at one time as far as the Euphrates. It has also been remarked that the figures of the prisoners made by Tirhakah, who fought against Sennacherib, previous to Nebuchadnezzar's time (2 *Kings* xix. 9), are represented in the Egyptian monuments as similar to those captured by the earlier kings of the 18th dynasty.

Remeses II. was succeeded by his son Amenophis, according to Manetho (Phtahmen Thmeioftep, according to the Phonetic signs), who seems to be the same as the Pheron (Pharaoh?) of Herodotus and the Sesoosis II. of Diodorus, who, according to both the latter historians, was struck blind, but recovered his sight. With him ended the 18th dynasty. The 19th dynasty, also of Diospolitans, began about 1270 B.C., and reigned till 1170. During this period the war of Troy took place, in the reign of a Remeses, supposed to be the fifth of that name, according to Pliny. Herodotus and Diodorus give King Proteus as contemporary with the war of Troy. Of the 20th and 21st dynasties nothing is known beyond the mere names of some of the kings, according to the Phonetic signs. The Pharaoh whose daughter Solomon married, 1013 B.C., must have been one of the 21st dynasty. It is curious that, from the Exodus till Solomon's time, a period of nearly five centuries, no mention is made in the Scriptures of Egypt, which proves that the storm of war, if such there was, passed off either to the eastward of Palestine, or that the Egyptian conquerors followed the maritime road by Gaza and the Phœnician coast, leaving the high land of Judæa to their right. (Wilkinson, *Materia Hieroglyphica*, Part ii.) The 22d dynasty, beginning with Sesonchis, according to Manetho, and Sheshonk, according to the Phonetic signs, who began to reign about 978 B.C., and who is the Shishak of the Scripture, at whose court Jeroboam took refuge and married his daughter, and who, after Solomon's death, plundered the temple of Jerusalem in the 5th year of Rehoboam (2 *Chronicles*, xii.). Shishak is represented as coming to the attack 'with 1200 chariots and 60,000 horsemen, and an immense multitude of Lubims (probably Libyans), of Sukkiims, and Ethiopians.' Of Osorkon I., the successor of Sheshonk, we have a date at Thebes commemorating the 11th year of his reign. Zerah, the Ethiopian king or chief, who attacked Asa, king of Judah (2 *Chron.* xiv.), was Osorkon's contemporary.

The 23rd dynasty, called Diospolitan, like the preceding, began about 908 B.C. with Osorkon II. Homer is believed to have flourished about his time, and he speaks of Egypt under its Greek name. The 24th dynasty, which is called Saite, from Sais, a district of Lower Egypt, begins with the Bocchoris of Manetho, the Bakhor or Pehor of the Phonetic signs, about 812 B.C. Diodorus places a long period between his reign and that of Sabacos, the Ethiopian, who however follows Bocchoris next but one in the Phonetic chronology and in that of Manetho. Sabacos (Sabakoph, Phonetic) begins the 25th dynasty of Ethiopians, who, about this time, invaded Egypt, or at least Upper Egypt. Tehrak or Tirhakah, one of his successors, attacked Sennacherib, 710 B.C. Sethos, a priest of Hephæstus, the great temple of Memphis, became king, and ruled at Memphis, contemporary with Tirhakah. After Sethos' death a great confusion or anarchy took place. At last twelve chiefs or monarchs assembled at Memphis, and took the direction of affairs, which they retained for 15 years. After this Psamatik I., or Psammitichus, the son of Nechao or Necos, who had been put to death by Sabacos, became, by the aid of Greek mercenaries, king of all Egypt, about 650 B.C. His son Necos II., the Pharaoh Nechoh of the Scripture (2 *Kings* xxiii.) marched against the king of Assyria to the river Euphrates: he defeated and slew Josiah, king of Judah, 610 B.C. He also began the canal that joined the east branch of the Nile with the Red Sea. His successor, Psamatik II., was followed by Psamatik III., supposed by some to be the Apries of Manetho, and the Pharaoh of Hophra of the Scripture, who defeated the Phœnicians, took Sidon, and invaded Cyprus, which was finally subjected by Amasis, who succeeded him on the throne. The reign of Amasis lasted forty-four years, according to a date on the monuments: his successor, Psammenitus, reigned only six months, when Egypt was invaded by Cambyses, 525 B.C., who overran and ravaged the country, and lost the greater part of his army in the neighbouring deserts.

The 27th dynasty includes the Persian Kings from Cambyses to Darius Nothus, during which time Egypt was a province, though a very unruly one, of the Persian monarchy. It was during this period that Herodotus visited Egypt. Though he saw that country in a state of humiliation and depression, yet he was powerfully struck by its buildings, and its highly advanced social state, as well as by the peculiarities of its manners and institutions. Egypt appears to have made upon Herodotus an impression something like that produced by England upon French or other continental travellers in the last century, as being a country unlike any other. But Herodotus derived his information concerning Egyptian history chiefly from the priests of Memphis, and consequently his account is very meagre in all that relates to Thebes and Heliopolis, the two other great centres of Egyptian hierarchy.

After several revolts the Egyptians succeeded in placing Amyrtæus, or Aomahorte, a Saite, on the throne, about 414 B.C. This king alone constitutes the 28th dynasty. He was succeeded by the 29th dynasty, of Mendesians, who defended Egypt against the repeated attacks of the Persians, with the assistance of Greek auxiliaries under Agesilaus and others. At last Nectanebos, being defeated by Ochus, fled into Ethiopia, 340 B.C., and Egypt fell again under the yoke of the Persians. The Persians were succeeded by the Macedonians, who, after the death of Alexander, founded the dynasty of the Ptolemies, or Lagidæ, who ruled over Egypt for nearly 300 years, and restored that country to a considerable degree of prosperity. [PTOLEMY.] At the death of Cleopatra, 30 B.C., Egypt was reduced to a Roman province by Augustus.

Having now closed this brief summary of the history of antient Egypt, imperfect and conjectural in part as it unavoidably is, we shall, in a few words, advert to the social condition of the country under its native kings. That condition is now tolerably well known by the attentive examination of its remaining monuments and their sculptures and paintings. The researches of the French in the expedition to Egypt, and of Belzoni, Champollion, Rosellini, and others, have put us in possession of a series of sketches evidently drawn from the life, and descriptive of the arts, industry, and habits of the antient Egyptians. To these works and the plates which accompany them we must refer the reader. There is no doubt that this singular nation had attained a high degree of refinement and luxury at a time when the whole western world was still involved in barbarism; when the history of Europe, including Greece, had not yet begun; and long before Carthage, Athens, and Rome were thought of. This high state of material civilization was attained under a system of institutions and policy which resembles in some respects those of the Hindoos. It was a monarchy based upon an all-powerful hierarchy. The inhabitants were divided into a kind of hereditary castes, the first of which consisted of the priests, who filled the chief offices of the state. They were the depositaries and the expounders of the law and the religion of the country. They monopolized the principal branches of learning: they were judges, physicians, architects. Their sacred books, like their temples, were not open to the vulgar.

They had a language or at least a writing peculiar to themselves. The king himself, if not of their caste, was adopted into it, was initiated into its mysteries, and became bound by its regulations. The priests were exempt from all duties, and a large portion of land was set apart for their maintenance; and we read in *Genesis*, that when Pharaoh in a season of famine bought, by the advice of Joseph, all the land of the Egyptians on condition of feeding them out of his stores, 'only the land of the priests bought he not, for the priests had a portion (of corn) assigned them of Pharaoh, and did eat their portion which Pharaoh gave them, wherefore they sold not their lands.' (xlvii. 22.) And again when Joseph, after the scarcity was over, made it a law of the land that the king should have for ever after a fifth part of the produce of the soil, restoring the rest to the owners, he excepted only 'the land of the priests,' which became not Pharaoh's.' (ib. 26.) The testimony of the Scripture is here perfectly in accordance with that of Herodotus and other historians. The priests were subject to certain strict regulations: they abstained from certain meats, and at times from wine, made their regular ablutions, had but one wife, while polygamy was allowed to the other castes, and they wore a peculiar dress according to their rank.

The soldiers formed the second caste, for Egypt had a standing army from a very remote period, divided into regiments or battalions, each having its standard with a peculiar emblem raised on a pike and carried by an officer. Their arms were the bow, sword, battle-axe, shield, knife or dagger, spear, club, and sling. Their besieging engines were the battering-ram, the testudo, and the scaling ladder. They had a military music, consisting of a kind of drum, cymbals, pipe, trumpet, and other instruments. The military caste was held in high repute and enjoyed great privileges. Each soldier was allowed a certain measure of land, exempt from every charge, which he either cultivated himself when not on active service, or let to husbandmen or farmers. Those who did the duty of royal guards had besides an ample allowance of rations. They were inured to the fatigues of war by gymnastic exercises, such as wrestling, cudgelling, racing, sporting, and other games, of which the representations still exist on their monuments.

The husbandmen formed another class, which was next in rank, as agriculture was highly esteemed among the Egyptians. They made use of the plough and other implements. They had various breeds of large cattle, sheep, goats, pigs, and a quantity of poultry reared chiefly by artificial means, the eggs being hatched in ovens, as it is the practice of the country in this day. The peasants appear to have been divided into hundreds, each with a peculiar banner, which they followed when presenting themselves before the magistrate for the census, which was taken at stated periods, when they were obliged to give an account of their conduct; and if found delinquent, were punished with the stick.

The next class was that of the artificers and tradesmen, who lived in the towns. The progress made by the Egyptians in the mechanical arts is evident from their monuments, paintings, and sculptures; in which the various handicrafts are represented. The mines of gold, copper, iron, and lead, which are in the mountains between the Nile and the Red Sea, were worked at a very remote date under the early Pharaohs. There is a passage in the work of Agatharchides on the Red Sea which describes their manner of working the gold mines and smelting the metal, and the sufferings of the people who were compelled to do that labour. (*British Museum, Egyptian Antiquities*, vol. ii. ch. 9.) The Egyptians were acquainted also with the art of gilding. The art of fabricating glass was early known among them. Beads of glass, generally coloured blue, are found on many mummies, as well as other ornaments of a coarse kind of the same material. A kind of antient porcelain, sometimes covered with enamel and varnish is found in great quantities in Egypt. Their pottery was often of the most elegant forms. The taste displayed by the Egyptians in several of their articles of furniture is not surpassed by our most refined manufactures of modern times. In the great French work and in the recent one of Rosellini we have specimens of many articles of furniture, especially chairs and couches, which are singularly beautiful in their forms Linen cloth, plain or embroidered, white or dyed, was an article of Egyptian manufacture highly in repute among foreign nations. (*Ezekiel* xxvii. 7.) The art of making leather was also known to them.

The last class or caste included pastors or herdsmen, poulterers, fishermen, and servants. The herdsmen and shepherds appear to have been held in peculiar contempt among them. Besides servants, they had a number of slaves, both black and white. Fish was an article of common food, except to the priests. Wine of native growth was used by the rich, and a kind of beer was the drink of the poor. An account of the different grains, plants, and trees, the produce of antient Egypt, and also of its native animals, is given in Wilkinson's *Topography of Thebes*, ch. v., *on the manners and customs of the antient Egyptians* The above-mentioned five castes as specified by Diodorus i. 74, were subdivided into ranks according to the various callings and trades, and this has occasioned some variety in their enumeration. Herodotus reckons seven castes, Plato six, others have not reckoned the despised shepherds as a caste, and others have counted the military as one caste with the husbandmen, as being drafted from the body of the latter. Like the Hindoo, every Egyptian was required to follow his father's profession and to remain in his caste.

That such institutions were incompatible with our modern notions of independence and freedom is evident enough; but freedom is a word differently understood in different ages and countries, and the Egyptians, trained up as they were from infancy to reverence laws which they deemed immutable, might have enjoyed as great a degree of happiness as most nations in the old world. But the degradation of the lowest caste, and the waste of human strength and human life in the working of their mines and the building of their pyramids and other colossal structures, and the frequency and nature of the summary punishments inflicted, as mentioned by Diodorus and confirmed by their monuments, seem to imply that the mass of the people, and the lower classes especially, found their superiors of the sacerdotal caste to be hard task-masters.

The progress of the Egyptians in the exact sciences has been taken for granted without sufficient evidence. Of their astronomy we know but little, but it appears to have been confounded with mythology and astrology, and made subservient to religious polity. [DENDERAH, ZODIAC OF.] Their year was of 365 days: for their method of correcting it see SOTHIAC PERIOD. Diodorus says that they foretold comets; but he also says that they foretold future events, leaving us in doubt whether they were successful in either or both cases. We cannot here enter into the vast and intricate ground of Egyptian mythology, and must refer the reader to the special works on that subject by Champollion, Wilkinson, and others. Their mythology appears to have been originally symbolical, but afterwards degenerated, at least for the vulgar, into gross idolatry. That they had some practical knowledge of geometry, which indeed must have been requisite for the construction of their buildings, &c. is generally admitted. Yet they appear not to have known until a comparatively later period that the level of the Red Sea was much higher than that of the Mediterranean or of the Nile. Their boats were rude and clumsy, and chiefly constructed for river navigation. They were for a long time averse to maritime expeditions from superstitious prejudice, probably instilled by their priests in order to keep them secluded from the rest of the world, and the Phœnicians were then the sea-carriers of Egypt. It was chiefly after the restoration effected by Psamaticus I., and their consequent intercourse with the Greeks, that their rigidity in this and other respects relaxed: they had their ships of war both on the Mediterranean and Red Sea, and under Apries Egypt had sufficient naval power and skill to cope with the fleets of Tyre. His predecessor Necos II. is said by Herodotus to have dispatched some Phœnician vessels by the Red Sea to circumnavigate Libya (Africa), and to return to Egypt by the Pillars of Hercules, which they effected. The truth, or at least the extent of this expedition has been much questioned. [AFRICA.] There is a curious story in Plato's 'Critias,' of Sonchis, an Egyptian priest, having told Solon of the Atlantic isles, which he said were larger than Asia and Africa united, which seems to imply something like a knowledge of the existence of the Western Continent.

The money of the Egyptians was in rings of silver and gold, similar to those still used in Sennaar, and its value was ascertained by weight, and its purity by fire. Gold was brought to Egypt from different tributary countries of Ethiopia and Asia, besides what they drew from their own mines. The revenue of Egypt, derived from the taxes alone, amounted, even during the negligent administration of Ptolemy Auletes, to 12,500 talents, between three and four millions sterling. Diodorus reckoned its population at seven millions, and Josephus at seven millions and a half, exclusive of that of Alexandria, which exceeded 300,000. For further particulars on the commerce, resources and policy of antient Egypt, see Heeren's *Researches*. Champollion le Jeune in his 'Egypte sous les Pharaons,' has endeavoured to retrace the national names and localities of the antient Egyptian towns, many of which had disappeared long before Strabo's time, or their names had been disfigured by the Greek writers. Egypt was, according to Champollion, divided already under the Pharaohs into 36 nomes or governments, 10 in the Thebais or Upper Egypt, 16 in Middle Egypt, and 10 in Lower Egypt, commonly called the Delta. Each nome was subdivided into districts or toparchies. This was exclusive of the Oases, the dependencies on the side of Nubia, &c.

With regard to the principal existing monuments of antient Egypt we refer the reader to the respective heads, such as DENDERAH, EDFU, PYRAMIDS, THEBES, &c., and for the general character of Egyptian architecture to the following article.

Modern History. Passing over the ages during which Egypt was a province of the Roman Empire (see Hamilton's *Ægyptiaca*, on the State of Egypt under the Romans, and *map of Egypt* with the names of the Roman period, by Raoul Rochette), we begin the modern history of Egypt at the Mohammedan conquest. Under the Caliphate of Omar, successor of Abu Bekr, Amer Ebn el As invaded Egypt, A.D. 638, and took Pelusium and Babylon of Egypt, a strong Roman station, which sustained seven months' siege. John Mecaukes, governor of Memphis for the Byzantine emperor, treacherously surrendered his trust, and the Copts agreed to pay tribute or a capitation tax to the Caliph, with the exception of old men, women, and monks. The hatred, not only political but religious, which the Copts bore to the Greeks, facilitated the success of the Moslems. The first mosque on Egyptian ground rose with the new town of Fostat on the site of Roman Babylon. Alexandria made a long and obstinate defence; it fell at last, and was plundered. The Saracen General asked the Caliph what was to be done with the library, and Omar ordered it to be burnt. But the libraries of the Ptolemies had perished before—the Bruchion was destroyed during the siege of Julius Cæsar, and that of the Serapion was dispersed by Theophilus the Patriarch, A.D. 390; the library destroyed by Omar's order was therefore a more recent collection. [ALEXANDRIAN LIBRARY.] The whole of Egypt as far as Syene was soon reduced to a province of the Caliphate, the capital of which was Fostat. In A.D. 868, Ahmed ebn e' Tooloon, governor of Egypt for the Abbaside Caliphs, usurped the sovereignty of the country and founded the dynasty of the Tooloonides, which lasted till 906, when the Caliphs retook Egypt. But in 912 Abayd Allah el Mahdee after usurping the government of Eastern Africa, invaded Egypt, which he retained till 934, when he was defeated by the forces of the Caliph. In 936 El Akhshed Mohammed ebn Tughg, a Turkish chief in the service of the Caliph, usurped the government of Egypt, and began a new dynasty which lasted till 970, when the Fatmieh or Fatemides, the successors of Mahdee, who had continued to rule in Africa, took possession of Egypt. El Moez, who styled himself Caliph, built Misr el Kahirah, where he fixed his residence, leaving Yousef Ebn Zeiri his viceroy in Africa. From that time till 1171, the Fatemite Caliphs reigned over Egypt, independent of and rivals to the Abbaside Caliphs of Bagdad. This was the period of the wars of the early Crusades, in which the Fatemides acted a conspicuous part. Egypt retained much of its importance and splendour under their dynasty. (See *Etat Arabe de l'Egypte*, by Sylvester de Sacy, joined to his translation of Abdallatif.) The Kurd Salah e' deen Yoosef Ebn Eyoob succeeded to the Fatemides in 1171, and founded the dynasty of the Eyoobites, which lasted till 1250, when El Moez, a Turkoman memlook or slave, after murdering Touran Shah, usurped the throne, and founded the dynasty of the Baharite Sultans, who took possession of Syria also. Baybers, a memlook also, assassinated his master in 1261 or 62, made himself Sultan of Egypt, retook Syria from the Tatars, took Damascus, and put an end to the Caliphate of Asia, and extended his conquests as far as and over part of Armenia. His descendants reigned till 1382, maintained possession of Syria as far as the Euphrates, and encouraged agriculture and the arts. Their dynasty is known by the name of Baharite Memlook Meleks or Sultans. They did not assume the title of Caliphs, but allowed the descendants of the Abbasides to retain that name, and to live in Egypt under their subjection, as a sort of state prisoners.

In 1382 Dowlet el Memeleek el Borgéëh, a Circassian slave, took possession of the throne and founded the dynasty of the Borgéëh, or Circassian Memlooks, which lasted till 1517, when Selim I., the Ottoman sultan, advanced into Egypt, defeated the Memlooks at the battle of Heliopolis, and caused Toman Bey, the last of their kings, to be hanged at Cairo. Selim abolished the dynasty, but not the aristocracy of the Memlooks; he even made conditions with the Memlooks by a regular treaty, in which he acknowledged Egypt as a republic, governed by twenty-four beys tributary to him and his successors, who appointed a pacha, or governor, to reside at Cairo. This pacha, however, was to make no alterations in the system of government without the consent of the beys, who might even suspend him from his functions if he acted arbitrarily, until the pleasure of the Porte should be known. The beys were to elect from among themselves a sheik of Belad to be their head, who was looked upon by the Porte as the chief of the republic. In time of war the republic was to send 12,000 men to join the Ottoman armies. In other respects the republic, that is to say, the Memlook aristocracy, was to enjoy absolute power over the inhabitants of Egypt, levy taxes, keep a military force, raise money, and exercise all the rights of sovereignty. This treaty was signed in the year 887 of the Hegira, A.D. 1517. (Savary, *Lettres sur l'Egypte*, vol. ii.) Under this form of government Egypt remained nominally subject to the Porte, against whose authority the Memlooks often openly revolted, till the French invasion of 1798, when Bonaparte, under the pretence of delivering Egypt from the yoke of the Memlooks, took possession of the country. The English sent an expedition in 1801 to aid the Porte, which drove away the French, and restored the pacha appointed by the sultan. The Memlooks and the pacha, however, could not agree; scenes of bloodshed and treachery took place, and at last the present pacha, Mehemet, or rather Mohhammed Ali, contrived to collect most of the beys with their principal officers within the citadel of Cairo, under pretence of an entertainment, where he had them all massacred in March, 1811. A few escaped into Upper Egypt, from whence they were driven into Nubia, and being also driven from thence in 1821, the few who survived took refuge in Dar-fur. [DONGOLA.] Thus ended the Memlook power, which had ruled over Egypt for more than four centuries. Savary gives an account of the institutions of that singular body, which were still in full force in his time. Their destruction, although perfidiously contrived, has been undoubtedly a benefit to Egypt, for their government was as tyrannical and oppressive as their moral character was depraved. It was a government of slaves who had become masters, for the body of Memlooks was perpetually recruited from young slaves brought chiefly from Georgia and Circassia. Every bey was a tyrant in his own district. There was not even union among them, as they were frequently at war with each other. Personal bravery or animal courage was their only virtue, if it deserves that name. Egypt suffered more under the Memlooks than during any other period of its history.

Present State of Egypt.—This country is commonly divided by geographers into three regions, namely, Bahari, or Maritime, or Lower Egypt; Vostani, or Middle Egypt; and Said, or Upper Egypt. But the administrative division of the country is by provinces, or prefectships, of which there are fifteen in Lower Egypt, and ten in Middle and Upper Egypt together. The provinces are—1. Masr, or Cairo, with the town of that name, the capital of the whole country, and the town of Boolak, the port of Cairo on the Nile, Old Cairo, or Fostat, and Suez, on the Red Sea; 2. Kelioub, north of Cairo, with the towns of Kelioub, Matarych, near the ruins of Heliopolis; Artrib, Choubra, where the pacha has a fine country residence, and Abouzabel, where is the new College of medicine and surgery, with 300 pupils, and a large hospital attached to it; 3. Belbeys, east of Kelioub, on the borders of the Desert; 4. Chibeh, north of Belbeys, with the towns or villages of Chibeh, and Tell Bastah, and Heydeh; 5. Mit Ghamer, north of Kelioub and near the Damietta branch of the Nile; 6. Mansourah, north of Mit Ghamer, likewise on the east bank of the Damietta branch, with the town of Mansourah, and the village of Tmay el Emdid, which has a monolith of granite; 7. Damietta, with the towns of Damietta and

Menzaleh, and the forts of El Arish and Tyneh, on the borders of the Syrian Desert; 8. Mehallet el Kebir, with the town of that name, within the actual Delta, on the left bank of the Damietta branch, and the small towns of Semennout and Abousir; 9. Tantah, south of Mehallet, with the town of Tantah, situated near the middle of the Delta, one of the principal towns of Lower Egypt, remarkable for its fine mosque, and the fair which takes place three times a-year, and is much frequented by pilgrims who come to visit the tomb of Seyd Ahmed el Bedaouy, a celebrated Mohammedan saint; 10. Melig, south of Tantah with the towns of Melig and Chibn el Koum; 11. Menouf, south of Melig, and within the angle formed by the bifurcation of the Nile; 12. Negileh, with the town of that name, on the left or west bank of the Rosetta branch, and the towns of Terraneh and Wardan; 13. Fouah, north-west of Mehallet, with the town of Rashid, or Rosetta, and the towns of Fouah and Deiroot; 14. Damanhour, on the left bank of the Rosetta branch, north of Negileh, with the towns of Damanhour and Rahmanyeh; 15. Alexandria, with the city of that name.

On entering the valley of the Nile from the Delta side we find, 1. Jizeh, on the left or west bank of the river, opposite Cairo, a small town, head of the prefectship of that name, near the great pyramids, and not far from the ruins of Memphis, upon which are built three modern villages, Bedreshin, Mit Rahyneh, and Memf; 2. Benisouef, south of Jizeh, on the same side of the Nile, a considerable and industrious town, in one of the most fertile districts of the valley of the Nile, with the towns of Abou Girgeh and Samallout further south; 3. On the opposite or east bank of the Nile is Atfyh, a town and prefectship; 4. West of Benisouef is the district of Faïoum, with the town of Medinet el Faïoum; 5. South of Benisouef, but extending on both banks of the Nile, is the district of Minyeh, with the towns of Minyeh, Melaoui, and Eshmounein on the left, and those of Sheyk Abadeh and El Bershel on the right bank; 6. Manfalout, south of Minyeh, with the town of that name on the left bank, and several villages on both banks of the Nile; 7. Siout, with the town of that name, the capital of Upper Egypt, and the residence of a governor. It is situated on the left bank, is a great slave-market, and the entrepôt of the caravan trade with Darf-fur and Sennaar, with a spacious bazaar, and 12,000 inhabitants—Richardson says 20,000; 8. Girgeh, south of Siout, with the towns of Girgeh, 7000 inhabitants, on the left, and Ekhmym, 10,000, on the right bank of the Nile; 9. Kenéh, with the town of that name, on the right bank, which has 5000 inhabitants, and carries on a considerable intercourse with Cosseir and the opposite coast of Arabia, and is known for its manufactory of porous earthen vessels used for keeping water cool. Kous, near the ruins of Coptos, Denderah, on the left bank, and the ruins of Thebes and of Abydus are in the prefectship of Kenéh; 10. Esneh, the most southern province of Egypt, with the town of that name, on the left bank, with about 4000 inhabitants, manufactories of cottons and shawls, and pottery; it is a great market for camels, and the emporium of the Abyssinian trade. The other towns are Edfu, Assouan or Syene, Koum Ombou, with a fine temple, and Selseleh, with its quarries.

For the principal towns of Egypt see the respective heads **Alexandria**, **Cairo**, **Damietta**, **Rosetta**, &c. The population of the smaller towns is very difficult to be ascertained, as there is no census or register kept.

The whole of the cultivable land of Egypt, in the valley of the Nile and the Delta, is reckoned at 17,000 square miles. The resident population has been generally stated at two millions and a half, but a recent traveller thinks it does not exceed two millions at the utmost, of whom 1,750,000 are Mohammedan Egyptians, including the fellahs or peasants and the townspeople; 150,000 are Copts or Christian Egyptians; 10,000 are Osmanlees or Turks and Albanians, as yet the ruling race; 5000 Syrians, 5000 Greeks, 5000 Jews, and 2000 Armenians, and about 70,000 are black slaves, Nubians, Moghrebins, &c. (Lane's *Modern Egyptians*.) In this calculation the nomadic Arabs of the neighbouring deserts, whose number cannot be ascertained, are not included. The language of the natives is Arabic; but Turkish is still the language of the government. For the Copts and Coptic language see those articles. The great bulk of the Mohammedan natives is of Arab stock, but many Copts or aborigines have at different times embraced Mohammedanism, and numerous intermarriages have taken place between the Arab settlers and the Copts, Nubians, &c. The fellahs of Egypt have lost much of their original Arabian character; they are become proverbially tame and servile, and are despised by the neighbouring Beduins, who never give them their daughters in marriage. The townspeople may be considered as having attained as high a degree of civilization as any in the East, and 'Cairo,' says Mr. Lane, 'must be regarded as the first Arab city of our age. There is no other place in which we can obtain so complete a knowledge of the most civilized class of the Arabs.' The men are generally well proportioned and muscular, their height about five feet eight or five feet nine; the women beautifully formed, and not too fat. Their complexion in Cairo and the northern provinces is clear, though yellowish, and their skin soft; the lower classes are darker and coarser. The people of middle Egypt are of a more tawny colour, and those of the southern provinces are of a deep bronze complexion. Their countenance in general is of a fine oval form; the nose is straight though rather thick, the lips rather full, the eyes black and brilliant, the beard commonly black and curly, but scanty. For the dress and habits of the various orders, see Lane's *Modern Egyptians*, vol. i.

The climate of Egypt, during the greater part of the year, is salubrious. The khamseen, or hot south wind, which blows in April and May, is oppressive and unhealthy. The exhalations from the soil after the inundation render the latter part of the autumn less healthy than the summer and winter, and cause ophthalmia and dysentery, and other diseases. The summer heat is seldom very oppressive, being accompanied by a refreshing northerly breeze, and the air being extremely dry. This dryness however causes an excessive quantity of dust, which is very annoying. The thermometer in Lower Egypt in the depth of winter is from 50° to 60° in the afternoon and in the shade; in the hottest season it is from 90° to 100°, and about ten degrees higher in the southern parts of Upper Egypt. The climate of Upper Egypt, though hotter, is more healthy than that of the lower country. The plague seldom ascends far above Cairo. Ophthalmia is also more common in Lower Egypt: it generally arises from checked perspiration, but is aggravated by the dust and other causes, and by the neglect and filth of the natives, so that great numbers of Egyptians are blind in one or both eyes. The houses of the wealthier classes in the principal towns are substantially built, roomy, and commodious, but the dwellings of the lower orders, especially of the peasants, are of a very mean description, being mostly built of unbaked brick, cemented with mud. Many of them are mere hovels. Most of the villages of Egypt are situated upon eminences of rubbish, the materials of former buildings, and thus rise a few feet above the reach of the inundation: they are surrounded by palm-trees.

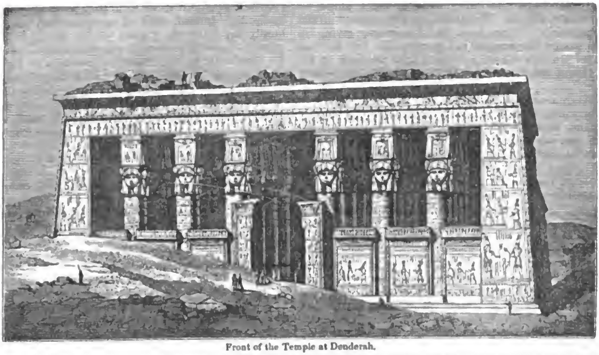
The agricultural produce of Egypt consists of the following winter plants, which are sown after the inundation and reaped in about three or four months after: wheat, barley, beans, peas, lentils, vetches, lupins, clover, flax, coleseed, lettuce, hemp, cummin, coriander, poppy, tobacco, water-melons, and cucumbers; and of the following summer plants, which are raised by artificial irrigation by means of water-wheels and other machinery: doorah, Indian corn, onions, millet, henneh, sugar-cane, cotton, coffee, indigo, madder. Rice is sown in the spring and gathered in October, chiefly near Lake Menzaleh. Of the fruit trees, which grow mostly in gardens near the principal towns, the mulberry and Seville orange ripens in January, apricots in May, peaches and plums in June, apples, pears, and caroobs at the end of June, grapes at the beginning of July, figs in July, prickly pears end of July, pomegranates and lemons in August, dates in August, citrus medica in September, oranges in October, sweet lemons and banana in November. The poor fellah or farmer who cultivates the soil derives but little benefit from the prodigality of nature: he is compelled to pay a heavy land-tax, another tax to government for the use of the water-wheels, besides additional taxes and exactions of the local sheikh, the Copt scribe, and the Turkish officers, and then he is obliged to sell a portion or the whole of the produce of his land to the government at a fixed price, and to carry it to the granary at his own expense. The fellah, to supply the bare necessaries of life, is often obliged to steal and convey secretly to his hut as much as he can of the produce of his own labour. He may either himself supply the seed for his land, or obtain it as a loan from the government; but in the latter case he receives hardly three-fourths of what he pays for, the remainder being stolen by the subordinate officers. The pacha has dispossessed all the private proprietors throughout his dominions, giving to each, as a partial compensation, a pension for life, so that the farmers are now his own tenants and entirely at his mercy. (Lane, vol. i., c. 4, and Wilkinson's *Thebes*, pp. 268 and foll.)

The government of Mohammed Ali, too extravagantly praised by some, is certainly much more rational, orderly, and humane, than that of the memlooks or that of the old pachas in the other dominions of the Porte. He administers impartial justice to all his subjects, without regard to race or religion; has established regular judicial courts and a good police; has done away with tortures and other barbarous punishments; has encouraged instruction to a certain extent; has removed most of the ignorant prejudices which existed among his subjects against the arts and learning of Europe; and has introduced European manufactures and machinery; he keeps a printing-office and a journal; has formed schools and colleges for the arts and sciences and for military and naval tactics. All this is much more than it may seem at first sight to a person unacquainted with the state of Egypt and other Turkish provinces forty years ago. But the pacha's ambition and the difficulties of his situation have obliged him to resort to two violent expedients, an enormous taxation and an oppressive conscription. The pretended legislative assembly sitting at Cairo is a mere fiction of enthusiastic panegyrists. The government of Egypt is still absolute in the strictest sense of the word, though the present pacha has chosen to govern according to forms and regulations which he has himself established. He has formed a council consisting of his chief officers and of the provincial and local governors and sheikhs, whom he occasionally consults. Many of the subordinate agents of the government in the provinces still exercise occasional acts of capricious tyranny, which seldom reach their master's ears, but whenever they do he is not slow in punishing the offenders and redressing the grievances of the oppressed. Of what Mohammed Ali has really done a good sketch may be found in Planat, *Histoire de la Régénération de l'Egypte*, 8vo., Paris, 1830, and in a notice of the same work in No. xiv. of the *Foreign Quarterly Review*, April, 1831. The reforms effected by Mohammed Ali are far more complete and effective than those of Sultan Mahmood in Turkey, and are directed by a keener sagacity and with a steadier purpose. Mengin, 'Histoire de l'Egypte sous le gouvernement de Mohammed Ali,' 2 vols. 8vo. with an atlas, Paris, 1823, gives a full account of the career of this extraordinary man. At the end of the atlas there is a 'Tableau du Commerce de l'Egypte avec l'Europe.' For the various arts and manufactures of Egypt see Lane's vol. ii. 1.

The present dominions of the ruler of Egypt extend on one side to Sennaar and Kordofan, and on the other over all Syria to Adana, a part of Cilicia at the foot of Mount Taurus. He is likewise possessed of the fine island of Candia. In Arabia he is protector of Mecca and Medina, and lord of the Hedjaz. He is possessed of at least as extensive a tract of country as any of his predecessors of the Fatimite, Ptolemaic, or Pharaoh dynasties. Whether this empire will survive his death is a very doubtful question. His power is founded on a strong military force, which consists of between fifty and sixty thousand regular troops, the officers of which are mostly proud Osmanlees, aliens to Egypt, and the soldiers are the sons of the poor, oppressed, despised fellahs. No Arab officer, says Planat, is raised above the rank of lieutenant. The Osmanlees fill likewise the principal offices of the government. But the native Egyptians are said to be quick at learning, hardy, frugal and persevering; they make excellent soldiers; they divest themselves of old prejudices more easily than the Turks, and in their intercourse with Europeans they exhibit none of the jealousy and pride of the latter. Whatever therefore may be the consequence of Mohammed Ali's reforms, with regard to the stability of his dynasty, there is some reason to hope that the impulse which he has given to the native population will not be lost, and that the seeds of improvement scattered about Egypt will spread in course of time to other parts of the Arab world, of which Egypt forms the central and so important a part.

EGYPTIAN ARCHITECTURE. This was not included under the head of CIVIL ARCHITECTURE, for the reason that it is purely monumental or historical, and not at all the object of study to the architect except as belonging to the archæology of his art, and as matter of curiosity; so totally distinct is it in its taste from what is termed classical antiquity. Indeed, until of comparatively very late years, hardly any thing was known of the Egyptian style, or the edifices executed in it, with the exception of the pyramids; for previously to the French expedition to Egypt, at the close of the last century, no satisfactory delineations had been taken of the temples and their details; but merely such views as were calculated to convey some general idea of their enormous masses and colossal grandeur. Hence it has been—we may say even still continues to be—regarded as wonderful both for the gigantic vastness of its structures, and the prodigious solidity of the materials and mode of construction employed, but at the same time as utterly devoid of beauty in its forms and proportions,—uncouthly sublime. Yet as the first impression of strangeness wears off—when the eye, so long habituated to Grecian and modern architecture, becomes more accustomed to it, and the first prejudices against it are overcome, it will be found to possess much elegance in some of its forms, together with powerful and legitimate architectural effect.

In character, the Egyptian is the very reverse of the Gothic style; for although both are distinguished by grandeur and solemnity, the one aims at ponderous massiveness, and affects low proportions, and great extent of unbroken horizontal lines; while the other affects exactly the contrary—slenderness and loftiness, forms aspiring upwards, and extreme diversity of outlines. Notwithstanding, too, that Egyptian architecture has much in common with that of Greece, it exhibits, together with what stamps the affinity between them, many striking points of difference. While they agree in having columns supporting a horizontal epistylium, or entablature, and in the general proportions resulting from such a disposition, they disagree in almost all their other subordinate particulars. It will, therefore, not only be interesting in itself, but facilitate explanation, to compare the Egyptian style with the Greek, as described in the articles CIVIL ARCHITECTURE and COLUMN. Although, in the massiveness of its proportions, in simplicity and breadth of effect, its character partakes more of that of the earlier Doric—the latter being, in fact, the first remove from it,—there is one remarkably striking difference between them; for Egyptian columns are as frequently cylindrical as not; whereas those of the earlier Doric taper very suddenly, owing to the difference between their upper and lower diameter, and the shortness of their shafts. In Egyptian buildings, on the contrary, the profile of the columns is vertical, or nearly so, while that of the walls is sloped; thus producing the same degree of contrast between the two which is observable in the Greek Doric, although the mode adopted in the one case is just the reverse of that pursued in the other. It may further be remarked that in both styles the general outline was nearly the same, it being sloped in each; in the Egyptian, by the walls; in the Doric, by the external peristyle of columns enclosing them; whereby, in the latter case, as well as in the former, the base is wider than a horizontal line on the level with the upper part of the columns. Or if we take the ground-line formed by the lowest of the steps on which the columns are placed, we find that it accords very nearly with that of the cornice, or uppermost line of the building, similarly as in Egyptian edifices. This will be tolerably well understood from the view, in the next page, of the front of the temple at Denderah, which exhibits the sloping or tapering profile we have been describing, and to which we shall have occasion again to refer in explanation of various other particulars. From what has been stated as to Egyptian columns being cylindrical, it is not to be understood that they were either invariably or perfectly so, but that such was their general form; because there is occasionally a slight difference between the upper and lower diameter; or else the shaft is cinctured at intervals by bands consisting of three or more rings encircling it, and thereby increasing the diameter in those parts. In addition to this species of ornament, the shaft was variously decorated in other respects, the spaces between the bands being sometimes sculptured with hieroglyphics; at others, reeded, that is, its surface was divided into a series of upright mouldings, or staves, so as to have the appearance of a bundle of smaller pillars bound together, of which mode, as well as that of encircling the shaft with ring mouldings, frequent examples occur in Gothic buildings. The kind of striating, or striping, just described, is the reverse of that practised in the Doric and other Grecian orders, since in the latter it was produced by concave channels, or flutings, but in this by convex surfaces. The diver-



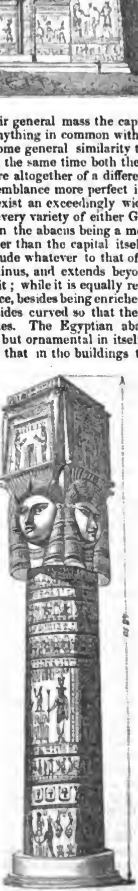
Front of the Temple at Denderah.

sity observable in Egyptian columns is so great that it is impossible to specify here all their varieties, which can be learned only by studying them in engravings; equally impossible is it, too, to reduce them to any kind of system, there being neither any peculiar form of capital, or other distinct characteristic, nor any thing in regard to proportions whereby they can be classified; for we find columns similar in proportions differing materially in all the rest, or else *vice-versâ*.

Egyptian columns have rarely any distinct base, seldom more than a circular plinth; but they have frequently an ornamental footing, which differs, however, from a base, in being contracted instead of expanded below. It may be described as shaped like the calyx of a flower, the resemblance to which is increased by its being sculptured into some forms of foliage, so that the shaft appears to be set in and rise out of a plant. Of this description are the bases of the columns of the temple at Latopolis or Esné. By somo this has been insisted upon as a defect and as indicative of weakness; consequently, contrary to that law of architecture which prescribes that there should be apparent as well as real strength, more especially where the expression of solidity is naturally looked for. Still it may not unreasonably be urged that, as in all such cases, the judgment comes to the aid of and corrects the eye, what is known to be strong cannot fairly be said to appear weak; and the solidity of columns which have stood the test of some thousands of years cannot possibly be called in question. Were we unacquainted with its properties, even the form of the arch might be thought ill calculated for sustaining pressure; by others pendents likewise from vaulted roofs might be deemed blemishes rather than ornaments, as carrying with them a decided appearance of insecurity. The particular kind of Egyptian base here alluded to is certainly not in accordance with Grecian principles, yet it does not therefore exactly follow that it is faulty in itself. On the contrary, it may be argued that the excess of strength which they gave their structure, and the prodigious solidity and durability of the materials employed, allowed the architects of Egypt to contract the diameter of their columns below, without rendering them at all weak. Perhaps, too, one motive for doing so was thereby to produce a still more effective contrast between the columns and the general outline of the building, which, as already explained, sloped upwards.

The most usual form adopted for capitals was bell-shaped, that is, resembling a bell reversed, or rather the bell and petals of a flower, with a rim bending downwards, which was sometimes quite circular, thereby giving the whole somewhat the appearance of a mushroom; at others, jagged, the circumference being divided into a number of convex curves, forming so many distinct petals. The six specimens given in the article COLUMN, vol. vii., page 383, exhibit two of the latter, and three of the first-mentioned variety of the bell-shaped capital.

From these it will be seen what variety prevailed in the decorative details, some being cut into distinct leaves, either convex or concave, others embellished with sculpture representing branches and flowers. It will also be perceived that in their general mass the capitals of this class, far from having anything in common with that of the Grecian Doric, bear some general similarity to that of the Corinthian order; at the same time both the foliage itself and its arrangemont are altogether of a different character. Yet even were the resemblance more perfect in these respects, there would still exist an exceedingly wide distinction between them and every variety of either Grecian or Roman capitals, namely, in the abacus being a mere square plinth, considerably smaller than the capital itself. Consequently it bears no similitude whatever to that of the Doric, which overhangs the echinus, and extends beyond the architrave which rests upon it; while it is equally remote from that of the Corinthian, since, besides being enriched with mouldings, the latter has its sides curved so that the angles extend to those of tho volutes. The Egyptian abacus, on the contrary, is anything but ornamental in itself, and would be a defect, were it not that in tho buildings themselves it var

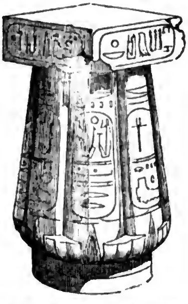


Column from Denderah.

hardly be seen, owing to its smallness, and the projection of the rim of the capital; consequently, unless it happens to be very deep, it serves chiefly to detach the capital from the architrave, and prevent that heaviness of appearance which would otherwise be occasioned. The first figure among the specimens above referred to shows an example of what may be termed the double capital, peculiar to Egyptian architecture, for above the usual shaped capital is a square member, sculptured on each of its sides with an Isis' head, and on this again is placed a small temple, so that instead of a double this may be termed a triple capital. The columns of the temple at Tentyra or Denderah offer another instance of the double capital in some respects similar to, in others greatly differing from the preceding.

Here the lower capital consists of four Isis' faces, disposed so as to form a square, larger than the shaft, the folds of the head-dress hanging down and projecting beyond it: above each face is a kind of fluted abacus; and above is a square temple. The shaft also varies considerably from those shown in the preceding examples; for instead of being striated vertically and banded horizontally, this is covered with hieroglyphics disposed in series of rings. Another remarkable circumstance is the great height of the whole capital, it being not less than two-fifths of the shaft.

There is another species of capital of very frequent occurrence, which is totally distinct from either of the above two classes; and although its form may, at first sight, be considered uncouth, it is well calculated for effect; neither is it devoid of simplicity. After sweeping out from the shaft, instead of continuing to expand as it proceeds upwards, it slopes back so as to diminish until it is contracted again to the diameter of the shaft itself. The decoration consists in its being subdivided into eight lesser shafts, inscribed with hieroglyphics, as are likewise the faces of the abacus, which member here becomes very pronounced, and occasions a picturesque play of light and shade. Capitals of this kind, as well as other varieties, occur at Luxor. In their proportions Egyptian columns vary no less than in other particulars, their height amounting in some instances to no more than three diameters, in others extending to eight or upwards. Yet such difference is not attended by any regularly corresponding one, either as regards the column itself, or the parts connected with it. Further, it is by no means unusual to meet with square pillars or *tetrapleurons*, with either a statue, or a caryatid figure standing before, but distinct from it.

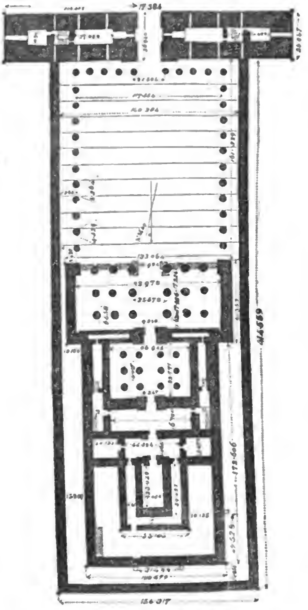


The Egyptian entablature is so far from displaying any thing like the same variety as the columns, that it is nearly uniformly the same in buildings which differ very much from each other in regard to their columns. Unlike that of the Greeks, it consists of only two divisions, the epistylium or architrave, and the cornice; the height of both being generally one-third of that of the columns. More frequently than not the epistylium was enriched with sculpture in hieroglyphics; which circumstance alone constitutes a great difference between the practice of the Egyptians and that of the Greeks. Another singularity is, that the epistylium was included within the convex moulding or *torus* carried up at the angles of the building, and then returned horizontally along the front, owing to which the architrave itself (epistylium) appears to be returned downwards, like that of a door or window. This will be at once understood by referring to the view of Denderah on the opposite page, by which it will also be seen that the cornice consists of little more than a deep cove, enriched with sculpture; a form peculiarly adapted for effect in a climate like that of Egypt, as it not only casts a bold shadow but receives a strong reflected light.

With the cornice the building terminated, for the roof being a flat terrace, there was no indication of roof; consequently Egyptian architecture is entirely destitute of what are such expressive and highly ornamental features in that of Greece, namely, the pediment, antifixæ, and ridge tiles. By way of indemnity for its deficiency in this respect, and the sameness arising from it, greater latitude was allowed to it in others. Not only was there far greater diversity in the forms and ornaments of columns, which do not appear to have been subject to any regulations beyond those prescribed either by symbolic allusions or by national taste; but columns of very different character appear in the same edifice, and even capitals of different design in the same range of columns; wherein again a kindred spirit may be observed between Egyptian and Gothic architecture, notwithstanding that in treatment they are so dissimilar from each other. Another thing peculiar to Egyptian buildings is the frequent use in the external porticoes of temples of intercolumnar walls, or screens, that is, walls built between the columns and carried up half their height; thereby giving to the open part of the intercolumns above them somewhat the appearance of windows. For an example, we again refer to the view of Denderah, in which instance these walls are brought forward so as to encase the shafts of the columns between them, and fling a shadow upon them. Like every other part of the front in the same edifice, these walls are decorated with sculpture and hieroglyphics; for the Egyptians were exceeding lavish of that species of embellishment, not confining it to particular situations, as did the Greeks, namely to the pediment, frieze, and inner frieze behind the columns, along the walls of the cella, but extending it over the entire surface, in compartments forming tier above tier. Those architectural sculptures were generally in very low relief, and some of them also occasionally in intaglio, or hollowed into the surface instead of projecting from it. There are even instances of a combination of both modes, the figures being outlined by a groove or incision, so as to give them greater apparent relief; a mode that has been denominated by some intaglio-rilevato. In addition to this species of enrichment may be added that of colours and gilding, especially in the interior and upon beams and ceilings. In this respect, however, the Greeks displayed a similar taste; for it has been recently established beyond all doubt that their temples were decorated with colours and gilding, externally as well as internally, even those of the Doric order, where what have hitherto been considered mere plain mouldings and surfaces, because they were unsculptured, were, in fact, highly ornamented, and frequently with embellishments remarkable for their delicacy.

Having thus given some notion of the elementary parts and features of Egyptian temples, we proceed to describe their general plan and distribution, selecting by way of explanatory illustration the ground plan of the temple at Edfu, or Apollinopolis Magna, one of the largest in Egypt.

This, it will instantly be seen, was far more varied and complex than the plan adhered to by the Greeks, which, as has been shown in the article Civil Architecture, consisted merely of a cella, either surrounded entirely with columns, or with columns only in front, or at both ends Here, on the contrary, the temple is placed within an enclosure, forming a court in front of it, surrounded on three of its sides by colonnades; and the entrance to this court was through a colossal doorway, or propylæum, placed between two enormous pyramidal towers, or moles, covered with colossal figures in sculpture. These vast masses of structure, which rose considerably higher than the temple itself, had the usual cornice, and likewise the torus moulding running up their angles. Other conspicuous objects frequently accompanying such propylæa, were lofty obelisks, as was the case at Luxor, where there still exists one in front of each mole. These moles may almost be said to be solid, for although they contained chambers and staircases, such spaces amounted to no more than voids left in the mass. Within the court the colonnades were pycnostyle, which seems to have been the usual mode of intercolumniation adopted by the Egyptians, the columns being seldom more than a diameter and a half from each other, except in the centre of a portico, where there was generally a doorway between the columns, the lower part of the other intercolumns being walled up, as described above, and as shown in the view of Denderah. Such is the case in that of Edfu, which also agrees with the one just mentioned in the number of its columns in front. Owing to their being enclosed at their extremities, both these examples answer to a Greek hexastyle in antis [Civil Architecture], or an octastyle; because although there are but six columns, there are seven intercolumns. They agree, too, in having other rows of columns within, parallel to those in front; but in this respect that at Denderah is richer than the other, for while it has three inner ranges of columns, that at Edfu has only a couple. Even this, however, exceeds what we meet with in Grecian buildings, where there is only—neither is that very general—a single row of columns in antis behind those in front, forming the pronaos or vestibule to the cella—for being inclosed not only at its sides, but in front, by the intercolumnar walls, it answers more to the character of a *pronaos* than a portico. The plan of such structures as the propylæa at Athens and Eleusis corresponds more with that of an Egyptian portico than does any thing else in Grecian architecture; they being, like the latter halls, open in front and enclosed at their sides or ends, and having files of columns within. Beyond this portico, or first hall, is one of smaller extent, passages being cut off at its ends by exceedingly thick partition walls. This has three rows of four columns each, so disposed as to occupy the whole area, leaving merely narrow aisles in every direction between them—a mode peculiar to Egyptian architecture, occasioned by the necessity for employing such thickly-set columns to prop the massive beams and slabs of stone composing the ceiling; and hence such apartments have obtained the name of *hypostyle* halls. It is hardly necessary to observe that they are altogether different from what has oddly enough acquired the title of an 'Egyptian hall' in this country, (for instance, the large room in the Mansion House, London; the entrance hall at Holkham, &c.), which, besides being utterly unlike Egyptian architecture as to style, has merely a peristyle of columns, or else only colonnades along its sides. To this hypostyle succeed two chambers, the farther one having smaller lateral rooms attached to it, which, it is conjectured, were appropriated to the use of the priests; and facing its entrance was that leading into the *sekos* or shrine containing the figure of the deity. While all the preceding vestibules and chambers are placed transversely to the longitudinal direction of the building, the last and innermost apartment is parallel to that direction, and in continuation of the line of approach; the reason for which is obvious enough, it being almost indispensably requisite that the statue of the divinity should be at one end, and directly facing the entrance. In all probability likewise the object aimed at in disposing the rest as we perceive it to be, was twofold; first, for the sake of having a greater number of apartments to be crossed before the sanctuary was reached and thus rendering it more difficult of access and more mysterious; and secondly, for the sake of contrast; the other divisions of the plan being intended to be merely passed through, but this, on the contrary, being the termination of the whole. If we keep this in view, and the peculiar nature of the worship to which these temples were dedicated, the arrangement must be allowed to be judicious and appropriate, notwithstanding that under different circumstances it might be objected to as constituting a very strong anti-climax, since every portion of it successively diminishes, the last of the sacred chambers being, as the plan shows, hardly equal to the space forming the great doorway between the two moles. Yet what is thus an anti-climax, if we have regard to dimensions alone, became a perfect climax that must have made a powerful impression on those who were allowed to penetrate into the *adytum*—the most sacred part of the fane—the presence chamber, as it were, of the presiding divinity, where the sanctity of the whole precinct was concentrated in a focus, and to which the magnificence and colossal grandeur of all the rest served merely as preparation and prelude.



Plan of the Temple of Edfu.
The figures in the plan are feet and decimal parts of a foot.

Such was the general disposition and distribution of an Egyptian temple, which, besides other very obvious distinctions, differs from those of Greece in the columns being situated chiefly within the building, for even the colonnades may be considered in some degree to be so, with respect to the entire plan. The portico, again, was neither *prostyle*, or advanced before the body of the temple itself, nor *peristyle*, that is, continued around it, but enclosed by the lateral walls, as is the case with a Greek temple in antis. Except in the particular instances already alluded to, columns are of very rare occurrence within Grecian edifices, except they were of large dimensions and *hypæthral* (like the Parthenon), that is, open to the sky, having no roof except over the aisles between the walls and the colonnades along them. A court-like area of this latter description was altogether different in character from the hypostyle halls within Egyptian temples, which, owing to the multiplied files of columns and the narrowness of the intercolumns, presented the appearance of a grove of pillars; and had it not been for the great diameter of the columns themselves, their being set so close together would have been no small inconvenience. But the columns themselves were generally of such prodigious bulk, that the space of a diameter and a half between them would generally be equal to about eight or ten feet, and in some instances to much more. In the vast hypostyle hall at Karnak, which is about 338 feet by 170 in extent, and has 134 columns disposed in nine parallel rows one way, and sixteen the other, the smaller pillars are nearly nine feet in diameter, and the larger almost eleven! In comparison with such enormous dimensions both in this and every other respect—for the whole structure extended several thousand feet—the most astonishing works of Roman and of modern architecture shrink into insignificance—even the Colosseum and St. Peter's, and the largest Gothic cathedrals, cease to appear astonishing in point of magnitude.

Some particulars remain yet to be noticed in respect to the temple at Edfu. Instead of being level, the court has a slight ascent towards the front of the temple; not however in one continued slope, but in a succession of low and very wide steps, each being the width of a column and intercolumn, as indicated by the plan; and the columns around the court are not so lofty as those of the portico, whereby the temple itself acquired greater dignity. Of these latter the capitals are bell-shaped, but not uniform as to design; while those of the pillars in the hypostyle hall have quadrilateral capitals with the four Isis' faces similar to those at Denderah. This hall, again, is not so lofty as the outer one or portico, but the height is proportioned to its other dimensions.

As in Grecian, so in Egyptian architecture, doorways are conspicuous and important features, more particularly in the latter, where they occur as distinct parts of tho design in the form of propyla; sometimes standing quite insulated after the manner of arches or gateways; yet more usually placed between and connecting two pyramidal moles that rise to a great elevation above the propylon itself; consequently such entrance is both lower and narrower than the parts attached to it; which is altogether contrary to what is observable in Grecian composition, where the centre is, if not uniformly more elevated than the rest, at least not depressed; whereas there is here something analogous to what we observe in the façade of a Gothic cathedral, where the portail and body of the church are similarly flanked by towers. In its general form the propylon or gateway resembled the temple itself, yet with this difference, that the proportions of the one are lofty and narrow; of the other, wide and low, and its opening filled with columns supporting the lintel or epistylium. Their similarity in all other respects is obvious enough, owing to the epistylium of the portico being returned and carried downwards just as the lintel of the door is in order to form its jambs. The outer angles are similarly inclined in both cases, and ornamented with the same torus moulding on their edge. It should be understood, however, that the jambs of the doorway were, for the most part, not vertical next the opening, but sloped like the external angles, so that the aperture was narrower at top than at bottom, which form seems to have been copied by the Greeks in that of their doors and windows. The lintel and cornice above it were also proportionably much deeper than the epistylium and corresponding member, over columns, in order to produce sufficient mass; otherwise the effect would have been both unarchitectural and disagreeable, too much like that of the mere framing of a door, standing, although not quite insulated, yet distinct from the rest of the composition. Some idea may be given of the imposing magnitude of such doorways or propyla, by stating that the one at Edfu measures 74 feet to its summit, and 51 to that of the aperture, which gives a depth of 23 feet, or nearly one-third of the whole height, for the lintel and cornice.

The magnificence of these propylæa was greatly enhanced by colossal statues or obelisks—in some instances both—placed on either side of the entrance. Besides which there were sometimes two or even more propylæa and courts preceding the temple, which were in their turn preceded by avenues of gigantic sphinxes or crio-sphinxes (that is, sphinxes with rams' heads). There are, likewise, instances of avenues of columns crossing the courts in a line from the entrance. The remains at Luxor furnish an example of the kind, where, after the first court (which has a double peristyle), there is a second with a double range of columns extending down it, that are 11½ feet in diameter and 56 high, and beyond this was a third court, flanked by colonnades, consisting of double rows of pillars.

Having thus far given a sketch of the leading characteristics of the Egyptian style, in respect to the principal forms and details, together with their disposition and the arrangement of the buildings themselves, we shall touch very briefly upon the subject of the pyramids, because, interesting as they are in themselves, they are structures of so very peculiar and distinct a nature, as to have but little connection with the architecture of the country in general, being, when considered with reference to it, little more than uniform and simple, although enormous masses. They are, in fact, greatly more important in an historical and archæological point of view than in one purely architectural. Their shape is so familiar to every one that it requires no description, but may be defined as square in plan and triangular in section, its four sides being as many triangles united so as to terminate in a point; and as the height is much less than the width of the base, each side constitutes nearly an equilateral triangle. Hence, to say nothing of the amazing difference in regard to bulk and dimensions, an Egyptian pyramid is altogether dissimilar in character from a Gothic spire, notwithstanding that Murphy and some other writers have considered it the prototype of the latter. The magnitude of these singular erections, to which there is nothing corresponding in the architecture of any other country (except in Mexico), will be rendered more striking by observing that the base of the great pyramid is of the same dimensions as the area of Lincoln's Inn Fields, namely, about 700 feet square and 450 in height, while the corresponding admeasurements of the second and third pyramids are 650 feet and 280, and 400 and 160. Owing to these proportions, which in the latter case are much lower than those above stated, the extraordinary height is combined with imperishable stability and solidity, the whole being nearly one entire mass of the hardest materials, for the inner galleries and chambers form but mere veins and cavities compared with the entire mass.

In the Great Pyramid three chambers, hitherto undiscovered, have been lately (1836-7) explored and opened by Colonel Vyse. The largest, measuring 38 feet 1 inch by 17 feet 1 inch, has been denominated by him the 'Wellington Chamber;' the second (38 feet 9 inches by 16 feet 8 inches) named 'Nelson's;' and the third (37 feet 4 inches by 16 feet 4 inches) has been named after Lady Arbuthnot, who was present at the time of the discovery. These chambers vary as to height, and the blocks of granite which form the ceiling of the one below serve as the pavement to the next above it. According to the colonel, were chiefly intended as voids in that portion of the pyramid above what is termed the King's Chamber,—the only one that appears to have had any destination—and thereby to lessen the superincumbent mass.

Notwithstanding Egyptian architecture is so dissimilar in its character, in the taste and feeling manifested by it, from every modern style founded upon that of the Greeks and Romans, as to offer little that can be directly applied to any modification of the forms we are accustomed to; it is highly worthy of study by professional men, were it only on account of the beautiful and picturesque arrangements, the skilful contrasts, and varied harmony in the distribution of plan, which it exhibits. For our buildings in general it would be utterly inappropriate, but it might be adopted both with propriety and economy in such as require the expression of massive strength: namely, prisons, manufactories, propylæa entrances to railroads, and works of that description; for which purposes it has been recommended by Dr. Macculloch. Neither need it be an objection that it is quite as remarkable for the high finish and multiplicity of ornament, as for its other qualities; because, apart from all that is merely decorative, it is well calculated to produce effect by its forms and masses alone. It must also be admitted that, although its chief monuments are of colossal bulk and extent, such magnitude is not absolutely essential to the style itself, since there are many moderate-sized edifices still remaining; among others, the temple of Dandour, which does not exceed 22 feet by 44, a scale not very extravagant even for a mere ornamental building in a garden.

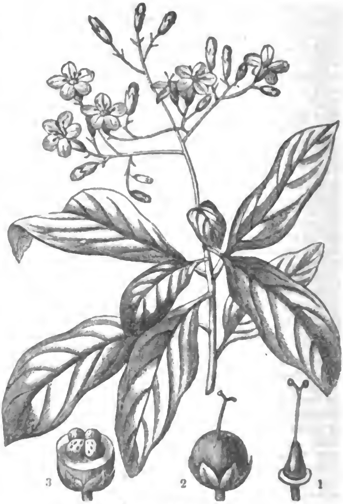
We cannot here, as in the article on CIVIL ARCHITECTURE, refer to actual examples at home: still there are two buildings in the metropolis which, as far as single features and details go, may be cited as specimens of Egyptian architecture, viz.: the 'Egyptian Hall,' Piccadilly, and a smaller structure in Welbeck-street. The latter was, as originally erected, the most correct in point of character, but has since been almost spoiled by very barbarous alterations. The other conforms to the style only in certain peculiarities and separate parts, such as the columns, the general outline as indicated by the inclined torus-moulding at the extremities of the front, the cornice, &c., for the composition of the design itself is quite at variance with the principles of genuine Egyptian architecture, the front being divided into two floors with wide windows to both; whereas windows, wherever they do occur in Egyptian buildings, which is but rarely, are exceedingly small and narrow apertures; consequently the Piccadilly example must be looked at with some degree of mistrust. It must also be confessed that any imitation of the style is better adapted for situations where no other buildings would interfere with it, than for street architecture, where a building of such design will look small unless actually much larger than any of those around it.

Hitherto the taste of the Egyptians has been called in question, as being confined to a feeling for grandeur and magnificence, yet evincing very little refinement or perception of beauty. When examined with unprejudiced eyes, however, many of these forms, especially those of the bell-shaped and lotus-leaved capitals, will be found to possess much of the last-mentioned quality; while recent discoveries in the palaces, tombs, and temples of Upper Egypt, communicated to the world in the splendid publications of Rossellini and others, show not only the great variety and taste manifested in decoration and embellishment of every kind, but prove that many ornamental forms we have been accustomed to consider as essentially Greek, and have imitated as such, are really Egyptian. This is rendered strikingly evident by the delineations given in Rossellini of the various pieces of furniture, musical instruments, vessels of gold and silver, and other articles, from the royal tombs and palaces; and in regard to which luxury and refinement appear to have attained the highest pitch. Not only their archetypes, but even the express forms, till now attributed to the Greeks exclusively, are thus shown not to have been of their invention, but borrowed by them from the Egyptians, in like manner as they have since been copied by ourselves, while ignorant of their real origin. In consequence of this highly curious and important discovery, it is exceedingly probable that the subject of Egyptian architecture will engage attention in a much greater degree than it has ever before done.

EGYPTIAN BEAN, a name sometimes given to the bean-like fruits of Nelumbium speciosum, from the notion that they were the beans which the disciples of Pythagoras were forbidden to eat.

EHRENBREITSTEIN, a township on the right bank of the Rhine, in the circle of Coblenz, and in the Prussian province of the Lower Rhine. It contains one town and eight villages, with about 6400 inhabitants; an increase of 568 since the year 1817. The town is called Thal Ehrenbreitstein (Vale Ehrenbreitstein), and is situated at the foot of a precipitous height 772 ft. in elevation, opposite to Coblenz, in 50° 23′ N. lat. and 7° 36′ E. long. It occurs in records of the year 1210 under the name of Mulne or Mullenheim; but in 1533 the name appears to have been changed into Mühlheim and Müllenthal, probably from the number of mills in the valleys of two rivulets close to it. It contains 2 Roman Catholic churches, a synagogue, 11 public buildings, 9 mills, about 270 dwelling-houses, and 2400 inhabitants. The electoral palace is in a state of great decay. The town has a tobacco manufactory; the acidulous spring in the town is of some repute; and it has a brisk trade in wine, corn, iron, clay for tobacco-pipes, &c. Above the town stands the fortress, which has been entirely reconstructed since the year 1817, with the addition of three forts on adjacent heights, which command the mouth of the Moselle and the access to it from the Lower Rhine. These are, Fort Alexander, on a height in front of Coblenz; Fort Francis, on St. Peter's Hill, on the left bank of the Moselle; and the Pfaffendorf redoubt, opposite the flying bridge across the Rhine. The road up to it from the town is about 1200 paces long; it is fortified, and rests almost entirely upon arches built over the chasms in the rock of which the height consists. The 'Cavalier,' or highest point of this formidable stronghold, is not accessible to strangers, as it affords a full view of the detail and interior of the defences; but the prospects from other points are extensive and beautiful. According to Professor Klein, the Romans had a watch-tower on this height in the times of the Emperor Julian; subsequently the Franks built a burg or castle on the site; and in 1153 it was restored, enlarged, and fortified by the then archbishop of Treves. In 1632 it fell into the hands of the French, whom the Imperialists drove out by famine in 1637. In 1795, 1796, and 1797 it was blockaded by Generals Marceau, Jourdan, and Goullus successively; and in 1799 it surrendered to the French, who the next year razed all its fortifications.

EHRETIA'CEÆ, a small natural order of exogenous plants consisting of shrubs or trees inhabiting the warmer countries of the world, and having rough leaves, monopetalous regular flowers, a definite number of stamens, a superior ovary, a two-lobed style whose divisions are capitate, and a nucamentaceous undivided fruit. The flowers are more or less gyrate, and the order itself, which contains no species of economical value, is so near Boraginaceæ as to render it doubtful whether it ought to be separated. The common heliotrope is the most generally known representation of Ehretiaceæ, forming however the type of a sectional division, characterized by the fruit being dry, not succulent.



Beurreria succulenta.

1, An ovary with the style and double stigma; 2, a ripe fruit with the calyx at the base; 3, a section of the same showing the seeds.

EICHHORN, JOHANN GOTTFRIED, an eminent professor of oriental and biblical literature in the university of Göttingen, and one of the most learned and distinguished scholars of Germany, was born in 1752, at Dorrenzimmern, in the principality of Hohenlohe Oeringen, and at first was rector of the school at Ohrdruf, in the principality of Gotha. Having applied with great success to the study of the oriental languages, he obtained, in 1775, a professor's chair in the university of Jona, where he continued thirteen years, giving instruction in Hebrew, Arabic, &c., and was made, in 1783, a court councillor by the duke of Saxe Weimar. In 1788 he was appointed to the professorship previously held by Michaelis in the university of Göttingen, of which institution he continued a very distinguished ornament during the remainder of his life, as professor of oriental and biblical literature.

His reputation was equally high as a proficient in oriental, classical, and scriptural antiquities; in philosophical criticism; in the history of nations, and of antient and modern literature and science; and in universal bibliology. He was made, in 1811, a doctor of divinity; in 1813 the directorship of the Royal Scientific Society of Göttingen was conferred on him, and the office of pro-rector of that university; in 1819 he was appointed privy councillor of justice for the kingdom of Hanover (Geheimer Justizrath). He died in 1827, on the 25th of June, at the age of 75. These few incidents, which appear to be all which are published, verify the trite observation that the secluded lives of students furnish but scanty materials for biographical memoirs. In completing the present notice it is therefore only necessary to enumerate the principal works of Eichhorn, and to give a brief and general account of his doctrines as a divine and critic.

The following statements are made, partly from an examination of the works enumerated, and partly on the authority of several German bibliographical publications, and the last edition of the Conversations Lexicon (3rd vol., 1833). While at Jona, Eichhorn first displayed his knowledge of Oriental literature in a history of East Indian commerce prior to the time of Mohammed (Geschichte des Ostind. handels vor Mohammed), Gotha, 1775. This was followed by a survey of the most antient monuments of the

Arabs (Monumenta antiquissimæ Historiæ Arabum, post Schultensium collecta atque edita, cum animadversionibus), Gotha, 1775: and a treatise on the antient numismatical history of Arabia, Gotha, 1775. He next published a large collection of learned and valuable treatises, entitled a Repertorium of biblical and oriental literature (Repertorium für biblische und morgenländische Litteratur), 18 vols. Leipzig, 1777-86. After removing to Göttingen he devoted his attention almost exclusively to the archæology of biblical literature, and the results of his studies appeared in a general repository of biblical literature (Allgemeine Bibliotek der biblischen Litteratur) 10 vols. 1788-1801; and in a disquisition on primitive history (Urgeschichte) 2 vols., Altdorf and Nurnberg, 1790-93, with an introduction and notes by the learned Gabler. This work contains a searching and bold criticism of the Mosaic Pentateuch. The two next are among the most important of the author's productions, namely, the introduction to the Old Testament (Einleitung in das Alte Test.) of which a 4th and improved edition, in 5 vols., appeared at Gotha in 1824: and the introduction to the New Testament (Einleitung in das Neue Test.) new edition in 2 vols. 1827. These were accompanied with an introduction to the apocryphal writings of the Old Testament (Einleitung in die apokryphischen Schriften des Alten Test.) Leipzig, 1795, Götting. 1798; and a revised and uniform edition of the three, with the title of Critical Writings (Kritische Schriften) was published at Leipzig in 7 vols. 1804-14.

The other works of Eichhorn on biblical criticism and philology are a commentary on Revelations (Commentarius in Apocalypsin Joannis) 2 vols., Gotting. 1791. A revised and enlarged edition of Professor Simon's Hebrew and Chaldaic Lexicon, Halle, 1793. A critical translation and exposition of the writings of the Hebrew prophets (Die Hebraischen Propheten), 3 vols. Götting. 1816-20. Commentaries on the prophetic poetry of the Hebrews (Commentationes de Prophetica Poesi Hebræorum), 4to., Götting., 1823. Preface to the 'Nova Bibliotheca Hebraica' by Koecherus; and numerous critical treatises in a learned periodical work entitled Mines of the East (Fundgruben des Orients); and in the Commentaries of the 'Göttingen Royal Society of Sciences' (Commentarii Societat. Reg. Scientiarium Gottingensis).

In 1796 he published the plan of a comprehensive history of arts and sciences from their revival in Europe to the end of the 18th century, and wrote, as a part of the work, a general history of civilization and literature in modern Europe (Allgemeine Geschichte der Cultur und Litteratur des neuern Europa), 2 vols., Götting., 1796-99. The History of modern Poetry and Eloquence, by Bouterwek, and the History of Military Science, by Hoyer, constituted other parts of the undertaking, which was left unfinished. The first three parts and the fifth part, of a similarly extensive and uncompleted work were written by Eichhorn, namely the History of Literature, antient and modern, from its commencement to the present time (Geschichte der Litteratur von ihrem Ursprunge bis auf die neuesten Zeiten), 6 vols., Götting., 1805-11. He also wrote Literary History (Literargeschichte), 2 vols., Gotting., 2nd edition, 1813-14. A History of all parts of the world during the last three centuries (Geschichte der drey letzten Jahrhunderte, &c.), 6 vols., Gotting., 3rd edition, 1818. An Historical Survey of the French Revolution (Uebersicht der franz. Revolution), 2 vols., Götting., 1797. And a Universal History (Weltgeschichte) on the plan of Gatterer's universal statistics (Weltstatistik) 4 vols., Gotting. 3rd edition, 1818-20. The two following laborious and judicious compilations have obtained a high repute in the schools of Germany, namely, a History of antient Rome, composed entirely of connected passages from the antient Roman writers (Antiqua Historia ex ipsis veterum script. Roman. narrationibus contexta), 2 vols., Gotting., 1811; and a History of antient Greece, constructed on the same plan, from the antient Greek historians (Antiqua Historia, &c.), 4 vols., Leipzig, 1812. His last historical work was a curious research on the early history of the illustrious house of the Guelphs, in which the ancestors of the present royal family of England are traced up to the middle of the 5th century. (Urgeschichte des erlauchten Hauses der Welfen, von 449-1055), 4to., Hanover, 1817. From the year 1813 to his death in 1827, Professor Eichhorn was the editor of the Göttingen Literary Gazette (Göttingische gelehrte Anzeigen.) His critical writings display extensive and exact learning, which in his biblical treatises he employs for the development of doctrines often the reverse of those which are generally regarded as orthodox. As a divine, his character, with reference to one of his principal works, is thus described in Orme's Bibliotheca Biblica (p. 166): 'Professor Eichhorn is the Geddes of Modern Germany, and has performed for the Old Testament what Michaelis, whom he succeeded, did for the New. Possessing the erudition, the diligence, and all the bold free-thinking of his celebrated predecessor, he introduces the Old Testament by demolishing its authority, by denying its inspiration, and by calling in question the antiquity of its chief historical documents.' It is added, that many of the author's opinions can meet with few supporters in England, except among those who arrogate the title of rational divines; and that the work is noticed only on account of its celebrity in Germany; a statement strangely inconsistent with the fact of its being in the hands of every learned student of divinity in Europe and America. Eichhorn applies to the Hebrew Scriptures the principles on which Heyne explained the mythology of the Greeks, and his name is conspicuous in the theological school commenced by Michaelis and Semler, and extended by Rosenmüller, Kuhnoel, Döderlein, Rohr, Teller, Schmidt, Henke, Ammon, Steinbart, Wegscheider, &c., as an ultra rationalist, and a promoter of the system of *logical* religion and morality, founded on the Kantian transcendental theory of ideology, so generally prevalent in the universities of Germany, and which in truth is a system of mere moral philosophy and philosophical theism, exhibited under the ostensible profession of Christianity; since all traditionary doctrines and statements are made to give way to the operation of 'abstract, universal, and eternal principles of reason.' By his superior knowledge of Oriental antiquities, and by his bold mode of thinking, Eichhorn established a new system of scriptural explication, in which he displays a degree of learned and philosophical scepticism much beyond that of his predecessor Michaelis. He denies all supernatural revelation to the Hebrew prophets, believing them to have been clever and experienced persons, who, from their peculiar abilities, were likely to foresee political and other events. He examines, questions, and rejects the authenticity of several books of the Old Testament, and of some of the epistles in the New, and asserts generally that miraculous appearances, visions, voices, &c., are explainable by the laws of nature and the principles of human physiology and psychology, and that supernatural communications are chiefly referable to the mysterious traditions and superstitious notions common to all people in a state of ignorance and barbarism. His theory of the origin of the canonical gospels which regards them as compilations from anterior documents has been adopted by many subsequent critics (See Dr. Schleiermacher's work on the Gospels.) Many of the sceptical positions of Eichhorn have been attacked in Germany by the anti-rationalist class of divines. On this point see 'The Present State of Protestantism in Germany,' by the Rev. Hugh Rose, 2nd edition, 1829, and the controversial publications which it elicited.

EICHSTÄTT, a bailiwick in the circle of the Regen, and in the west part of Bavaria. It gives the title of Prince to the duke of Leuchtenberg, and forms a portion of his mediatised possessions in the Bavarian dominions. The country, which is mountainous and well wooded, is traversed by the Altmühl: it produces grain, flax and hemp, hops, timber, iron, potters' clay, slate, &c.

EICHSTATT or **EICHSTÄDT**, is a handsome town situated in a narrow but productive valley on the left bank of the Altmühl, across which four bridges have been built. It is the residence of the duke of Leuchtenberg, as well as of a bishop. It lies in 48° 53′ N. lat., and 11° 10′ E. long. The town is walled round, has four suburbs, about 900 houses, and a population of about 7800, distributed in three parishes. It has an ecclesiastical seminary, a Latin or grammar-school, a capuchin monastery, a nunnery, an hospital, an orphan asylum, and other charitable institutions, a cathedral church and chapter, and four other churches. Among the buildings of note are the ducal palace, with the celebrated Brazilian cabinet, a library and museum of antiquities, the fine arts, &c.; the cathedral church; and the burg or stronghold of St. Willibald, which overlooks the town from the summit of the mount of that name, and has a well 1200 feet deep. This burg is said to be on the site of Aureatum, a Roman castle, and was the abode of the

first bishop, Willibald, who was the builder of the cathedral church and the adjacent dwellings for his clergy, in the middle of the eighth century. For this purpose he cleared an area covered with oaks, whence the town derives its name of Eichstädt, or town of oaks. In the romantic grounds called Aumühlwald, near this place, is a tablet of cast-iron, set in a block of marble, 198 feet square, and laid into a mass of rock: it was erected by the citizens in memory of Eugene Beauharnois, step-son of Napoleon, and viceroy of Italy. This prince was afterwards duke of Leuchtenberg, and prince of Eichstädt. The town manufactures woollens, earthenware, beer, iron ware, &c., and has quarries in the neighbourhood.

EIDER. [DENMARK.]

EIDER-DUCK. [FULIGULINÆ.]

EIGHTH (in music), the octave or eighth note of the diatonic scale. It is a perfect concord [CONCORD], and in harmony is accompanied by the 5th and 3rd; but being almost identical with the base note, it may form a part of any chord, or be omitted at discretion.

EIKON BASI'LIKE. [CHARLES I. OF ENGLAND.]

EILENBURG, a town in the county or administrative circle of Merseburg, and in the minor circle of Delitsch, which, before its transfer to the Prussian crown, formed part of the circle of Leipzig in Saxony. It is situated on an island of the Mulde, in 51° 28′ N. lat., and 12° 37′ E. long. The town is surrounded by walls and ditches, and has two gates and a bridge over each arm of the river, four suburbs, an old castle, two churches, an hospital, and infirmary, a civic school, about 640 houses, and 6300 inhabitants. The manufactures consist of cottons, bleached wax, starch, vinegar, brandy, woollen-yarn, crucibles, &c.

EIMBECK or **EINBECK**, the chief town of the former principality of Grubenhagen, which is now incorporated with the principality of Göttingen, a portion of the Landrostei or bailiwick of Hildesheim in Hanover. It is encircled by two arms of the Ilm, and lies in 51° 48′ N. lat., and 9° 51′ E. long. The walls which enclose it have five gates; the streets are crooked and ill-paved; and the houses, about 780 in number, are old and originally built in the middle ages. The number of inhabitants was 4995 in 1812, and is at present about 5150. It has three churches (one of which, St. Alexander's, contains the sarcophagi of the princes of Grubenhagen, and has a chapter attached to it), an orphan asylum, where woollen yarns are spun, two hospitals, a refuge for the indigent, a gymnasium or high school, and six elementary schools. The church of the Blessed Virgin has likewise a chapter attached to it. Eimbeck, besides a considerable traffic in agricultural products, possesses manufactories of woollens, cottons, tobacco, linens, leather, beer, &c., and there are large bleaching grounds outside the walls.

EIRE'NE. (Zoology.) [MEDUSA.]

EISENACH, a principality in the centre of Germany, forming the western portion of the grand duchy of Saxe-Weimar-Eisenach, from which it is disjoined by the intervention of part of the Prussian province of Erfurt, and the Saxe-Coburg-Gotha territory. It is bounded on the north by Prussian Saxony, on the north-east by the principality of Gotha, on the south-east by Saxe-Meiningen, on the south and south-west by Bavaria, and on the north-west by the electorate of Hesse-Cassel. The detached district of Ostheim, also part of Eisenach, lies to the south within the Bavarian confines, and there are likewise other small and detached portions of the Eisenach territory within the boundaries of Gotha and Saxe-Meiningen. The principality is of greater extent than it formerly was, since it now comprehends the bailiwics of Lichtenberg, Kaltennordheim, Geiss, Dermbach, Vach, Frauensee, Völkershausen, and some minor tracts, which have been acquired by cession or exchange from the territories of Fulda, Henneberg, and Hesse-Cassel. Its area is about 440 square miles, rather less than a third part of the grand duchy of Saxe-Weimar-Eisenach; and it has a population of about 78,500 souls; in 1818, the numbers were 65,349, and in 1835, 77,729. The greater part of this principality belongs to Thüringia, and a considerable portion of it is traversed by the Thüringian Forest mountains (*Thüringer-Wald-Gebirge*); between which and the Rhön mountains the principality comprehends a tract about forty-two miles in length, and from nine to fourteen in width. The country presents a succession of hills and mountain-heights, uninterrupted by any extensive levels, and the soil is consequently not very favourable to cultivation. It is watered by the Werra, with its tributaries, the Ness and Hörsel, Ulster, Fulda, Sulz, Suhl, and Vach. The climate is pure and healthy, though, from the proximity of the Thüringian heights, it is variable and not so mild in Franconia and on the Rhine. The products consist of grain, which is not adequate to the consumption, timber, potashes, and tar, rape-seed, flax, hemp, hops, fruit, &c. Horned cattle and sheep are reared in great numbers, as well as swine. Mining has been much neglected; copper, iron, vitriol, alum, and coals, in small quantities, are obtained; and there are quarries of stone and marble, as well as salt-springs near Kreutzburg, from which about 500 tons of salt are annually extracted. Potters' clay and fullers' earth are found. There is more mechanical industry in Eisenach than in Saxe-Weimar: its principal manufactures are linens, woollens, cottons, iron and copper ware, yarn, potashes, leather, earthenware, and articles of wood. Eisenach is divided into eleven bailiwics, and contains eight municipal towns, twelve market-towns, or villages with markets, and 130 villages and hamlets. The chief towns are Eisenach, Ruhla (3000 inhabitants, of whom 1800 are subjects of Saxe-Gotha), Dermbach (800), Geisa (1700), Berka (1000), Gerstungen (1300), Kaltennordheim (1200), Kreutzburg (1700), Lengsfeld (2100), Ostheim (2600), Vacha (1600), and Völkershausen (1000). The principality fell to the grand-dukes of Saxe-Weimar upon the decease of the last duke of Saxe-Eisenach, who left no issue, in the year 1741.

EISENACH, the chief town and seat of government of the principality of Eisenach, is situated at the confluence of the Hörsel and Nessel, which unite immediately north of the town, and then flow through it in one channel: the village of Fischbach touches it on the east; and the celebrated Wartburg, a mountain fastness, commands it on the south. Eisenach lies in 50° 58′ N. lat. and 10° 18′ E. long. It is surrounded by walls, has five gates, is well built, and has broad, clean, well-paved streets. It contains about 1450 houses, and has about 9300 inhabitants; an increase of about 1042 since the year 1818, when the number was 8258 independently of the military. The grand-ducal palace, or house of princes (Fürstenhaus), a structure of the last century, is a large and handsome edifice. Among other public buildings there are five churches; a gymnasium, founded in 1233, with an extensive library; a handsome civic school which ornaments the spacious market-place, and was erected in 1825; a seminary for the education of schoolmasters; and an academy for young men designed for the profession of superintendents of woods and forests, an important branch of study in those countries where wood supplies the place of coals. Eisenach has also an agricultural institute for the instruction of youth intended for husbandry, a school of design, a free-school, as well as six elementary schools, a house of correction and orphan asylum, two hospitals, an infirmary, a school of industry for indigent girls, a bible society, and several philanthropic associations. The chief manufactures are woollens, cottons, linens, soap, white-lead, meerschaum heads of pipes, leather, and carpets. The original name of the town was Ysenaha or Ysenacha: it was the abode of Hilten, who preceded Luther as a reformer of the church, and of Amsdorf (a first bishop of Naumburg, and afterwards Luther's bosom friend and fellow-labourer), who died here in 1565. A steep ascent through a fine park leads to the well-known stronghold called the Wartburg, which is about a mile and a quarter from Eisenach, and at an elevation of 1318 feet above the level of the sea. The original burg was built by Lewis the Jumper in 1140, and was the residence of the landgraves of Thüringia until the year 1406: a large portion of it was rebuilt in the beginning of the present century. On this spot, in the early part of the thirteenth century, the minnesänger, or minstrels of Germany, used to contend; and it is still better known as the place of refuge or 'Patmos,' as Luther styled it, to which that great reformer was conveyed in 1521, on his way back from attending the Diet of Worms: here he found an aslyum for the ten succeeding months, which he devoted principally to his translation of the Scriptures. The little chapel in which he frequently preached, with its altar-piece, a fine carving in wood representing the Entombment of Christ, and the cell which Luther inhabited, have been carefully preserved in the same state as when he used them. In the antient portion of the **Wartburg** also the Baronial Hall (*Rittersaal*), in which the minstrels held their poetic contests; and the Armoury, built in 1810, which contains reliques of the paraphernalia of Pope Julius II., the Princess Cunigunda, and other personages. This hold is still protected by external works, and is now made use of as a prison. In the grounds between the Wartburg and the town is the remarkable rock in which the hand of nature has sculptured the representation of a monk and nun.

EISENBURG, or in Hungarian Vas Vármegye, and Sclavonian Zelezne Mesto, a large county in the western part of Hungary, bounded on the north-west by the Austrian province 'below the Ens' (or Lower Austria), on the south-west and west by Styria, and on the east by the counties of Oedenburg, Vezprim, and Szalad. It contains an area of about 2037 square miles, which is divided into 6 circles, and has 1 royal free town (Güns or Koeszoeg), 1 episcopal town (Stein), 41 market towns, 612 villages, 57 prædia or privileged settlements, and about 301,000 inhabitants. The southern and western parts of Eisenburg are very mountainous; for here the Alpine chains which traverse Styria and the duchy of Austria terminate. The northern districts are hilly; but extensive and highly productive plains lie on both sides of the Kemenes, an elevated plateau on the right bank of the Raab. This river is the principal stream in the county, and flows through its southern parts, whence it takes a direction to the north-eastern: the three lesser rivers, the Pinka, Sorok, and Güns, which water the centre and western districts, fall into the Raab on its left bank. Eisenburg, though it has many forests, is on the whole a fertile and productive land: and it has been estimated that of the 1,039,000 acres available for useful purposes, 530,700 are already under the plough; 48,000 have been converted into vineyards; and 358,300 are occupied by woods and forests. Wheat, oats, barley and maize, peas and beans, and flax, are grown in abundance; the Yánosháza tobacco is in repute; and much wine is made. There are many rich pasture lands, and the extensive forests, particularly the Farkas, afford plenty of timber and fuel. Large herds of horned cattle are kept, along the banks of the Raab especially; more pains are now bestowed on the breeding of sheep; poultry is extensively fed for the Vienna market; and there is much game. Near Bernstein, a mining district in the north-west of Eisenburg, large quantities of sulphur are dug: quicksilver, also vitriol, ironstone, and copper, are obtained here on a small scale. Coals are dug at Mariadorf. Marble and alum, are likewise among the products of this county. The majority of the inhabitants are Roman Catholics, of whom there are about 170,000, and of Protestants about 60,000. They are as much distinguished by their mechanical as their agricultural industry, and have a good trade with various parts of Austria.

The most remarkable spot in Eisenburg is Stein-am-Anger (Szombathely), the Sabaria of the Romans, an episcopal town, lying between the Perenth and Güns, in 47° 13′ N. lat., and 16° 37′ E. long., with about 3800 inhabitants. This town, where the states of the county hold their meetings, as well as its environs, abounds in remains of Roman art, in columns, sepulchral tablets, votive stones, inscriptions, &c. The cathedral is a handsome modern edifice: the town has three other churches, an episcopal residence, seminary, and chapter-house, three monasteries, a Roman Catholic gymnasium, college of philosophy, county-hall, and other handsome buildings. At Tatzmannsdorf (Tarcza), a beautifully situated village in the north-western part of the county, there are excellent and much-frequented chalybeate springs. The dignity of Obergespan (or Headman of the county) is hereditary in the Bathyáni family.

EISENSTADT (in Hungarian Kis-Martony), a royal free town in the Hungarian county of Oedenburg, finely situated in a noble expanse of country bounded by the Leitha mountain range, in 47° 33′ N. lat., and 16° 24′ E. long. It lies about 26 miles south-east of Vienna, and contains about 5400 inhabitants. The town itself is walled round, has two gates, and three main streets, a church, and a Franciscan monastery, in which is the sepulchral vault of the Esterházy family, a monastery, and hospital of the Brothers of Charity, a town-hall, and the offices for the administration of the Esterházy domains. The 'Schlossgrund,' or palace-domain, is an extensive suburb, containing about 2600 of the population, and comprising the 'Judenstadt' or Jew's Town, where 500 of that community reside here are Mount Calvary, laid out in conformity with the supposed disposition of the site in Palestine, and enriched in the eyes of the Roman Catholics by a miraculous effigy of the Virgin; and the palace called Kis-Martony, a splendid quadrangular structure, erected in 1805 by Prince Esterházy, to whose family the whole suburb belongs. The park is large, rises in terraces towards the Leitha hills, and is embellished with temples, a canal and cascades, an avenue of rose-trees, 262 paces in length, an orangery of 400 trees, nine large conservatories, containing nearly 70,000 plants, water-works impelled by steam, &c. Eisenstadt possesses a head-school, a Protestant public school, a town-hospital, and an institute for forest economy. Much wine is brought here for sale.

EISLEBEN, formerly the capital of the earldom of Mannsfeld, the chief town of the Mannsfield circle of the Lake, in the administrative circle or county of Merseburg, in Prussian Saxony. It is situated on an eminence on the banks of the Böse, in 51° 33′ N. lat., and 11° 32′ E. long., and in the vicinity of two lakes. The town has two subdivisions; the Old Town, which is surrounded by walls and ditches, and has seven gates, and the New Town; besides these it has five suburbs. Eisleben contains altogether four churches, a Protestant gymnasium, several elementary schools, two hospitals, and has about 7500 inhabitants: between the years 1817 and 1831 the number increased from 6330 to 7230. The chief manufactures are potashes and tobacco; and there are copper and silver mines in the neighbourhood, with two smelting works. The town has a brisk inland trade. Luther was born here on the 10th of November, 1483, and died here on the 13th of February, 1546; but neither his parents nor himself had a permanent residence in Eisleben. The object of greatest attraction in it was the house in which he was born. After escaping several extensive conflagrations, it was at last destroyed by fire in June, 1689; and nothing was saved but a wooden table on which Luther's portrait was carved, an old engraving which also represented him, and a window, on the glass of which he and Melanchthon were pourtrayed in the old style. On the site of this house a more solid building of stone was soon afterwards erected, and on the 31st of October, 1693, it was solemnly consecrated to the purposes of a poor-house and free-school. This is the structure which is at present shown to visitors as Luther's house. A stone bust of the reformer stands over the entrance, with the well-known saying inscribed beneath it:

Gottes Wort ist Luthers Lehr,	The word of God is Luther's say.
Drum vergeht sie nimmermehr.	And it shall never pass away.

The old portraits of Luther and Melanchthon on glass have been introduced into one of the windows. Over the door of one of the rooms is the portrait of Luther in wood, and beneath it is the distich,

Hostis eram Papæ Sociorum pestis et hujus;
Vox mea cum scriptis nil nisi Christus erat.
Anno post R. S. 1594, mense Majo renovata.

This inscription refers to the verse, 'Pestis eram vivens; moriens ero mors tua, Papa!' which Luther is said to have written at Altenburg in the year 1530, and was fond of quoting. Several articles are exhibited, such as what is called Luther's table, which in fact never were his. At St. Andrew's, the principal church in the town, the little pulpit in which Luther preached is still preserved. Sermons to his memory are regularly delivered from this pulpit on the days of his birth and decease, and on the first day of public catechizing. There are busts of Luther and Melanchthon in the same church. On the day of the jubilee of the Reformation in 1817, several additions were made to Luther's house, at the expense of the present king of Prussia, who bestowed a sufficient endowment to preserve it against future decay, and perpetuate its benevolent object.

EISTEDDFOD, from *eistedd* to sit; a meeting or assembly. This term was more especially used as the name for the session of the bards and minstrels which was held in Wales for many centuries. [Bard.]

EJECTMENT is the name of an action at law of a nature partly real and partly personal, and therefore called a mixed action, by which a party entitled to the immediate possession of lands or other corporeal hereditaments may recover that possession from the party wrongfully withholding it.

Since the disuse of real actions, and under the provisions of the 3rd and 4th Will. IV., c. 27, for the abolition of real and some mixed actions, it has become the only legal mode of trying the title to lands and tenements.

The remedy by ejectment is founded almost entirely upon a succession of legal fictions, and it is therefore necessary to give a short account of its history and the proceedings under it.

Originally this action was brought by any person having a lease for years of lands, &c., to repair an injury done him by dispossession; but gradually it became the means of indirectly bringing in question the title to the lands, which was thus collaterally tried with the supposed trespass. For this purpose it was necessary that the claimant should enter upon the lands in order to empower him to constitute a lessee for years who would be capable of receiving the injury of dispossession. A lease for a term of years is therefore stated in the declaration (for there is no other process in this action) to have been made by the party claiming title to the plaintiff, who is generally a fictitious person. It is also stated that the lessee, in consequence of the demise to him, entered into the premises, and that the defendant, who is also a fictitious person, and called the *casual ejector*, entered thereupon and ousted the plaintiff, for which ouster the plaintiff brings his action.

Under the declaration is a notice in terms professing to be written by the casual ejector to the tenant in possession of the premises, advising him to appear in court at a certain time and defend his title; otherwise he, the casual ejector, will suffer judgment to be had against him, by which means the actual tenant would inevitably be turned out of possession.

The declaration, as well as the notice, is then served upon the tenant in possession of the premises, who has thus an opportunity of defending his title. If he omits to do so within a limited time, he is supposed to have no right; and upon judgment being obtained against the casual ejector, the real occupier is turned out of possession by the sheriff.

If the tenant apply to be made a defendant, he is allowed upon condition that he enters into a rule of court to confess at the trial of the cause four of five requisites for the maintenance of the plaintiff's action—the lease of the lessor, the entry of the plaintiff, the ouster by the tenant himself, and the possession by the tenant. These requisites (except in certain cases, as of vacant possession, &c.) are wholly fictitious; and if the plaintiff should put the defendant to the proof of them, he would of course be nonsuited at the trial; but the stipulated confession of lease, entry, and ouster being made, the case then rests upon the merits of the title only. The cause goes to trial under the name of the fictitious lessee on the demise of the lessor, who is the person claiming title against the defendant.

The lessor is bound to make out on the trial his title to the premises; and if he do so in a satisfactory manner, judgment is given for the nominal plaintiff, and a writ of possession goes to the sheriff to deliver up the possession to him, under which process it is in fact delivered to his lessor, the real claimant. If it appears that the person claiming title to the lands has no right of entry, that is, no right to the immediate possession, he cannot maintain this action.

A mortgagee may maintain an action of ejectment against the mortgagor to gain possession of the mortgaged premises without giving any notice, unless the mortgagor is protected by the covenant for quiet enjoyment until default. He may also eject the lessee, to whom the mortgagor has made a lease subsequent to the mortgage, without giving him notice to quit. Where the right of the tenant to retain the possession has ceased by effluxion of time, by a legal notice to quit, or by the commission of an act of forfeiture, a landlord may bring an ejectment against his tenant; and various other persons who have a right of entry in law upon the premises may take advantage of the same remedy.

The time within which an action of ejectment may now be brought is regulated by the 3 and 4 Wm. IV. cap. 27, which enacts that no person shall bring an action to recover any land or rent (the meaning of which terms is explained by the first section of the act) but within twenty years next after his right to bring such action, or that of the person through whom he claims, shall have first accrued. The third section fixes the time at which the right shall be deemed to have first accrued. (Runnington *On Ejectment*; Adams *On Ejectment*; Blackstone's *Com.*)

EKATARINBURG or **YEKATARINBURG** (Catherine's borough), the chief town of a circle in the government of Perm (Permia), in the western part of Asiatic Russia, was founded by Peter the Great, in the year 1723, who gave it the name which it bears in honour of his consort. It is situated on both sides of the Iceth or Iset, the western quarter of the town being built along the slope of a gentle acclivity of the Ural mountains. It is at an elevation of about 860 feet above the level of the sea: in 56° 50′ N. lat., and 60° 41′ E. long. It is fortified and regularly constructed: the streets are long and straight, but they are unpaved, and have planks laid on each side of them by way of a foot-pavement. The greater part of the houses are of wood, but there are many handsome stone buildings; the chief of them form three sides of a square, the fourth side of which is the right bank of the Iceth: this range of buildings is composed of the Mining Department (for Ekatarinburg is the seat of administration for the Ural mines), a museum of mineralogy, a public library, an excellent chemical laboratory, an imperial mint, works for cleansing and amalgamating metals, as well as for cutting and polishing precious stones, a school for educating miners, a hospital, storehouses, a guardhouse, &c. A handsome bridge unites both quarters of the town, and on the acclivity on the left bank of the river is a long range of wooden tenements where the work-people reside, with the stone residences of the public offices between them and the bridge. The merchants and dealers' houses in the town are also of stone, and would be an ornament to any city in Europe. Besides five churches, there are a Greek monastery, a public school for 300 pupils, a German school, a large bazaar, a magazine for grain, a house of correction, and several district and elementary schools. At the northwestern end of Ekatarinburg are remains of the fortifications where the garrison is quartered. The number of houses is upwards of 1200, and of inhabitants about 11,000. By the official return of the year 1830 they amounted to 10,695. The population consists of a motley assemblage of Asiatics and Europeans, the latter principally Russians and Germans, among whom are numbers of persons exiled for public offences. There is a public hall for drugs and chemicals, and a botanic garden attached to the hospital. The greater part of the inhabitants depend upon the Ural mining concerns for their subsistence; and as Ekatarinburg lies on the high road from Russia into Siberia, it is a place of transit and of brisk trade. In the neighbourhood lie the gold mines of Beresoff and the iron mines of Niviansk, which extend over a surface of nearly forty square miles: there is also a chalybeate well, which is much used by invalids. A wood of pines encircles the north-western extremity of the town, and about half a mile beyond lies lake Iset.

EKATARINOSLAF, one of the three southern provinces of Russia in Europe, which since 1822 have constituted the government of New Russia. It is bounded on the north by the provinces of Pultava, the Slobodsk-Ukraine, and Voronesh; on the east by the territory of the Don-Cossacks; on the south by the sea of Azof, and the government of Tauria; and on the west by the government of Cherson. There is an isolated district of this province, of which Taganrog is the chief town, lying at the northwestern extremity of the sea of Azof, and separated from the remainder of Ekatarinoslaf by the territory of the Don Cossacks. The area of this province is estimated by some at 23,700 square miles; but according to Arsenief, at 28,980. Upwards of two-thirds of this area are an open steppe, destitute of wood, and adapted to pasturage only: this is peculiarly the case with that large tract which is situated east of the Dnieper. The districts west of that river are much more fertile, and are skirted by a range of hills which run northwards from Alexandrofsk along the Dnieper. Here it is principally that the arable lands of Ekatarinoslaf, occupying about one-fourth of the soil, are situated. The whole extent of the woods and forests does not exceed 256,000 acres. The principal river is the Dnieper, which enters the province at its north-western extremity, and, winding through the western parts of it, quits it below Alexandrofsk. The immense blocks of granite which obstruct the course of the river at and below Kidak, give rise to thirteen beautiful falls, here called 'paroghi;' and below them the river is divided by islands into several channels. The Don skirts Ekatarinoslaf only at its mouth; but its tributary, the Donecz, waters it partially in the east. The other streams in this province, such as the Samara, Kalmius, &c., are of no great importance. There are several lakes, the water of which is often much impregnated with salt: swamps are of frequent occurrence. The climate is mild, and not exposed to much variation, and the winter is of short duration. The quantity of grain produced is scarcely adequate to the consumption; in some years it is so scanty that the supply is drawn from foreign parts. Hemp and flax, peas, beans, lentils, vegetables, and fruit, particularly melons, are cultivated. The grape ripens, and some wine is made, but the fruits of the mulberry and walnut do not attain to maturity. The forests do not furnish sufficient timber or fuel; and straw, rushes, and even dung, are substituted for the latter. The chief kinds of trees in the forests west of the Dnieper are the oak, linden, and poplar. In consequence of the scarcity of timber, the houses are built of clay, and roofed with rushes. Cattle-breeding is carried on upon an extended scale, for the steppes are one vast expanse of pasture-ground. The stock of horses, horned cattle, goats, and swine is immense; and numerous flocks of sheep are also kept, the breed of which has been so much ameliorated that 336,835 pure Merinos alone were in stock in the year 1832 all these animals are left to graze in the open fields throughout nearly the whole twelve months. There were, in 1832, between 1480 and 1500 establishments for breeding oxen and cows, and 232 for rearing horses. Cheese and butter are made of sheep's milk. In the same year Ekatarinoslaf possessed 86,100 hives, from which much honey and wax were obtained. The culture of the silkworm is a favourite pursuit with the Greeks at Mariapol and the Armenians at Nakitshevan, and this branch of industry is rapidly on the increase. The chase forms a means of livelihood, as wild animals and game are plentiful: under this head we may enumerate the jerboa, wolf, fox, buffalo, antelope-goat (saiga), wild cat, tiger-martin, musk-rat, pelican, wild duck, and partridge. The fisheries on the Dnieper, Don, Kalmius, and Sea of Azof are very productive, and are estimated to bring in upwards of 20,000*l.* per annum. Among the mineral products of the province, which are few and not of much importance, are lake salt, of which little advantage is taken on account of the scarcity of fuel, granite, chalk in large quantity, clay, and bog iron. The garnet is occasionally met with.

The population is a mixed race, principally of colonists who have gradually transformed a wilderness into a habitable and productive region during the last eighty or ninety years; they are composed of Great and Little Russians, Cossacks, Servians (who migrated hither between the years 1754 and 1760, by thousands at a time,) Walaks, Magyárs, Albanians, Greeks, Armenians, Tartars, Germans, and Europeans in general. Of Greeks and Armenians, the numbers are about 30,000 of each; the Germans amount to about 10,000. The inhabitants are classed as follows in the returns for the year 1830:—

Hereditary nobles	2555
Superior officers and servants of the crown	2363
Clergy (including six monks) .	4427
Soldiers on furlough and their families	3498
Merchants and dealers, mechanics, &c.	9355
Free peasantry and others attached to the crown lands . . .	285,777
Peasantry belonging to crown donations	1956
Peasantry and others, the property of individuals . .	236,684
Total . .	546,615

Arsenief considers this return as much below the real number, and estimates the population at 610,000 for the year in question; but Schubert, in his recent statistics of the Russian empire, states it to have been 826,100 even so far back as the year 1829. Hörschelmann, in his new edition of Professor Stein's 'Geography and Statistics,' states it to be 860,000. The numbers given by the two last writers appear to justify Hassel's estimate for 1820, of 761,600. All but the Cossack part of the population, which is semi-nomadic, have fixed abodes. We have no official account of their increase or decrease, excepting for the year 1832, when the births amounted to 40,218, and the deaths to 27,053, showing an increase of 13,165 in that year (Schnitzler). The religion of the majority is Russo-Greek: the province contains 690 parishes, and the ecclesiastical head is the archbishop of Ekatarinoslaf, Cherson, and Tauria. The 30,000 original Greeks have a bishop of their own at Feodosia; and the Armenians are under the bishop of Nakitshevan. There are a few Mohammedans and Jews.

Ekatarinoslaf is divided into the seven circles of Ekatarinoslaf, on the west side of the Dnieper; Verchne-Dniaprofsk, north of Ekatarinoslaf, also on the west side of the Dnieper; Novo-Moskofsk, on the east side of the Dnieper; Alexandrofsk, on the east side of the Dnieper, which separates it from Ekatarinoslaf; Paulograd, north-east of Ekatarinoslaf; Bakmut, east of Ekatarinoslaf; and Slarenoserfsk, the north-easternmost circle of the province, independently of the isolated district of Rostof, on the Sea of Azof. The principal towns are Ekatarinoslaf; Alexandrofsk, on the left bank of the Dnieper (about 4000 inhabitants); Novo-Moskofsk, on the Samara (3000); Paulograd, on the Voltsha, east of Ekatarinoslaf (900); Verknébiaprofsk, on the right bank of the Dnieper, (about 250 houses); Bakmut, on the Bakmuta, (about 4500 inhabitants); Slavenoserfsk, on a tributary of the Donecz; and Taganrog, on the Sea of Azof (about 14,000). Besides these towns, which are the capitals of the seven circles, there are several others, the most important of which are Azof, on the sea of that name; Mariapol, at the efflux of the Kalmius into the Sea of Azof, with about 3500 inhabitants; Nakitshevan, on the Don (about 9200); and St. Dmitria Rostofskaye, a fortress at the confluence of the Temernik and Don (about 2500).

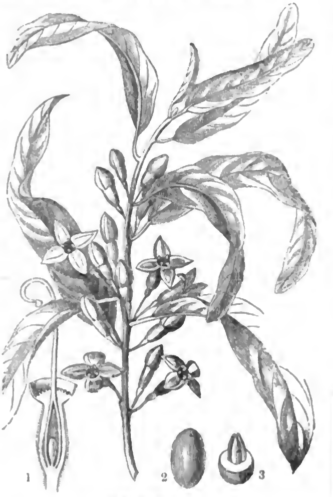
The manufactures of Ekatarinoslaf, although gradually extending, are not yet of much importance; in fact, there is still need for a much greater number of hands for the cultivation of the soil. The returns of 1830 show that in the 30 larger manufacturing establishments there were not more than 648 hands employed: these establishments consisted of 3 manufactories of woollen cloths, 6 of tallow and 7 of candles, 10 tanneries, 1 bell foundry, 2 breweries, &c. There were at that time not less than 225 brandy distilleries. The district of Rostof however is not comprised in this enumeration; and here there were 49 manufactories in the year 1832. The principal articles exported are fish, tallow, and other animal products.

The revenue collected by the crown in 1830 amounted to 7,439,704 paper rubles, or about 340,990*l.* sterling. About fifteen years before it was not more than 1,540,000 rubles, or about 70,580*l.*

The province of Ekatarinoslaf was first constituted by the empress Catherine in the year 1784, and was composed of the districts lying next the southern banks of the Dnieper, which were before this held by the Cossacks, of several large districts wrested from the Turks, and of Crimean Tartary as far as the shores of the Sea of Azof. In 1797 the emperor Paul augmented it by the addition of other lands between the Bog and Dniester, which had been ceded by Turkey, and the peninsula of Tauria; and he designated the whole of this extensive country New Russia. In the year 1822, however, the emperor Alexander, his son and successor, reorganised these possessions, and forming them into the governor-generalship of New Russia, divided it into the three provinces of Ekatarinoslaf, Cherson, or Nikolaieff, and Simferopol, or Tauria.

EKATARINOSLAF, the capital of the province, is situated on the right bank of the Dnieper, at the junction of the Kaidak with that river, in 43° 27′ N. lat., and 35° 2′ E. long. The first stone was laid by the empress Catherine II. in 1787. The town is close to the foot of a mountain, and is built according to an extended and regular plan adapted for a much greater number of inhabitants than the 12,000 which it at present contains. In 1833 they amounted to 11,648. The streets are broad, and laid out in straight lines, but in an unfinished state. There are three churches, a gymnasium, and an ecclesiastical seminary, an imperial manufacture of woollens, and several hospitals. Silk stockings are made, and some retail trade is carried on. The houses are about 900 in number. The navigation of the Dnieper terminates at Ekatarinoslaf, in consequence of the 'peroghi,' or falls, which obstruct its navigation at Kaidak just below it. Prince Potemkin has some gardens and grounds in the vicinity.

ELÆAGNA'CEÆ, a small natural order of Apetalous Exogens, consisting of trees or shrubs, whose leaves are either opposite or alternate, destitute of stipules, and always protected more or less by scurfy scales, which usually give the plants a leprous aspect. The genera of this order have a tubular 4-lobed calyx, the inside of which is lined with a fleshy disk, that sometimes almost closes up the tube, there are three, four, or eight stamens, and a superior ovary, containing a single erect ovule. The fruit is soft, succulent, and would be eatable if it were not for its dryness and insipidity. In a few cases, when it is more than usually juicy and acidulated, it is actually considered an excellent fruit. Elæagnus hortensis and Orientalis bear a brown fruit, about the size of an olive, which is brought to market in Persia under the name of Zinzeyd: in quality it is like a jujube. The red drupes of Elæagnus conferta, the large olive-shaped ones of E. arborea, and the pale orange-coloured ones of E. triflora, are in like manner eaten in India; another occurs among the drawings of Chinese fruits. It is not a little curious, nearly as Elæagnaceæ are related to Thymelæaceæ, that they do not seem to participate in any degree in the acidity of that deleterious order. The only species found wild in Great Britain is the Hippophae rhamnoides, a spiny shrub, with diœcious flowers, small round orange-coloured acid berries, and narrow leaves, like those of rosemary, found growing on cliffs near the sea; its fruit, when the acidity is sufficiently covered by sugar, becomes a rather pleasant preserve. Elæagnus angustifolia, called in the gardens the *Olivier de Bohème*, a native of the eastern parts of Europe, is one of the most fragrant of all plants; its dull yellow flowers, hardly remarked among the leaves, fill the atmosphere with a delicious perfume, the source of which is not readily discovered by the passer by.



Elæagnus angustifolia.

1. a section of the tube of the calyx, showing the fleshy disk almost closing up the tube, the carpel, with its style and stigma, and the erect solitary ovule; 2, a ripe fruit; 3, the same cut away to show the single furrowed seed.

ELÆIS, a genus of palms, so named from elaia, the olive-tree, because an oil is yielded by the fruit of its principal if not only species. This is Elæis Guineensis, or oil-palm, *maba* of the natives of the Congo, and common all along the western coast of Africa. The tree is monœcious, as we are informed that both male and female spadices were obtained from a single plant cut down by Professor Smith. (Brown, in Tuckey's *Congo*). The stem is tall, about ten inches in diameter, rough, and bristling with the persistent bases of the petioles, of which the margins, as in recent leaves, are fringed with spines. The leaves are pinnate, about 15 feet in length, with two rows of sword-shaped leaflets, each 1½ foot long. The fruit is ovoid, about the size of a pigeon's egg, with its outer fleshy covering of a golden yellow colour, and like that of the section Cocoinæ, to which it belongs, and analogous to the cocoa-nut, has the foramina of its putamen at the apex, and not at the base, as represented by Gærtner and others.

Mr. Brown has observed it as remarkable that Cocos Indica and this palm, which is universally, and he believes justly, considered as having been imported into the West India colonies from the west coast of Africa, should be the only two species of an extensive and very natural section of palms that are not confined to America. The *elæis occidentalis* of Swartz, the *thatch*-tree of Brown's 'Jamaica,' and the *avoira* of Aublet, are probably all identical with the *maba*, or oil-palm, of the African coast.

The oil is obtained by bruising the fleshy part of the fruit (and not the kernel, as sometimes stated), and subjecting the bruised paste to boiling water in wooden mortars; an oil of an orange-yellow colour separates, which concretes when cool to the consistence of butter, and has when fresh the smell of violets or of the root of the Florentine iris, with a very slightly sweetish taste. This oil is used by the Africans in cookery and for anointing the body. It forms a considerable article of commerce to Europe, where it is chiefly employed in perfumery and medicine. *Cocos butyracea* (which is referred by Kunth to the genus elæis) is considered by the Edinburgh College to be the plant which yields palm-oil.

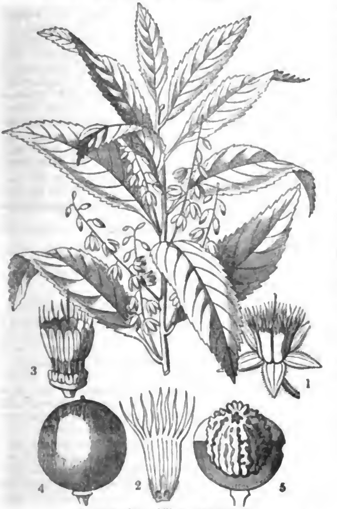
Reference has been made from ALFONSIA to this article in consequence of Mr. Brown (Tuckey's *Congo*, Appendix, p. 456) having stated, 'It is probable that *alfonsia oleifera* of Humboldt, Bonpland, and Kunth belongs to elæis, and possibly may not even differ from the African species. To this the above authors, in the 'Synopsis Plant. Æquinoct.' reply, that in elæis, according to the description of Jacquin, both the floral envelopes are sexifid, while in alfonsia they are trifid. If this, moreover, be the same as the *corozo* of Jacquin, 'another essential difference may be observed in the structure of the fruit of the two plants, the nut in elæis being perforated at the apex, while the corozo has its nut perforated with three foramina at its base;' but this might have been inverted, as that of elæis was by Gærtner. Humboldt and Bonpland, moreover, found *alfonsia oleifera* always growing wild, while *elæis guineensis*, as they state, is never found except in a cultivated state out of Africa These two palms require to be carefully re-examined and compared, to ascertain whether, if they are distinct as

Alfonsia oleifera.

species, as is probable from the figure of the former by Martius, they may not both belong to the same genus. The compressed nut of the alfonsia, like that of the cocoa-nut, is described as yielding an oil, which is obtained by boiling in water the *manteca del corozo;* it is described as a liquid fat employed for ordinary lamps, as well as those of churches.

ELÆOCARPA'CEÆ, a natural order of chiefly Indian trees, having a strong botanical resemblance to our European Lindens, but differing in having fringed petals, and anthers opening by two pores at the apex. The species have not yet received sufficient attention from botanists, especially the few known in South America; and it is doubtful whether this order will not be eventually combined with Tiliaceæ.

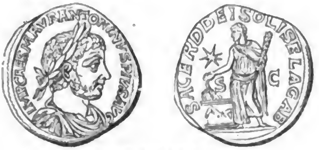
In the Indian genera the nuts, cleared of the soft pulp or flesh that covers them, are curiously sculptured, and being bony, and taking a fine polish, they are frequently set in gold and strung into necklaces The nuts of Ganitrus sphæricus, a middle-sized tree, common in various parts of India, as well as the Malay Archipelago, and those of Monocera tuberculata, from the forests of Travancore, are what are principally used for this purpose. The fruits of Elæocarpus serratus, which are very much like olives when ripe, are said by Roxburgh to be pickled or dried and used in their curries by the natives of India. Elæocarpus cyaneus has pure white beautifully fringed petals, and is one of the most ornamental plants of New Holland.



A flowering shoot of Elæocarpus cyaneus.

1, a magnified flower; 2, a petal; 3, the stamens; 4, a ripe fruit, 5, the same cut away to show the wrinkled seed.

ELAGABA'LUS, called also **HELIOGABA'LUS**, was the grandson of Mæsa, sister to the empress Julia, the wife of Septimius Severus. Mæsa had two daughters, Sæmis, or Semiamira, the mother of Varius Avitus Bassianus, afterwards called Elagabalus, who was reported to be the illegitimate son of Caracalla and Mammæa, mother of Alexander Severus. Elagabalus was born at Antioch A.D. 204. Mæsa took care of his infancy and placed him, when five years of age, in the temple of the Sun at Emesa to be educated by the priests; and through her influence he was made, while yet a boy, high priest of the Sun. That divinity was called in Syria Elagabal, which name the boy assumed. After the death of Caracalla and the elevation of Macrinus, the latter having incurred by his severity the dislike of the soldiers, Mæsa availed herself of this feeling to induce the officers to rise in favour of her grandson, whom she presented to them as the son of the murdered Caracalla. Elagabalus, who was then in his fifteenth year, was proclaimed emperor by the legion stationed at Emesa. Having put himself at their head he was attacked by Macrinus, who at first had the advantage, but he and his mother Soæmis with great spirit brought the soldiers again to the charge, and defeated Macrinus, who was overtaken in his flight and put to death A.D. 218. Elagabalus having entered Antioch, wrote a letter to the senate professing to take for his model Marcus Aurelius Antoninus, a name revered at Rome; Elagabalus also assumed that emperor's name. The senate acknowledged him, and he set off for Rome, but tarried several months on his way amidst festivals and amusements, and at last stopped at Nicomedia for the winter. In the following year he arrived at Rome, and began a career of debauchery, extravagance, and cruelty, which lasted the remaining three years of his reign, and the disgusting details of which are given by Lampridius, Herodianus, and Dion. Some critics have imagined, especially from the shortness of his reign, that there must be some exaggeration in these accounts, for he could hardly have done in so short a time all the mischief that is attributed to him. That he was extremely dissolute and totally incapable is certain; and this is not to be wondered at, from his previous eastern education, his extreme youth, the corrupt example of his mother, his sudden elevation, and the general profligacy of the times. He surrounded himself with gladiators, actors, and other base favourites, who made an unworthy use of their influence. He married several wives, among others a vestal. The imperial palace became a scene of debauch and open prostitution. Elagabalus being attached to the superstitions of the East, raised a temple on the Palatine hill to the Syrian god whose name he bore, and plundered the temples of the Roman gods to enrich his own. He put to death many senators; he established a senate of women, under the presidency of his mother Soæmis, which body decided all questions relative to female dresses, visits, precedence, amusements, &c. He wore his pontifical vest as high priest of the Sun, with a rich tiara on his head. His grandmother Mæsa, seeing his folly, thought of conciliating the Romans by associating with him as Cæsar his younger cousin, Alexander Severus, who soon became a favourite with the people. Elagabalus, who had consented to the association, became afterwards jealous of his cousin, and wished to deprive him of his honours, but he could not obtain the consent of the senate. His next measure was to spread the report of Alexander's death, which produced an insurrection among the prætorians, and Elagabalus having repaired to their camp to quell the mutiny, was murdered together with his mother and favourites, and his body was thrown into the Tiber. March, 222. He was succeeded by Alexander Severus. [SEVERUS.] The coins of Elagabalus bear the names of Marcus Aurelius Antoninus, like those of Caracalla, with which they are often confounded. The names of Varius Avitus Bassianus, which he also bore before his elevation to the throne, are not found on his medals.



Coin of Elagabalus.

British Museum. Actual Size. Copper. Weight, 360 grains.

ELAIDINE, a fatty substance produced by the action of nitrous acid upon certain oils, as olive and almond oil, &c. This substance is white, inodorous, insoluble in water, and fusible at 95° Fahr. It is soluble in sulphuric æther, and in 200 times its weight of boiling alcohol; when treated with potash it saponifies, giving rise to glycerin, and a peculiar acid which has been called elaïdic acid. This acid is solid, fusible at 112° Fahr., and is partially distilled by exposure to a strong heat.

ELAIN. [OLEIN.]

He took the name of Varius from Sextus Varius Marcellus, who was his mother's husband.

ELAM. [Elymais.]

ELAPS. [Viperidæ.]

ELASMOTHE'RIUM. [Pachydermata.]

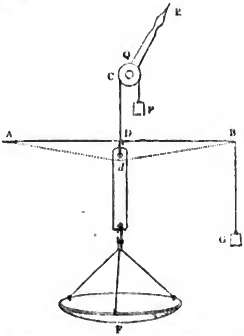
ELASTICITY (ἐλαστὴς, a spring). When the form of a body is affected by the pressure of another extraneous to it, the re-acting force by which it sustains or tends to remove that pressure is its elasticity. The term has been very loosely used in the most current works, which, instead of furnishing an exact and general idea of this force, are, in general, limited to the phenomena exhibited by elastic solid bodies; and to this imperfect notion of elastic force we are to attribute the discrepancies of treatises, some of which used to represent water as perfectly inelastic, some (as the more modern treatises) as perfectly elastic. The cause of elasticity then belongs to the theory of molecularity, its effects in aggregate masses to mechanics.

The equilibrium of the molecules of solid bodies is almost completely dependent on their own mutual actions and quantity of heat. These forces determine certain mean places for the constituent particles, to which points of stable equilibrium they tend to return when removed a little from them by an external force. This removal may be such as to effect in the mass either compression or extension, inflexion or torsion, and therefore their elastic force is capable of being exhibited in all these ways. It is demonstrated in fluids only by their compressibility, while in gases it arises as a predominant living force which would refuse any position of equilibrium to the constituent particles without external pressure, and is proportional to such pressure uniformly exercised.

When heat is applied to a solid elastic body, that is, when its temperature is raised, the particles seek a different position of equilibrium more remote from each other than before. But while this heat is much below that necessary for friction, or for destroying the fibrous formation of organized matter, the stability of the removable particles is but little affected, and experiment shows that there is scarcely any change of elasticity. In fluids the compressibility obtains a greater range, while in gases, where no countervailing force of attraction is sensible, the increase of temperature is accompanied by a proportional increase of elastic force.

Amongst bodies whose elasticity is very apparent, we may enumerate glass, ivory, caoutchouc, sponges, and fibrous substances, as beams, muscles, and artificial webs, some gums, steel, and all the gases and vapours. In gases and vapours its effects may be produced to any extent, but they are limited in solids by their softness and facility of fusion, as in wax, lead, &c.; by their absorption of moisture, as in clay, feathers, catgut, straw; or by their friability, as in glass, dry resins, and copper or iron which have been exposed to a stream of ammoniacal gas.

Suppose an elastic string, or lamina, to be fixed at one end, and at the other stretched by a force T, which will also represent its tension; if this force be increased by a small quantity t, an additional length l would be given to the string, or lamina; the whole tension now is $T + t$, and if we again add a force t, since the physical condition of the body is sensibly the same as before, the same length l will again be added, and generally the additional extension should be proportional to the additional tension: this law is, however, only approximative, for it is manifest that a force tending to produce either extension or contraction may be applied which would cause the body to break, and near these limits the law would vary considerably from simple proportionality. Let a horizontal elastic lamina AB be fixed by a screw at A, and having been stretched by a known weight G at B, let it be screwed also at that point, when its tension will evidently be equal to the weight appended; let the beam DE of a balance F be sustained at D, the middle of AB through a drilled orifice d, and be attached to a string passing over the fixed pulley C, which string also sustains a weight P, which is an exact counterpoise to the weight of the scale and beam so that they may produce no deflection of themselves in AB; then if a small weight be put into the scale, the lamina ADB will be bent into the form AdB, with a deflection Dd from its original position, which may be estimated with greater accuracy by a hand QR attached to the pulley. An extension AdB − ADB will thus be produced, as well as an increase of tension, which may then be compared by the common laws of statics; and the experiments show that as long as the added weights are small, this extension is proportional to the increase of tension. The apparatus is that employed by S'gravesande.



When a uniform elastic string is suspended vertically it will be stretched by its own weight. The tension varies from point to point, and is every where proportional to the portion of the string of which it supports the weight. If y be a portion of the stretched string corresponding to a portion x of the same unstretched, and $y + \Delta y, x + \Delta x$, another corresponding pair of portions greater than the former, and a the whole length of the string in its natural state, the extension $\Delta y - \Delta x$ of the element Δx is proportional to the weight of the remaining portion $a - x - \Delta x$ of the string; hence if g denote the weight of a unit of the string, and e the index of elasticity peculiar to the substance, we have ultimately [Differential Calculus] $\frac{dy}{dx} - 1 - ge(a-x)$, and therefore by the rules of the *Integral Calculus* $y - x = ge\,(ax - \frac{x^2}{2})$, to which no arbitrary constant need be added, because y commences at the same point with x if we now make $x = a$, we find that $g\,\frac{e}{2}.a^2$ expresses the extension of the entire string.

Similar principles may be easily applied to determine the form of an elastic string suspended from two points, and stretched by its own weight; but in this case the curve which differs from the common catenary cannot be considered as accurately determined without taking into account the elasticity of inflexion as well as that of extension. The mere mathematical problem may be seen in most mechanical treatises. (Whewell's *Mechanics*; Poisson, *Mécanique;* consult also Lagrange, *Mec. Analytique*, for the method of introducing the condition of elasticity in a system at rest.)

An important practical branch of this subject, on the strength of beams, which has been much advanced by Mr. Peter Barlow, and the more recent experiments of Mr Eaton Hodgkinson, of Manchester, we reserve for a future article. [Strength of Beams.]

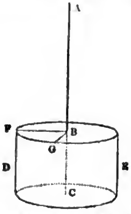
When a uniform elastic string, fixed at one extremity and stretched by a force applied at the other extremity, is abandoned to itself, it will return to its original form after a series of contractions and expansions, the force which solicits each point being proportional to its distance from its original place, though the successive oscillations go on rapidly diminishing in extent in consequence of the resistances encountered. The same law applies to the displacements of the molecules of elastic fluids and gases.

For the laws of the mutual impact of elastic bodies see Impact. If a body is attached to an elastic string, which at the other extremity is fixed, and be projected in any direction, the resolved part of the centrifugal force which acts in the direction of the length of the string tends to stretch it, and the centripetal force will be proportional to $r - c$, r being the length of the stretched and c of the unstretched string: this force is attractive when r is greater than c, and repulsive when less Hence if we conceive a circle, of which the centre is the fixed point, and the radius equal to c, the portions of the orbit described externally to the circle are concave, and those internally are convex relative to the centre of the circle, and there are as many points of contrary flexion [CURVE] as intersections of the trajectory and circle. Neither the law of the periodic times nor the form of the orbit is similar to those belonging to the earth and planets: the supposition, therefore, that attraction between the great masses which compose the solar system is conducted through the medium of interposed and invisible elastic strings is unfounded.

When an elastic string, fixed at one end is bent by a weight or other force applied at a given point, the elasticity of inflexion acts normally at each point of the curve, and is some function of the curvature at that point. It is usual to suppose it proportional to the simple curvature. On this supposition the figure of an elastic lamina in a vertical position, fixed at its lower point and bent by a small weight applied at the top, may be determined. This problem has been treated by Euler, Lagrange, and Poisson. The English reader may find the varieties of the elastic curve discussed in the appendix to Whewell's Mechanics.

The elastic force of a twisted string follows a law precisely similar to that of one which is only stretched: the latter is proportional to the extension, the former to the torsion. Thus, if a cylindrical elastic thread, fixed at one extremity, be twisted by a force applied perpendicularly to its length, any straight line taken along the surface of the cylinder will be converted into a helix; and with a double torsion the circular arc through which each point has been removed from its original place is doubled. And since the circular arc may be subdivided into any number of equal arcs, the successive resistances of the elasticity to the additional torsions are equal, supposing each preceding resistance to be sustained. Therefore the accumulated force of torsion is proportional to the angle through which an index would move if fixed at any point perpendicularly to the length of the cylinder, or in the prolongation of its radius. but this law has limits as well as that for the elasticity of extension; for the torsion may be continued until a strain is produced, when there will of course be an accompanying diminution of elastic force.

Let A B represent an elastic string, suspended vertically from the point A, and attached at B to a cylindrical body D E, of which the axis B C is in the direction of the string produced, the string being primitively in an untwisted state. Let the cylinder be turned round its axis through an angle F B G, or a, which measures the torsion generated in A B, and also the elastic force tending to bring the system back to its original state. Let the restraining force be now removed, and the cylinder, abandoned to itself, will return to its original place after a series of isochronous oscillations, which are gradually diminished by the resistance of the air and by the internal resistances of the molecules of A B during the processes of being twisted and untwisted.



Let δm stand for an element of the cylinder, situated at a distance r from its axis, and θ the angle of torsion, at any time after the commencement of this motion; then $-\frac{d\theta}{dt}$ is the angular velocity; and therefore the linear velocity of δm is $-r\frac{d\theta}{dt}$; the accelerating force or ratio of the increments of velocity and time is $-r\frac{d^2\theta}{dt^2}$; the force of torsion, being proportional to the angle θ, may be represented by $n\theta$ applied at a distance unity from the axis of the cylinder, perpendicularly to the radius, the constant n being the force of torsion corresponding to an angle unity. Now, by D'Alembert's principle, the impressed force, taken in a reversed direction, would make equilibrium with all the effective forces: that is, the force $-n\theta$, at a distance unity, would produce an equilibrium with the forces such as $-r\delta m\frac{d^2\theta}{dt^2}$ acting on δm at a distance r; hence the corresponding moments, which are $-n\theta\times 1$, and the sum of all, such as $-r^2\delta m\frac{d^2\theta}{dt^2}$ must be equal, but of contrary signs; and since $\frac{d^2\theta}{dt^2}$ is the *common* accelerating force on all the particles δm at a unit distance, we need only take the sum of the products $r^2\delta m$, which is easily found in this case by the rules of the integral calculus, and is called the moment of inertia of the cylinder. Representing it by MK^2, where M is the mass of the cylinder and K its radius of gyration, we have the equation—

$$MK^2\frac{d^2\theta}{dt^2}=-n\theta.$$

Put for abridgment $c^2=\frac{n}{MK^2}$; then, by the methods for integrating differential equations, we find $\theta=A\sin.(ct+B)$, where A B are arbitrary constants; and for the velocity $\frac{d\theta}{dt}=Ac\cos.(ct+B)$.

Now, we can determine the constants by the circumstances of the origin of the motion; for when $t=o$, we have supposed the initial torsion was a, or FBC, and $\frac{d\theta}{dt}$ was then nothing. Hence we have $a=A\sin.B$; $o=A\cos.B$ therefore $A^2=a^2$, $B=\frac{\pi}{2}$. The value of θ is therefore expressed at any time by $a\cos.(ct)$.

When the cylinder makes half an oscillation the elastic thread is then perfectly free from torsion; and if T be the time of an entire oscillation, since θ then vanishes, we find $o=a\cos.\left(\frac{cT}{2}\right)$; therefore $cT=\pi$, and $T=\frac{\pi}{c}$, which shows that the successive oscillations are of the same duration, and that the square of the time of one oscillation varies directly as the moment of inertia, and inversely as the force of torsion, estimated at a given distance from the string.

The suspended body may be any other as well as the cylinder we have supposed, with manifestly the same results. For instance, in Coulomb's torsion balance it consists of a needle of gum-lac attached perpendicularly to the string, as B F in the above figure, and a small weight at B to steady the string; the law of the times of oscillation above found is sufficient to give the force of torsion in all cases if we know it in one. It is thus that Coulomb used his balance in finding the law of electrical attractions and repulsions; the electrised ball acted on, being attached to the end of the needle of gum-lac, was subjected to the joint action of electrical and elastic forces. [ELECTRICITY.]

The range of the elastic force of fluids, in consequence of their great resistance to compression, is extremely limited, and therefore few ordinary phænomena of nature are dependent on this cause. The great pressure at considerable depths in the ocean must produce a corresponding increase of density in the lower strata, if it is not in a great measure compensated by the increase of temperature

There exists one simple and uniform law for the elastic forces of dry air and all the gases. From the experiments of Boyle, Mariotte, and Dalton, it is established, that the elasticity, which is proportional to the pressure, is inversely as the volume, and therefore directly as the density, when the temperature is constant.

But an increase of temperature produces an increase of the elastic force of gases: or, which is the same, under a given pressure it expands the gas into a greater volume. Between the temperature of melting ice and boiling water this increase of volume is proportional sensibly to the additional temperature, measured by a mercurial thermometer, as was well established by the experiments of Gay-Lussac; but by the more recent experiments of MM. Dulong and Petit, it appears that at much higher temperatures the degrees of the mercurial and gas thermometers no longer correspond; for the expansions of the mercury might be expected to become irregular when it tends to gasefy, and therefore to have greater expansions for each degree of heat than in its liquid state. (*Annales de Chimie et de Physique.*)

In such experiments it is essential that the gas should be perfectly dry; for if not, the elastic force obtained will be that of dry air *plus* that of the contained aqueous vapours. For most observations on the latter we are indebted to the researches of Dalton, who observed that when the inside of a barometer is moistened, the elastic force of the vapours, occupying the space which is a vacuum in ordinary barometers, causes a depression in the column of mercury proportional to itself.

When a space is saturated with aqueous vapour or steam, the elasticity remains the same when the volume is diminished, the only effect of compression being to convert the surplus portion into water. The contrary holds generally in gases, as we have seen that their elasticity is inversely as their volume; but it is probable that with very high pressures, such as that employed by Mr. Faraday to liquefy carbonic acid gas, there exists a limit for each, beyond which it is impossible to render them more elastic by compression.

Moreover, the ratio of the elastic force of dry gas at the temperature of boiling water to that at the freezing point is by no means the same as in aqueous vapours; but at very high temperatures it seems probable that similar ratios would approximate. The following is a table of the elastic forces of the latter, corresponding to degrees of the centigrade thermometer:—

Temperatures.	Elastic Force in inches.	Successive Ratios.
0	0·2	. . . . .
6¼	0·297	1·485
12½	0·435	1·465
18¾	0·63	1·448
25	0·91	1·444
31¼	1·29	1·418
37½	1·82	1·411
43¾	2·54	1·395
50	3·5	1·378
56¼	4·76	1·36
62½	6·45	1·355
68¾	8·55	1·326
75	11.25	1·316
81¼	14·6	1·298
87½	18·8	1·288
93¾	24	1·277
100	30	1·25

The third column is given incorrectly in Biot's 'Physique;' and it follows from inspection that the elastic force of steam increases nearly in a geometrical progression when the temperature is increased in arithmetical; from which property steam has now become a great mechanical agent.

When vapours are mixed with each other at the same temperature and in the same space, the elastic force of the compound is the sum of the separate elasticities, provided this sum is not sufficiently great to render any of the vapours liquid, and provided these vapours have no chemical affinity.

The vibrations of elastic bodies belong to the subject of acoustics, to which we refer, and to the head VIBRATION. Beside the authorities already quoted in this article, see Pouillet, 'Physique,' and 'Manchester Transactions.'

ELATÆA. [PHOCIS.]

ELATE'RIDÆ, a family of Coleopterous insects belonging to the section Sternoxi (*Latreille*), and, according to Linnæus, constituting the genus Elater.

The insects of this family are of a lengthened form; the head is, in nearly all cases, deeply inserted into the thorax: the thorax is usually of the same width as the elytra, or nearly so, longer than broad, and the posterior angles are acute, and most frequently produced into a pointed spine-like process: the elytra are long and narrow, cover the abdomen, and their external margins are often nearly parallel. The antennæ are of moderate length, either filiform, serrated, or pectinated, and when the insect is at rest they are deposited in two grooves on the under side of the thorax; at least such is the case in very many of the species. The legs are short and rather slender, and the femora and tibiæ are generally compressed.

These beetles are found upon flowers and upon the leaves of trees and plants; some species however are most frequently met with upon the ground. When upon any elevated situation, if approached, they apply the legs and antennæ close to the body, and allow themselves to fall to the ground; if they fall upon their back they regain their natural position by a leap, which is always accompanied by a snapping noise similar to that which may be made by the finger-nails. When about to leap, they bend the thorax backwards, so that the body is arched, or rather forms an angle, the insect then resting upon the apex of the abdomen and the fore part of the thorax. The leap appears to be effected by the sudden relaxation of the muscular effort which kept the thorax bent backwards, there being a peculiarity in its structure which causes it to spring forwards.

Even in a dried specimen, upon attempting to bend the thorax back, we found considerable resistance; but when allowed, it suddenly assumed its natural position, which is a slight inclination forwards.

There is a strong spine, it must be observed, on the under part of the thorax, at its base, which, when the thorax is in its usual position, is deposited in a groove; and it is said that the leap is performed principally by means of this spine, which is at the time forcibly pressed against the margin of the hollow 'into which it sinks suddenly, as if by a spring.' From this opinion we are inclined to differ; for upon removing the spine we found not the slightest alteration in that natural spring in the thorax which we before mentioned. Not however having at this moment the means of investigating the subject, it would be premature to venture any further remarks.

The larvæ of the Elateridæ feed most generally upon vegetable substances: rotten wood affords food to many; others live in the ground, and feed upon the roots of plants: one of them (the larva of Elater striatus of Fabricius) is said to attack the roots of the wheat, and when in great numbers, to do much injury*.

These larvæ are long, rather slender, generally cylindrical, and covered with a tough skin: the head and terminal joint of the body are of a corneous texture; the latter is very variable in form, and is often depressed and produced into two bluntly-pointed processes: the former is furnished with the usual parts, such as jaws or mandibles, maxillæ, palpi, labrum, labium, and antennæ. The three segments which constitute the thorax are each furnished with a pair of short legs.

Of the insects included by Linnæus under the generic name of Elater, and others of similar general characters which have been discovered since that naturalist's time, there are upwards of five hundred species enumerated, and as these species (which are now regarded as constituting a family) are divided into about sixty genera, it will be impossible, consistent with the plan of this Cyclopædia, to enter into the detail of their characters. We will therefore confine ourselves to some of the more important;—in fact to those which are given by Latreille in the 'Règne Animal:' these are as follows:—*Galba, Eucnemis, Adelocera, Lissomus, Chelonarium, Throscus, Cerophytum, Cryptostoma, Nematodes, Hemeripus, Stenicera, Elater* (proper), and *Camphylus*. These genera are divided by Latreille into two sections, in the first of which the antennæ are lodged (when the insects is at rest) within two grooves situated on the under side of the thorax.

This section includes the six first genera. The genus *Galba* (Latreille) has the antennæ filiform, and received into two grooves situated directly under the lateral margins of the thorax: the joints of the tarsi are simple: the thorax is convex: the mandibles are terminated by a simple point: the maxillæ are furnished with a single small lobe: the terminal joint of the palpi is globular, and the body is nearly cylindrical.

The species are all from Brazil. The genus *Eucnemis* (Ahrens) differs from Galba chiefly, in having the mandibles bifid at the apex, the maxillæ terminated by two lobes, the terminal joint of the palpi securiform, and the body nearly elliptical. Species of this genus are found in Europe and North America.

Genus *Adelocera* (Latreille). Here the antennæ are filiform; the joints of the tarsi are simple, and the anterior legs, when contracted, are received into lateral cavities in the under part of the thorax.

Lissomus (Dalman.) The species of this genus have little cushion-like lobes on the under side of each joint of the tarsi.

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* A larva of one of the Elateridæ (which there were good reasons for believing was that of Elater æneus) we have found more than once feeding upon worms.

In the genus *Chelonarium* (Fabricius) the form approaches to an oval, the second and third joints of the antennæ are larger than the following and of a flattened form, and these alone are received into the sternal grooves. The head is almost hidden by the thorax, which is semicircular, and the anterior legs are larger than the rest. All the species are from South America.

Genus *Throscus* (Latreille). This genus is readily distinguished by the antennæ being terminated by a tree-jointed knob: the penultimate joint of each tarsus is bifid; the mandibles are simple.

The species of Throscus are very minute. *Throscus dermestoides*, an insect not uncommon in this country, is about one-eighth of an inch in length, of a brown colour, and obscurely covered with an ashy pubescence.

The second section of the Elateridæ comprises those species in which the antennæ are free, or not lodged within grooves on the under part of the thorax.

Cerophytum (Latreille). The principal characters of this genus are: terminal joint of the palpi larger than the following, and almost securiform; tarsi with the four basal joints short and triangular, the penultimate joint bilobed; antennæ serrated in the female, and in the male branched internally.

The *Cerophytum Elateroides* (Latreille), an European species, affords an example of this genus.

Cryptostoma (Dejean). Tarsi simple, small, and slender; anterior extremity of the præsternum projecting beneath the head; the apex of the third and seven following joints of the antennæ prolonged; mandibles unidentate; maxillæ with a single lobe; palpi very short.

Cryptostoma denticornis (Lat.), the only species known, is from Cayenne.

Nematodes (Latreille). Body nearly linear; antennæ with the basal joint elongated; each of the five following joints in the form of a reversed cone; the remaining joints almost perfoliate, with the exception of the last, which is oval.

Species of this genus have been found in Europe and North America.

Hemerhipus (Latreille). In this genus the parts of the mouth are exposed, i. e., not as in the two last genera, hidden by the projecting process of the præsternum; the antennæ are flabellate at the apex in the males.

All the species of this genus are extra-European.

In the genus *Ctenicera* (Latreille) the antennæ are pectinated in the males, and deeply serrated in the females.

The *Ctenicera pectinicornis*, an insect common in some parts of this country, affords an example of this genus. This species is rather more than half an inch in length, and of a brilliant metallic green or copper-like colour: the female is larger and broader than the male.

In the genus *Elater*, as now restricted, the antennæ are simply serrated.

The *Elater æneus* of Linnæus will serve to illustrate this genus. This species, which is common in some parts of England, is generally found under stones on hills of but little elevation, and which are more or less covered with heath. It is about three quarters of an inch in length, and most commonly of a brilliant green colour; some specimens however are blue, and others are of a brassy or bronze hue.

The *Elater noctilucus*, according to Latreille, also belongs to this genus. This species is well known in South America, where it is called the fire-fly.[*] It is rather more than an inch in length, of a brown colour, and covered with an ashy down: on each side of the thorax there is a round glossy yellow spot. These spots emit by night a light so brilliant as to enable a person to read by it, and it is a common practice to place several of the insects together in a glass jar or bottle for this purpose. This insect (with upwards of twenty other species, all of which emit light by night) is now included in Illiger's genus *Pyrophorus*. The species of this genus are, some of them, from each of the following localities:—Brazil, Peru, Buenos Ayres, Chile, Cuba, St. Domingo, and Guiana.

In the genus *Campylus* (Fischer) the eyes are more prominent than in the other Elateridæ, and the head is protruded from the thorax: the antennæ are inserted beneath a frontal projection on each side, and the body is long and almost linear.

One species of this genus is found in England, the *Campylis dispar*, which is of a yellowish colour. In some specimens the head, legs, and antennæ are black, and sometimes the elytra are black with a broad pale margin.

ELATE'RIUM. [MOMORDICA.]

ELATMA or YELATMA, the chief town of the most northerly circle in the Russian government of Tambof in Great Russia. It is situated at the confluence of the Myksha and Oka, on the left bank of the latter, in 55° 5′ N. lat., and 42° 34′ E. long. Elatma is an old town, and contains ten churches, eight of wood and two of stone, several government buildings, about 800 houses and thirty-four wooden stores, and about 6000 inhabitants. It has manufactures of linens, vitriol, and sulphur, and a considerable trade in grain, hemp, wax, and honey, chiefly with Moscow, and the provinces on the banks of the Volga, to which parts the Oka gives the means of ready access. The extensive iron works of Yeremshink, which employ nearly a thousand hands, are in its immediate neighbourhood.

ELBA, the Ilva of the Romans, called *Æthalia* (*Αἰθαλία*) by Strabo, p. 223, is an island in the Mediterranean sea, near the coast of Tuscany, and divided from it by the channel of Piombino, which is about five miles broad in its narrowest part opposite the town of Piombino, which lies on the main land. The shape of Elba is very irregular; its length is about eighteen miles, from 10° 6′ to 10° 25′ E. long., and its greatest breadth, which is on its east side, is about ten miles, from Cape Calamita 42° 43 to Cape Vito 42° 52′ N. lat.; but in its west part it is six miles broad, and towards the middle of its length it is only three, owing to the coast being indented by gulfs both from the north and south. Its area is about 154 square miles. The island is mountainous; the highest summit, Monte della Capanna, in its west part, is 3600 feet above the sea. The mountains are mostly naked, but the lower ridges and the valleys between are planted with the vine, olive, and mulberry, and other fruit trees. The island produces also some wheat and Indian corn, vegetables, and water melons. Wine, both white and red, is made in considerable quantities; some of it, especially the red sort, is very good, and forms an article of exportation. There is also a kind of muscadel, or dessert wine. Horned cattle and horses are rather scarce, but there are plenty of sheep, goats, pigs, and asses. Fish is plentiful on the coast, and the tunny fishery yields a considerable profit. The salt pans on the sea-shore produce about 50,000 cwts. of salt yearly. Elba is rich in iron, which is of the best quality, and was worked in the time of the Romans. It is found in a mountain, near Rio on the east coast, which is almost entirely a mass of ore, about two miles in circumference, and 500 feet in height. About 120 miners are employed in it, and the ore yields from 50 to 75 per cent. of pure metal. Owing to the scarcity of fuel the ore is embarked and taken to the mainland to be smelted, as it was when Strabo wrote. The annual quantity of metal raised is about 40,000 cwts. The other mineral productions of Elba are loadstone, alum, vitriol, and marble of various kinds. The population of Elba is about 13,500, of which Porto Ferrajo, the capital, has about 3000. Porto Ferrajo lies on the north coast of the island, and is strongly fortified with two citadels on the hill above it, and has an excellent harbour. The town has two parish churches, one hospital, and a lazzaretto. It is the residence of the cancelliere, or political governor for the whole island, which is included in the province of Pisa; it has a garrison and military commander, a civil and criminal court, from which appeals are laid before the ruota, or high court of Grosseto. From Porto Ferrajo a good road, five miles in length, made by Napoleon, leads to Porto Longone on the east coast of the island, on a deep bay, where there is good anchorage for vessels. The castle of Porto Longone is on a steep hill, and is regularly fortified. The town or village is small, and reckons about 1000 inhabitants. The other principal villages in the island are Rio, Marciana, Campo, and Capo Liveri. The island of Elba has acquired considerable celebrity in our times, on account of it having been the residence of Napoleon after his first abdication, from May, 1814, to the 26th of February, 1815, when he set sail for Cannes. From that time it has been annexed to the grand duchy of Tuscany. The mountains of Elba form a conspicuous object as seen from Leghorn, which is about fifty miles north of the nearest point of the island. (Neigebaur, *Gemälde Italiens*; Pini, *Osservazione sulle Miniera di Ferro dell' Isola dell' Elba.*)

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[*] Other insects having the same power of emitting a light by night are undoubtedly confounded with the present species under the name of the *fire-fly*.

ELBE, The, one of the largest rivers in Europe, flows like the Weser entirely within Germany. It originates in the confluence of a number of rivulets and brooks which fall down the western side of the Schneekoppe, or Snow-cap, one of the highest mountains in the Riesengebirge, or Giant mountains, of Bohemia, and in that part of them which separates Bohemia from Silesia. Some writers refer the source of this river to the Weissbach (Whitebrook), which springs from the White Meadow, at the foot of the Schneekoppe; others to the Elbe or Narvor Meadow, where eleven springs, called the Wells of the Elbe, are said to rise, and uniting in one stream, which takes the name of the Elbe or Mädelbrunn, fall over a lofty precipice into what is termed the Elbgrund, or region of the Elbe. Here the stream is increased by the Seifen and other rivulets which join it below Krausensbaude, whence it runs towards Hohenelbe under the universally admitted designation of the Elbe. From Hohenelbe, a mountain town in the north-eastern circle of Bidschow, in Bohemia, it flows south-east to Arnau, thence south-west into the circle of Königsgrätz, where it is joined by the Aupa near Yarowitz, the Metau at Josephstadt, and the Adler or Orlitz at Königsgrätz, and afterwards passes into the circle of Chrudim, whence, after receiving the Chrudimka at Pardubitz, it takes a westerly direction. Having passed Elbe-Teinitz, below which it is joined by the Dobrowa, and skirting the northern extremity of the circle of Czaslau, it traverses the most north-eastern part of that of Kaurzim, where it flows past Kolin, and there winding to the north-west re-enters the circle of Bidschow, and crosses its south-westerly districts past Podiebrad. It now pursues a course due west along the southern border of the circle of Bunzlau, re-enters that of Kaurzim, flows north-west from Taurzim past Brandeis, above which it receives the Iser and Elbe-Kostoletz. to Melnik, in the south-western extremity of the circle of Bunzlau, where it is increased by the waters of the Moldau, and from which place (in 50° 20′ N. lat. and 14° 28′ E. long.) it has an unobstructed navigation to its mouth. From Melnik it forms the boundary for a short distance between the circles of Rakonitz and Leitmeritz, then winds southwards to Kaunnitz, and after entering the last-mentioned circle by again flowing north-westwards from Kaunnitz, is joined by the Eger a few miles above the town of Leitmeritz. From this place it flows northwards to Aussig, takes a winding easterly course past Totschen where it receives the Pulznitz, bends gradually north-westwards, quits Bohemia near Herrnskretschen, or Hirniskretschen, and enters the kingdom of Saxony. At this point the Elbe is 355 feet in width. It thence takes a north-westerly course past Schandau, between which place and Dresden it passes through the Lusatian and Ohre Mountains of Saxony, then flows to Pirna, Dresden, Meissen, Riesa, and Strehla, and enters Prussian Saxony at Loesnitz, about seven miles above Muhlberg. Its whole length from the south-eastern to the northern frontiers of Saxony is between 70 and 75 miles. From Mühlberg its course is north-westerly to Torgau, and thence to Wittenberg, above which it receives the Black Elster; here it takes a westerly direction, leaves for a while the Prussian states, traverses the Duchy of Anhalt from Koswig past Dessau to Barby, during its passage through which it receives the Saale and Mulde, and thence turning northwards, re-enters those states above Aacken, receives the Ohre, and flows on to Magdeburg until it reaches the point below Sandow, where it is joined by the Havel. Here it again has a north-westerly direction, forming first the boundary between Brandenburg and Prussian Saxony till it passes Schneckendorf, and next for a short distance between Brandenburg and Hanover: thence it separates Hanover from Mecklenburg until it enters the north-eastern districts of that kingdom between Dömitz and Hitzacker. After traversing them as far as Boitzenburg, it divides the Hanoverian dominions from the duchies of Lauenburg and Holstein and the Hamburg territory, until it discharges itself into the North Sea. Altogether it traverses Hanover or forms its north-eastern boundary for about 120 miles. Below Winsen, which lies to the south-east of Harburg in Hanover, the Ilmenau falls into it, and below Neuhauss somewhat above Altona, but on the left bank like the former, the Oste. From Hamburg and Altona downwards to Glückstadt in Holstein and thence to the North Sea it becomes navigable for large ships. Its mouth lies north of Cuxhaven, about 85 miles below Hamburg.

The Elbe first flows through a deep narrow valley to Josephstadt, the right bank being much higher than the left. This valley widens gradually until the Elbe has passed Nimburg, between Kollin and Brandeis, where it again becomes contracted. From Nimburg to Raudnitz, south of Theresienstadt its banks are lower, but from the last town until it reaches Lowositz they are much more elevated, and thence as far as to Pirna in Saxony its bed lies in a deep confined valley. From Pirna the heights on its left bank subside, whilst those on its right accompany the Elbe at a little distance until it has passed Dresden and Meissen. From thence to Torgau a succession of low hills run parallel to both banks, and there entirely disappear. A range of hills approaches the left bank at Dömitz, and occasional heights the right bank near Wittenberg. From the mouth of the Saale until a little above Magdeburg the banks are flat, but in this part high hills command them at several points. From Magdeburg the Elbe flows through a level country into the North Sea, except between Hitzacker and Bleckede on its left and about Altona on its right bank, where the adjacent ground rises to gentle elevations.

In the lower parts of its course, namely, between Harburg on its left bank, and Hamburg and Altona on its right, the Elbe is divided into several arms by five large and seven small islands; these arms, however, unite again in a single channel at Blankenese, about five miles below Hamburg.

The whole length of the Elbe is about 710 miles, and it is navigable for about 470 miles. Its mean depth is 10 feet and its average breadth 900 feet, but it widens at some points to 1000 feet and more, and near its mouth to several miles.

The height of this river above the level of the sea is as follows: near its source 4151 feet; at Königsgrätz 618; at Melnik 426; at Schandau 320; at Pirna 287; at Dresden 262; at Wittenberg 204; at Magdeburg 128; at Tangermünde 87; at Losenrade 48; at Dömitz 26; at Hitzacker 19; at Bleckede 11, and at Boitzenburg 9 feet.

There are 35 bridges across the Elbe between its source and Torgau, below which town the communication between both banks is by ferries. The principal bridges are those at Leitmeritz, which is of wood and stone, and 823 feet in length; Brandeis; Dresden, of stone, 1420 feet long and 36 broad; Meissen; Torgau; Wittenberg, of stone and wood, 1000 feet long; and Magdeburg, where there are three wooden bridges, one across the Old Elbe 76 roods long; another across the main arm of the river, 24 roods and the third across a side arm 20 roods long.

The waters of the Elbe are increased by the confluence of 17 rivers and upwards of 70 minor streams. Between the years 1801 and 1835 its depth has decreased nearly 8¼ inches at Dresden, and about 18¼ at Magdeburg. In Bohemia, where less attention has been paid to the clearing of woodlands and drainage of swamps and marshes than in the territories through which the Saale, Mulde, and Black Elster flow, the diminution has been far less. The basin is estimated to occupy about 58,800 miles, and lies between 50° 2′ and 53° 54′ N. lat., and 8° 41′ and 16° 12′ E. long.

This river is well stocked with fish, particularly salmon, eels, and sturgeons.

ELBERFELD, a circle in the eastern part of the county or administrative circle of Düsseldorf in the Prussian province of the Rhine. It contains an area of about 125 square miles, three towns (Elberfeld, Gemarke or BARMEN, and Mettmann, with about 2100 inhabitants), one market-village, 21 villages, and 135 hamlets, and has a population of about 93,500; which is an increase of 22,750 since the year 1816. About one-fifth are Roman Catholics, and the remainder Protestants. The circle is traversed in all parts by offsets of the Sauerland hills, and is well wooded. Extensive beds of alum lie between Velbert and Langenberg in the northern part of the circle, where a number of alum works are established. Elberfeld is watered by the Ruhr, Wipper or Wupper, Düssel, and 26 minor streams and brooks. The soil is in general but of middling quality; in some of the more elevated districts it is light, and calculated for the cultivation of rye, oats, and potatoes only In the others, wheat, rye, barley, oats, peas, and flax are raised. There are excellent meadow and grazing lands. The vicinities of Elberfeld, Barmen, Hardenberg, and Kronenberg are crowded with manufactories of cotton yarn and cloths, silks, woollens, linens, ribbons, lace, velvets, stockings, iron and steel wares, leather, &c. The stock of cattle in 1831 was composed of 1901 horses, 8201 horned cattle, 4386 sheep, 2811 goats, and 1837 swine.

ELBERFELD, the chief town of the circle, lies in a romantic situation upon the right bank of the Wupper, which is 200 feet higher at this spot than at its junction with the Rhine below Opladen: in 51° 16′ N. lat. and 7° 8′ E. long. It is an open well-built town, and stands at an elevation of 405 feet above the level of the sea. The streets are long, but few of them are of any great breadth, as the place is built partly between hills and partly upon them. It is divided into two quarters, the Island and the Liberty, and contains three churches, one of which is Roman Catholic, a gymnasium, a school of trade, a mechanics' school, 15 elementary schools, two orphan asylums, three hospitals and infirmaries, about 650 manufactories, large and small, 2500 private houses, and about 24,200 inhabitants. This is a great increase since the year 1801, when their numbers were 11,720: from which they rose to 15,595 in 1819: 21,027 in 1828, and 23,398 in 1831. Among other establishments in Elberfeld are a museum, a society of the arts and sciences, a bible, a missionary, and a tract society, a savings' bank and loan bank, and a German American mining society. There is no town in the Prussian dominions which carries on such extensive manufactures and none which has a more flourishing trade. The chief manufactures are thread-lace, of which above 20,000*l.* in value are annually made; silks, for the weaving of which with upwards of 1100 looms more than 28,000*l.* a year are paid in wages; cotton cloths, plain and printed, in which 45 factories and above 3600 looms are employed; coverlids to the extent of 30,000 per annum; thread linens, damask cloths, tapes, iron-ware and cutlery, ribbons, stockings, leather, potashes, furniture, &c. There are several bleach-grounds and establishments for dyeing; nearly 300 merchants and manufacturers; and the yearly amount of bills passed on the exchange of the town is said to be upwards of 1,500,000*l.* sterling, in which sum the large manufacturing districts of Barmen, Kronenberg, Langenberg, &c., are comprised.

The earliest historical record of Elberfeld is of the twelfth century, when a burg occupied a small portion of its site, which belonged to the Elverfelds, a family whose descendants established the first manufactures. The Reformation was introduced here in the year 1552. It is the seat of a tribunal of commerce and two courts of arbitration. Elberfeld is also a township (Bürgermeisterei) with 32 hamlets, and contained, at the close of the year 1836, 34,257 inhabitants. In that year the births were 1650, the deaths 1132, and the marriages 353. It lies about 19 miles east of Düsseldorf.

ELBING, a circle of the county or administrative circle of Danzig, in Western Prussia, is bounded on the north by the Frisches Haff, the south and west by the circle of Marienburg, and the east by the province of East Prussia. It contains about 268 square miles, two towns, 222 villages, and 5532 dwelling-houses, and had in 1831 a population of 44,406. The north-western part is traversed by a chain of hills, which are connected with East Prussia. The soil is exceedingly fertile, and has luxuriant pastures; it produces an abundance of grain, and fruits and vegetables of the finest sorts, especially in the south-western part. Elbing is well watered by the navigable rivers the Nogat and the Elbing, besides numerous smaller streams and canals. The fishery is productive. Owing to the great scarcity of wood, except in the forest near the town of Elbing, the inhabitants are obliged to use turf. Next to Danzig, Elbing has the most manufactures in the government; the chief are those of tobacco, soap, sugar, vitriol, woad, &c. It also carries on a considerable trade in corn, wood from the Upper Vistula districts, horse-hair bristles, packing cloth, fustian, butter, fruits, woad, potash, &c. The circle, besides Elbing, contains the town of Tolkemit, on the Haff, with 1800 inhabitants.

ELBING (Elbinga, Polish Elbiag or Elblag, also called Urbs Drusinia), chief town of the circle, and a place of considerable commercial importance, is situated on the navigable river of the same name, which is united to the Nogat by the Kraffuhl canal about four miles north of the town. It lies in 54° 10′ N. lat., and in 19° 25′ E. long., in a very fertile valley, and is surrounded by high walls, towers, and ditches. It is divided into the old and new town, three inner and eleven outer suburbs, and has five land and two water gates, five Lutheran churches, one reformed, and one Roman Catholic, one synagogue, five hospitals, one convent for elderly females, an orphan asylum, workhouse, house of correction, house of industry, the Pott and Cowle Institute, founded by Richard Cowle, who died in 1821, a savings' bank, a Lutheran gymnasium, with a large library, besides other establishments for the education of the poor. The various benevolent institutions are admirably conducted.

Elbing was founded by the Teutonic knights about the year 1229; in the fourteenth and fifteenth centuries it was a member of the Hanseatic league, but afterwards declined when Danzig engrossed the trade with Poland, and the frequent wars between Poland, Prussia, and Sweden, stopped the intercourse. It however revived during the occupation of West Prussia by Frederick II., and now ranks in the second class of towns in the Prussian monarchy.

The population in 1817 was 18,534, of whom 225 were Jews; in 1831 it was 17,761, of whom 3500 were Roman Catholics, 350 Menonites, and 380 Jews, besides the garrison. The inhabitants carry on manufactures of tobacco, sail-cloth, soap, starch, caviar, stockings, oil, and linen; there are also tan-yards, ship-building, &c. It has a brisk trade with Poland, from which corn, potash, woad, linen, wood, tallow, and wax are obtained; and iron, wine, manufactured and colonial goods, &c., are sent in exchange. The shipping business too is considerable; the townsmen are owners of a great number of large vessels and coasters; and many vessels are built here. By the Kraffuhl canal small vessels can come up to the wharfs, but the larger ones are obliged to unlade in the depth of Pillau, which is the harbour of Elbing. About 1400 vessels enter the port every year; but the greater portion of these are vessels of small burden. There is likewise a considerable fishery, particularly in sturgeon.

ELBŒUF, a town in France, in the department of Seine Inférieure. It is on the left bank of the Seine, seventy-nine miles from Paris by Mantes, Vernon, Louviers, and Pont de l'Arche. The town is situated in a pleasant valley, and may be recognized afar off by the chimneys of its numerous steam-engines. Elbœuf appears to possess little that is worthy of notice, except the choir of the church of St. Etienne. The population of the town in 1832 was 9951, that of the whole commune 10,258: the inhabitants have been engaged since the latter part of the seventeenth century in the manufacture of woollen goods; tapestries were long included in their productions, but this branch of industry has been nearly or quite given up; woollen cloths are now the staple manufacture; and Elbœuf is the centre of a prosperous branch of industry. There were at the publication of M. Dupin's 'Forces Productives et Commerciales de la France,' (Paris, 1827,) in and round the town 1200 looms, furnishing employment to 2700 weavers, and 4300 workmen of other kinds employed in the various branches of the woollen trade. The cloth is purchased of the small manufacturers by wholesale houses of extensive business (by which the cloths of Louviers are also purchased), and by them sold and sent into various parts of France, especially to Paris, Lyon, Limoges, and Bordeaux. The wool formerly employed by the clothiers of Elbœuf was Spanish; latterly, the wool of the neighbouring country, owing to the improvement of the native sheep by crossing the breed with the Merinos, has to a considerable extent replaced that of Spain. Elbœuf has a large charity-school, in which, in 1823, 400 girls were taught.

ELBORUS, ELBURZ, or ELBROOZ. [CAUCASUS, p. 382.]

ELCAJA, an Arabian plant, whose fruit is said to possess emetic properties. Botanists call it *Trichilia emetica* Forskahl describes it as a large tree, with villous shoots, pinnated leaves, with entire oval-oblong pedicellate leaflets, clustered flowers with five greenish-yellow petals, ten monadelphous stamens, and a downy capsular fruit about an inch long, with three valves, three angles, and three cells, having two plano-convex seeds in each cell. The tree is said to be called Roka, and to be common on the mountains of Yemen. The fruit is sold at Beit el fakih, for mixing with fragrant materials with which the Arab women wash their hair. The fruit called *Djour elkai* is reputed an emetic. The ripe seeds mixed with Sesamum oil are formed into an ointment as a cure for the itch.

ELCHE, the Illici of the Romans, is a considerable town

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in the kingdom of Valencia in Spain, situated on the river Segura, in a fertile plain covered with vines and palm-trees. The latter is the date-palm, with a thick wood of which the town is surrounded to the distance of half a league. Though there are several good streets and squares, the town has on the whole a melancholy aspect. Among the most remarkable buildings is a ducal palace, which is evidently the work of a very remote age. The great church is a beautiful edifice, with a noble dome. The barracks are well built and extensive. There are besides many convents and charitable institutions for the poor. Population, 15,000.

ELDEN HOLE. [Derbyshire.]

ELDER TREE. [Sambucus.]

EL DORA'DO, literally the golden country, was the name given by the Spaniards in the 16th century to an imaginary region somewhere in the interior of South America, south of the Orinoco and between that and the Amazon river, where gold and precious stones were supposed to be as common as rocks and pebbles in other countries, and to be had for merely picking them up. The first notion of this story was communicated by an Indian Cacique to Gonzalo Pizarro, brother of the conqueror, who sent his companion, Francisco Orellana, down the Amazon river to discover this wonderful land. Orellana followed the course of the Amazon down to the sea; but though he did not find El Dorado, still he countenanced the report of its existence. The temper of mind of the Spanish conquerors and discoverers of America seems to have been singularly fitted for credulous belief in all wonderful reports. The story of El Dorado continued to be accredited; a Spanish adventurer was said to have reached the capital of this enchanted region, called Manoa, and wonderful tales were told of its splendour and its wealth, far surpassing those of Peru. The Spanish governor of Guiana was also styled governor of El Dorado, because the latter country was reckoned to belong to his jurisdiction. Raleigh was so persuaded, or pretended to be persuaded, of the existence of this wonderful country, that he fitted out several expeditions for the purpose of discovering and conquering it for England: his last attempt in 1617 involved him in hostilities with the Spaniards of Guiana, which ultimately led to his death on the scaffold. [Raleigh, Walter.]

ELEATIC PHILOSOPHY has its name from Elea (called by the Romans, Velia), a Grecian colony on the western coast of Lower Italy, where Xenophanes of Colophon settled in his old age (about 530 B.C.), and founded a school distinguished by its bold attempt to construct a system of the universe upon metaphysical principles. The theory was brought to perfection by Parmenides, but it also reckons among its members Zeno, Melissus, and Empedocles, who however only gave a further development to particular principles; the labour of Melissus being mainly confined to the defence of those positions which were opposed to the Ionian physics, while Zeno and Empedocles exhibit the opposite aspects of the theory, the former confining himself to its doctrine of the supra-sensible, the latter to a detailed application of its physiological views.

In its formation it was subsequent to the Ionian and Pythagorean schools, and was so far a consequence of them as it thought necessary to submit to investigation the legitimacy of the principles upon which they had proceeded. The problem which they had proposed to themselves was, assuming the possibility of a beginning of motion and of production and decay, to determine the first ground or grounds of all that comes into being. This assumption the Eleatæ attacked as irreconcilable with that idea of the reason which involves the law of causality, the Eleatic expression for which was, 'out of non-being being cannot come,' and its later and more general formula, 'ex nihilo nihil;' and as no distinction had as yet been made between the efficient and material causes, they necessarily arrived at the conclusion that the world had not a beginning.

With the founder of the school religious considerations predominated, and in order to refute the unworthy conceptions of the Deity to which polytheism had given rise, he showed from the very notion of God that he is necessarily one. The notion of Deity, he argued, implies his infinity and eternity, but there cannot be many infinite beings; the eternal and infinite God is therefore one. But from the denial of production it followed that the world is eternal. Now an eternal world would equally limit the eternal God: the co-existence, therefore, of the two, separately and independently of each other, is impossible: consequently the world and the Deity are one. This result is the foundation of the so-called error of Pantheism; but it was only by such an error that man could arrive at a right and worthy conception of the Deity, which it is the merit of the Eleatæ to have distinctly propounded.

From the position that God or the world is one, it necessarily followed that our conceptions of sensible things singly are imperfect and insufficient to bring us to a knowledge of the All or of God. Man, consequently, is placed in a painful situation, desiring on the one hand to know God, on the other to look to individual phenomena. Attention was thus awakened to the opposition which exists between the pure truth and the sensible appearance, and the Eleatæ were the first to advance a systematic theory of human knowledge; and although its object was to deny the validity of the testimony of sense and experience, and to ascribe to the reason exclusively the merit of arriving at the truth without any attempt to reconcile appearance and reality, it nevertheless constituted a most important advancement of the philosophy of the period, and so completed its edifice as a system by contributing the dialectical or logical portion; the Ionians and Pythagoreans having respectively constructed the physical and moral parts.

In conclusion, we must observe that the history of this as well as of the other early schools of Grecian philosophy is both obscure and imperfect, since of the written works of its several members we only possess a few and unconnected fragments.

ELECAMPANE, the herbalist's name of the plant called Inula Helenium. Mr. Burnett speaks of it thus:—It is by some persons esteemed as a grateful stomachic; its leaves are aromatic and bitter, but its root much more so. The former were used by the Romans as pot-herbs, and it would appear were held in no mean repute in after times, from the monkish line, 'Enula campana, reddit præcordia sana.' When preserved, it is still eaten as a cordial by Eastern nations, and the root is used in Europe to flavour certain sorts of confectionary that bear its name; and it enters into the composition of several continental carminatives. It is seldom used in England except in veterinary practice, or by fraudulent druggists to make an emetic powder, by the addition of tartrate of antimony, and then sold as a substitute for ipecacuanha. A peculiar proximate principle, something resembling starch, was first detected in the roots of this plant, and hence called Inulin; it has since been discovered in the tubers of the Jerusalem artichoke, the roots of the common pellitory, the angelicum, the cormus of the colchicum, &c. [Inula.]

ELECTION (Lat. *electio*), in divinity, is a doctrine which, on the authority of Scripture, and as a consequence of the omniscient and prescient attributes of God, teaches that from all eternity the destiny of every individual of mankind was determined by an immutable decree, some (the elect) being ordained to eternal salvation, while others (the reprobate) are left to inevitable and eternal damnation. The term election is often considered as but another name for the doctrine of predestination, both implying that man is subject to a certain predetermined fate. This doctrine in modern times is associated constantly with the name of Calvin, though similar notions were maintained or opposed among the philosophical and religious sects of the antient Gentiles, Jews, and Christians. The Essenes were believers in absolute preordination. The Sadducees rejected it, and adopted the doctrine of moral freedom. The Pharisees, in a theory of syncretism, endeavoured to reconcile and combine the two extremes. (Josephus, *Antiq. Jud.*) The Stoics insisted upon the doctrine of predestination or necessarianism; while the rival sect of Epicureans maintained that of the perfect free agency of man and the contingent nature of events. The Gnostics taught that human souls, according as they emanated from the good or bad principle, were destined to happiness or misery. In the systems of Manes (Manichæism), Marcion, Cerdon, and others of the second century, similar doctrines were enforced concerning the fixed inevitable fate of men. Throughout the first four centuries the pagan philosophers, especially those of the Stoical school, opposed the dogmas and miracles of Christianity by alleging the principle of necessity as exhibited in the immutable series of causes and effects, or antecedents and consequents, in the physical and mental phenomena of nature, and the ignorant populace were confirmed believers in the influence of fortune and fatality. Justin Martyr, Irenæus, and most of the Greek fathers, in defending the Christian system, resorted therefore to arguments tending to establish anti-predestinarian doctrines. Origen, in the third century, had taught that man, in his moral and religious agency, is not necessitated by omniprescient decrees of God. His tenets were adopted in Palestine, and throughout the East, especially by Chrysostom, Isidorus, Theodoret, and the other Greek fathers; and Pelagius, an English monk, proceeding on their authority, promulgated in the first half of the fifth century the sectarian theory designated Pelagianism, which asserts free agency, moral responsibility and perfectibility, making good works meritorious, and denouncing the predestinarian doctrine of imputed guilt and inherited depravity. (Pelagius in Pluquet's *Dict. des Hérésies.*) St. Augustin was among the most strenuous opponents of Pelagius, and adduced abundance of scriptural authority to show the absolute omnipotence, the omniprescience, and consequently the preordination of God, with respect to the characters and destiny of men; showing some to be elected by the divine will as objects of especial grace, and others to be abandoned to the perdition which through Adam is merited by all. (St. Augustin, *De Gratia, De Peccat. orig., De lib. arbitr., De Dono Perseverantiæ.*) The arguments of St. Augustin occasioned the formation in the fifth century of a sect in Africa called Predestinarians, the tenets of which were zealously propagated in Gaul by a priest named Lucidus, who was excommunicated and anathematized by the church in council. (See the treatise of Père Sirmond on this heresy, and the replies of the Jansenists and divines of Port Royal.) In the ninth century, the Predestinarian controversy was revived with great enthusiasm by Gottescalque, a French Benedictine monk, who was condemned, and terminated his life in a dungeon, for teaching the 'five points' concerning election, which subsequently gained for Calvin so much celebrity. Gottescalque was answered by Scotus Erigena, and many others. (Dufresnoy, *Tablettes Chronolog.*) This incomprehensible subject formed one of the great points of subtle disputation in the scholastic theology; it was discussed by 'the Angelic Doctor,' Thomas Aquinas, and others, in the thirteenth century. Whether God's election was before or after the prevision of human merits was a standard thesis for the exercise of syllogistic skill (electio ante vel post prævisa merita). Aquinas sustained the doctrines of Augustin, and the controversy was subsequently carried on in the sixteenth century between his followers (the Thomists) and the adherents of Louis Molina (the Molinists). When Luther began to form his opinions, he perceived that nothing could so effectually demolish the Catholic doctrine of justification by works as the predestinarian theory of St. Augustin, which he therefore enforced in his writings; but finally he was induced by Melanchthon to mitigate the rigour of his opinions concerning man's passive subjection to God's eternal decrees. By the Socinians the certain prescience of future events by the Deity is denied, and the divine decrees are maintained to be merely general, and not specially relative to particular persons. The system of Calvin is set forth in his great work entitled 'Institutes of the Christian Religion' (Institutiones, &c.), in which he states that 'no one desirous of the credit of piety can dare to deny God's predestination of some to eternal happiness, and of others to eternal damnation;' that 'every man is created for one or the other of these purposes,' God having from all eternity fixed the destiny of every individual of the human race, all of whom, in consequence of Adam's offence, have been, are, and to the end of time will be, under the curse and wrath of God, and justly subject to everlasting punishment; that salvation depends wholly on God's will; that particular persons, without any regard whatever to their merits or demerits, are elected, or rejected for ever; and that God is an absolute, tremendous, and incomprehensible Judge. Such propositions, it must be confessed, are sufficiently mysterious and fearful to overwhelm the timid with despair, and excite the bold to inquire if they are founded in truth. One of the ablest works in confutation of Calvin is Dr. Whitby's discourse on the five points of his system, which are as follows:—1. God, before the creation, was pleased to choose, without prevision of merit, some of mankind to enjoy everlasting happiness, and others to suffer everlasting misery. What was certainly foreseen must certainly come to pass, as the prescience of the omnipotent and omniscient Being must be coincident with, and not by possibility antecedent to, his decrees. 2. Atonement was made by Christ only for the sins of the elect. His death did not make the salvation of all *possible*, and dependent on the performance of certain conditions; for if God intended salvation for all, doubtless all must be saved; and if Christ died for all, he died in vain for many, which is a supposition absurd and impious. 3. By original sin, that is, the imputation of Adam's guilt, all are by nature in total depravity, which justifies the consignment of the whole human race to eternal misery, and makes the election of some to happiness an act of God's especial grace and good pleasure. 4. All the elect are effectually called at some point of time in life when the influence of the divine grace is first communicated. 5. As all who are not elected must be damned, so all those who are elected must be saved: irremissible grace necessitates all their actions, and inevitable salvation must terminate their 'final perseverance.'

The following are some of the scriptural authorities alleged in support of these doctrines: Ephesians i. 4, 5, 11, some chosen before the foundation of the world; predestinated according to God's pleasure: Acts xv. 18. God's foreknowledge: Rom. viii. 29, 30, 33, those foreknown, predestinated, called, justified, and glorified, are God's elect Math. xxv. 34, to inherit a kingdom eternally prepared for them: Acts xiii. 48, those ordained to eternal life believe Rom. ix. 11, 18, 21, 22, 23, election before birth, and not according to works; God's power absolute; mercifully favours some and hardens others. Divine election is considered to be shown in the acceptance of Abel, and the rejection of Cain; in God's love of Jacob, and hatred of Esau (Malachi i. 2, 3); in the two men in the field; the two women at the mill; and the two in a bed, of whom one was taken and the other left (Luke xvii. 34; Matth. xxiv. 40).

Arminius, a professor in the University of Leyden, became, at the commencement of the seventeenth century, the chief of Calvin's opponents, who were thence called Arminians, and Remonstrants, from the remonstrance which they addressed to the Dutch government against Calvinistic intolerance. But the rigid Calvinists, headed by Goar (Goarites), being by far the most powerful party, Arminius and his adherents were condemned at the general synod of Dordrecht, convened for the purpose in 1619. (Scott's *Synod of Dort*, pp. 112-124.) At this synod the standard points of strict Calvinism, with respect to election, were determined upon and established. That the homilies and articles of the English church, especially the seventeenth, are confirmatory of the Calvinistic views of election, is beyond dispute, though many Arminian expositors have made laborious efforts to explain away their obvious original purport. Bishop Burnet, in his exposition of the articles, observes that the seventeenth, on Election and Predestination, 'has given occasion to one of the longest, the subtilest, and the most intricate of all the questions in divinity.' It displays in fact the *medulla* of Calvin's Institutes, precisely involving all the doctrinal particulars of his 'five points,' and asserting that, to the *elect* predestination 'is full of sweet, pleasant, and unspeakable comfort; while to the *reprobate* it is a most dangerous downfall, whereby the devil doth thrust them into desperation and wretchedness.' Baxter endeavoured to reconcile the doctrines of Calvin and Arminius. Arnauld, in his treatise on the subject, contends that the Calvinistic predestination directly overthrows all the principles of morality; though many others, including Dr. Chalmers, in his recent course of lectures on Predestination, assert the contrary. To enumerate the various modifications of this doctrine, which at different times have been maintained by distinguished theologians, would be endless. Some, as Origen and the Catabaptists, have denied that any one is predestined to perdition, and contended that salvation will be finally extended to every one of God's creatures, including the devil and all his angels. (Bullinger, *Contra Catabap.*) The following references, in addition to those already given, may be useful to the studious inquirer.—

(Cudworth's *Free Thoughts on Election*; Diderot, *Encyclop.*, articles Predestination, &c.; Bossuet, *Hist. des Variations*, liv. 14; *Westminster Assembly's Confession of Faith* (Calvinistic); Mosheim's *Eccles. Hist.*, vols. iii. and iv.; *Authentic Documents relating to the Predestinarian Controversy under Queen Mary*, by Archbishop Lawrence, 1819; Finch's *Examination of Cudworth's Free Thoughts on Elect.*, 1755. A list of numerous treatises on Election, written in the sixteenth and seventeenth centuries, and of sermons for and against the doctrine, may be seen in Watt's *Bibliotheca*, and Du Pin's *Study of Divinity*.)

ELECTION (law) is when a man is left to his own free will to take or do one thing or another which he pleases (*Termes de la Ley*); and he who is to do the first act shall have the election. As, if A covenants to pay B a pound of pepper or saffron before Whitsuntide, it is at the election of A at all times before Whitsuntide which of them he will pay; but if he does not pay either before the time fixed, then it is at the election of B to sue for which he pleases. So, if a man give to another one of his horses, the donee may take which he chooses; but if the donation be that he will give one of his horses (in the future tense), then the election is in the donor.

Courts of equity frequently apply the principle of election in cases where a party has inconsistent rights, and compel him to elect which he will enforce: as, if A by his will assumes to give an estate belonging to B to C, and gives other benefits to B, B cannot obtain the benefits given to him by the will unless he gives effect to the testator's disposition to C. It does not appear to be quite settled whether the party electing to retain his own property in opposition to the instrument is bound to relinquish only so much of the property given to him as will be sufficient to compensate the disappointed parties, or whether his election will be followed by absolute forfeiture of the whole. The arguments on both sides are ably stated 1 Roper, Husb. and Wife, 566 n.; 1 Swanst. Reports, 441; 2 Coke's Repts., 35 b., Thomas's note. The principle of election is equally recognized in courts of law, though they are seldom called to adjudicate upon it, except where the alternative is very distinct, or the party has already elected. Indeed this principle is of universal application, and prevails in the laws of all countries; it is applicable to all interests, whether of married women or of infants; to interests immediate, remote, or contingent; to copyhold as well as to freehold estates; to personalty as well as to realty; to deeds as well as to wills.

Courts of equity also will compel a plaintiff suing at law as well as in equity, or in a foreign court as well as in the court in England, for the same matter, at the same time, to elect in which court he will proceed, and will restrain him from pursuing his rights in all others. There are some exceptions to this doctrine, as in the case of a mortgagee, who may proceed in equity for a foreclosure, and on his bond or covenant at law at the same time; but this arises from the difference of the remedy, and from the original agreement to give the concurrent remedies: and even in such a case a court of equity will restrain a mortgagee from enforcing his judgment at law upon the bond or covenant, if he is not prepared to deliver up the mortgaged property and the title-deeds belonging to it.

On Election under a will in the Roman Law see *Dig.* xxxiii. tit. 5, De Optione vel Electione Legata: and as to the French Law, see the *Code Napoléon*, art. 1189, &c., Des Obligations Alternatives.

ELECTOR. [BOROUGHS OF ENGLAND; COMMONS, HOUSE OF.]

ELECTRA. [CELLARIÆA, vol. vi. p. 401.]

ELECTRICITY (ἤλεκτρον, amber). The electric phenomena, connected as they are now known to be by certain well-ascertained laws, form together the most complete and important addition to the physical sciences which has been made since the time of Newton.

The simplest and most usual mode of producing electricity is by friction. When any two substances are rubbed against each other briskly it is always produced; but it is only a particular description of bodies called non-conductors that retain it after it is thus produced so as to exhibit its primary effects of attraction and repulsion.

The production of electricity may be observed in a very familiar manner thus:—Tear up a piece of paper into small fragments, and place them on a table; then take a stick of sealing-wax, and rub it briskly with a piece of flannel, or against the sleeve of a cloth coat, and immediately after hold it near the fragments of paper; these small pieces will be soon observed to be agitated and the smaller to fly with considerable velocity to the wax, to which having adhered for some time, some will suddenly jump off, others which have touched the stick edgeways will dangle from it a considerable interval, and then fall off by their own gravitation when the electrical force has sufficiently subsided. It was by observing amber produce similar effects after friction to those we have described that electricity obtained its name.

Glass is now more commonly employed to produce electricity than any wax or gum; and there is a striking difference in the kind of electricity then generated, which we shall afterwards notice more at length. These bodies are non-conductors, as they manifestly retain their electricity beyond the moment of its production, and they are isolators, because a conducting substance will also retain its electricity when communication with the earth, or other conducting substances, is cut off by means of non-conducting supports or envelopes.

Water is a conductor of electricity; for if you immerse a conducting isolated and electrised substance in water, it will completely lose its electrical properties. Perfectly dry airs or gases, on the other hand, are non-conductors; for if not, none of the phenomena mentioned could have been observed, as the experiments are not made in vacuo. We are not aware that it has yet been established whether the vapours of all substances are conductors (or all the gases non-conductors). Aqueous vapour certainly is a conductor; and therefore when the air is impregnated with moisture it is difficult to perform any electrical experiments which require duration.

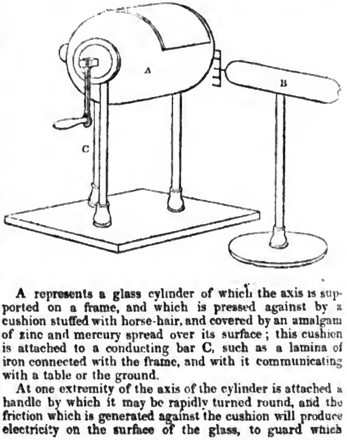
Hence a conductor constitutes a channel by which the electricity produced on a non-conductor will gradually escape, and a non-conductor constitutes an isolator by which the electricity communicated to a conductor may be retained.

Thus, place an electrified glass tube on a tin stand, and the metals being conductors, the electricity will be gradually dissipated; on the contrary, place an electrised tin cylinder on a glass support in dry air, and the electricity will be retained for a very long time.

Nevertheless it is far from improbable that this is a question only of degree; that all substances are conductors; and that the usual terms conductor and non-conductor strictly mean quick conductor and slow conductor.

When an electrised body is brought near the skin where the power of touch is delicate, a sensation is produced which has been compared to that produced by the touch of a cobweb; but instruments founded on the laws of electric action have been constructed, which indicate the presence of electricity in its most feeble state, and measure its tension. [ELECTROMETER.]

Previous to our study of the properties of electricity, on which the construction of the best machines for procuring it in large quantities depends, it will be useful to describe a simple apparatus, and one easily constructed or procured, by which we may learn the first laws of electrical action.



A represents a glass cylinder of which the axis is supported on a frame, and which is pressed against by a cushion stuffed with horse-hair, and covered by an amalgam of zinc and mercury spread over its surface; this cushion is attached to a conducting bar C, such as a lamina of iron connected with the frame, and with it communicating with a table or the ground.

At one extremity of the axis of the cylinder is attached a handle by which it may be rapidly turned round, and the friction which is generated against the cushion will produce electricity on the surface of the glass, to guard which against the action of the moisture of the air, the upper side of the cylinder may be lapped over by a piece of glazed taffeta in the direction of the rotatory motion of the cylinder.

B is a long narrow and hollow metallic cylinder standing on a glass support, and having at the extremity near A a small cross bar garnished with points or teeth presented towards the cylinder. B is called the conductor in this apparatus

When the cylinder A is turned briskly round, the motion will be accompanied by a crackling noise, and if in the dark, streams of light of a blueish hue will be perceived directed to the several points on the projecting bar of the conductor.

B may be thus charged with electricity, and when removed from the presence of the cylinder (taking it away by its isolating support), it will retain its electrical properties (the longer as the air is more free from moisture), and will by simple contact communicate a portion of its electricity to another isolated conducting substance, or be discharged by touching one not isolated: if, with a feeble charge, it is touched by the finger, a sensation like the pricking of a needle is felt, accompanied by a faint spark apparently penetrating the fingers.

It is useful to cover the glass supports at their points of contact with gum-lac, which is an excellent isolator.

Glass plates are now in more general use than cylinders for the production of electricity by friction. It would be impossible here to describe the varieties of electrical machines which have been constructed. Perhaps the most perfect apparatus for producing electricity, and also measuring its quantity, is that employed by Mr. Snow Harris, and which is described in his paper on Electricity in the Philosophical Transactions; a valuable memoir, which deserves also to be consulted for the electrical data, which are there established with much accuracy, in the mode of performing the experiments on which they are founded; though we do not acquiesce with some of the inferences drawn by the author.

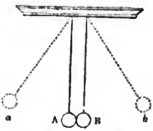
We shall now observe, as our first phenomenon, that neither the cylinder which has generated and given out electricity, nor the conductor which has acquired it, exhibits the least alteration of weight, nor will the greatest possible accumulation of electricity produce the least perceptible alteration in this way. Those who suppose that electricity is a distinct species of matter, an all-pervading fluid, have therefore denominated it *imponderable*. Facts do not, however, authorize us yet to take this view of it, or to regard it as essentially different from the forces which the molecules of matter exercise, which, though neutralized for external bodies when these molecules are in positions of equilibrium or stability relative to their mean places, may become sensible by impressed forces, such as friction, which would alter the position of their poles, or by sudden concussion forcibly altering their relative situations. There is a convenience of language, however, in speaking of it as a fluid, which can lead to no error by its adoption until the phenomena of molecular actions are more studied, and the views of Mosotti and many other natural philosophers with respect to the identity of these forces better established. Adopting, therefore, this hypothesis, the sense in which we speak of its quantity, its accumulation, its density, or its partition between bodies, may be readily translated into the hypothesis founded on the views of molecular action if we should find any occasion for it.

The next phenomenon to notice is the limit to the quantity of electricity we can communicate to a perfect conductor. If, from different sources of electricity, we charge a metallic ball, and so continue to charge, we shall find that there is a limit beyond which we cannot communicate more; for on attempting so to do, the ball will discharge itself through the air into the nearest conducting body, when a spark, describing apparently a zigzag course, will be observed, the colour of the light being dependent on the medium it traverses. This spark travels with immense velocity, and is accompanied by a very audible sound: and if received by the body of a man or animal, it produces through a part or the whole of the system an instantaneous muscular contraction, which may be rendered sufficiently strong to cause death, but in more moderation has been used in some diseases, as deafness, though its use has become by no means general.

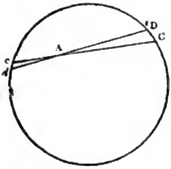
Two points determine this limit, or fix the charge of which a perfect conductor is susceptible. The first is the extent of its surface; for if two bodies have similar figures, the quantities of electricity of which they are capable are proportional, not to their solid content or weight, but to their surfaces; that is, to the square of their linear dimensions. The second is the pressure of the non-conducting medium by which they are encompassed. The quantity of electricity is then as the square root of the pressure. When placed in an artificial vacuum, an electrical light is observed along the sides of the machine. Mr. Harris has shown that dry air, considerably rarefied by the action of the pump, will suffice to retain the electricity of a body for a long time; but it should be remembered that the square root of two quantities gives a much lower ratio than the quantities themselves; and this ratio cannot be considered very small in any artificially-formed vacuum.

That the quantities of electricity should follow the law of proportionality to the surfaces, and not to the content or weight of the body, will not excite surprise when we state that no developed electricity exists within a body, at least to any appreciable depth below its surface. This fact has been repeatedly confirmed experimentally; and in consequence of this law we see the advantage of using a long cylindrical form for a conductor, and perceive the proportions in which the partition of electricity takes place when several similar conductors communicate.

We come now to the third and very important phenomenon of the mutual repulsion of the different parts of developed electricity: these parts repel each other with forces which vary inversely as the square of the distance. We may easily witness this repulsion in the following familiar manner. Take a small well-dried ball of elder-pith, and suspend it from the hand by a fine silk thread, which is a good non-conductor; then bring it near the conductor of an electrical machine, or to a body to which this conductor has communicated electricity. The ball will at first be attracted to this body; but when it has touched it and shared a small portion of its electricity, it will be repelled from it and will stretch the string by which it is suspended in a slant direction, until the obliquity is sufficiently great for its own gravity and the tension of the string to counterpoise the repulsion of the electricity on the conductor Let two pith balls be suspended by rallel strings so as to touch each other, as A, B, and if a portion of electricity be communicated to them by temporary contact with a body already charged, the strings will diverge in consequence of the mutual repulsion, and the balls will come into the positions *a*, *b*, where, notwithstanding their gravitation, they will remain a considerable time, if the air be very free from moisture. They will be observed gradually to close in towards each other as they lose their electricity from the contact of the surrounding medium.



That the law of force in this case is, as in gravitation expressed by the inverse square of the distance, was satisfactorily demonstrated by Coulomb by means of his torsion balance, the principle of which we have before explained [ELASTICITY], and has been lately confirmed by Mr. Harris's experiments: and a remarkable fact arises from it, namely, if the electrised pith-ball A be placed any where within the concavity of a spherical shell, it will not be moved in any direction by the repulsion of the electricity on the surface of the shell; for the electricity being then uniformly distributed, the intensity of the force of any small portion DC is at its extent, or proportional to the square of the arc DC, and is therefore destroyed by the action of an opposite portion *dc*, cut off by a conical surface having A as vertex, and DC as base; for $DC^2 : dc^2 :: DA^2 : cA^2$, that is, what the portion gains in extent it loses in its distance from A. This law was first demonstrated by Newton (*Principia*, book 12); and it was afterwards shown by other analysts, that for no other law of force but that stated could the same mutual destruction of forces occur (Laplace, *Mécanique Céleste*



tom. .., liv 2; Murphy's *Electricity*, chap. iii.); and Poisson, from other considerations which we shall afterwards notice, made this condition, for a body of any figure, the ground of his calculations on the distribution of electricity over the surfaces of bodies.

When electricity is produced, as above described, and a conductor charged, if the conductor be removed, and another conductor replace it, the latter will become charged by repeating the operation: thus the cylinder and every substance is an inexhaustible source of electricity.

We have supposed the cushion by which the cylinder is rubbed to be in communication with the ground by a conductor; but if two substances both isolated be electrised by friction, and when separated the electricities belonging to each surface be examined, we find the following results:—

Let two isolated pith-balls A and B, as before, be electrised by communication with one of the surfaces, and two other balls *a b* in like manner electrised by the other surface.

Then when A is presented to B, or *a* to *b*, repulsion takes place as before described; but when A is presented to *a*, or B to *b*, they will attract each other; and if A, *a* have equal charges from the different surfaces which have been rubbed against each other other, when contact takes place between A and *a*, all signs of developed electricity will depart from each, and the bodies will take their natural positions, neither attracting nor repelling each other; but if A has a greater electrical charge than *a*, a surplus of the electricity of A will remain, and will be partly communicated to *a* when a consequent repulsion arises.

The same results would occur if two machines were used, in one of which the cylinder is glass, and in the other resin or a gummed substance: the pith-ball which receives its electricity from the glass cylinder will attract that which has been in communication with the other machine.

Hence arise the terms *vitreous* electricity and *resinous* electricity, or, as they are now more usually and properly called, positive electricity and negative; for whatever two substances they may be which are rubbed together when electricity is produced, it will be found positive on one substance, and negative on the other, even if the substances are of the same nature; for instance, both glass.

The phenomenon above noticed may be then announced as follows: 'Like electricities mutually repel, unlike mutually attract;' and the law of force between particle and particle is in both cases the inverse square of the distance.

Moreover, we have seen that the addition of quantities of unlike electricities is similar to the addition of quantities with unlike signs in algebra: when equal the sum is zero, when unequal it is the excess, and of the same name as the greater charge.

Franklin's theory makes only one electric fluid in excess above its natural state in bodies positively electrised, and in defect in those said to be negatively electrised.

Epinus, and most of the continental philosophers after him, suppose two distinct electrical fluids, the particles of each of which repel those of the same kind, but attract those of the contrary, and therefore the opposite electricities always seek combination or neutralization, so that in natural bodies the two fluids exist in equal quantity, by which the presence of neither is indicated.

Mosotti has in some degree revived the theory of Franklin in his memoir on the forces which determine the state of bodies. We adopt at present the theory of two fluids, but all the phenomena may be readily expressed also on Franklin's theory.

The pressure of the electricity on the surrounding medium, when the body is perfectly conducting, determines the direction of the motion under the influence of foreign electrised or non-electrised substances, which, by rendering this pressure unequal on the different parts of the surface, produce motion by the unequal reaction of the medium. But imperfectly conducting bodies have in themselves a certain retentive or coercive force, and the electrical particles, instead of then freely obeying the external impressed force by a corresponding law of arrangement or accumulation amongst themselves, communicate the forces impressed to the particles of matter by which they are restrained. In imperfect conductors the force is partially exercised in each of these ways. The circumstances of the motions of electrised substances therefore vary with their conducting faculty.

We can now understand the mode in which light substances are attracted to a stick of sealing-wax which has been made electrical by friction: the electricity of the wax is in this case negative; and when brought near a small piece of paper, which is a conductor, it acts upon the neutral fluid of the paper, attracting some of its positive electricity to the side next it, and forcing the negative to the farther surface, which, being in communication with the ground or a conductor, is carried off; so that the paper is thus *by influence* made positively electrical, which, being of a contrary kind to that of the wax, is attracted by it, and therefore the paper flies to the wax, and having touched it communicates its positive electricity to it, thereby neutralizing a portion of its free fluid; after which it shares a part of the surplus of negative electricity remaining on the wax, when it is of course repelled; and if it become neutral by again touching the ground, and the electrical force has sufficient energy, it will again fly to the wax and the same results will be repeated.

When a body is of an irregular figure, and is electrised, the electricity of its surface will be differently accumulated at the different parts, projecting points having the most, and portions of small curvature the least in convex surfaces; and it is a mathematical problem of considerable difficulty in some cases 'to find the law of the distribution of free electricity on the surface of a perfectly conducting body of a given form.' The datum for the solution is, that the whole action of the electric envelope on any point interior to the body is zero: we have shown that it would be so in the case of a sphere by a uniform distribution on the surface; but in other bodies this distribution cannot be uniform to produce the same effect. The next case in the order of simplicity is the spheroid, or more generally the ellipsoid, for a spheroidal shell, bounded by two similar and concentric spheroidical surfaces, and attracting by the law of the inverse square of the distance, will exercise no action on an internal point; hence the accumulation of electricity on the surface of a spheroid at any point is proportional to the normal breadth of the stratum at that point, which it may be easily proved is proportional to the perpendicular drawn from the centre on the tangent plane, or inversely as the diameter parallel to the tangent at that point.

Hence we see why the accumulation of electricity at points is so great, which are therefore part of the armature of prime conductors; for if we conceive the axis minor of an ellipse to diminish indefinitely, while the axis major remains invariable, the breadth of the spheroid generated will be correspondingly diminished while the length remains the same, and ultimately it will approximate to the form of a needle pointed at the extremities of its axis major, the breadth of the electricity at the point is then to that at the middle of the needle as the length of the needle to its greatest breadth. Now, in consequence of the law of force being the inverse square of the distance, we find the pressure against the air is as the square of the accumulation, and consequently is very much greater at either extremity of the needle than at or towards the middle; and therefore, on being overcharged, the electrical spark is given from the extremity, when not otherwise determined by the influence of external bodies.

Moreover, when several conducting bodies, some or all of which are electrised, are placed near each other, a new distribution of electricity takes place on their surfaces, caused by the decomposition of the neutral fluid of each by the action of the extraneous substances: thus, the principle for calculating the distribution in this case on every body is to suppose it such that the total action on any point within each of the conductors shall be zero; for if not, the neutral fluid at that point would be decomposed, and the separated fluids proceeding to the surface of the body would alter the distribution. When the distribution is ascertained, then the motions of the bodies may be calculated according to the laws of dynamics, the pressure against the surrounding medium being as the square of the accumulation.

Two spheres placed in contact and electrised will have the point of contact neutral. This result of theory (founded on the principles above detailed), with many others, has been fully confirmed by experiment. Those who wish to follow up the mathematical principle here noticed, may see Poisson's *Memoirs on Electricity* (*Mémoires de l'Institut*), and an English treatise expressly on this subject by Mr. Murphy of Cambridge.

When electricity is generated by the friction of two substances, one acquires positive, the other negative electricity, but it is difficult to judge *à priori*, from the nature of the substances employed, the character of the electricity which each will take; and though most treatises contain tables of substances in which each is positive to that which precedes and negative to the succeeding, yet the nature of the electricity is so liable to alteration, from very minute circumstances of the friction, that it is better, even in each case, to try direct experiment. The friction produced by liquids also produces electricity, the electric light, when a barometer well freed from air is first filled with mercury, having been remarked from the earliest dates of the use of that instrument; and when a current of air is directed against a plate of glass the latter will acquire positive electricity, and therefore the air negative, and the rapid agitation of a piece of silk in the air communicates to the latter positive electricity while the silk acquires negative.

The difference of temperature of a substance often determines the species of electricity it acquires by friction. Generally an increase of temperature disposes to negative electricity, and polish or smoothness to positive; pressure on many crystals will produce opposite electricities, as will also heat (as in tourmaline), and even the slight adherence which a piece of glazed taffeta would have to an isolated metallic plate which it covers is sufficient to give the plate negative electricity, which is the more remarkable from the fact that the friction of the two would have made the taffeta negative and the plate positive.

Moreover, both the electricities are produced in most of the chemical compositions and decompositions, in the sudden fracture of substances, in evaporations, &c.; and the higher couches of the air are in a state of positive electricity when unoccupied by clouds, which are found indifferently charged with either.

When a body is positively electrised, we can procure the negative electrisation of another conducting substance by the influence of the former on the neutral electricity of the latter. Let the conductor be placed in the vicinity of the influencing body, but not so close as to receive any positive electricity by sparks or other direct communication. The natural electricities of the conductor will be then separated by the influence of the positively electrised body, towards which the negative electricity must be attracted and the positive repelled; the part of the conductor nearest the influencing body must therefore be covered with negative electricity, and that more remote with positive. If now this end of the conductor be made to communicate with the ground, the positive electricity will escape into this great reservoir, and moreover sufficient negative electricity will be communicated from the ground to the conductor to render the point of contact neutral: thus the conductor acquires a double change of negative electricity, and when isolated will be found negatively electrised after it has been removed from the vicinity of the isolating body.

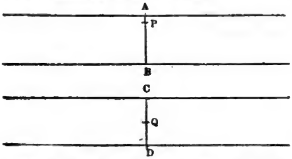
The effects of influence, as above described, may be easily observed in the following manner: Place a long and narrow isolated conducting cylinder before a body strongly electrised, and from different equi-distant points of the cylinder suspend pairs of pith-balls by cotton threads, which will acquire the electricities of the parts of the cylinder with which they are connected. We shall observe a considerable divergence in the pair suspended nearest the influencing body, because they are strongly charged with an electricity of a contrary nature to that of the body: going along the cylinder, the divergence diminishes, and at a point not as remote as the middle of the cylinder there will be no divergence. Beyond this neutral line the cylinder has an electricity of the same kind as the influencing body, increasing in intensity towards its farthest extremity, and therefore the strings commence to diverge more and more as we approach that end. In making this experiment a single pair of pith-balls moved along the cylinder will be sufficient if we secure them from the direct influence of the body by a piece of glass interposed near them.

This is the direct influence the electrised body has on a neutral body, but the neutral body must again re-act on the original body, sensibly decomposing its electricity if it be a conductor; and thus the true arrangement of the electricity, in two surfaces influencing each other, although instantaneously effected, may be regarded as the final effect of a succession of direct and reflected influences between the bodies. This principle has been shown by Mr. Murphy materially to facilitate the actual calculation of the distribution of electricity on two electrised surfaces in presence of each other.

The effect of the influence of a near electrised cloud has been felt by several persons; among others by the writer; and in many cases fatal results have followed, not from the direct discharge of the electricity or, as it is called, the lightning, but from the sudden reunion of the electricities which had been separated by influence, and which, upon the discharge of the cloud, is effected by means of a corresponding electric charge brought through the body from the ground.

From the power of separation of the neutral fluid in bodies at a distance which is exercised by electricity, an easy means has presented itself by which a much greater quantity of electricity may be collected upon a conducting plate than that which could be directly communicated by a conductor. We shall therefore now endeavour to explain the principle of the condenser, which we think very inaccurately stated in Biot's *Physique*, in which the subject of electricity is treated, generally speaking, in a very luminous manner.

The following investigation the author of this article gives, on his own responsibility, with the desire of placing the power of the condenser on its true basis:—



Suppose two equal conducting plates, of which the axes are AB, CD, to communicate respectively at A and D with known sources of electricity, and have their opposite faces B, C near to each other and parallel, the whole being surrounded by a non-conducting medium, the known sources of electricity communicate quantities E, E′ of electricity to the bases B, D, and the mutual influences of the system generate other quantities X, X′ on the second bases B, C, these quantities are dependent on E, E, on AB, CD, which for simplicity we shall suppose both equal to *c*, and on the mutual distance B,C of the plates, which we shall call *a*. Our problem is to find X and X′ from these data.

Consider the total action on a point P, taken anywhere within the first plate and on its axis; this must be equal to zero, in order that the neutral electricity at that point may not be further decomposed. Let $PB = z$.

The action arising from the base A and the adjoining portion of the sides of the plate included between A and a parallel drawn through P is $Ef(c-z)$; the form of the function f is unknown, since it depends on the law of the distribution of the fluid at the different parts of the base and sides.

Similarly, the action arising from the base $B = Xf(z)$
.. .. $C = X'f(a+z)$
.. .. $D = E'f(a+c+z)$.

Our first equation of condition must therefore be—

$$Xf(z) + X'f(a+z) - Ef(c-z) + E'f(a+c+z) = o \ldots (1);$$

and if we consider in precisely the same way the equilibrium of a point Q within the second plate and in its axis, we obtain (putting $CQ = z'$)—

$$X'f(z') + Xf(a+z') - E'f(c-z') + Ef(a+c+z') = o \ldots\ldots (2).$$

The equations (1) and (2) must hold true for all values of z and z' between o and c, and they serve to determine the form of the function and the values of X, X′.

If the bases were infinite, $f(z)$ would be constant. (*Principia*, book xiv.)

Now $f(z)=f(o)+f'(o)\cdot z+f''(o)\cdot\frac{z^2}{1.2}+$&c. by Maclaurin's Theorem $=f(o)\left\{1+n\frac{z}{c}\right\}$ nearly;

for z being very small, we reject the powers higher than the first, and put $\frac{n}{c}$ for abridgment, instead of $\frac{f'(o)}{f(o)}$; c is introduced for homogeneity.

We may observe that n is necessarily a very small fraction in the actual case; for it depends on $\frac{c}{\text{R}}$, R being the linear dimension of the base, and it vanishes when R is infinite.

The equations may be thus simplified; and dividing them by $f(o)$ they become—

$$\text{X}+\text{X}'\left(1+\frac{na}{c}\right)-\text{E}(1+n)+\text{E}'\left(1+\frac{na}{c}+n\right)$$
$$+\frac{nz}{c}(\text{X}+\text{X}'+\text{E}+\text{E}')=o\ldots.(3)$$
$$\text{X}'+\text{X}\left(1+\frac{na}{c}\right)-\text{E}'(1+n)+\text{E}\left(1+\frac{na}{c}+n\right)$$
$$+\frac{nz'}{c}(\text{X}+\text{X}'+\text{E}+\text{E}')=o\ldots.(4).$$

Hence, by subtraction and dividing by $\frac{na}{c}$, we obtain—

$$\text{X}'+\text{X}+(\text{E}'-\text{E})\left(1+\frac{2c}{na}+\frac{2c}{a}\right)+\frac{z-z'}{a}(\text{X}+\text{X}'+\text{E}+\text{E}')$$
$$=o\ldots.(5).$$

Since $z-z'$ may be positive, negative, or zero, and yet this equation always true, we must have separately—

$$\left.\begin{array}{l}\text{X}'-\text{X}=(\text{E}-\text{E}')\left(1+\frac{2c}{na}+\frac{2c}{a}\right)\\ \text{X}'+\text{X}=-(\text{E}+\text{E}')\end{array}\right\}\begin{array}{l}\ldots.(6)\\ \ldots.(7)\end{array}$$

It will be useful to make a few remarks before proceeding further. The expression which we have put for the action of the plane C on P in equation (3) is in reality the action not only of that plane but also of the side of the prism or cylinder, of which the base is C and altitude CP; and a similar remark applies to the action of the plane D; therefore the total action given in that equation is too great by twice the action of the side of the prism or cylinder included between the plates B and C. For the same reasons we have a like excess in the equation (4); wherefore we have subtracted these equations, when that excess disappears; whereas, if we had added them, an error would arise, small with respect to X and X′, but comparable to E+E′.

Also, from equation (7), the apparatus would be discharged by making the two plates communicate.

In the actual case the lower plate communicates with the ground; therefore $\text{E}'=o$.

Adding now the two equations, we find—

$$\text{X}'=\frac{c\text{E}}{a}\left(1+\frac{1}{n}\right),$$

and subtracting—

$$\text{X}=-\frac{c\text{E}}{a}\left(1+\frac{1}{n}+\frac{a}{c}\right).$$

n is a very small quantity and negative, since the attractive force diminishes as the point acted on becomes more remote. Hence X is very great and positive compared with E, and it follows—

First, that the greater the extent of the plates, the less n will be, being zero when that extent is infinite; therefore the power of the condenser is increased by the extent of the surfaces being enlarged.

Second, that another source of increase of the condensing power is the diminution of a, the space occupied by the non-conducting medium interposed between the parallel conducting plates.

These results are perfectly accordant with experience.

In practice, the conducting plates are generally separated by a plate of glass or a cover of varnish, the latter being used when the electrical charge is feeble; for the attractive forces of the two opposite electricities X, X′ would be too powerful for such an obstacle if E were great, and the electricities would penetrate it, and unite; but in chemical operations, where the electricity developed is of weak tension, the diminution of a is of great advantage, the quantity of electricity acquired by the plates becoming very sensible to the electrometer. [ELECTROMETER.]

The Leyden jar is an instrument founded on these principles. A glass bottle is coated within and without with tinfoil. The conductor of an electrical machine communicates with the foil on the inside by means of a metallic chain, while the outside is in communication with the ground. The opposite electricities are therefore accumulated on the internal and external sides of the glass; hence a flash and a powerful shock is produced, when the two fluids combine, by touching the outside foil with one hand, while the conductor or chain communicating with the inside is touched by the other.

It was ascertained by Cavendish that the quantity of electricity produced in the Leyden jar, with given surfaces, was inversely proportional to the breadth of the glass; this completely corresponds with the results which we have above obtained by theoretical considerations.

There seems little doubt, from the experiments of Wollaston, that much of the electricity produced by the common machine is attributable to chemical action; for the best amalgam to use with the rubber is that which oxidizes most readily, such as tin and zinc, and scarcely any quantity of electricity is produced if, by the nature of the amalgam, there is no sensible oxidation, or if we envelope the apparatus in a medium which will not communicate oxygen, as carbonic acid gas. As the quantity taken by the conductors is proportional, *cæteris paribus*, to their surfaces, it is usual to employ several narrow cylindrical conductors placed parallel to each other; the total surface in this case being the same as that of a single cylinder of the same length, and of which the radius would be the sum of all their radii.

The electrophorus is founded on a principle nearly similar to that of the condenser; but in this case it is the non-isolated body which acquires electricity by the influence of that which is isolated.

It should be observed that the non-conducting plates employed in the condenser and Leyden jar have a certain retentive power on the electricity, and which is of the same origin as its non-conducting faculty: hence it will happen generally in experiments that the whole of the electricity will not be discharged at once, when the opposite electricities of the two plates are made to communicate by a conductor, and frequently not after several repetitions.

The same principle of the separation of the neutral electricity of remote bodies by influence is only varied in the number of electrical machines which have been at different times constructed, such as electrical batteries, electrical piles, &c. The construction of such apparatus is continually varying, as frequently from caprice as from experience. Those which are most commonly employed in laboratories will be found (by such as cannot actually see them) described in most popular treatises on electricity.

In the best conducted experiments there will be a loss of electricity, arising either from the hygrometric state of the atmosphere or the imperfect insulation of the supporters employed. When, for instance, the moist particles of vapour floating in the air come in contact with the conductor of an electrical machine, they acquire by their own conducting power a small portion of the electricity developed in the conductor; being similarly electrised they are repelled; and new particles of moisture arising, repeat the same process of exhaustion, each tiny robber carrying away as much electricity, not as it can hold, but as it may hold without being itself held. The quantity thus lost in a small given time is proportional to the whole charge, and therefore the latter must diminish in a geometrical progression when the time increases in arithmetical.

For atmospheric electricity, see METEOROLOGY.

The electrical light produced in a discharge, whether in an artificial vacuum, in air, or in water, which is susceptible of decomposition by the prism, and varies its tint with the substances between which it is discharged, has been a subject of controversy among physical philosophers; but the opinion most generally received is, that it is the effect of the compression of the traversed medium, which, under such circumstances, would give out light and heat. Mr. Wheatstone has recently exhibited some ingenious experiments to show the velocity of the electric fluid, an account of which may be seen in a paper communicated to the Royal Society. Its immense velocity has been demonstrated long since by the instantaneousness of its arrival at different parts of long metallic tubes, or a series of them, such as are used in pipes for conducting gas. The chemical and other effects of electricity will be found under their proper heads.

(Biot's *Physique*, tome ii.; Pouillet, *Elémens de Physique;* Murphy's *Electricity;* Papers by Mr. Snow Harris in the *Philosophical Transactions;* Turner's *Chemistry*, fifth ed., &c.)

ELECTRICITY, LATENT. [MOLECULARITY.]

ELECTRICITY, *Medical application of.* A supposed analogy between electricity and the nervous power has led to the employment of this agent, particularly in diseases connected with defective nervous energy, and also in cases of defective secretion, perhaps originating in a similar cause. The influence of electricity on the human system differs much according to the manner in which it is applied, the length of time during which it is continued, and the degree of intensity. It also differs in its action according as it is abstracted from, or communicated to, the individual. When applied in a moderate degree of intensity, it occasions an increase of nervous action, of sensibility and irritability, more vigorous circulation of the blood, augmented warmth, and secretion, especially cutaneous transpiration: even the exhalation of plants is much increased by electricity. When the electric principle is more intense, all these actions are heightened, often to a painful degree; while such a degree of concentration as occurs during certain atmospheric changes can occasion instant death. Death occasioned by this means is always followed by rapid decomposition of the body. The diseased states in which electricity has been found most useful are—in asphyxia, from any cause (except organic disease of the heart), but particularly from exposure to irrespirable gases; in certain asthmatic diseases; and dyspepsia, dependent on irregular or defective supply of nervous energy to the lungs and stomach. It is however much inferior to galvanism as a remedial agent in these diseases. (Wilson Philip *on the Vital Functions.*) In local paralytic affections, when of a chronic character, electricity, duly persevered with, has been found very useful: in a case of dysphagia, from paralysis of the œsophagus, the patient could only swallow when placed on a seat resting on nonconductors and electrified. In deafness and loss of sight, when directed by a competent judge, it has restored the functions of seeing and hearing. Lastly, in defective secretion, especially amenorrhœa, it has proved of service.

ELECTRO-CHEMISTRY. The effects of electricity, whether produced by the common electrical machine or the galvanic apparatus, when applied to substances with sufficient intensity, are recognized in their composition or decomposition, their fusion, phosphorescence, &c.; this class of phenomena have been successively investigated by Franklin, Priestley, Cavendish, Wollaston, Cuthbertson, Davy, Van Marum, Gay-Lussac, and Thénard, Becquerel, Faraday, &c., and form an important branch of science closely connected with the nature of chemical affinities, and called electro-chemistry.

Though the decomposition of water by common electricity was effected before Wollaston, yet the remarkable simplifications which this celebrated man introduced into every chemical subject with which he was connected accompanied his electro-chemical researches, we shall therefore confine ourselves to the description of the mode he adopted to decompose water.

Finely-pointed wires of gold or platina are introduced into capillary tubes, the glass is then heated by a lamp until it becomes soft and completely covers the metal, the uncovered part of the wire is then cut off with a sharp instrument, or else the glass may be ground away until the very point of the wire commences to project; sometimes the platina is first silvered, and when the uncovered part has been cut away, the whole is plunged in nitric acid, which dissolves the silver envelope, leaving only a very fine point of platina.

Two wires thus prepared are placed in a vessel containing water, bringing the metallic points very close to each other; one wire is now put in communication with the ground, the other with one of the conductors of an electrical machine; when the electricity of the machine is evolved, a series of sparks passes through the water between the metallic points, the water becomes decomposed into its constituent gases at the points of the wires, and being collected in glass vessels filled with water, they are found in the ratio of 2 to 1 in volume, which is the known proportion of hydrogen and oxygen combined to form water: the finer the metallic points, the greater will be this decomposition; some of those used by Wollaston were of only the 1500th of an inch in diameter.

The decomposition of æther, alcohol, oils, &c., have also been effected in nearly a similar manner, by the electrical spark, and the correct proportions of the constituent gases have invariably been obtained; the oxygen in such cases is always found at the negative pole, and the same result is obtained if we use only a single wire, and do not insulate the vessel containing the fluid operated on.

In metallic solutions the precipitate on the electrised wire shows visibly the decomposition; thus in a solution of copper, if we employ a silver wire, protected by an envelope of sealing-wax, when the electrical discharge is communicated we find the copper precipitated on the negative wire.

When solid substances are inclosed in tubes of glass, such as the oxides of gold, tin, &c., and a strong electrical discharge passed through them, a similar decomposition takes place, the products being deposited on the sides of the glass.

When a gas is thus to be decomposed, a glass vessel is filled with mercury, and the wires introduced; the vessel is then inverted in a reservoir of mercury, and the vacuum is sufficiently filled with the gas that the wire points project above the surface of the mercury; the discharge is then effected, and the required decomposition is produced.

Example.—Sulphuretted hydrogen. Hydrogen is disengaged, the sulphur deposited, and the volume remains unaltered.

Conversely, the composition of compound bodies from their elements in many cases is effected by the electrical spark, two volumes of hydrogen, and one of oxygen gas being introduced into a stout glass tube filled with mercury, and an electrical spark passed through them by means of the wires, water is formed, accompanied with a loud detonation, and the rising of the mercury in the tube in consequence of the diminution of volume. The instruments used for the combustion of gas are called eudiometers, the principle of their construction, particularly that of Mitscherlisch, is particularly simple; the object being generally to measure the quantity of oxygen contained in airs.

The electrical spark will re-light a candle which has been just blown out by the carburetted hydrogen of the smoke with the oxygen of the air, which are then easily inflamed.

When electrical sparks are transmitted incessantly through a small given portion of atmospheric air, its volume becomes compressed, and nitric acid formed. (*Phil. Trans.*, vol. 75.)

By adding oxygen, we can decompose gaseous bodies (by means of the spark) which contain hydrogen: however, it has been found that there is a limit in such mixtures, beyond which the burning will no longer take place. A table of these limits is given by Turner.

Table of mixed Gases and their Products when decomposed.

Names of the gases.	Products.
Deuto-carbonate of hydrogen	Carbon and hydrogen; volume of hydrogen double
Olefeant gas . . .	Carbon and hydrogen
Gas ammoniacal . . .	Hydrogen and azote; volume doubled
Phosphoretted hydrogen .	Phosphorus precipitated; volume of hydrogen unaltered
Carbonic acid gas . . .	Imperfect decomposition
Hydro-chloric acid gas . .	Hydrogen and chlorine (Henry)
Azote-protoxide . . .	Oxygen and azote
Nitrous gas . . .	Nitric acid and azote

A species of phosphorescence is produced in different bodies by subjecting them to the action of a powerful electrical machine. Calcareous spar, carbonate of barytes, Derbyshire bitumen, &c. become luminous by the shock, while other substances give great sparks, and do not become luminous, as mica, dry peat, plumbago, &c.

We shall now consider the electro-chemical effects of the voltaic pile. In general, if two rods of platina in communication with the poles of a voltaic battery be immersed in a saline solution, it will cause a separation of its constituent parts; when the current passes through solutions of neutral salt, coloured with vegetable blues, the part of the liquid at the negative pole is green, at the positive, red.

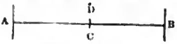
When the water contains a solution of a metallic salt, as of zinc, lead, or copper, the negative wire receives a coating of the particular metal; and in the general electro-chemical decompositions, oxygen and the oxides are found at the positive pole, hydrogen and the bases at the negative. Bodies thus susceptible of decomposition by the pile have been lately distinguished by the term electrolytes (ηλεκτρον λυω): thus hydro-chloric acid, water, &c. are electrolytes; boric acid is not such; substances are said to be electrolysable when capable of being thus decomposed. These terms have been introduced by Mr. Farady.

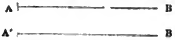
This is the place to notice the decomposition of the alcalis by means of a powerful galvanic battery. These substances had been previously taken as simple or elementary, but upon being introduced into the circuit of the battery, at the positive pole oxygen was disengaged, while at the negative pole was found the metallic base of the alcali, as sodium or potassium, according to the nature of the alcali employed; these substances burn at the temperature of the air, in oxygen or air, and are even capable of being inflamed in water. To preserve them therefore from the contact of the air, Seabeck adopted a process by which they are made to combine with mercury, in proportion as they become disengaged; the amalgam thus produced is afterwards separated by the evaporation of the mercury.

Gold-leaf, carbon, &c. placed in the voltaic current between the points of the positive and negative wires of a pile become inflamed, yielding a light of the greatest brilliancy often so intense as to be painful to the eyes.

All the chemical effects of voltaic electricity are *cæteris paribus* proportional to the extent of surface of the plates employed, and are also increased by augmenting the number of plates. (For further information on this subject, the reader is referred to the actual memoirs of Davy, Wollaston, and Faraday, in the Transactions of the Royal Society; to the *Annales de Chimie;* and to the *Traité de l'Electricité*, par Becquerel. Several isolated and interesting facts on the same subject will be found in the *Annals of Philosophy*, and the *Edinburgh Journal of Science*. See also GALVANISM.)

ELECTRO-DYNAMICS. In ordinary electricity, that fluid when developed takes a position of equilibrium, dependent on the conducting power of the medium on which it is disposed, on the non-conducting power of the medium by which it is enveloped, and on the law of force, whether of attraction or repulsion, between the elementary portions of electricty. The motions of electrised bodies are only results of the statical equilibrium of this fluid, and do not therefore belong to electro-dynamics. The mode of calculating such effects may be found under the head ELECTRICITY. These effects are moreover of the same nature whether the source of electricity be by means of friction, or by chemical action, as in the voltaic pile, the nature of the electricities in these cases differing from each other only in the mode of their production; but when the contrary, electricities are no sooner produced than re-combined, again reproduced and again re-combined, a new class of phænomena is produced belonging to electricity as it were in motion. Suppose, for example, that the plate A is a constant source of positive electricity, the plate B in like manner a constant source of negative electricity of equal intensity; that AC, BC are two conducting rods communicating with each; the electricities immediately combine when the conductors are made to touch at C, and for an instant the whole may be conceived to be in the neutral state, but A being the next instant replenished with positive and B with negative electricity, the same combination takes place over again, the same neutrality succeeds, and so on indefinitely. The rod ACB is in a different condition from one in its natural state, since electrical charges are continually pouring through it from A and B; and again it is in a different condition from an electrised rod, since we cannot at any moment say that it is charged positively rather than negatively. Hence we cannot infer that it should attract rather than repel an electrised ball D, since there is as much reason for one event as the other, and in point of fact we find that it neither will attract nor repel D. We have here a positive current of electricity issuing from A and a negative from B, and no effect of attraction or repulsion is produced on an electrised point as in statical electricity. How then is its state recognized? First by touch; for if we touch the rod ACB, a series of shocks is felt, the interval between two succeeding ones being inappreciable; and secondly, powerful chemical decomposition may be effected. [GALVANISM, ELECTRO-CHEMISTRY.] But thirdly, we may recognise it mechanically by presenting to AB another rod A'B' under exactly similar circumstances, when the effects of the currents in AB, A'B' will be recognized by the visible motions of the rods, provided they be free to move while their communication with the proper sources of electricity remains unbroken: for example, if their extremities be immersed in cups of mercury communicating with the constant sources of the positive and negative electricities. The laws of the mutual action of electrical currents constitute the science of electro-dynamics; and previous to its study it would be desirable that the reader should be acquainted with the construction and applications of the galvanic apparatus, the opposite poles of which afford the two constant sources A, B of electricity which we have supposed. These will be found under the head GALVANISM.

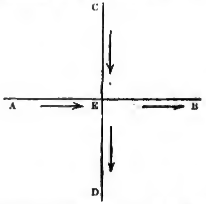




To discover the laws of the mutual actions of electrical currents we must have recourse to experiment. An apparatus similar to that employed by Ampère will be found in Professor Cumming's translation of Dumonferrand's treatise on this subject; together with a description of the mode of performing the various experiments by which these laws have become known. The term *direction of a current* is convenient when speaking of more than one; for instance, the zinc end of the pile being a constant source of positive electricity and the copper end of negative, a rod communicating with wires connected respectively with these extremities will have a current of positive electricity from the zinc to the copper, and a negative current in a contrary direction; but as it is simultaneously permeated by both, when we speak of the direction of a current we shall understand that of the positive current to avoid ambiguity.

Two parallel currents which are directed in the same way attract each other, but when directed in opposite ways, they repel.

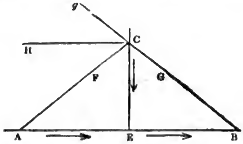
When rectilineal currents form mutually an angle, the species of action which they exercise may be thus defined 'Two portions of currents will attract if they are both approaching or both receding from the vertex of the angle which they form; but when one approaches and the other recedes from that angle, then they repel:' the same law holds in the limiting case of parallelism.



Let two currents cross each other, as AEB, CED, and suppose the directions of the currents to be those indicated by the arrows in the figure; then, according to this law, the force between CE, EB, is repulsive; and that between CE, EA, attractive; if, therefore, AB is fixed, and CED moveable, we ought to have CE tending towards AE, and for the same reason, DE tending towards EB; the rod CED, therefore, has a rotatory motion impressed on it until it is placed parallel with AB: this is confirmed by experiment.

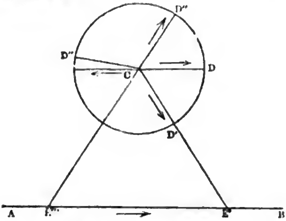
If we now consider two currents to form a very obtuse angle, one of them approaching, and the other receding from the vertex, we have repulsion; let the obtuse angle be increased to 180°, and in this extreme case the two currents merge into one: hence it follows that the consecutive parts of one and the same current exercise a mutual repulsion on each other.

The actions exercised by a rectilineal current and by a sinuous current, which have generally the same direction and are terminated at the same extremities, are equal, the intensity of action being supposed the same in both cases; thus, if we suspend a moveable conductor between a rectilineal and a sinuous conductor disposed so as to repel the first, this, after a little oscillation about its mean place, will finally rest in the middle of the interval between the conductors.



Let us now consider the action of an indefinite current AB, on a terminated current CE, which is directed towards E; the direction of AB being that indicated in the figure.

The portion BE of the indefinite current repels EC, in consequence of the contrary direction of the current in the latter. Let us represent this force in magnitude and direction by C*g* = CG; also AE attracts CE; the force may be represented by CF, similarly situated with CG; but C*g*, the repulsive force of BE, is drawn without the angle BEC; and CF, or the attractive force of AE, must be drawn within the angle AEC. If we now compound the forces CF, CG, they will manifestly produce a resultant CH parallel to the indefinite current AB. Hence the terminated current will be urged by a force parallel to the other, and in a contrary direction; and by similar reasoning it is easily seen that if the direction of the current CE were contrary to that indicated by the arrow, or receded from AB, then the whole force in CE would be in the same direction as the current AB, and parallel to it.



Let us suppose CD to be a conductor moveable round an axis at C in the plane DD′D″, and suppose the direction of its current to be from C towards D, and that of an indefinite conductor AB to be similar and parallel; then AB attracting OD will turn it round C into the position CD′, and the force on the angle CE′B is then repulsive, and in CE′A attractive; hence CD′ will further turn round, and the same direction of rotation will be continued in the upper semicircle; for the force is attractive in the angle D‴E‴B, and repulsive in D‴E‴A. Hence a continued rotation will be produced. This rotation will be in the contrary direction if we change the direction of the current either in AB or CD; or if, without changing the current, we transfer AB to the opposite side of CD: hence if AB be placed so as to meet the axis C, there will be no rotation; hence also if the terminated current be moveable round its middle point there will be no rotation, since both its halves tend to rotate in contrary ways. It is easy to analyse in the same manner the action of an indefinite conductor on a closed current by considering its action on each of the parts, the general effect being to bring the moveable conductor into a position of equilibrium in a plane parallel to the indefinite conductor.

Instead of a single closed circuit we may suppose any number of them connected together after an invariable manner. The action of an indefinite current will still tend to bring that system into a plane parallel to its direction These systems have been called electro-dynamic cylinders and also canals of currents.

In consequence of the electro-chemical causes which are so widely diffused through the globe, electrical currents are generated, which give its polarity to the magnet, and which, as is well known, are sufficient to generate continued rotation of given currents.

It has been found by Ampère that the actions of similar conductors on points similarly situated are equal; and that a closed conductor exercises no action on a circular conductor moveable round a central axis.

In seeking for the true laws of elementary action of currents, a decomposition similar to that of the parallelipiped of forces may be employed; that is, for the action of an elementary current we may substitute the actions of the three sides of a parallipiped terminated at the same extremities; for, as before stated, if we preserve the direction of the currents we shall not alter the action by substituting any sinuous for a plane conductor with the same extremities.

We will now show how the law of force between the elements of currents may be obtained, which, when once known, will reduce all the phænomena to mathematical calculation.

To determine the law of force tending to or from any element of an electrical current, when points of another current are taken at different distances but in a given direction:—

Let ∂s, $\partial s'$ be the elements of two electrical currents, of which the intensities are i, i', their distance a unit, and f the force mutually exercised in the line forming their middle points; hence $f = ii'\ \partial s\ \partial s$.

Let $\partial\sigma\ \partial\sigma'$ be portions of similar currents to the former, but of which the linear dimensions are ν times as great, and since their mutual distance is also ν times as great; this force is diminished in proportion to some function of ν, as $\phi(\nu)$: hence $f' = ii'\ \partial\sigma.\ \partial\sigma'.\ \phi(\nu)$.

$$\text{Now } \partial\sigma = \nu\ \partial s \qquad \partial\sigma' = \nu\ \partial s'; \text{ therefore}$$
$$f' = ii'\ \nu^2\ \partial s\ \partial s'.\ \phi(\nu).$$

$$\text{Hence } \frac{f}{f'} = \frac{1}{\nu^2\phi(\nu)}$$

We should have the same proportions if, instead of elements, we took conductors of any lengths but still similar, for this is equivalent merely to integrating the above expressions after decomposing the forces in fixed directions: and since we have experimentally in this case $f = f'$, it follows that $\phi(\nu) = \frac{1}{\nu^2}$; that is, the law is the inverse square of the distance, as in statical electricity; but we must observe that the directions of the currents are here supposed to make given angles with the joining line ν.

The following theorems are taken from Mr. Murphy's 'Electricity,' to which we refer for the demonstrations, which are by no means difficult to persons a little acquainted with the differential and integral calculus.

Let a right line ν join the middles of the elements ∂s, $\partial s'$ of two currents, being inclined respectively to those elements at the angles θ, θ', the planes of which angles are mutually inclined at an angle ϕ, and let ρ, ρ' be the intensities of the currents; the mutual action of these two elements will then be represented in all cases by the formula

$$\frac{\rho\rho'\ \partial s\ \partial s'}{\nu^2}\left\{\sin\theta,\ \sin\theta'\cos\phi - \tfrac{1}{2}\cos\theta\cos\theta'\right\}$$
$$= \rho\rho'\ \partial s\ \partial s'.\ \genfrac{}{}{0pt}{}{-\frac{1}{2}}{\nu}\ \frac{d}{ds}\left(\genfrac{}{}{0pt}{}{-\frac{1}{2}}{\nu}\ \frac{dr}{ds'}\right)$$

Let R Θ, R_1 Θ_1 be the final values of ν and θ for any given current of which ∂s is an element, $\partial s'$ remaining as before; then the total action of this electrical current on the element ∂s in the direction of its length will be

$$\tfrac{1}{2}\ \rho\rho'\ \partial s'\left(\frac{\text{Cos}^2\ \Theta_1}{R_1} - \frac{\text{Cos}^2\ \Theta}{R}\right).$$

This may be easily deduced from the preceding formula.

Hence an indefinite current, for which R, R_1 are infinite, exerts no longitudinal action on $\delta s'$; only a normal force. This coincides with what has been before shown for the action of an indefinite current on a terminated conductor. The same property holds true for a closed current, since in this case $\theta = \theta_1$ $R = R_1$.

From hence it is easy to find the total action of a fixed current, or a moveable rectilineal current.

The action of a closed current, or an element of another current, which is turned in all possible positions round its middle point, lies in an invariable plane.

The mutual action of two small closed conductors, containing areas λ, λ', the centres of which are at a distance ν, exercise on each other a force directly as the plane areas, and inversely as the fourth power of the distance.

The action of a uniform canal of currents indefinitely extended in one way varies inversely as the square of the distance of its extremity from the element acted on, and directly as the sine of the angle which that distance forms with the element, and is in a direction perpendicular to the plane passing through the element and the extremity of the canal.

When two uniform and indefinite canals of currents act on each other, the canals being supposed terminated at one extremity only, the resultant is in the line joining their extremities, and the force is inversely as the square of this line: hence the action of finite canals may be easily estimated, as being the difference between two indefinite canals. With respect to the nature of the force, it will be attractive or repulsive as before described. The simplest mode of observing the actions of a canal of closed currents is by twisting a wire in the form of a helix having but small intervals between the successive convolutions, the action of each portion of the helix being then very nearly the same force as that of a portion of a circle or closed current.

Ampère imagined an ingenious manner of calculating the actions of any plane closed conductors. Conceive one such to be divided into an infinity of small compartments by right lines parallel to the rectangular axes of co-ordinates, and the periphery of each compartment to be traversed by currents, in the same manner as the whole curvilineal side which encloses the area; then it is easily seen that all the internal sides of the compartments, being traversed by two currents in opposite directions, will have no electro-dynamical action, and therefore the sole remaining current is that which circulates in the periphery of the given figure; but by this division into compartments we can calculate the mutual actions of the two closed conductors from the very simple law which we have already given for the action of small closed conductors on each other.

Voltaic conductors, of which the centres of gravity are supported, undergo terrestrial action, similar to that produced by a canal of currents. We should infer, by the position which the moveable conductor takes, that the direction of the terrestrial currents is nearly from east to west, having the north magnetic pole situated on their right.

Since the action of closed currents on an element of a conductor is perpendicular to that element, hence a straight conductor fixed at one extremity, and free to move in a horizontal plane, will receive a continued rotation from the influence of the currents of the earth; but if the conductor were supported by its centre of gravity, it would be brought by their action into a fixed plane, and an electro-dynamic cylinder would come into a position perpendicular to that plane.

All these results of theory are confirmed by experiments, and are shown in the lecture-rooms of gentlemen who profess this branch of science.

There are few works expressly on this subject beside those quoted, the subject being itself the most modern addition to the exact sciences.

ELECTRO-MAGNETISM. The first important discovery in point of time, which laid the foundation of this new science, was made by Professor Oersted of Copenhagen. By reference to the article ELECTRO-DYNAMICS it will be seen that when the wires which communicate with the poles of a galvanic battery are connected by a conductor or by being brought into contact with each other, the opposite electricities thus continually made to combine acquire a power of action on another conductor under similar circumstances, though latent with respect to common electrical action; but this discovery of Ampère was preceded by that of Oersted, who found that the electrical current thus generated acted upon a magnetised bar, and tended to turn it round as if exercising a tangential force. Before this time a connexion between electricity and magnetism had been suspected, or rather believed, by Franklin, Beccaria, and others, from the well-known circumstance that the poles of the compass-needle had been frequently reversed during thunder-storms, and that the same effect could be produced by electrical discharges. In most experiments which were then made these discharges were unnecessarily strong; but to Oersted's discovery, followed up as it has been by Ampère, Faraday, Barlow, Arago, &c., we must ascribe the source of those accurate data by which the actions of the earth on magnets, of magnets on each other, of conducting wires on magnets, and of the earth on conducting wires, are reducible to similar and simple principles of action.

When a magnetic needle is placed near a conducting wire in the plane of the magnetic meridian, and the battery is powerful, it is observed that the needle will turn round, placing itself at right angles to the direction of the current; the same effect, which we have seen in the preceding article, would be produced by the same conductor on a canal of currents. If we suppose that a man with his face turned to the needle is himself the conductor, with his feet at the positive pole, the north pole of the needle will turn towards his right. This must be understood as only meant to illustrate the direction of rotation.

In order to discover the law of action of a current on a magnetic element, Biot and Savart used a small magnetic needle, guarded from the agitations of the air, and having the action of terrestrial magnetism neutralized by a bar, thus subjected only to the immediate action of the conductor. Having acquired the position indicated by Oersted, the times of its small oscillations were observed, which we know by the principles of Dynamics must be inversely proportional, *cæteris paribus*, to the square root of the accelerating force impressed. By observing the times in which, for instance, ten oscillations of the needle took place, at different distances, it was deduced, without difficulty, that the electro-magnetic force exercised by the whole conductor was inversely as the distance of the needle from the conductor: this of course supposes that the current may be regarded as indefinite, compared with the dimensions of the needle. Hence it easily followed, as was shown by Laplace, that the force exercised by each element of the conductor on the magnetic needle must, like all known forces, vary inversely as the square of the distance; and Biot showed that, when the distance was given, the force was then proportional to the sine of the angle formed by each element of the current with the right line joining the middle of that element with the middle of the needle.

It has been shown by means of the multiplier that the electrical intensity of the current at different points of the same conductor is constant. We may observe that the principle of the multiplier consists in bending the wire in the form of a helix, but returning upon itself so as to form a closed circuit, the wire being covered with silk to prevent communication at the crossings; the action of such a spiral being similar to that of closed circular currents equal in number to the spiral convolutions.

It was afterwards found that the magnetic needle of the multiplier could be acted on by electrical discharges from a Leyden jar; and Mr. Faraday showed conclusively that, with the condition of time, ordinary electricity can produce a continued deviation of the needle; this condition he fulfilled by making the electricity pass through imperfect conductors.

Arago observed that small fragments of soft iron were attracted by the conductor of the galvanic pile, and the same current imparted permanent magnetism to small needles of steel. The needle should be placed perpendicularly to the joining wire or current, or, which is better, be introduced in a helix, the discharge of the current through which instantaneously magnetises the needle.

Nobili observed that needles placed between the isolated spires of a plane spiral of copper wire were, by an electrical discharge, magnetised in opposite ways, when near the centre and when near the circumference. Savary also observed that when needles were placed horizontally with their middle points vertical over a horizontal current and the needles perpendicular to the direction of the current, they were differently magnetised according to their distances. These experiments he has varied relatively to the length of the needles, the length and diameter of the conductor, &c.

The magnetising force of the current is transmitted without sensible loss through isolating media, as glass, wood, &c., but is much altered by the interposition of conducting plates, a result similar to the development of ordinary electricity by the influence of electrised bodies. Thus —

A large plate interposed between the conductor and the needles weakens the magnetising effect of feeble discharges, while it augments strong ones; and for a given charge, a thin and a broad interposed conducting plate may produce contrary effects, and with a certain determinate breadth the effect would be unaltered, and in general the two surfaces of the same plate exercise contrary actions. (Savary.)

When a bar of soft iron, bent in a horse-shoe shape, is encompassed by a helix covered with silk and always turned in the same way, it may be made to receive a powerful magnetism under the influence of a current through the helix discharged from a voltaic battery. Mr. Watkins has made some valuable experiments on the conservation of the magnetic power in soft iron, for which see *Phil. Trans.*, 1833.

The discovery of the currents produced by volta-electric induction is due to Mr. Faraday. With about 203 feet of copper wire he formed each of two helices, and twisted them about a cylinder of wood, making one in communication with a galvanometer and the other with a powerful voltaic pile. The moment the communication was established, the galvanometer deviated; then, after some oscillations, returned to its place, and again deviated the instant this communication was broken: hence the directions of the inducing and induced currents are contrary, while that generated at the interruption of communication or cessation of the inducing current is directed the same way with the latter.

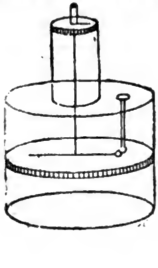
The same philosopher has also succeeded in producing currents by the influence of magnets, his experiments with the great magnets of the Royal Society proving most manifestly the disengagement of electricity by the influence of ordinary magnetism. The extraction of the electrical spark from the magnet is now pretty generally exhibited, as also the continued rotations produced by terrestrial magnetism. The theory of Ampère, which supposes electrical currents to exist round the component particles of magnetised substances, and round the mass of the earth, is perhaps the most satisfactory explanation yet given of the cause of magnetic action, and has been greatly strengthened by the discoveries of Faraday on electro-magnetic induction, by which many objections that had been urged against this theory are removed.

This branch of science is daily receiving constant accessions, and it is gratifying that much of its progress is eminently due to our countrymen. The labours of the French and German philosophers have also been far from unfruitful.

The following works may be consulted on this subject: Gilbert's *Annalen*; *Memoirs* by Erman of Berlin, Prechtl, Hansteen, &c.; and in *Poggendorf* the papers by Seebeck, Kupffer, &c.; the recent volumes of the *Philosophical Transactions*, containing Faraday's *Researches*, Professor Cumming's *Electro-Dynamics*, and his papers in the *Annals of Philosophy*; Barlow's labours described by himself in an article of the *Encyclopædia Metropolitana*, &c.

ELECTRO'METER. This term strictly applies only to instruments adapted to measure electricity; it has however been applied in a more extended sense to those which only indicate the presence of that fluid; but these are more correctly denominated electroscopes.

Of the former kind is the Balance of Torsion invented by Coulomb, to which we have had occasion to refer in the articles Elasticity and Electricity. The following is a description of this delicate instrument.



A very fine metallic wire, or, which is better, a single thread of silk taken from the cocoon, is fixed at the upper extremity, and at the lower it supports horizontally a fine needle made of a good non-conducting substance, as gum lac, to one of the ends of which is attached the body to be electrised, as for instance a small ball of elder-pith; at the top of the suspended string there is placed a plate moveable with friction on a glass cylinder, in which the thread is contained, by which any requisite torsion may be given to the thread, which is shewn by an index on a micrometer screw; the body of the large cylinder which encloses the needle is also surmounted with a graduated brass circle. In electrical experiments the index of the micrometer is on its division zero, and the plate is turned round to bring the needle and pith-ball to the zero of the graduated circle on the string. Again a second ball is attached to the extremity of a fine isolating cylinder inserted in the apparatus so that both balls may be in contact without pressure. The balls are then electrised by communication with some isolated and electrised body, and acquiring similar electricities repulsion immediately takes place. That attached to the needle being moveable with it, carries it round through a certain angle, and after some oscillations settles at a definite position with respect to the fixed ball, this angle being indicated by the graduated arc; the elastic force of torsion is then in equilibrium with the moving force of repulsion between the balls, and hence a measure of the latter can be obtained. In such experiments only a very small electrical charge is communicated to the balls.

Coulomb, in seeking the law of electrical action, found that in the first instance of his experiment the needle deviated by 36°. Then, communicating a torsion to the thread in a direction tending to diminish this deviation, he found that the micrometer index traversed 126° to reduce the angle of deviation to 18°, and 567° of torsion was necessary to bring it to 8½°; the thread being twisted by forces applied at both ends it is evident that the entire torsions in the two latter cases are $126° + 18° = 144°$ and $567 + 8\frac{1}{2} = 575\frac{1}{2}°$, while in the first case it is only 36°. By comparing the deviations with the torsions, it was easily seen that the force of repulsion varied inversely as the square of the distance between the balls. It should be remembered in such experiments that if the torsion of the thread be too great, its elasticity will act imperfectly, and be no longer proportional to the angle of torsion. [Elasticity.]

In like manner the law of attraction of differently electrised balls was ascertained, the torsion being then employed in resisting the attraction. We may observe here that the results thus deduced are necessarily approximative, and not exact, because the neutral electricity of the balls being partly decomposed by the mutual influence of the electricities communicated, the small forces thus arising interfere with the actions which should be due to the latter only. The attractive and repulsive forces may also be estimated by disturbing the needle a little from its position of equilibrium, and observing the number of oscillations which it makes in a given time, as was adopted by Biot in determining the law of electro-magnetic action of a galvanic current.

The proof-plane also used by Coulomb was merely a small disc of gilt paper fastened to an isolating handle; this he employed to discover the distribution of electricity on the surfaces of bodies by touching them with the plane at various points, and observing by means of the torsion-balance the quantity of electricity taken up by contact, which he assumed to be proportional to the quantity of electricity at the point touched. Mr. S. Harris has lately thrown doubt on the exactness of this assumption.

Various instruments have been constructed for estimating approximatively the total quantity of electricity in the charge of an electrised body, such as Lane's, Henley's, and Cuthbertson's electrometers. The most precise instrument of this description is one recently invented by Mr. Harris, who is always distinguished by the beautiful precision of his experiments: its description will be found in his paper on electricity in the 'Philosophical Transactions.'

Electroscopes indicate the presence of very small quantities of electricity, and therefore are generally used with a condenser; as the gold-leaf electroscope, consisting of two small portions of gold-leaf laid flat together; and when made to communicate by a conducting stem, with a condenser which has acquired electricity from a very feeble source, they diverge from each other. They have been also employed to indicate atmospheric electricity. [METEOROLOGY.]

Similar instruments have been constructed for the purpose of indicating the existence of electrical currents of but slight intensity, such for instance as those generated by inequality of temperature. [GALVANOMETER and THERMO-ELECTRICITY.]

ELECTRUM, from the Greek *electron* (ἤλεκτρον). Pliny says this term denotes two substances, namely, amber and a metallic alloy composed of four parts of gold and one part of silver. 'Ubicumque quinta argenti portio est *electrum* vocatur.' (*Hist. Nat.*, lib. xxxiii., section 23; *Hardouin*, tom. ii., p. 619.) The term electron, in the Odyssey of Homer, is supposed to mean amber.

The metallic electrum was in use in the Roman times: it is uncertain whether it was known to the Greeks. The Romans were partial to it for its brilliancy. Pliny, a few sentences lower down than the passage just quoted, says, 'Electri natura est ad Lucernarum lumina clarius argento splendere.' The Romans used it frequently for what we term plate.

Lampridius, in his Life of Alexander Severus, remarks, that this prince caused coins to be struck in honour of Alexander the Great, both of electrum and gold. 'Alexandri habitu nummos plurimos figuravit: et quidem electreos aliquantos: sed plurimos tamen aureos.' (*Hist. Aug. Scriptores*, p. 922.)

Isidorus, in his Origines (li. xvi., c. 23), speaks of three sorts of electrum:—1, amber; 2, a metal so called, found in a natural state; and 3, a metal compounded of three parts of gold and one of silver.

ELECTUARY, a term applied to a compound of various medicines, united by means of syrup, or wine, and formed into a soft mass, nearly of the consistence of honey. Substances in the state of powder or extract were thus combined, and rendered capable of being swallowed without their natural taste, which might be unpleasant, being perceived. Formerly electuaries consisted of a great variety of ingredients, often very unsuitable to be taken together. In the present day the few electuaries which are prescribed are much simpler in their composition. Many compounds which were formerly preserved in a soft state are now kept in a hard dry condition, and termed *confections*.

ELEDO'NE. [CEPHALOPODA; SEPIADÆ.]

ELE'GIT, so called from the entry of its award upon the roll, 'quod elegit sibi executionem' (because the plaintiff hath chosen the writ of execution), is a writ of execution given by the statute 13th Edw. I., cap. 18, to parties recovering upon judgments for debt or damages, or upon the forfeiture of a recognizance in the king's courts. It is directed to the sheriff of the county where the defendant's property lies, commanding him to make delivery of a moiety of the debtor's lands and all his goods (except oxen and beasts of the plough) to the plaintiff.

The sheriff, immediately upon the receipt of this writ, empanels a jury, who appraise the debtor's lands as well as his goods, and if the goods alone are insufficient to pay the debt, then the sheriff, upon the finding of the jury, sets out one-half of the lands by metes and bounds, and delivers them over to the party suing out the writ, who thereupon becomes what in law is termed a *tenant by elegit*, and continues to occupy them until the whole of his debt and damages are satisfied. The tenant's interest in the land is only a chattel, and as such goes to his personal representatives.

In like manner every subsequent judgment creditor takes a moiety of what is left; the last moiety being reserved according to the feudal law for the lord to distrain for his services.

Previously to the passing of the statute above referred to, a judgment creditor could only have obtained satisfaction of his debtor's goods by the writ of *fieri facias*, and of the present profits of his lands by a *levari facias*; but as the latter writ did not extend to the possession of the lands themselves, a defendant might, if he thought proper, alien the property, and thus oust the plaintiff of his remedy.

Copyhold lands are not liable to be extended under an elegit; but all estates in fee-simple in possession, all estates in reversion, expectation, leases for lives or years (in which case the creditor takes half the rents), an estate tail during the life of the tenant in tail, who is the debtor, a rent charge, and a term of years, are liable to an elegit.

When the judgment is satisfied out of the extended, that is, estimated value of the estate, the defendant may recover his lands either by an action of ejectment, or by a suit in equity. If the lands are recovered by ejectment, the plaintiff only accounts for the extended value of the land, which is usually below the real value; and he is not entitled to any interest on his judgment. If, on the other hand, a bill in equity is filed, the plaintiff is allowed interest, and accounts not merely for the extended value, but for the actual profits of the lands during his possession, and it is referred to a master of the Court of Chancery to ascertain the exact amount of such profits. (Reeves's *History of the English Law;* Archbold's *Practice.*)

ELEGY, from the Greek, *élegos* (ἔλεγος, whence ἐλεγεῖον), in English commonly means a short poem composed on some person's death; also, in a more general sense, any mournful or serious poem, as, for instance, Gray's 'Elegy in a Country Church-yard.' The Greek word, *élegos*, is properly a strain of lament; *elegeion*, the form of versification in which such strains were first composed by the Greeks; *i. e.*, the combination of an hexameter and a pentameter (commonly called long and short) verse; *elegeia*, a poem made up of such verses. (Müller, *Hist. of Lit. of Greece.*) The elegiac was the first variation from the hexametral, or epic, measure; and this change of form corresponded with a change of subject: the poet in epic composition keeping himself and the workings of his own mind out of sight; while, on the contrary, the free and full expression of the poet's feelings, as affected by external circumstances, constituted the essence of the Greek elegy. Hence arises its variety; the elegies of Callinus and Tyrtæus (the earliest) being political and warlike; of Mimnermus, contemplative and melancholy; of Theognis and Solon, moral and political, &c. It was at first more peculiarly appropriated to social meetings, and therefore equally fit for topics of political and local interest, and for those which refer to the common feelings of our nature, as love, regret for the perishableness of human things, exhortations to the enjoyment of the present hour, and the like. The elegiac was also a favourite measure for epigrams, that is, taking the word in its proper sense, inscriptions. [EPIGRAM.]

Catullus is the first Latin elegiac writer of any note; he was followed by Tibullus, Propertius, and Ovid, with many others of the Augustan age, whose poems are either totally lost, or have only come down to us in fragments. With them political and moral subjects find no place; the elegiac verses of Catullus (a small part of his poems) are, for the most part, either mournful or satirical; those of the other poets above named are chiefly devoted to love, fortunate and unfortunate. Ovid, however, has taken a wider scope of personal feelings in his Epistles from Pontus, and of historical and mythological learning in his Fasti.

ELEMI, a resin, of which there are two or more sorts, brought from different parts of the world, and apparently produced by different kinds of trees. The West Indian or American elemi is commonly referred to the Amyris elemifera (Linn.), but the very existence of such a species is doubtful, unless it be synonymous with the Amyris Plumieri. (Dec.) The East Indian elemi is obtained from the Amyris zeylanica (Retz.), while a third sort, called African, or elemi verum, is referred to the Eleagnus hortensis. A substance resembling elemi, and capable of being applied to similar purposes, may be procured from several plants. West Indian elemi occurs in irregular-shaped small pieces, which run into masses, of a yellowish colour, of an agreeable odour, which is most perfectly developed by the application of heat. The consistence is at first soft, but it hardens with age, and even becomes brittle, losing some of its odour. Specific gravity 1.083. It seems to contain a principle termed Elemine. Elemi is recommended as an ointment, but it is chiefly used to form pastilles, or to burn as incense.

ELEMENTARY ORGANS, in plants, are those minute internal parts out of which all the visible organs are constructed; they are always too small to be seen without the assistance of the microscope, and often require very high magnifying powers to be distinctly observed. When of a spheroidal figure 5000 of them have been sometimes computed to lie in half a square inch; and when tubular they are often not more than $\frac{1}{1000}$ of an inch in diameter; their size is however extremely variable, and their magnitudes are given only to convey an idea of their smallness.

These organs may be defined to be closed, transparent, thin-sided membranous sacs, varying in form according to the part of the plant in which they are placed, and the purpose they serve.

If for the conveyance of fluid matter equally in all directions, and for the general purposes of digestion and respiration, they have a spheroidal figure shaped into a polygon by the pressure of the sacs upon each other, and constitute *common cellular tissue;* if fluid is to be conveyed more in one direction than another the spheroids are lengthened in that direction, and *prismatical cellular tissue* is the result, or *muriform* if they are placed horizontally and strongly compressed from the side; sometimes instead of being prismatical they are lengthened into bags acute at each end, the *clostres* of some French botanists, and the tissue thus formed is named *prosenchyma,* in contradistinction to *parenchyma,* which is a collective name for all cellular tissue the ends of whose sacs are truncated. Now and then a fibre is generated spirally in the inside of a sac of cellular tissue, but for what purpose is unknown.

If the elementary organs are for the conveyance of air they are lengthened into tubes, the sides of which are protected in the inside by a fibre, or fibres twisted spirally, so that the threads touch each other, thus forming a lining to the membrane and preventing the ingress of fluid through the sides. Such organs are called *spiral vessels,* and are exclusively (except in a very few cases) stationed around the pith of exogens, in the woody bundles of endogens, and in the veins of the leaves and of all the parts of the flower. They unrol with elasticity when stretched; and even uncoil with the growth of the membranous tube in which they have been generated so as to leave spaces between the threads through which fluid percolates; they then become *ducts,* and probably cease to convey air, but become passages for fluid.

If they are required to serve the two purposes at once of conveying fluid along the plant and of strengthening and protecting the parts in which they are placed, the sacs become fine tubes, thick-sided, elastic, tough, and collected in bundles so as to bend any way without breaking; this occurs in wood, which is composed principally of them, and which gives them the name of *woody tissue,* in the liber, and in the veins of the leaves where they are placed around the spiral vessels.

For an explanation of the many varieties of the elementary organs, and for a more particular account of their nature and uses, see Lindley's *Introduction to Botany,* 2nd edit., book i.

ELENCHUS, the Latin form of the Greek *elenchos* (ἔλεγχος), and commonly translated by the words *argumentum, inquisitio, confutatio,* and *demonstratio,* is a term of frequent use in the Aristotelian system of logic, and signifies argument, replication, refutation, or the point, subject, or nature, of dispute or demonstration. (See the authorities cited in Valpy's edition of Stephens's Greek Thesaurus under Ἐλέγχω.) Aristotle defines *elenchos* as 'a syllogism of contradiction,' that is, an argument alleged in opposition to another; and Mr. Thomas Taylor, in his translation of the Organon, considers the Greek term to be precisely equivalent to *Redargutio* in Latin. By some of the early English authors the noun *elench* is used in a similar sense, and also the verb *elenchize,* meaning to argue with captious or sophistical opposition. (Johnson's *Dict.*) In the two last books of the Organon, entitled Περὶ τῶν Σοφιστικῶν Ἐλέγχων, Aristotle minutely classifies and discusses the various kinds of sophistical elenchi, or modes of argument used by contentious sophists. The sophism which, in scholastic phraseology, is designated *Ignoratio elenchi,* that is, a real ignorance of, a mistaking, or sinister deviation from, the argument, or question under discussion, consists in proving something irrelevant, and which, as it may be true without affecting the truth of the real proposition, with which it has no necessary connexion, does not determine, though it may seem to determine, the question. Aristotle includes under this designation the introduction of anything extraneous to the point in dispute (ἔξω τοῦ πράγματος); the disproving of what is not asserted, as well as the proving of what is not denied. Examples of this species of sophism are of very frequent occurrence in discourses which display the rhetorical artifice of appealing to passions and prejudices, and resort to injurious imputations, or ludicrous and satirical illustration; especially in religious, political, and forensic disputations, which affect individual interests and feelings, and in which the predominant desire is not the exhibition of truth, but merely the obtaining of victory; for a disingenuous disputant when excited, and conscious of the superiority of his adversary's argument, strives to elude conviction by the stratagem of *deploying,* and seeks to gain a sinister advantage and triumph, by proving or disproving, not the real proposition in question, but one or more which in some way are apparently involved or implied, so as to create the assumption of identity. The following instance is given by Dr. Kirwan (*Essay on Logic,* vol. ii., p. 440): 'Paschal arguing against atheism insists that it is *more dangerous* than theism, whereas the point in debate is the *truth,* and not the *prudence* of either system. Some Christian sects use similar arguments. Mistake or misrepresentation of the question to be determined, and the consequent proving of what is not to the purpose, are also common in didactic and conversational discussions, and the sophisms of *Petitio principii* and *non causa pro causa* are frequently combined with the *Ignoratio elenchi.* In all cases of irrelevant conclusion, when something is proved which does not in reality contradict the adversary's proposition, the latent fallacy is best exposed by showing that both propositions may be equally true (Archbishop Whateley's *Logic,* p. 235, 5th ed. 1834); and the best means of preventing sophistical deception of this nature is to keep the attention constantly fixed upon the precise point of dispute, neither wandering ourselves, nor suffering our opponent to wander or make any substitution. (Dr. Watts's *Logic.*) In dramatical writing the *Ignoratio elenchi,* or as it is otherwise called, the *quid pro quo,* is frequently adopted as a very effective expedient for the production of laughter. Numerous and long continued instances of consistent dialogue, displaying the most ingenious and amusing *équivoque* or cross-purposes, are to be found in the comedies of Molière, the source of amusement being in each party's 'ignorance of the question' about which the other is concerned.

ELEPHANT, in Latin *Elephas* and *Elephantus;* in Greek ἐλέφας; in Spanish *Elephante;* in Italian *Elefante,* in French *Elephant;* in German *Olyphant;* the name of the well-known genus which forms the only living type of the family of *true Proboscidians* or Pachydermatous Mammifers, with a proboscis and tusks, and presents the largest of existing terrestrial animals.

The *proboscis* or *trunk,* from which the name of the family is derived, demands some attention previous to our inquiry into the rest of the structure, habits, and history of the elephants.

The great size of the alveoli necessary for the lodgment of the tusks renders, as Cuvier observes, the upper jaw so high and shortens the nasal bones to such a degree, that in the skeleton the nostrils are placed towards the upper part of the face; but in the living animal they are prolonged into a cylindrical trunk or proboscis composed of thousands* of small muscles variously interlaced, so as to bestow on it the most complicated powers of mobility in all the varieties of extension, contraction, and motion in every direction. It is of a tapering subconical form, and has internally two perforations. On the upper side of the extremity, immediately above the partition of the nostrils, is an elongated process, which may be considered as a finger; and on the under edge is a sort of tubercle, which acts as an opposable point; in short, as a thumb. Endowed with exquisite sensibility, nearly 8 ft. in length, and stout in proportion to the massive size of the whole animal, this organ, at the volition of the elephant, will uproot trees or gather grass—raise a piece of artillery or pick up a comfit—kill a man or brush off a fly. It conveys the food to the mouth and pumps up the enormous draughts of water, which by its recurvature are turned into and driven down the capacious throat, or showered over the body. Its length supplies the place of a long neck, which would have been incompatible with the support of the large head and weighty tusks. A glance at the head of an elephant will show the thickness and strength of the trunk at its insertion; and the massy arched bones of the face and thick muscular neck are admirably adapted for supporting and working this powerful and wonderful instrument.

The following cuts will convey some idea of the form and action of the termination of the proboscis:—

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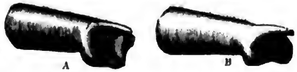
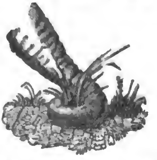
* Cuvier gives the number of muscles having the power of distinct action as not far short of 40,000.

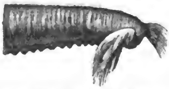
Anterior termination of elephant's trunk (profile).



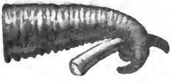
Anterior extremities of the trunks of male (A) and female elephants (B).



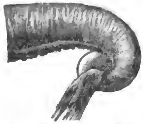
Action of anterior extremity of proboscis in gathering long herbage.



Mode of holding herbage when gathered.



Mode of holding a root till enough is collected for a mouthful.



Curled action, when a powerful grasp and much force is required.

Dental Formula.—African elephant, incisors $\frac{2}{0}$, molars $\frac{4}{4}=10$. Asiatic elephant, incisors $\frac{2}{0}$, molars $\frac{2}{2}=6$.

Dentition and osseous Structure.—The succession of *molar teeth* in the elephants takes place in a direction from behind forwards; and the tooth last developed pushing against that which preceded it, and in time replacing it, gives as a result that there are never more than two molar teeth on each side of each jaw, and that sometimes there is only one. The last case happens immediately after the shedding of the anterior tooth, which has been pushed out by its successor, and which, in its turn, is to be replaced in like manner. This succession happens many times during the life of the animal, and Mr. Corse noticed it eight times in an Asiatic elephant. Now, as these teeth show their anterior extremity first, long before the other extremity appears, and as they begin to be worn down anteriorly, it follows that the anterior tooth, when it is shed, is infinitely smaller in size than it once was, and that its form is entirely changed.

In the molar teeth of most graminivorous quadrupeds there is, besides the bony substance and enamel, a third component part, differing in appearance from both the others, but resembling the bone more than the enamel. Blake and others have distinguished this substance by the name of *crusta petrosa;* Cuvier calls it *cement.* The distinction of these three substances is, perhaps, better seen in the molar tooth of an elephant than in any other animal. If a longitudinal vertical section be made and the surface be polished, the *crusta petrosa* will be distinguished by a greater yellowness and opacity, as well as by a uniformity of appearance, there being no apparent laminæ nor fibres. 'The grinding teeth of the elephant,' writes Lawrence in his 'Additions' to Blumenbach, 'contain the most complete intermixture of these three substances, and have a greater proportion of *crusta petrosa* than those of any other animal. The pulp forms a number of broad flat processes lying parallel to each other, and placed transversely between the inner and outer laminæ of the alveoli. The bone of the tooth is formed on these in separate shells, commencing at their loose extremities and extending towards the basis, where they are connected together. The capsule sends an equal number of membranous productions, which first cover the bony shells with enamel and then invest them with *crusta petrosa,* which latter substance unites and consolidates the different portions. The bony shells vary in number from four to twenty-three, according to the size of the tooth and the age of the animal, they have been described under the name of denticuli, and have been represented as separate teeth in the first instance. It must, however, be remembered that they are formed on processes of one single pulp. When the *crusta petrosa* is completely deposited, the different denticuli are consolidated together. The bony shells are united at the base to the neighbouring ones; the investments of enamel are joined in like manner; and the intervals are filled with the third substance, which really deserves the name bestowed on it by Cuvier of *cement.* The pulp is then elongated for the purpose of forming the roots or fangs of the tooth. From the peculiar mode of dentition of this animal, the front portion of the tooth has cut the gum and is employed in mastication before the back part is completely formed; even before some of the posterior denticuli have been consolidated. The back of the tooth does not appear in the mouth until the anterior part has been worn down even to the fang. A horizontal section of the elephant's tooth presents a series of narrow bands of bone of the tooth, surrounded by corresponding portions of enamel. Between these are portions of crusta petrosa; and the whole circumference of the section is composed of a thick layer of the same substance. A vertical section in the longitudinal direction exhibits the processes of bone upon the different denticuli, running up from the fangs; a vertical layer of enamel is placed before and another behind each of these. If the tooth is not yet worn by mastication, the two layers of enamel are continuous at the part where the bone terminates in a point; and the front layer of one denticulus is continuous with the back layer of the succeeding one, at the root of the tooth. Crusta petrosa intervenes between the ascending and descending portions of the enamel. As the surface of the tooth is worn down in mastication, the processes of enamel, resisting by their superior hardness, form prominent ridges on the grinding surface, which must adapt it excellently for bruising and comminuting any hard substance. The grinding bases, when worn sufficiently to expose the enamel, in the Asiatic species, represent flattened ovals placed across the tooth. In the African they form a series of lozenges, which touch each other in the middle of the tooth.' In the Museum of the Royal College of Surgeons are a series of preparations (Nos. 350 to 354, both inclusive) illustrative of the structure and physiology of the molar teeth of elephants, preceded by an interesting extract from the Hunterian MS. catalogue. No. 375 B. is a portion of the cæmentum of an elephant's grinder, which has been steeped in an acid, dried, and preserved in oil of turpentine, for the purpose of showing the proportion of animal matter which it contains.

Nos. 262 to 264, both inclusive, show the interarticular ligamentous substance from the joint of the lower jaw of the elephant, and the adaptation of the structure for applying two convex surfaces to each other.

More than one molar tooth and part of another are never to be seen through the gum in the elephant. When the anterior tooth is gradually worn away by mastication, the absorption of its fangs and alveolus takes place, while the posterior tooth advances to occupy its position; then comes a third to take the place of the second tooth, which undergoes the same process, and so on as we have stated for at least eight times. Each succeeding tooth is larger than its predecessor. Thus the first or milk grinder, which cuts the gum soon after birth, has but four transverse plates (denticuli); the second is composed of eight or nine, and appears completely when the animal is two years old; the third consists of twelve or thirteen, and comes at the age of six years; and in the fourth up to the eighth grinder both inclusive, the number of plates varies from fifteen to twenty-three. It would seem that every new tooth takes at least a year more for its formation than its predecessor. As the tooth advances gradually, a comparatively small portion only is through the gum at once. A molar tooth, composed of twelve or fourteen plates, shows only two or three of these through the gum, the others being imbedded in the jaw, and in fact the tooth is complete anteriorly, where it is required for mastication, while, posteriorly it is very incomplete. As the laminæ advance, they are successively perfected. An elephant's molar tooth is therefore never to be seen in a perfect state; for if it is not worn at all anteriorly, the posterior part is not formed, and the fangs are wanting; nor is the structure of the back part of the tooth perfected until the anterior portion is gone.

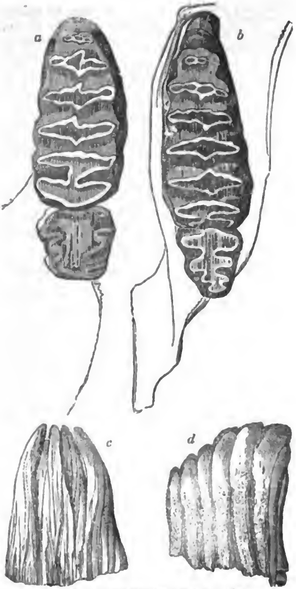
Elephants have no canine teeth; but in the upper jaw there are two incisors better known by the name of *tusks*. These enormous weapons are round, arched, and terminating in a point, and their capsule is always free, so that the tusk continues to grow as long as the animal lives. The structure of the ivory of which it is composed differs from other tusks; and a transverse section presents striæ forming the arc of a circle from the centre to the circumference, and, in crossing each other, curvilinear lozenges which occupy the whole surface. The tusk is hollow within for a great part of its length, and the cavity contains a vascular pulp, which supplies successive layers internally as the tusk is worn down externally. Blumenbach, in his 'Comparative Anatomy,' observes, that not to mention other peculiarities of ivory, which have induced some modern naturalists to consider it as a species of horn, the difference between its structure and that of the bone of teeth is evinced in the remarkable pathological phenomenon resulting from balls, with which the animal has been shot when young, being found, on sawing through the tooth, imbedded in its substance in a peculiar manner. Haller employed this fact, both to refute Duhamel's opinion of the formation of bones by the periosteum, like that of wood by the bark of a tree, as well as to prove the constant renovation of the hard parts of the animal machine. It is still more important in explanation of that '*nutritio ultra vasa*,' which is particularly known through the Petersburgh prize dissertation. Blumenbach further states that the fact above mentioned may be seen in Buffon (4to. ed., tom. xi., p. 161); in Galandat *over de Olyphants Tanden;* in the Verhandelingen der Genootsch, te Vlissingen, p. 352, tom. ix.; and in Bonn. *descr. thesauri Hoviani*, p. 146. In all these cases, according to Blumenbach, the balls were of iron; and he adds that he possesses a similar specimen. In the cases we have seen the balls were also of iron. 'But,' continues Blumenbach, 'there is a still more curious example in my collection, of a leaden bullet contained in the tusk of an East Indian elephant, which must have been equal in size to a man's thigh, without having been flattened. It lies close to the cavity of the tooth; its entrance from without is closed, as it were, by means of a cicatrix; and the ball itself is surrounded apparently by a peculiar covering. The bony matter has been poured out on the side of the cavity in a stalactitic form.' Upon this Lawrence well remarks that the facts here recounted have been sometimes brought forward in order to prove the vascularity of the teeth; a doctrine which is refuted by every circumstance in the formation, structure, and diseases of these organs. When a bullet has entered the substance of the body, the surrounding lacerated and contused parts do not grow to the metal and become firmly attached to its surface, but they inflame and suppurate in order to get rid of the offending matter. If the ivory be vascular, asks Mr. Lawrence, why do not the same processes take place in it? 'We can explain very satisfactorily,' writes Mr. Lawrence in continuation, 'how a bullet may enter the tusk of an elephant, and become imbedded in the ivory without any opening for its admission being perceptible. These tusks are constantly growing during the animal's life by a deposition of successive laminæ within the cavity, while the outer surface and the point are gradually worn away; and the cavity is filled for this purpose with a vascular pulp, similar to that on which teeth are originally formed. If a ball penetrate the side of a tusk, cross its cavity, and lodge in the slightest way on the opposite side, it will become covered towards the cavity by the newly-deposited layers of ivory, while no opening will exist between it and the surface to account for its entrance. If it have only sufficient force to enter, it will probably sink by its own weight between the pulp and the tooth, until it rests at the bottom of the cavity. It there becomes surrounded by new layers of ivory; and as the tusk is gradually worn away and supplied by new depositions, it will soon be found in the centre of the solid part of the tooth. Lastly, a foreign body may enter the tusk from above, as the plate of bone which forms its socket is thin: if this descends to the lower part of the cavity, it may become imbedded by the subsequent formations of ivory. This must have happened in a case where a spear-head was found in an elephant's tooth. The long axis of the foreign body corresponded to that of the cavity. No opening for its admission could be discovered, and it is very clear that no human strength could drive such a body through the side of a tusk.' 'Phil. Trans.' 1801, part 1.

The great size to which these tusks grow may be judged of by examining the table published by Cuvier in his 'Ossemens Fossiles,' tome i., p. 57. It is generally considered that the tusks of the African elephant are the largest; but with regard to the table, Cuvier observes that the African tusks could not be distinguished from those of the Indies, and that there is not the certainty that could be wished in the measures employed. According to Mr. Corse, the tusks of the Indian elephant seldom exceed 72 lbs. in weight, and do not weigh beyond 50 lbs. in the province of Tiperah, which produces thousands of elephants. There are however, in London, tusks which weigh 150 lbs., probably from Pegue; for it is from Pegu and Cochin China that the largest Indian elephants and tusks are brought. The largest recorded in Cuvier's table was a tusk sold at Amsterdam, according to Klokner, which weighed 350 lbs.: this is stated on the authority of Camper; and one possessed by a merchant of Venice, which was 14 feet in length, and resting on the authority of Hartenfels, in his Elephantographia. The largest in the Paris Museum is nearly 7 feet long, and about 5¼ inches in diameter at the large end. These tusks have different degrees of curvature.

Mr. Corse, speaking of the Asiatic elephant, states that the first or milk tusks of an elephant never grow to any size, but are shed between the first and second year. These, as well as the first grinders, are named by the natives *dood-kau-daunt*, which literally signifies milk teeth. The tusks which are shed have a considerable part of the root or fang absorbed before this happens. The time at which the tusk cuts the gum seems to vary. Mr. Corse knew a young one which had his tusks when about five months old, while those of another did not cut the gum till he was seven months old. Those tusks, which are deciduous, observes the same author, are perfect and without any hollow at the root, in a fœtus which is come to its full time, and at this period the socket of the permanent tusk begins to be formed on the inner side of the deciduous tusk: he gives the following examples of the progress of this part of the dentition. A young elephant shed one of his milk tusks on the 6th of November, 1790, when near thirteen months old, and the other on the 27th of December, when about fourteen months old: they were merely two black-coloured stumps, when shed; but, two months afterwards, the permanent tusks cut the gum, and on the 19th of April, 1791, they were an inch long, but black and ragged at the ends. When they became longer and projected beyond the lip, they soon were worn smooth by the motion and friction of the trunk. Another young elephant did not shed his milk tusks till he was sixteen months old. The permanent tusks of the female are very small in comparison with those of the male, and do not take their rise so deep in the jaw; but they use them as weapons of offence in the same manner as the male named *Moaknah*, that is by putting their head above another elephant, and pressing their tusks down into the animal,

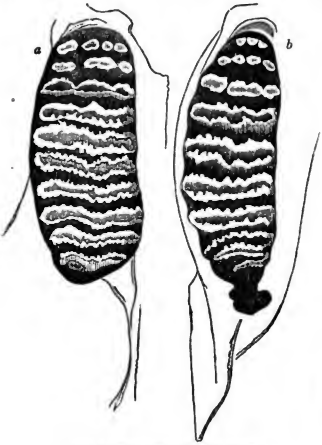
In the *lower jaw* there are neither incisors nor canines, and the molar teeth resemble those to which they are opposed.

Cuvier comes to the conclusion that the females of the African species have large tusks, and that the difference between the sexes in this respect is much less than in the Indian elephants; but Burchell attributes the want of success of the elephant hunters whom he met with to their having only fallen in with females whose tusks were small.



Teeth of African Elephant, from F. Cuvier.

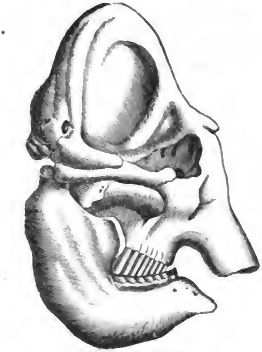
a, Upper jaw; *b*, lower jaw; *c*, original state of the tooth when the laminæ which compose it are free; *d*, the laminæ as they are attached in parallels one to the other by the cortical substance in a subsequent state of dentition, but before the crown of the tooth has been worn by mastication, and when it only presents on its surface blunt tubercles.



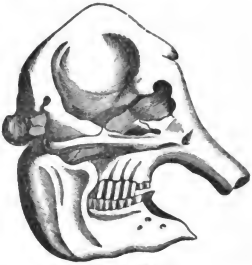
Teeth of Asiatic Elephant, from F. Cuvier.

a, Upper molar tooth; *b*, lower molar tooth.

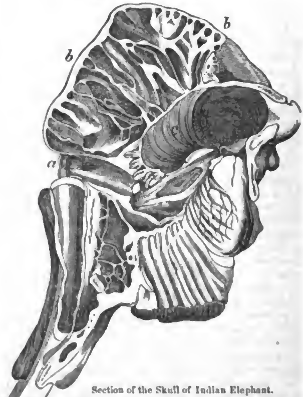
Pursuing our inquiry into the general structure of the *skeleton*, we shall find a marked difference in the external appearance of the *skulls* of the African and Indian species.



Skull of Indian Elephant.



Skull of African Elephant.



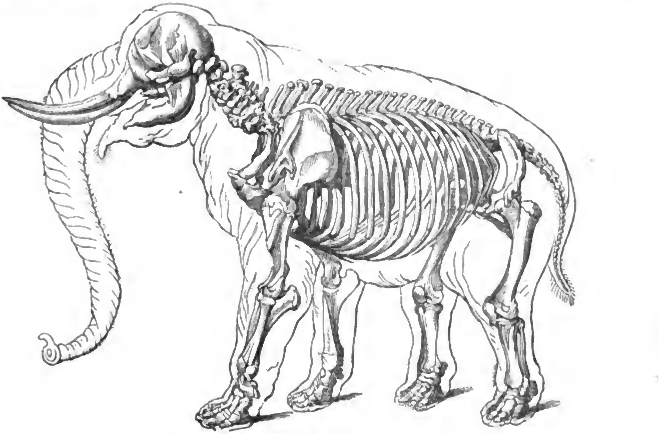
Section of the Skull of Indian Elephant.

a, shows the opening of the nostrils; *b*, the cellula sinus which separates the external from the internal tab. of the skull; *c*, the cavity where the brain is lodged.

Here we see that the almost pyramidical form of the skull in the Indian species is strongly contrasted with the more rounded form and contour of that of the African species. The front of the head is concave in the Indian species, while in the African it is rather convex; there are besides other differences.

Internally we find a beautiful provision for increasing the surface necessary for the attachment of muscles combined with strength and lightness.

The other parts of the skull most worthy of note are the nasal bones, of which the elephant possesses only a kind of imitation: the lachrymal bones are entirely wanting. The cervical vertebræ form a short and stiff series, allowing hardly more than a limited motion of the head from side to side, a more extended action being rendered unnecessary by the flexibility of the trunk, and a firm support for the head being the principal object to be attained. The spinous processes of the anterior dorsal vertebræ are exceedingly long for the attachment of the great suspensory ligament of the neck (*ligamentum nuchæ* or pax-wax). Blumenbach puts the number of ribs, and consequently of dorsal vertebræ, at 19 pairs, observing that this, at least, is the case in the skeleton of the Asiatic elephant at Cassel Blair, he remarks, found the same number in the individuals of which he has given an account; and a manuscript Italian description of the elephant which died at Florence in 1657 confirms this statement. Allen Moulins, on the contrary (*Anatomical Account of the Elephant burned in Dublin*, London, 1682, 4to.), and Daubenton, represent the number of pairs as 20. The elephant in the Museum of the Royal College of Surgeons (Chunee, formerly of Exeter Change) has 19 pairs of ribs; and that in the British Museum has the same number, 14 true and 5 false; but Mr. Gray informs us that, in a second specimen of a young one, the bones of which have not been separated, there are 20 pairs, 15 true and 5 false. There are only three lumbar vertebræ. The margin of the scapula, which is turned towards the spine, and is shortest in most of the proper quadrupeds, is the longest in the elephant, as it is in the *Cheiroptera*, most of the *Quadrumana*, and especially in man. There is no *ligamentum teres*, and consequently no impression on the head of the *femur* or thigh-bone.



Skeleton of Elephant.

Structure of internal soft parts.—The following internal soft parts are more particularly worthy of remark in the elephant. *Brain, &c.*—A portion of the *dura mater* from an Asiatic elephant may be seen in the Museum of the Royal College of Surgeons, in London (Gallery No. 1346), where the termination of the falx and the commencement of the tentorium or process which separates the cerebrum from the cerebellum are shown. The two fibrous layers of the dura mater are separated by a softer cellular substance, in which the vessels ramify; and it may be observed that the thickness of the dura mater is in proportion to the size of the skull, and of the entire animal, but not to the size of the brain, which does not much exceed that of the human brain, as will be seen in the preparation of the brain of a young Asiatic elephant (No. 1331). For though the absolute size of the organ exceeds that of man, the proportion which the cerebrum bears to the rest of the brain, and especially that part of the hemisphere which forms the roof and sides of the lateral ventricle, is much less. The hemispheres are broad and short, with a considerable development of the natiform protuberance. The convolutions are comparatively small and numerous. A lateral section has been removed from the left hemisphere, which shows that the anfractuosities are also deep, extending in some cases more than two-thirds of an inch into the substance of the brain. The hippocampus is comparatively smaller than in the ass, and the corpus striatum larger The ventricle is seen to be continued into the olfactory bulb. The cerebellum is of considerable width, and its surface, as shown by the lateral section, is increased by numerous and complex anfractuosities. The tuber annulare corresponds in size to the development of the lateral lobes of the cerebellum. The corpora olivaria are remarkably prominent. The origins of all the cerebral nerves are shown, among which the olfactory nerves of the fifth pair, which supplies the proboscis, are remarkable for their prodigious size; whilst the optic nerves, and those which supply the muscles of the eye, are remarkable for their small size. The *pia mater* is left on with the vessels at the base of the brain. A bristle is placed in the infundibulum. (Cat. Gallery, vol. iii.) The brain in man is from $\frac{1}{22}$ to $\frac{1}{35}$ of the body, that of the elephant $\frac{1}{500}$. The *stomach* is simple, the intestines are very voluminous, and the cæcum enormous. In the sanguiferous system the *heart* is worthy of note, and a section of the right auricle and ventricle of that of an Asiatic elephant may be seen in the museum last mentioned (Gallery, No. 924). In this animal, which, in some other respects, singularly resembles the *Rodentia*, three venæ cavæ terminate in the right auricle. Besides the Eustachian valve, which projects between the orifices of the inferior and left superior cavæ, there is also, as in the Porcupine, a rudiment of a superior valve, extending from the posterior side of the orifice of the right superior cava. The tricuspid valve, and its chordæ tendineæ and columnæ carneæ, are also well displayed. (Cat. Gallery, vol. ii.)

Reproduction, &c.—Romantic stories were formerly told of the extreme modesty of elephants; but Mr. Corse has disproved these and others which asserted that they would only reproduce the species in a state of nature, by showing that captivity and numerous witnesses formed no obstacle: but it must be remembered that the experiments recorded by him were made in India. Copulatio more equino. The period of gestation is twenty months and some days. The female mentioned by Mr. Corse produced a fine male, which was thirty-five inches and a half high just twenty months and eighteen days after she was first covered. The breasts of the female are placed under the chest, and the young one sucks, not with the trunk, but with the mouth. 'The young of the elephant, at least all those I have seen,' writes Mr. Corse, 'begin to nibble and suck the breast soon after birth; pressing it with the trunk, which, by natural instinct, they know will make the milk flow more readily into the mouth while sucking. Elephants never lie down to give their young ones suck; and it often happens, when the dam is tall, that she is obliged for some time to bend her body towards her young to enable him to reach the nipple with his mouth; consequently, if ever the trunk was used to lay hold of the nipple, it would be at this period, when he is making laborious efforts to reach it with his mouth, but which he could always easily do with his trunk if it answered the purpose. In sucking, the young elephant always grasps the nipple (which projects horizontally from the breast) with the side of his mouth. I have very often observed this; and so sensible are the attendants of it, that, with them, it is a common practice to raise a small mound of earth, about six or eight inches high, for the young one to stand on, and thus save the mother the trouble of bending her body every time she gives suck, which she cannot readily do when tied to her picket.' The maternal affection does not seem to be very strong in the female elephant, at least in captivity; for the same author states that tame elephants are never suffered to remain loose, as instances occur of the mother leaving her young and escaping into the woods; and he says that if a wild elephant happens to be separated from her young, for only two days, though giving suck, she never afterwards recognises or acknowledges it. 'This separation,' adds Mr. Corse, 'sometimes happened unavoidably, when they were enticed separately into the outlet of the *Keddah*. I have been much mortified at such unnatural conduct in the mother, particularly when it was evident the young elephant knew its dam, and, by its plaintive cries and submissive approaches, solicited her assistance.'

LIVING SPECIES.

Elephas Indicus. The Asiatic elephant differs from the African species, not only in its greater size and in the characters of the teeth and skull, but also in the comparative smallness of the ears, the paler brown colour of the skin, and in having four nails on the hind feet instead of three. The sagacity of this species is also supposed to be greater than that of the African elephants; but though many wonderful stories are told, and some of them are as true as they are wonderful, of the grateful remembrance which it long retains of benefits conferred, or of the tenacity with which it 'treasures up a wrong,' and though the instances of its docility, both antient and modern are very extraordinary, we agree, upon the whole, with Baron Cuvier, who observes, that after having studied these animals a long time, he never found their intelligence surpass that of a dog nor of many other carnivorous animals. It is imposing to see such a mountain of vitality obedient to the voice of its keeper and performing feats at his dictation; and the massive gravity of its physiognomy assists the impression.

The following is Mr. Corse's description of a perfect *Asiatic Elephant.* An elephant is said to be perfect when his ears are large and rounded, not ragged or indented at the margin; his eyes of a dark hazle colour free from specks; the roof of his mouth and his tongue without dark or black spots of any considerable size; his trunk large, and his tail long, with a tuft of hair reaching nearly to the ground. There must be five nails on each of his fore-feet, and four on each of the hind ones, making eighteen in all; his head well set on and carried rather high; the arch or curve of his back rising gradually from the shoulder to the middle, and thence descending to the insertion of the tail, and all his joints firm and strong.

The following are the castes (*Zat*) or varieties of the Asiatic elephant noticed by Mr. Corse. Both males and females are divided into two castes, by the natives of Bengal, viz., the *Koomareah* (of a princely race) and the *Merghee* (hunting elephant, from *mrigah* a deer, or hunting, or from its slender make), and this without any regard to the appearance, shape, or size of the tusks in the male, as these serve merely to characterize some varieties in the species. The *Koomareah* is deep-bodied, strong, and compact, with a large trunk and short but thick legs. The *Merghee* is generally taller but is not so compact nor so strong: he travels faster, has a lighter body, and his trunk is both short and slender in proportion to his height. As a large trunk is considered a great beauty in an elephant, the *Koomareah* is preferred, but not only for this, but for its superior strength, and greater capability of sustaining fatigue. The mixed breed is held in greater or less estimation in proportion as it partakes of the qualities of the *Koomareah* or *Merghee.* A breed from a pure *Koomereah* and *Merghee* is termed *Sunkareah* (from *sunkarah*, a mixture), or *Merghabauliah* (for the most part *Merghee*); but a farther mixture or crossing of the breed renders it extremely difficult for the hunters to ascertain the variety. Besides the *Koomareah, Merghee,* and *Sunkareah* breeds, several varieties are generally to be found in the same herd; but the nearer an elephant approaches to the true *Koomareah* the more he is preferred, especially by the natives, and the higher will be his price; though Europeans are not so particular, and will sometimes prefer a female *Merghee* for hunting and riding when she has good paces and is mild and tractable.

The variety of male termed *Dauntelah* (toothy, having large fine teeth,) produces the largest tusks and the finest ivory: his head is strongly contrasted with that of the *Mooknah* (probably from *mookh*, the mouth or face), which can hardly be distinguished in this respect from a female elephant, and the tusks of some of the females are so small as not to appear beyond the lip, while in others they are almost as large as in the variety of male called *Mooknah.* The *Dauntelah* is generally more daring and less manageable than the *Mooknah;* and for this reason, until the temper and disposition are ascertained, the Europeans prefer the *Mooknah;* but the natives who are fond of show generally take their chance, and prefer the *Dauntelah:* and though there is a material difference in their appearance as well as in the value of their tusks, yet, if they are of the same caste, size, and disposition, and perfect, there is scarcely any difference in their price.

There are many varieties between the *Mooknah* and *Dauntelah*, and these are varied according to the variation of the form of the tusks from the projecting horizontal, but rather elevated, curve of the *Pullung-Daunt*[*] of the true *Dauntelah*, to the nearly straight tusks of the *Mooknah*, which point directly downwards.

Thus the *Goneish* or *Ganesa*, which is a *Dauntelah* that has never had but one tusk and this of the *pullung* sort, and which is so called from *Ganesa*, the Hindu god of wisdom, who is represented with a head like an elephant's with only one tooth, was sold in Mr. Corse's time to the Hindu princes for a very high price, to be kept in state and worshipped as a divinity. Another variety of the *Dauntelah* has the large tusks pointing downwards and projecting only a little beyond the trunk: he is then said to have *Soor* or *Choordaunt* (Hog's teeth). A third is the *Puttel-dauntee*, whose tusks are straight like those of the *Mooknah*, only much longer and thicker. The *Ankoos Dauntee* is a fourth, and has one tusk growing nearly horizontal, like the *Pullung-Daunt*, and the other like the *Puttul-Daunt*, and there are other less distinct varieties.

The term *Goondah* seems to be used to designate those wandering male elephants which are much larger and stronger than the males generally taken with the herd, the *Goondah* departing from it or returning to it according to his desire. The *Goondahs* are supposed to be rarely taken with the herd: when they are so taken, their violence and ferocity renders them most destructive. Mr. Corse relates an instance of the ungovernable passions and terrible havock occasioned by the savage disposition of one, or at least a large male that was supposed to be one, when in the *Keddah*[*]. He was at length tied and led out, but his untameable spirit could not brook restraint, and after languishing about 40 days he died.

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[*] *Pullung* signifies a bed or cot, and *daunt* teeth; and, from the tusks projecting so regularly, and being a little curved and elevated at the extremities, the natives suppose a man might lie on them at his ease, as on a bed. (Corse.)

Mr. Hodgson in his paper 'on the Mammalia of Nepâl' (*Zool. Proc.* 1834) suggests that there are two varieties, or perhaps rather species of the Indian elephant, *Elephas Indicus*, viz., the Ceylonese, and that of the Saul Forest. The Ceylonese has a smaller, lighter head, which is carried more elevated; it has also higher fore-quarters. The elephant of the Saul Forest has sometimes nails on its hinder feet.

The height to which the Asiatic elephant will attain has been variously stated: but upon a strict examination of alleged great heights, the natural disposition among men to exaggerate has generally been detected.

A male elephant recorded by Mr. Corse was at its birth 35 inches high.

			Feet.	Inches.	
In one year he grew	11	inches, and was .	3	10	high.
In the 2nd year	8	„	4	6	„
In the 3rd year	6	„	5	0	„
In the 4th year	5	„ .	5	5	„
In the 5th year	5	„	5	10	„
In the 6th year	3½	„ . . .	6	1½	„
In the 7th year	2½	„	6	4	„

A female elephant was six feet nine inches high at the time she came to Mr. Corse's possession, and was supposed to be 14 years old according to the hunters; but, according to the belief of Mr. Corse, she was only 11 years of age. During the next five years, before she was covered, she grew only six inches, but, while pregnant, she grew five inches in 21 months, and in the following 17 months, though again pregnant, she grew only half an inch. Mr. Corse then lost sight of her. She was at this time about 19 years old and had perhaps attained her full growth. Her young one was then not 20 months old, yet he was four feet five inches and a half high, having grown 18 inches since his birth. It thus appears that no certain standard of growth, for captive elephants, at least, can be depended on: nor do there seem to be any satisfactory data for defining the age at which the animal ceases to grow. Mr. Corse conjectures that elephants attain their full growth between the ages of 18 and 24. With regard to the height, the East India Company's standard for serviceable elephants was, in Mr. Corse's time, seven feet and upwards, measured at the shoulder in the same manner as horses are. At the middle of the back, they are considerably higher; and the curve or arch, particularly in young elephants, makes a difference of several inches. The lessening of this curve is a sign of old age when not brought on by disease or violence. During the war with Tippoo Sultaun, of the 150 elephants under the management of Captain Sandys, not one was ten feet high, and only a few males nine feet and a half. Mr. Corse was very particular in ascertaining the height of the elephants employed at Madras, and with the army under Marquis Cornwallis, where there were both Ceylon and Bengal elephants, and he was assured that those of Ceylon were neither higher nor superior, in any respect, to those of Bengal: nay, some officers asserted that they were considerably inferior in point of utility.

The only elephant ever heard of by Mr. Corse as exceeding 10 feet, on good authority, was a male belonging to Asaph Ul Dowlah, formerly vizier of Oude. The following were his dimensions:—

	Feet.	Inches.
From foot to foot over the shoulder	22	10½
From the top of the shoulder, perpendicular height	10	6
From the top of the head, when set up as he ought to march in state	12	2
From the front of the face to the insertion of the tail	15	11

And yet the Madras elephants have been said to be from 17 to 20 feet high. Now let us see how dimensions shrink before the severity of measurement. Mr. Corse heard from several gentlemen who had been at Dacca, that the Nabob there had an elephant about 14 feet high. Mr. Corse was desirous to measure him, especially as he had seen the elephant often at a former period, and then supposed him to be 12 feet high. He accordingly went to Dacca. At first he sent for the mahoto or driver, who without hesitation assured him that the elephant was from 10 to 12 cubits, that is from 15 to 18 feet high; but added that he could not bring the elephant for Mr. Corse's examination without the Nabob's permission. Permission was asked and granted. Mr. Corse measured the elephant exactly, and was rather surprised to find that the animal did not exceed 10 feet in height.

Variety. The *white elephants* so much esteemed by the Indian sovereigns are merely Albinos.

Geographical Distribution.—The Asiatic elephant inhabits the greater part of the warm countries of Asia, and the large islands of the Indian archipelago. Mr. Corse states that the elephants for the service of the East India Company are generally taken in the provinces of Chittagong and Tiperah; but from what he had heard, those to the southward of Chittagong, in the Burmah territories and kingdom of Pegu, are of a superior breed. In confirmation of this opinion, he observes that the elephants taken to the south of the Goomty river, which divides the province of Tiperah from east to west, were generally better than those taken to the north of that river; and though elephants were taken at Pilibet as far north as lat. 29° in the vizier of Oude's territories, yet the vizier, and also the officers of his court, gave those taken in Chittagong and Tiperah a decided preference, they being much larger and stronger than the Pilibet elephant. Till the year 1790 Tiperah was a part of the Chittagong province; and so sensible was the Bengal government of the superiority of the southern elephants for carrying burdens, enduring fatigue, and being less liable to casualties, that in the then late contracts[*] for supplying the army, the contractor was bound not to send any elephant to the military stations taken north of the Chittagong province. Hence Mr. Corse concludes the torrid zone to be the natural clime, and the most favourable for producing the largest, the best, and the hardiest elephant; and that when this animal migrates beyond the tropics the species degenerates. He speaks of elephants being taken on the coast of Malabar as far north as the territories of the Coorgah rajah; but adds that these were much inferior to the Ceylon elephant, and that from this circumstance the report of the superiority of the Ceylon elephant to all others probably originated. He remarks that most of the previous accounts respecting the Asiatic elephant had been given by gentlemen who resided many years ago on the coast of Malabar or Coromandel, where, at that time, they had but few opportunities of seeing the Chittagong or the Pegu elephant.

Mr. Hodgson, in the paper above noticed, states that *Elephas Indicus* and *Rhinoceros unicornis* are both abundant in the forests and hills of the lower region of Nepâl, whence, in the rainy season, they issue into the cultivated parts of the Tarâi to feed upon the rice crops.

Habits, Utility to Man, &c.—In a state of nature the Asiatic elephant lives in great herds, which are generally said to be under the conduct of the old males, or bulls, as they are sometimes termed. From time immemorial the species has been brought under the dominion of man[†] and trained to swell the pomp of pageants, and add to the terrors of war, as well as to perform the more useful offices of a beast of burthen and draught, and the more dreadful one of executing the sentence of death on criminals. It has been long made the companion of the sports of the Orientalist in the great hunting parties; and from the same early period has been made to minister to the wanton and cruel pleasures of Eastern princes by being stimulated to combat not only with other elephants but with various wild animals. Our limits will not allow us to enter into the highly interesting detail of the mode of capturing this enormous animal, &c., &c.; and we must refer the reader to the second volume of the *Menageries*[‡], where he will find an abundant and amusing collection of anecdotes connected with this subject, as well as a complete history of the elephant, both in the wild state and as the servant of man.

The tusks of both species still form, as they did from the earliest periods, a valuable article of commerce. The ivory which is now sought for useful purposes and ornaments of minor importance, was in great request with the antient

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[*] *Keddah* is the name of the enclosure into which the wild elephants are driven and then captured.

[*] Mr. Corse's paper was read before the Royal Society in 1799.

[†] The earliest extant account in any European language of the mode of capturing the Indian elephant is in Arrian, *Indike*, chap. 13.

[‡] 'Library of Entertaining Knowledge,' 8vo., London, 1831.

Greeks and Romans for various domestic uses, as well as for the Chrys-elephantine statuary rendered so famous by Phidias. Of these rich statues the Minerva of the Parthenon, and especially the Olympian Jupiter, appear to have been the master-pieces.

Elephas Indicus—Asiatic Elephant.

Elephas Africanus.—The African elephant is less than the Asiatic. The head is rounded; the front convex instead of concave; the ears are much larger than those of the Asiatic species; and the general number of nails on each hind foot is only three instead of four.

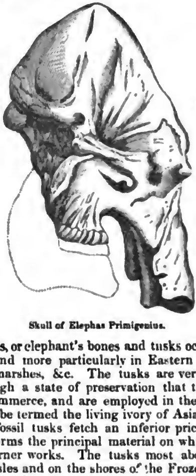
Geographical Distribution.—From Senegal to the Cape of Good Hope. Cuvier says that it is not known whether the species is found up the whole oriental side of Africa, or whether it is there replaced by the preceding species.

Habits, Utility to Man, &c.—The flesh is relished by the inhabitants of many districts of Africa. Major Denham speaks of it as being esteemed by all, and even eaten in secret by the first people about the sheikh; and he says that though it looked coarse it was better flavoured than any beef he found in the country. The antient Romans considered the trunk as the most delicious part; but Le Vaillant speaks of the foot as a dish for a king. The disposition of this species is supposed to be more ferocious than that of the Asiatic elephant; though its habits in a state of nature do not greatly differ. It is not now tamed; but there is good ground for believing that the Carthaginians availed themselves of the services of this species as the Indians did of those of the Asiatic elephant. The elephants exhibited in the Roman arena by Cæsar and Pompey appear to have been Africans; and from them principally, if not entirely, the ivory for ornamental purposes and the statues above alluded to, seems to have been taken. The tusks of this species are of great size.

Elephas Africanus. African Elephant.

FOSSIL SPECIES.

The third and fourth divisions of the tertiary fresh-water deposits (Pliocene period of Lyell) abound in extinct species of recent genera, and among them the remains of fossil elephants are very numerous. The alluvium, the crag, the ossiferous caverns, the osseous breccias, and the subappenine formations afford the most numerous examples. Cuvier ('Règne Animal,' last edit.) observes that there are found under the earth, in almost all parts of both continents, the bones of a species of elephant approximating to the existing Asiatic species, but whose grinders have the ribands of enamel narrower and straiter, the alveoli of the tusks longer in proportion, and the lower jaw more obtuse. An individual, he adds, found in the ice on the coasts of Siberia appeared to have been covered with hair of two sorts, so that it might have been possible for this species to have lived in cold climates. The species has, he concludes, long since disappeared from the face of the globe. This species he characterizes (Ossemens Fossiles) as having an elongated skull, a concave front, very long alveoli for the tusks, the lower jaw obtuse, the grinders larger, parallel, and marked with closer set ribands of enamel, and he designates it as *The fossil Elephant, Elephas primigenius* of Blumenbach, *Elephas Mammonteus*, Fischer, *The Mammoth* of the Russians.

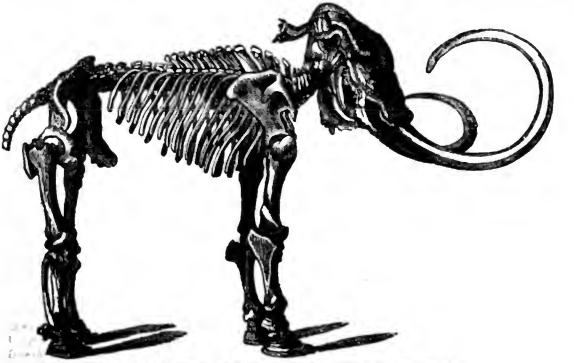


Skull of Elephas Primigenius.

Mammoth's, or elephant's bones and tusks occur throughout Russia, and more particularly in Eastern Siberia and the Arctic marshes, &c. The tusks are very numerous, and in so high a state of preservation that they form an article of commerce, and are employed in the same works as what may be termed the living ivory of Asia and Africa, though the fossil tusks fetch an inferior price. Siberian fossil ivory forms the principal material on which the Russian ivory-turner works. The tusks most abound in the Laichovian Isles and on the shores of the Frozen Sea; and the best are found in the countries near the Arctic circle, and in the most eastern regions, where the soil in the very short summer is thawed only at the surface: in some years not at all. In 1799 a Tungusian, named Schumachoff, who generally went to hunt and fish at the peninsula of Tamut, after the fishing season of the Lena was over, had constructed for his wife some cabins on the banks of the lake Oncoul, and had embarked to seek along the coasts for Mammoth horns (tusks). One day he saw among the blocks of ice a shapeless mass, but did not then discover what it was. In 1800 he perceived that this object was more disengaged from the ice, and that it had two projecting parts; and towards the end of the summer of 1801 the entire side of the animal and one of his tusks were quite free from ice. The summer of 1802 was cold, but in 1803 part of the ice between the earth and the *Mammoth*, for such was the object, having melted more rapidly than the rest, the plane of its support became inclined, and the enormous mass fell by its own weight on a bank of sand. In March, 1804, Schumachoff came to his mammoth, and having cut off the tusks, exchanged them with a merchant for goods of the value of fifty rubles. We shall now let

Mr. Adams, from whose account these particulars are abridged, speak for himself.

'Two years afterwards, or the seventh after the discovery of the mammoth, I fortunately traversed these distant and desert regions, and I congratulate myself in being able to prove a fact which appears so improbable. I found the mammoth still in the same place, but altogether mutilated. The prejudices being dissipated because the Tungusian chief had recovered his health,[*] there was no obstacle to prevent approach to the carcase of the mammoth; the proprietor was content with his profit from the tusks, and the Jakutski of the neighbourhood had cut off the flesh, with which they fed their dogs during the scarcity. Wild beasts, such as white bears, wolves, wolverines, and foxes, also fed upon it, and the traces of their footsteps were seen around. The skeleton, almost entirely cleared of its flesh, remained whole, with the exception of one fore-leg. The spine from the head to the os coccygis,[†] one scapula, the basin and the other three extremities were still held together by the ligaments and by parts of the skin. The head was covered with a dry skin: one of the ears well preserved was furnished with a tuft of hairs. All these parts have necessarily been injured in transporting them a distance of 11,000 wersts (7330 miles); yet the eyes have been preserved, and the pupil of the eye can still be distinguished.[‡] This mammoth was a male, with a long mane on the neck, but without tail or proboscis.' (The places of the insertion of the muscles of the proboscis are, it is asserted, visible on the skull, and it was probably devoured as well as the end of the tail.) 'The skin, of which I possess three-fourths, is of a dark grey colour, covered with a reddish wool and black hairs. The dampness of the spot, where the animal had lain so long, had in some degree destroyed the hair. The entire carcase, of which I collected the bones on the spot, is four archines (9 feet 4 inches) high, and seven archines (16 feet 4 inches) long from the point of the nose to the end of the tail, without including the tusks, which are a toise and a half (9 feet 6 inches, measuring along the curve; the distance from the base or root of the tusk to the point is 3 feet 7 inches) in length; the two together weighed 360 lbs. avoirdupois; the head alone, with the tusks, weighs 11 poods and a half (414 lbs. avoirdupois.) The principal object of my care was to separate the bones, to arrange them, and put them up safely, which was done with particular attention. I had the satisfaction to find the other scapula, which had remained not far off. I next detached the skin of the side on which the animal had lain, which was well preserved. This skin was of such extraordinary weight that ten persons found great difficulty in transporting it to the shore. After this I dug the ground in different places to ascertain whether any of its bones were buried, but principally to collect all the hairs which the white bears had trod into the ground while devouring the flesh. Although this was difficult from the want of proper instruments, I succeeded in collecting more than a pood (36 pounds) of hair. In a few days the work was completed, and I found myself in possession of a treasure which amply recompensed me for the fatigues and dangers of the journey, and the considerable expenses of the enterprise. The place where I found the mammoth is about 60 paces distant from the shore, and nearly 100 paces from the escarpment of the ice from which it had fallen. This escarpment occupies exactly the middle between the two points of the peninsula, and is three wersts long (two miles), and in the place where the mammoth was found this rock has a perpendicular elevation of 30 or 40 toises. Its substance is a clear pure ice; it inclines towards the sea; its top is covered with a layer of moss and friable earth, half an archine (14 inches) in thickness. During the heat of the month of July, a part of this crust is melted, but the rest remains frozen. Curiosity induced me to ascend two other hills at some distance from the sea; they were of the same substance, and less covered with moss. In various places were seen enormous pieces of wood of all the kinds produced in Siberia; and also mammoths' horns (tusks) in great numbers appeared between the hollows of the rocks; they all were of astonishing freshness. How all these things could become collected there, is a question as curious as it is difficult to resolve. The inhabitants of the coast call this kind of wood *Adamschina*, and distinguish it from the floating pieces of wood which are brought down by the large rivers to the ocean, and collect in masses on the shores of the frozen sea. The latter are called *Noachina*. I have seen, when the ice melts, large lumps of earth detached from the hills mix with the water, and form thick muddy torrents which roll slowly towards the sea. This earth forms wedges which fill up the spaces between the blocks of ice. The escarpment of ice was 35 to 40 toises high; and, according to the report of the Tungusians, the animal was, when they first saw it, seven toises below the surface of the ice, &c. On arriving with the mammoth at Borchaya, our first care was to separate the remaining flesh and ligaments from the bones, which were then packed up. When I arrived at Jakutsk, I had the good fortune to repurchase the tusks, and from thence expedited the whole to St. Petersburg.' The skeleton is now in the Museum of the Academy, and the skin still remains attached to the head and feet. A part of the skin and some of the hair of this animal were sent by Mr. Adams to Sir Joseph Banks, who presented them to the Museum of the Royal College of Surgeons. The hair is entirely separated from the skin, excepting in one very small part, where it still remains attached. It consists of two sorts, common hair and bristles, and of each there are several varieties, differing in length and thickness That remaining fixed on the skin is of the colour of the camel, an inch and a half long, very thick set, and curled



Mammoth found in Siberia. Reduced from the lithographic plate above mentioned.

[*] He had fallen sick from alarm, on first hearing of the discovery, as it was considered a bad omen.

[†] An error, as of 28 or 30 caudal vertebræ only 8 remained.

[‡] This is doubted; a dried substance is visible.

in locks. It is interspersed with a few bristles about three inches long, of a dark reddish colour. Among the separate parcels of hair are some rather redder than the short hair just mentioned, about four inches long; and some bristles nearly black, much thicker than horse hair, and from 12 to 18 inches long. The skin when first brought to the Museum was offensive; it is now quite dry and hard, and where most compact is half an inch thick. Its colour is the dull black of the living elephants. (*On the Mammoth, or Fossil Elephant, found in the Ice at the Mouth of the river Lena, in Siberia, with a lithographic Plate of the Skeleton.* From the 5th vol. of the Memoirs of the Imperial Acad. of Sciences of St. Petersburg, London, 1819, 4to.)

Fischer indicates the following species of fossil elephants resting principally on the difference of form in the molar teeth. 1. *Elephas mammonteus* (*E. primigenius*, Blumenb.) 2. *Elephas panicus*. 3. *Elephas proboletes*. 4. *Elephas pygmæus*. 5. *Elephas campylotes*. 6. *Elephas Kamenskii*. M. Nesti proposes a species under the name of *Elephas Meridionalis*, whose remains have been found in a fresh-water formation in many places in Italy, and especially in the Val d'Arno. M. Nesti rests principally on the difference of the conformation of the cranium, and especially on an apophysis in form of a beak which terminates the lower jaw.

Dr. Harlan is of opinion that there are two species of fossil elephants peculiar to the United States.

Captain Cautley mentions the remains of elephants among those of mammalia found by him in the Sewalik mountains, at the southern foot of the Himalayas, between the Sutluj and the Ganges, partly lying on the slopes among the ruins of fallen cliffs, and partly in situ in the sandstone.

ELEPHANTA, a small island about seven miles in circumference, situated between the island of Bombay and the Maharatta shore, distant five miles from the latter and seven miles from the castle of Bombay. Its name among the natives is Gorapori; that by which it is known to Europeans was derived from the figure of an elephant cut out of the solid black rock on the acclivity of a hill about 250 yards from the landing-place, and which is a conspicuous object in approaching the island. This figure has been split in two, apparently by means of gunpowder, which injury is attributed to the religious zeal of the Portuguese invaders of Hindustan, which prompted them to destroy whatever they considered to be objects of pagan worship. In 1814 the head and neck of the elephant dropped off, and the figure is otherwise in such a state of decay as to threaten its speedy fall. At a short distance from the elephant stands the figure of a horse, also cut out of the rock. Mr. Dalrymple, in a description inserted in the Archæologia (vol. vii., page 324), says that this figure is still called the horse of Alexander, in memory of Alexander the Great, to whom has been attributed, without the least foundation, the excavation to which this island owes its celebrity. The construction of this cave has also been attributed, with no greater probability, to Semiramis; its origin is, in fact, involved in the greatest obscurity, although the rapidity with which its decay is seen to go forward seems to preclude the idea of its being the work of any very remote age. The entrance to this cave, or temple, occurs about half way up the steep ascent of the mountain or rock out of which it is excavated.

The length of this temple, measuring from the entrance, which is on the north side, is 130 feet, and its breadth 123 feet; the floor not being level the height varies from 15 feet to 17½ feet. The roof was supported by 26 pillars and 8 pilasters, disposed in four rows; but several of the pillars are broken. Each column stands upon a square pedestal, and is fluted, but instead of being cylindrical is gradually enlarged towards the middle. Above the tops of the columns a kind of ridge has been cut to resemble a beam about 12 inches square, and this is richly carved. Along the sides of the temple are cut between forty and fifty colossal figures varying in height from 12 to 15 feet; none of them are entirely detached from the wall. Some of these figures have on their heads a kind of helmet; others wear crowns with rich devices, and others again are without any other covering than curled or flowing hair. Some of them have four and others six hands, holding 'sceptres, shields, symbols of justice, ensigns of religion, weapons of war, and trophies of peace. On the south side, facing the main entrance, is an enormous bust with three faces, representing the triple deity, Brahma, Vishnu, and Siva. Brahma, the creator, occupies the centre position. This face measures 5 feet in length; the width from the ear to the middle of the nose is 3 feet 4 inches; the breadth of the whole figure is near 20 feet. On the right is the preserver, Vishnu; and Siva, the destroyer, is on the left, having in his hand a cobra capella, or hooded snake, and on his cap a human skull. To the left of this bust, amid a group of uncouth figures, is one, a female figure, to which Niebuhr has given the name of Amazon, from the fact of its being without the right breast. This figure has four arms. The right fore-arm rests upon the head of a bull; the left fore-arm hangs down, and once contained something which is now mutilated and undistinguishable. The hand of the hinder right arm grasps a cobra capella, and that of the hinder left arm holds a shield. At the west side of the temple is a recess, 20 feet square, having in the centre an altar, upon which are placed symbols of a worship offensive to European notions of delicacy. The entrance to this recess is guarded by eight naked figures, each 13½ feet high, sculptured in a manner which shows that the people by whom they were executed must have made considerable progress in the statuary's art.

The cave is not at present used as a temple, nor has it any establishment of priests connected with it, although it is frequently visited by devotees for the purpose of offering prayers and oblations.

(Captain Hamilton's *Account of India*, 1744; Maurice's *Indian Antiquities*; Niebuhr's *Voyage en Arabie*; *Archæologia*, vol. vii.; *Asiatic Researches*, vol. i.)

ELEPHANTI'ASIS (*ἐλέφας* and *ἐλεφαντίασις*), *elephant* and *elephant disease*, so called partly on account of some supposed resemblance of the diseased skin to that of the elephant, but principally from the formidable nature of the malady. It is disgusting to the sight, says Aretæus, and in all respects terrible, like the beast of similar name.

The term is now commonly applied to two different diseases; first to a peculiar disease of the skin, one of the most formidable of the dreadful cutaneous affections which occur in hot climates, and more particularly where agriculture and the arts of civilization are imperfectly advanced; and secondly to a peculiar disease of the leg, which becoming enormously tumid, is conceived to bear some resemblance to the leg of an elephant.

The first distemper, elephantiasis properly so called, is a tubercular disease of the skin. The tubercles present a shining appearance; they are of different sizes, and are of a dusky red or livid colour on the face, ears, and extremities. The tubercles are accompanied with a thickened and rugous state of the skin, a diminution or total loss of its sensibility, and a falling off of all the hair excepting that of the scalp.

The disease is wholly unknown in this country. It is described as slow in its progress, sometimes continuing several years without materially deranging the functions, but gradually producing an extraordinary degree of deformity. The following is the description commonly given of this formidable malady; but there is reason to believe that the picture is much exaggerated.

The alæ of the nose become swelled and scabrous; the nostrils are dilated; the lips are tumid; the external ears, particularly the lobes, are enlarged and thickened, and beset with tubercles; the skin of the forehead and cheeks grows thick and tumid, and forms large and prominent rugæ, especially over the eyes; the hair of the eye-brows, the beard, the pubes, axillæ, &c., falls off; the voice becomes hoarse and obscure; and the sensibility of the parts affected is obtuse or totally abolished, so that pinching or puncturing them gives no uneasiness. This disfiguration of the countenance suggested the idea of the features of a satyr or a wild beast; whence the disease was by some called *Satyriasis*, and partly also on account of the excessive libidinous disposition said to be connected with it; and by others *Leontiasis*, from the laxity and wrinkles of the skin of the forehead, which resembles the prominent and flexible front of the lion.

As the malady proceeds, the tubercles begin to crack, and at length to ulcerate; ulcerations also appear in the throat and in the nose, which sometimes destroy the palate and the cartilaginous septum; the nose falls; and the breath is intolerably offensive; the thickened and tuberculated skin of the extremities becomes divided by fissures, and ulcerates, or is corroded under dry sordid scabs, so that the fingers and toes gangrene and separate joint after joint

The large misshapen leg, which is also often termed elephantiasis, arises from a repeated effusion and collection of a lymphatic and gelatinous matter in the cellular membrane under the skin, in consequence of inflammation of the lymphatic glands and vessels. The skin itself is much thickened in the protracted stages of the disease, and its vessels become greatly enlarged; its surface grows dark, rough, and sometimes scaly. As the effusion first takes place after a febrile paroxysm, in which the inguinal glands of the side about to be affected are inflamed, and the limb is subsequently augmented in bulk by a repetition of those attacks, Dr. Hendy termed the malady the glandular disease of Barbadoes, in which island it is endemial. In England it is often called the Barbadoes leg. Except when these paroxysms occur, the functions and constitution of the patients are not mainly injured, and they often live many years, incommoded only by carrying about 'such a troublesome load of leg.'

In this country the disease is only seen in its inveterate stage, after repeated attacks of the fever and effusion have completely altered the organization of the integuments of the limb, and rendered it altogether incurable. In this state the swelling is hard and firm, does not pit on pressure, and is entirely free from pain. The skin is thickened and much hardened; its blood vessels are enlarged, particularly the external veins, and the lymphatics distended; and the cellular substance is flaccid and sometimes thickened, and its cells much loaded with a gelatinous fluid. The muscles, tendons, ligaments, and bones are generally in a sound state.

In this advanced stage the disease is altogether irremediable. Little success indeed seems to have attended the practice employed in the earlier stages, which has chiefly been directed to alleviate the febrile paroxysms by laxatives and diaphoretics, and subsequently to strengthen the system by cinchona. Local bleeding has not been employed; but after the fever and inflammation have subsided, the practice of binding the limb in a strong bandage is strongly recommended as the best means of exciting absorption, and of reducing the swelling. (Dr. Bateman's *Practical Synopsis of Cutaneous Diseases.*)

ELEPHANTINE. [EGYPT.]

ELETTA'RIA, a genus established by the late Dr. Maton of the plant yielding the lesser cardamoms. The name is that (elettari) under which it was first figured by Rheede, *Hort. Mal.* xi. t. 4, 5, and is softened into *elachee* (Sanskrit *ela*), the common appellation of this substance over all India. The genus belongs to the natural family of Scitamineæ, or Zingiberaceæ of some authors; besides this it includes three other species, of which one E. cardamomum medium, is a native of the hilly countries in the vicinity of Silhet. Dr. Roxburgh concludes, from the form of the capsule and its acrid, aromatic taste, that it is the plant which produces the Cardamomum medium of the writers on materia medica. The whole of the species, differing chiefly in their radical inflorescence, are however by Dr. Roxburgh and some other botanists, referred to the genus Alpinia.

Elettaria Cardamomum is a native of the mountainous districts of the coast of Malabar, especially above Calicut, in the Wynaad district, between 11° and 12° of N. lat. where the best are produced. It is therefore well placed; for cardamoms formed a portion of the early commerce, which subsisted between this part of India and Arabia, whence they must have been made known to the Greeks, as they are described by Dioscorides and mentioned as early as the time of Hippocrates.

The cardamom plant delights in moist and shady places on the declivities of the hills. It is cultivated from partings of the root in the district of Soonda Balaghat, but the fruit is very inferior; but the best grows in a wild state, at least where no other measures are adopted, than clearing away the weeds from under the largest trees, which are felled close to the roots. The earth being loosened by the force of the fallen tree, young cardamom plants shoot forth in a month's time, and are sheltered by the shade of the branches. The tree-like herbaceous plants attain a height of from 9 to 12 feet. The root is as tortuous and tuberous as that of the ginger, and the leaves, with long sheathing footstalks, are from one to two feet in length, placed in two rows, and lanceolate in shape, like those of the Indian shot (Canna indica) common in English gardens. The scapes, or flower- and fruit-bearing stalks, make their appearance in Februray of the 4th year, from the base of the stems, are three to four in number, and from one to two feet long, lax, and resting on the ground. The fruit is ripe in November, and requires nothing but drying in the sun to be fit for commerce.

Species of Amomum, q. v., yield the other kinds of cardamom.

ELEVATION, ANGLE OF ELEVATION. [ALTITUDE.]

ELEVATION (Architecture). [DESIGN, ARCHITECTURAL.]

ELEUSIS, a celebrated town of Attica, on the borders of Megaris. In very antient times it is said to have been an independent state of some importance, and carried on a war with Athens, by the result of which it became subject to that city. (Thucyd. ii., 15.) Eleusis owed its celebrity in the historical age to its being the principal seat of the mystical worship of Demeter, who, in search of her daughter, was said to have rested by the well Callichorus, at Eleusis, and to have taught Triptolemus the use of corn on the Rharian plain, near the city. This worship subsisted at Eleusis from the earliest period of history to the time of Alaric. Eleusis stood near the northern shore of the Gulf of Salamis. Its port was small and circular, and formed by two piers running out into the sea. Traces of a theatre have been found on a hill about half a mile from the sea. The temple of Demeter was commenced by Ictinus, in the administration of Pericles, and finished by Philo under the auspices of Demetrius Phalereus. It was originally a Doric building in antis, but was afterwards changed into a decastyle temple, with fluted columns. The upper part of an admirably executed colossal statue of Ceres, or Proserpine, brought from Eleusis by Dr. E. D. Clarke, is now in the vestibule of the public library at Cambridge. A modern village on the site is called Lefsina.

Coin of Eleusis.

British Museum. Actual Size. Copper. Weight, 59 grains.

ELEUSI'NIA, the great mystic festival of Demeter celebrated at Eleusis in the month Böedromion. The lesser mysteries were celebrated in Elaphebolion at Agræ, on the Ilissus, and were a sort of preparation for the Eleusinia. The great festival began on the 15th Boedromion, and lasted nine days. The first day was called the assembling (ἀγυρμός); on it all who had been initiated in Elaphebolion were invited to complete their sacred duty. The second day was named ἅλαδε μύσται, 'to the sea ye initiated!' from the words of the proclamation by which they were admonished to purify themselves. This purification took place in the ῥειτοί, two streamlets of salt water running into the gulf of Salamis, and which separated the territory of Eleusis from the rest of Attica. Tho third day was called εἰς λίχη μύσται, from some ceremonies imitative of the marriage of Proserpine, which took place on that day. What was the name or employment of the fourth day is unknown. The fifth was called the 'day of the torches,' λαμπάδων ἡμέρα, on account of a lampadephoria, or torch-procession, in which the initiated marched two and two round the temple. The initiation took place on the sixth and seventh days of the feast. The sixth day, which was called Iacchus, was the chief day of the Eleusinia. On this day the statue of Iacchus was carried in procession from the Cerameicus to Eleusis, and back again on the following day, which was named the return of the fully-initiated (νοστοῦσιν οἱ ἐπόπται). The seventh day was called Epidauria, in honour of Æsculapius who did not arrive from Epidaurus to be initiated until after the return of the Epoptæ. The ninth day was called πλημοχόη. The ceremony of this day consisted in the symbolical overturning of two vessels filled with wine. Those initiated at the lesser mysteries were called μύσται, from μυῶ 'to close up,' because they were bound to strict silence; those who had passed through the Eleusinian ceremonies were called ἐπόπται or ἔφοροι, 'contemplators,' because they had been admitted to see the sacred objects; they were also hailed as happy and fortunate (εὐδαίμονες, ὄλβιοι). The initiation consisted in a set of rites not very different, it is believed, from the free-masonry of modern Europe, though the effects were far from the same, and the initiated were not supposed to be bound to one another by any particular tie. Every Athenian was obliged to pass through these ceremonies once in the course of his life. Bastards, slaves, and prostitutes, as well as strangers, and in later time Christians and Epicureans, were excluded from the Eleusinia. To reveal any of the mysteries, or to apply to private purposes any of the hallowed solemnities, was considered a capital crime. The priests at Eleusis belonged to the house of the Eumolpidæ. The chief priest was called the Hierophant, the second in rank the Torch-bearer (δαδοῦχος), the third the Sacred Herald (ἱεροκήρυξ), and the fourth the Altar-priest (ὁ ἐπὶ βωμῷ). The other two festivals of Demeter, the Demetria and the Thesmophoria, must be distinguished from the Eleusinia. (Jul. Poll. i., § 37.)

ELGINSHIRE, formerly and by some still called MORAYSHIRE, a small county of Scotland lying between 57° and 58° N. lat., and between 3° and 4° W. long. It is bounded on the north by the Moray Frith (Æstuarium Varar of Ptolemy); on the south by Inverness-shire and Banffshire; on the east by Banffshire; and on the west by Nairnshire and Inverness-shire. A portion of Inverness-shire intersects and divides Elginshire into two separate parts to the north and south. The north part approaches to a circular figure, in diameter nearly 25 miles. The south part has about half this extent of area, and a very irregular outline. The line of sea-coast measures about 35 miles, and presents in some parts precipitous rocks, in others a beach of level sands. The low country forms a plain varying from five to twelve miles in width from the sea-shore to the mountainous district, and extending from the river Spey to the western boundary. It is intersected by small ridges running nearly parallel with the line of coast. On the southern course of the Spey are some considerable plains. The rest of the country, including the distinct southern part, is hilly, and the cultivated land lies chiefly on the banks of the streams in the valleys. The number of entire parishes is fifteen; of eight others, five partially belong to Banffshire, three partially to Inverness, and one partially to Nairn. The soil of the eastern part of the large northern plain is principally sandy, with small fields of clay and peat. The middle and western parts are chiefly clay and loam. The arable and pasture lands of the mountainous district are for the most part sand and sandy loam. Considerable tracts of peat moss occur in the south-east part, and patches of it here and there throughout the country. In the Agricultural Survey, published in 1811, the proportion of waste land is stated to be about three times the amount of that in cultivation, but since that time some extension of and improvements in agriculture have been made, though a great deal yet remains to be done.

The rivers are the Spey, the Lossie, and the Findhorn, which flow in a north-east and nearly parallel course to the sea. The Spey, one of the most productive fishing rivers in Scotland, has its source in the south west part of Invernessshire, and forms a great portion of the boundary line between Elgin and Banff. In the upper part of its course its branches extend 15 miles on each side, and it drains about 800,000 acres. It is not navigable except for floating timber-rafts from the large forests of Strathspey; but its salmon fishery is of great importance and rents for more than 8000*l.* a year. Since 1815 the depth of water to the extent of two miles out in the Speymouth Bay has diminished six feet, in consequence of the deposit of gravel carried down by the stream, the velocity of which is four or five miles an hour. This river is said to discharge into the sea a greater quantity of water than the Thames. The devastation occasioned by its great overflowings in 1829 is described by Sir T. D. Lauder in the work on the Great Floods in Moray.

The Findhorn rises also in Inverness-shire, and passes through Elginshire near the western boundary. Fir timber from the extensive forests on its banks is floated down in separate logs. The entrance from the sea to the large æstuary at its mouth is rendered difficult by a bar of sand, though the port and quay at the village of Findhorn are commodious for small vessels. The salmon fishery is valuable, but inferior to that of the Spey.

The Lossie is formed by the confluence of numerous streams in the centre of the shire; it passes to the north of the town of Elgin and falls into the sea on the eastern side of Loch Spynie. In a course of twenty miles it turns numerous corn-mills and some manufacturing machinery near Elgin. There was formerly a salmon fishery on this river, but at present the number of fish which enter is too small to offer any encouragement to the fishers. There is a port for small shipping at the Lossiemouth, five miles north-east of Elgin. Large embankments of earth have been raised at great expense along each side of this river through the low plains between Elgin and the sea, in order to prevent a recurrence of the calamitous inundation which happened in 1829, of which a very interesting description is given in Sir Thomas Dick Lauder's 'Account of the Great Floods in Moray;' a work containing much valuable information respecting this county.

Near Lossiemouth is the large Loch Spynie, the drainage of which has been imperfectly made at an expense of 10,800*l.*; but the expectation of finding its bed suitable for cultivation has been disappointed. The drainage of two or three small lakes between Elgin and Alves has also been proposed. The south portion of the county contains several lakes surrounded with picturesque mountain scenery. That of Glenmore is circular, and two miles in diameter; and Loughnadurb, in the south-west extremity, is four miles in length. Chalybeate springs are found in all parts of the county, but none are much distinguished for medicinal qualities; and it is remarked as a curious fact that the old holy wells are of pure water exempt from any mineral tinge.

The principal roads are, one which intersects the northern part of the county from Fochabers on the east to Burg Head on the north and Forres on the west, passing through the town of Elgin; one from Elgin to Craig-Elachie bridge, on the Spey; and two, one on the east from Fochabers, the other on the west from Forres, which communicate with the south portion of the county. A large proportion of Elginshire is covered with forests and plantations, chiefly of Scotch fir and larch. Many thousands of acres which, fifty years ago, were naked moor, are now clothed with various kinds of firs, interspersed with oaks, ash, and beeches. The aspect of the northern low country, although generally fertile and well-cultivated, is dull, flat, and unvaried; but in the southern highlands, especially in the parish of Knockando, on the banks of the Spey, the scenery is often highly picturesque and romantic; having mountains covered with broom and heather, richly wooded slopes, deep and gloomy glens, with lofty rocks, torrents, and waterfalls, and mossy banks abounding in many varieties of beautiful flowers, overhung by the honeysuckle and the wild rose. This woody district is a sheltered resort of all the ordinary kinds of singing and game birds; of the roe-deer, fox, hare, rabbit, badger, &c. The summits of Cairngorm (blue mountains), in the southern extremity of the south division of the county, are seldom free from snow: the highest point is 4080 feet above the sea. James Roy's Cairn, in the south part of the north division, is considered the highest elevation in the county, and commands, in clear weather, a very extensive prospect.

Geology and Mineralogy.—The rocks in the south consist of granite, felspar, mica, sandstone, slate, gravel, and rock crystal. The banks of the Spey towards its mouth exhibit secondary rocks of red sandstone which dip into the basin of the Moray Frith, and extend westward throughout the northern plain of the county. The upper beds are soft, and are cut into ravines by the rivulets. The rocks are covered with a great depth of sand, gravel, and other alluvial matter, so that the soil often on the same farm varies from strong clay to rich loam and light and gravelly sand. Numerous large granitic boulder stones, which are used for building, are found far from their parent rocks. (*New Statistical Account of Scotland*, part viii. p. 83.) Many large and inexhaustible quarries of freestone are worked, especially near the coast. Those on Quarrywood Hill, near Elgin, have supplied the stone for the handsome public edifices in that town. It is there found in large blocks adapted for pillars, millstones, and pavements; the colour is yellow and white, and it takes a fine polish. One or two quarries of slate supply the county with roofing materials. Neither coal nor any metallic ores of importance are found; but peat occurs in various places. The beds of peat, which are generally from four to twelve feet in thickness, lie on gravelly sand or clay, and are covered at the surface with a mossy turf about ten inches deep. This peat is in general use for fuel, but when burning, it often emits a disagreeable smell of sulphur. A similar smell rises from the surface of the fields of peat when heated by the sun. It changes the colour of silver to a leaden hue, and corrodes utensils of copper or iron. Numerous trunks of oak and fir trees, many of them large, intermixed with boughs of birch and alder and hazel nuts, are found deeply imbedded in the peat mosses. These are considered by the old bishop of Ross, in his description of Moray, to have been thus deposited by the Deluge; but closer observation shows this fossil timber to have fallen by the action of fire, and in some instances by the axe; and geologists, judging from the quantities of marine shells and other fossil exuviæ discovered beneath the surface, believe the northern plain to have been once the bed of the sea.

Antiquities, Buildings, Bridges.—In the parish of St. Andrew's Lhanbryd is a small Druidical structure, supposed to have been standing nearly 3000 years; another has been broken up to macadamize a piece of road. The ruins of the castle of the lords of Duffus stand on the margin of Loch Spynie; the tumuli or cairns, the supposed tombs of antient warriors, which are remaining on the heights along the shore, and the ruins of the Roman, or, according to others, the Danish, fortifications at Burghead; all deserve the attention of the antiquarian. In the parish of Urquhart are the remains of Druidical *lithoi*, forming a circular temple. The magnificent priory of Pluscarden, near Elgin, is sufficiently entire to show the plan of the structure and its numerous offices. The surrounding wall encloses nearly twelve acres. The church at Birnie is of great antiquity, and contains vestiges of Druidical and Scandinavian art. It was one of the earliest consecrated places of the Roman hierarchy in the north of Scotland. The curious old bell is described by Sir Thomas Dick Lauder. The ruins of the antient palace of the bishops of Moray, on the south bank of Loch Spynie, are those of a magnificent castle, whose lofty halls and deep vaults were fortified by towers, gates, and ditches. The fortified castle on the lonely lake called Loughnadurb, in the mountain wilds of the south-west extremity, is a romantic ruin of a place besieged by King Edward I. in his war with Bruce. Many more ruins and fragments of feudal castles and strongholds and monasteries are remaining, some of them famous in the legends of chivalry; also several of the artificial hills of sand, on which the *blaze*, or signal fires, antiently flamed to summon the warriors to battle. In barrows, cairns, and caves, and on the site of camps, have been found skeletons, stone coffins, and Danish and Lochaber dirks and battle-axes made of copper. Near the town of Forres is 'King Sueno's Stone,' a large column or obelisk with many curiously-sculptured historical figures, representing the expulsion of the Danes from Scotland, or, as others think, the murder of Macduff; and a wooded hill, called the Knock of Alves, near the town of that name, is famous in tradition as being the place where the usurper Macbeth consulted 'the Weird Sisters,' when, according to Shakspeare, he inquired—

> 'How far is it called to Forres? What are these,
> So wither'd and so wild in their attire,
> That look not like the inhabitants of the earth,
> And yet are on it?'

The foundations of the castle of Forres, in which Macduff was murdered, have been removed, and the green mound on which it stood has been levelled for the erection of a modern mansion. On a mount near the obelisk is an octagonal tower, raised to the memory of Nelson. Its diameter is 24 ft. and the height 70 ft., and the top is finished with a battlement, surmounted with a mast, ropes, and flag.

One of the finest and most useful of the public structures in this county is the bridge erected over the Spey, in 1801, from Fochabers to Elgin. The strength required to resist the impetuous force of the river when swollen with mountain-torrents is well provided for by massive piers deeply based on the rock and supporting four circular arches, of which the two smallest have each a span of 75 ft., and the two in the middle a span each of 95 ft.: that is, 19 ft. wider than the central arch of Westminster Bridge. The cost was 15,000*l.* The Spey is also crossed by an elegant bridge of cast iron at Craig Elachie, a very picturesque point of its course, in the eastern extremity of the parish of Knockando. The banks of the river are here formed by lofty rocks, and the centre of the span of the arch is more than 150 ft. above the water. This bridge was constructed in 1814 at a cost of about 10,000*l.* The following are some of the principal mansions of the nobility and gentry.—Darnway Castle, near Forres, is a magnificent palace, containing a spacious old hall of the fourteenth century, capable of entertaining 1000 men. The building is beautifully encompassed by several thousand acres of antient forest and plantations. Brodie House is an elegant mansion in a very extensive park. The Grange, near Alves, and Burgie Castle adjoining it, are large and elegant edifices. Innes House, in the parish of Urquhart, was the noble residence of the lairds of Innes. The spacious mansions of West and East Elchies are in the old manorial and castellated style. Knockando House is beautifully situated near the river Spey. Many more might be enumerated, this county being particularly rich in manorial mansions and seats of the opulent classes.

Agriculture, Climate.—This county was antiently reputed 'the Granery of Scotland.' In the great famine at the end of the sixteenth century, oatmeal was procured from Elgin for the districts south of the Grampian Hills, and at present it furnishes some of the best samples of wheat in the London market. (Mac Culloch's *Statistics of the British Empire.*) The soil of the lowland district about the latitude of Elgin is remarkably fertile, and especially adapted for the growth of wheat, oats, and barley, of which it produces many heavy and luxurious crops, a great portion of which is shipped at Speymouth, Burghead, Lossiemouth, and Findhorn, for the Scotch and English markets. The climate of this part of the country is noted for its general mildness, dryness, and salubrity, owing, it is thought, to the low level of the surface, which is little above that of the sea, and to the absorbent sandy nature of the soil. Instances occur of extraordinary longevity, and, as a winter residence for invalids, some physicians have considered it preferable to Devonshire. However, at the beginning of spring, a bleak easterly wind generally prevails for several weeks, blasting throughout the country the germinating corn and budding trees, and severely affecting sickly and delicate constitutions. (*Agricultural Survey*, 1811.) In the summer the wind is gentle from west-south-west, and in winter occasionally violent from west-north-west. The soil and climate of the southern highlands are less favourable for the cultivation of grain; and a great portion of the surface is still covered with native forests, or with uninclosed commons of furze and broom, abounding in rabbits, which greatly damage the crops. Oats and barley were formerly the only kinds of grain produced; wheat, though now one of the staple articles of commerce, is of comparatively recent introduction, and still more recent is the cultivation of peas, beans, clover, grasses, turnips, and potatoes; yet the turnip husbandry is very extensively and successfully adopted, and potatoes are as common as in Ireland. No uniform course of cropping is pursued; yet, on each of the larger farms, a six-shift rotation is generally used, by which it is divided into one-sixth in green crop, one-third in grass or clover, and one-half in corn, but the succession of each crop is more dependent on individual opinion and convenience than on any principles of experimental science. The land is in the possession of a few large proprietors. The annual rent of the arable kind varies from 7*s.* to 40*s.* per acre, and leases are taken commonly for nineteen years. The average produce of an acre of wheat or oats, of very superior quality, is from three to four quarters. Several mills are established for the preparation of pot-barley. [BARLEY, p. 466.] Oats being the principal article of food consumed by the peasantry, they are given very sparingly to horses. All the bread used by the labouring classes is wholly of oatmeal made simply with water into flat cakes, and baked over a wood fire in a pan. Their breakfast invariably, and frequently their other meals, consists of various preparations of oatmeal. In the form of porridge it is flavoured with onions, butter, pepper, sugar, milk, beer, or whiskey, and for supper it receives an addition of shredded kail or turnips. The farinaceous solution obtained by steeping oat-bran is called *sowens*. It is thick and gelatinous, and slightly acidulated by fermentation. Among servants and farm labourers it is consumed in large quantities. This paste is also dried and preserved in lumps for the convenience of those who require a portable breakfast. Sheep and horses are reared, for the most part, only for domestic use. The cheviot breed of sheep has been extensively introduced to cross that of the old white-faced and the small brown-faced breeds of Moray. The breed of native cattle has been improved by importations from Skye, Aberdeen, and Argyle. Stock of this kind are bred for, and sold to, the graziers of the southern counties. During the last thirty years numerous agricultural improvements have been attempted, and many with success, which, in part, is justly attributable to the premiums offered by the Farmers' Club at Elgin. New roads have been opened and some old ones made conveniently passable; large tracts of waste have been planted with trees; good horses and implements have been procured; many wretched farm-houses and offices have been rebuilt on superior plans; draining, over and under, has been adopted; inclosures have been made; and lime is much used for manuring, &c. The peasantry, who are naturally hardy and thrifty, have become in the same period considerably improved in knowledge, habits, manners, dress, and mode of living; still, it is truly asserted that Elgin, as to improvement, is greatly in the rear of many other counties of Scotland. Inclosures, for instance, are not general, and are made chiefly by dikes of loose stones: rent is yet partially paid in produce and labour, and such customs as night-wakes for the dead are still superstitiously observed. The Gaelic language is used among a few of the highlanders, but the peasantry in general speak a barbarous dialect of the English, of which a glossary, containing several hundred specimens, is given at the end of Mr. Leslie's 'Agricultural Survey.'

Education.—The people of this county, as in most parts of Scotland, highly appreciate the advantages of early instruction. A well-attended and well-conducted parochial school exists in every parish, and it is a rare occurrence to meet with a youth of either sex, however humble, who is not able at least to read and write. At several of these parochial establishments the masters, though their salaries seldom exceed 30*l.* a year, teach Latin, Greek, mathematics, geography, book-keeping; in short all the knowledge requisite either for entering upon a course of collegiate studies or commercial business. The more populous parishes have each one or more private schools, of which some are of superior character. Several Sunday-schools have been established, and a few small circulating libraries. This county, with the exception of the royal burghs of Elgin and Forres, shares in Mr. Dick's bequest. [BANFFSHIRE, p. 370.]

Commerce and Manufactures.—The chief articles exported are corn, timber, whiskey, and salmon. Of 204 vessels which in 1834 sailed from the Speymouth, 50 were laden with 18,000 quarters of oats and wheat, chiefly for Leith and London. Large quantities are also shipped at the ports of Findhorn, Burghead, and Lossiemouth, whence trading vessels and steam-packets regularly sail for London. At the Speymouth since 1793, 150 vessels, several above 750 tons burden, have been built entirely of natural fir from the forests on the bank of this river. It is greatly superior to that which is planted, and for ships appears to be no less durable than oak, as they are insured at Lloyd's on similar terms, and some of the largest dimensions have been employed in the trade with China and India.

Though the great flood of 1829 greatly damaged the harbour at the mouth of the Spey, the sales of timber thence exported still amount to 10,000*l.* or 11,000*l.* per annum. In the last war, when foreign timber was excluded, the annual amount commonly exceeded 40,000*l.* About 300 rafts are annually floated down the Spey from the parish of Abernethy, a distance of forty miles; and 100 men are employed at saw-mills in cutting timber into planks.

From eight to twelve smacks are employed by the Salmon Fishery Company of the Spey, in conveying salmon to London. In 1834, seventy-two cargoes were shipped, each on an average containing 280 boxes, the weight of each box being 112 lbs., and its value 5*l.* The fishing commences on the 1st of February, and ends on the 14th of September. About eighty boats are employed in the herring fishery off the port of Burghead. The salmon fishery on the river Findhorn is of less extent. At Linkwood, near Loch Spynie, the principal manufacture of whiskey is carried on in a spacious range of buildings erected for the business of malting, grinding, and distilling. The capacity of the stills is from 170 to 400 gallons each. The annual quantity of barley manufactured is 1200 quarters; and the annual quantity of liquor produced about 20,000 gallons. It is of great strength and purity, and is almost wholly consumed in this and the adjoining county of Nairn. Two other fine distilleries are in the highland parish of Knockando. From 70 to 100 cargoes of coals, Scotch and English, are annually imported for limekilns, distilleries, and domestic fires.

Besides the county town of Elgin, there is but the town of Forres which can be properly so designated: all other places in the county being merely villages, each with a population less than a thousand. That of Forres amounted, in 1831, to 3895. In the middle of the 10th century, under the reign of King Macduff, this town was a place of more importance than Elgin, from which it is distant twelve miles to the west. King James IV. of Scotland, in 1496, made it a royal burgh with separate jurisdiction. One street, extending about a mile from east to west, having the town-hall, church, and gaol in the centre, comprises the whole town. It is pleasantly and picturesquely situated on elevated ground, surrounded by verdant fields and wooded heights. The houses are neat and of modern construction, though some of an antient date present here and there their pointed gables. At the western extremity, half-encircled by a brook, is the green hill on which stood the castle of Macbeth, which, with the adjoining obelisk, and Nelson's monument, have already been noticed. The salmon fishery on the Findhorn gives employment to a few of the inhabitants; the rest belong chiefly to the agricultural class. The grammar-school maintains a good reputation, and there are several superior private academies. A well supplied market is held on Wednesdays, and several small fairs in the course of the year. Fochabers is a small modern-built market town, with a population of about 800, situated on the east bank of the Spey, about five miles from the mouth. The inhabitants are employed for the most part in manufacturing cotton, thread, and worsted. The site of the antient town was a mile to the north of its present position, and near the noble mansion of the duke of Gordon, of which the extensive park is only partly in the shire of Elgin. Burghead is a pretty village, with neat accommodation for sea-bathers. Its port is frequented by numerous vessels of about 80 tons burden.

The population of the county in 1831 was 34,231. In conjunction with Nairnshire, it sends one member to parliament.

(*New Statistical Account of Scotland*, 1835; Leslie's *Agricultural Survey of Moray*, 1811; Dr. Lachlan Shaw's *History of Moray*, 1775.)

ELGIN, the county town of the shire of Elgin, is agreeably situated in the north lowland plain of corn-fields, on the road which connects, and nearly at an equal distance from, Forres on the west, and Fochabers on the east. The small river Lossie passes near, in a winding course on the western and northern sides, and is crossed at five different points by substantial stone bridges. The town consists of one main street, extending nearly a mile, and numerous narrow lanes which intersect the main street at right angles and contain houses of antient date and construction. Elgin at the end of the tenth century was an important place, with a royal fort. The earliest charter was granted by Alexander II. in 1234. Various grants were ratified by Charles I. in a charter issued in 1633; but none of the lands and privileges thus conferred have ever been possessed. At a remote æra the neighbourhood was adorned with ecclesiastical palaces and other extensive establishments of monks and friars. The civic arms represent St. Giles in sacerdotal attire with crosier and book, and the motto 'sic itur ad astra.' The most interesting and magnificent ruins in this county are those of the cathedral of Elgin, which was founded in 1244. In 1390 the original structure was destroyed by fire to gratify the revenge of 'The Wolf of Badenoch' against the bishop of Moray. It was immediately rebuilt on a model similar to that of the cathedral of Lichfield; but on a scale of much greater magnitude, and with far more elaborate ornaments. The regent Morton, in 1568, having stripped off the lead of the roof to procure money for the payment of his troops, this venerable specimen of architecture and sculpture was left to decay as a monument only of popish superstition. In 1711 the great central tower fell to the ground; but the two western turrets, the walls of the choir, and parts of the nave and transept are still standing. The loftiness of the fabric, the symmetry and unity of design, and the great profusion of laboured sculpture, grotesque and elegant, must excite the greatest admiration of the skill and perseverance of the artists. A college was attached to the cathedral, and included within its walls the house and gardens of the bishop, and those of 22 canons. Part of the wall, which had four gateways, and was 900 yards in circuit and four yards in height, yet remains, with the eastern gateway, formerly secured by an iron grate, a portcullis, and a watchman's lodge. On the south side of the town are the ruins of a convent of Grey Friars, and on a hill at the west are the remains of an antient fort. The Elgin institution for the support of old age and the education of youth, is a handsome quadrangular building, at the eastern entrance, surmounted with a circular tower and a dome. The whole is constructed of beautiful freestone and ornamented with Doric columns and sculptured figures; and the interior is very conveniently laid out in school-rooms, eating-halls, dormitories, wards for the sick, a chapel, and various other offices. The building, playgrounds, and shrubbery cover an area of about three acres. The objects of this excellent charity are threefold: an almshouse for age and indigence; a school for the support and education of labourers' children, and a free-school solely for education. The inmates of the first class are 10 in number, of the second class 40, of the third class 230.

The new church in the centre of the town is one of the most elegant in the north of Scotland. It has a richly ornamented cupola, and a Doric portico. Grey's Hospital, at the western extremity, is a similar structure, with a Grecian portico and a central dome.

The sectarian places of public worship are numerous, and include an episcopal and a Catholic chapel. The schools within the town, endowed and private, are ten in number, and are generally well-conducted and efficient establishments. The Elgin Academy consists of three parochial schools of very superior character. The subjects taught are English reading, writing, grammar, and composition, arithmetic, geography, mathematics, French, Latin, and Greek. Courses of lectures on natural philosophy are occasionally delivered and illustrated by an experimental apparatus. The salaries of the teachers are each about 45*l.* per annum. A literary society for the purpose of procuring reviews and other periodical publications was established in 1818, and is still in prosperous existence; and also an extensive and valuable circulating library. There are many endowed charities, and various other religious and benevolent institutions. The Morayshire Farmer's Club was instituted in 1799. The members have subscribed the sum of 2250*l.*, which is very judiciously appropriated to the improvement of agricultural science, and the collection of valuable books on every department of rural economy.

The following observation on the progress of improvement in Elgin is made in the *New Statistical Account of Scotland*, No. VIII., p. 27: 'Forty years ago there were no turnpike-roads leading to or from it; no stage-coaches, no gas lights, indeed no lighting, nor any side pavement to the streets, no hospital for the sick, no institution for the support of old age or the education of youth, no academy, no printing-press, and no newspaper.' All these desiderata are now possessed. Many new and more convenient houses have been built, and the progress of knowledge and comfort are very apparent; improvements however are still wanting in the efficiency of the police, in the supply of water by pipes, and in the removal from the heart of the town of that greatest of nuisances, the butchers' shambles. The population of the town in 1831 was 6130.

The burgh, in conjunction with Banff, Cullen, Inverary, and Kintore, sends one member to parliament.

ELGIN MARBLES, the designation given to a collection of antient sculpture, chiefly from the Acropolis of Athens, whence it was obtained by the Earl of Elgin (who had been the English ambassador to Turkey) between the years 1801 and 1812. This collection was purchased in pursuance of an act of the legislature, dated July 1st, 1816, for the sum of 35,000*l.*, and is now deposited in the British Museum, in a room built especially for its reception.

The Parthenon, or Temple of Minerva, at Athens, whence the more important of these sculptures were obtained, was built during the administration of Pericles, about the year B.C. 448. It was constructed entirely of white marble from Mount Pentelicus; Callicrates and Ictinus were its architects; and its sculptures were produced partly by the hand and partly under the direction of Phidias.

The sculptures of the Parthenon in the Elgin collection are of three descriptions: Metopes; a portion of the Frieze of the cella; and Statues and their parts from the tympana or pediments.

The *Metopes* are fifteen in number, from the frieze of the peristyle on the southern side of the building, and bear reference to the contest between the Centaurs and the Lapithæ. The Centaurs were invited to the nuptials of Pirithous, king of the Lapithæ. During the marriage-feast one of them, named Eurytion or Eurytus, elated by wine, offered violence to the person of Hippodamia, the bride. This outrageous act was immediately resented by Theseus the friend of Pirithous, who, hurling a large vessel of wine at the head of the offender, brought him lifeless to the ground. A general engagement then ensued between the two parties; and the Centaurs not only sought to revenge the death of their companion Eurytus, but likewise attempted to carry off all the females who were guests at the nuptials. In this conflict, sustained on both sides with great fury, the Centaurs were finally vanquished. Such is the general outline of the mythic history represented in the Metopes. There is a sixteenth Metope, placed as No. 9; but it is a cast from one now in the Louvre gallery at Paris, the original of which, formerly belonging to the same series, was purchased for that collection in 1818, at the sale of the Count de Choiseul Gouffier, who before the French Revolution had been his king's ambassador in Turkey. The most interesting of the Elgin Metopes are Nos. 3, 11, 12, and 13. The three last mentioned are the finest in point of execution.

In an uninterrupted series of very low relief, placed round the cella, immediately below the ceiling of the porticoes of the Parthenon, was the *Frieze*, representing the solemn quinquennial procession, called the Panathenæa. The procession was represented as advancing in two parallel columns from west to east, one along the northern, the other along the southern side of the temple, and facing inwards after turning the two angles of the eastern front, and meeting towards its centre. Such was the frieze in its original position. Of its remains the Elgin collection possesses an extent, in slabs and fragments of marble, beginning at No. 17, of rather more than 249 ft., with a continuation of plaster casts of more than 76 ft. The greater part of the last are from portions of the sculpture which were not brought away, including a single slab, No. 23, which likewise belonged to the Count de Choiseul, now in the gallery of the Louvre; all forming a total of representation from the frieze of very near 326 ft. The bas-reliefs which at present compose the frieze in the Elgin Room, as far as they extend, are placed in the same order in which they were originally seen upon the Parthenon. Those on the principal front of the temple, namely, the east, are placed first, then follow those of the north, and lastly those of the west and south. They are arranged, in short, in the same manner in which the spectator viewed them as he approached the temple by the east and walked round it by the north, west, and south. But the spectator in the Elgin Room has to keep in mind that what formerly surrounded an exterior wall now lines the interior of a room.

The slabs 17 to 25, on the left of the entrance into the room, form the eastern frieze, the portion which occupied the east end of the temple. The figures on slab 17, the Virgins of Attica, head the procession from the southern frieze. The slab 19, the longest in the collection, stood immediately above the eastern entrance or door, and was the centre of the composition. In this slab, upon the left, a Priestess is represented, supposed to be the wife of the principal archon, or chief magistrate of Athens, in the act of receiving from two canephori, or bearers of the mystic baskets, the articles serving for the rites of sacrifice. To her left stands the Archon, in a drapery which reaches from the head to the feet, receiving from the hands of a youth a piece of cloth folded in a square form in numerous thicknesses, conjectured to be the peplus, or embroidered veil, the sail of the Panathenaic ship, and the principal ornament of the procession. On each side of the groups which represent the priestess and archon are various seated figures, among which Jupiter, Minerva, Triptolemus, Æsculapius, and Hygeia are the most conspicuous. Another train of females head the procession as it comes from the northern frieze; and here the sculptures which adorned the eastern front of the Parthenon terminate. This part of the frieze is greatly mutilated; but the explanation of it is aided by some drawings of the Parthenon made in 1674 by Jacques Carrey for the Marquis de Nointel, at a time when the sculptures were a little more perfect. These drawings are in the Royal Library at Paris, and copies of them are in the British Museum.

From the Nointel drawings it appears that the virgins who led the procession from the northern frieze, like those on the southern side, were followed by oxen led as victims; the foreigners settled in Athens were likewise represented, with the players on the flute and lyre; and a troop of citizens closed the train of persons on foot. But all these have disappeared. Nineteen metopes and a large portion of the northern frieze fell when the Acropolis was besieged by the Venetians in 1687, and these subjects were amongst them. The slabs with which the remains of this frieze now open, No. 26 to 31, consist of chariots and charioteers in action, followed by a train of horsemen, Athenian citizens of the second class, who served in the cavalry. This, the most beautiful portion of the whole frieze, extends from No. 32 to 45; in the forms and actions of the horses, in the attitudes and costumes of the riders, and in the distribution of the figures, the sculptors seem to have reached the highest excellence of their art in the department of low relief. The bridles of the horses, in many of the slabs here referred to, were originally of gilded bronze, as appears by the holes left in the marble. Small pieces of the bronze itself were found by lord Elgin's formatori when taking moulds for him from this part of the frieze in its original position.

A single slab of the western frieze (but of exquisite beauty, No. 47), is all which the Museum possesses in marble. Plaster casts of fourteen slabs, which form the remainder of the western frieze, and which are still attached to the Temple, follow it, numbered 48 to 61. The western frieze extended over the front, and over the antæ of the opisthodomos, or back chamber. The direction of the figures is the same as that on the north side, namely, from right to left. There is a peculiarity, too, in the frieze of the west end, which distinguishes it from that on the north and south sides of the temple. The subjects represented on the slabs of those two sides run one into another: that is, what was left imperfect in one slab is completed in the next; whereas in the west end the subjects are nearly complete on each piece of marble. The western frieze is likewise distinguished from those of the two sides of the temple by the comparatively few figures introduced into it.

We now come to that portion of the frieze which enriched the southern side of the Temple. The direction of the figures which form it is from left to right, and the numbers being in continuity from the western frieze, begin with the end of the procession, and extend from 62 to 90, round to the door of entrance into the Elgin room. In this, as in the western frieze, the spectator is supposed to have his face turned respectively to the north and south sides of the temple. A considerable number of the slabs, No. 62 to 77, represent horsemen; 78 to 82 consist of chariots; a collection of citizens and old men, corresponding with those of the northern frieze, but more numerous, preceded these; all, however, but a single fragment of four women (No. 83) have disappeared. In the slabs and fragments numbered 84 to 90 we see the sacrificial oxen, and upon the turn of the slab 90 is a figure, believed to be that of a magistrate looking round upon the procession which follows him. He is interposed between the end of the procession on the northern, and the beginning of that upon the eastern frieze.

Of the *Statues* and fragments from the tympana, or pediments, of the Parthenon, those toward the southern end of the Elgin Room, No. 91 to 98, are from the eastern pediment, the allegory of which represented the Birth of Minerva; these consist of the neck, the shoulders, and the arms of the figure of Hyperion rising from the sea, the Horses of Hyperion, the recumbent statue called Theseus, the goddesses, supposed to be Ceres and Proserpine, Iris with her veil inflated, Victory winged, the Fates, and the head of one of the Horses of Night. Those toward the northern end, No. 99 to 106, are from the western pediment, the allegory of which represented the Contest of Minerva and Neptune for the guardianship of Attica. With the exception of the first figure, the Ilissus, or River God, they are fragments, and were broken in an effort to remove them from the pediment after the siege of 1687. The greater part were recovered by lord Elgin by excavating below a house which had been built out of the ruins beneath the pediment, and which he had purchased. They consist of the torso of Cecrops, a fragment of the face and the chest of Minerva, the upper part of the torso of Neptune, a fragment of the Ericthonian Serpent, the torso of Apteral Victory, and the lower part, or rather lap, of the figure of Latona. M. Quatremère de Quincy, in his 'Monumens et Ouvrages d'Art Antique,' fol., Par., 1829, has given two plates of the pediments of the Parthenon in which all the figures are conjecturally restored.

Between, and separating the sculptures of the two pediments (No. 119), stands an imperfect statue of a youth of the size of life, of exquisite workmanship, supposed to have formed part of a group of Dædalus and Icarus: all that is certainly known of it, is, that it came in fragments, and from the Acropolis.

Casts from the temple of Theseus, and others from the bas-reliefs of the choragic monument of Lysicrates, are let into the eastern wall of the Elgin Room, the first above; the latter, at the northern end, below the Panathenaic frieze.

Of the remainder of the Elgin collection, it may be sufficient to name a few marbles of highest character, such as the colossal statue of Bacchus, from the choragic monument of Thrasyllus, No. 111, and the Caryatide, from the Temple of Pandrosus, No. 128. Of architectural fragments, the pieces of frieze, from the treasury of Atreus, at Mycenæ, Nos. 177, 180, are the most antient; the capital and portion of a shaft, No. 112, give a notion of the magnitude of the columns of the Parthenon: and the capital and shaft from the temple of Erectheus, No. 126, present the most beautiful example of the Ionic order now known. The frieze of the temple of Erectheus is also one of the most valuable parts of the collection. Among the inscriptions, the Sigean, written in the most antient Greek characters, and in the Boustrophedon manner, No. 107, claims the first place, followed by numerous others relating to the temples and buildings of Athens, some containing decrees or treaties, and a few inventories of the treasurers of the Parthenon: sepulchral inscriptions, urns, and stelæ abound in the collection; and among these the epitaph on the warriors who fell at Potidæa. (Thucyd. i. 63.) Votive bas-reliefs and offerings are also preserved in it in large number. The last article we shall name is a vessel of beautiful form, an urn of bronze; it was found in a tumulus situated on the road which leads from the Piræus to the Salaminian ferry and Eleusis, enclosed within the marble vase in which it now stands, and in it was a deposit of burnt bones, a lachrymatory of alabaster, and a sprig of myrtle in gold. It is supposed, from the last article, to have contained the ashes of some amatory poet.

The possession of the Elgin collection has established a national school of sculpture in our country, founded on the noblest models which human art has ever produced. A tribute of thanks is due to the nobleman to whose exertions the nation is indebted for it. If Lord Elgin had not removed them, the greater part would long since have been totally destroyed. In the last siege of Athens the Parthenon suffered additional damage.

ELIMINATION (Algebra), the process of reducing a number of equations, containing certain letters, to a smaller number, in which one or more of the letters shall not be found. The simplest case of elimination, and therefore the best adapted for the explanation of the term, is the following: if A be equal to B and B be equal to C, then A is equal to C. In the result, B is eliminated. Any operation of algebra may produce elimination. We give four instances in which such a result is obtained by addition, subtraction, multiplication, and division.

1. $x+y=12$, $x-y=8$; add, $2x=20$: y is eliminated.

2. $x+z=a$, $y+z=b$; subtract, $x-y=a-b$: z is eliminated.

3. $xy=a$, $\frac{2x}{3y}=b$; multiply, $\frac{2}{3}x^2=ab$: y is eliminated.

4. $xy=a$, $yz=b$; divide, $\frac{x}{z}=\frac{a}{b}$: y is eliminated.

The process of elimination, in the case of more complicated equations, becomes difficult and frequently impracticable. So much is this subject connected with the theory of equations, that a treatise on the first would be the largest portion of one on the second. The writings on this subject are scattered, but most works on algebra contain all that is absolutely necessary.

ELIOT, JOHN, often called the apostle of the Indians, was a native of England, born in 1604. He was educated at the university of Cambridge, and distinguished himself by proficiency in theology and in antient languages. Having seceded from the established church and embraced the ministry, he emigrated, like many other sufferers for conscience, to New England, and arrived at Boston in 1631. In the following year he married, and finally established his abode at Roxbury, only a mile distant, as minister of a small congregation, composed chiefly of friends to whose religious service he had previously engaged himself, in case they should follow him across the Atlantic. In discharging the duties of his function he was zealous and efficient; and he was also earnest in spreading the blessings of education, by promoting the establishment of schools.

Having qualified himself, by learning their language, to become a preacher to the Indians, he commenced his missionary labours, October 28, 1646, before a large assembly collected by his invitation a few miles from Roxbury. Many, it is said, on this and on a subsequent occasion, seemed deeply touched; and it is evident, by the questions asked of the preacher, that the understandings, as well as the feelings of his audience, were roused. From the chiefs and priests, or conjurors, both of whom felt interested in maintaining antient manners and superstitions, he usually met with opposition. Still no small number were converted; and these, abandoning their savage life, united in communities, to which lands were granted by the provincial government. In 1674 there were seven Indian praying-towns, containing near 500 persons, thus settled in Massachusetts, under the care of Eliot, besides a still greater number of converts, to whom land had not been thus assigned.

In travelling among the woods Eliot underwent great physical labour and hardship, and his mental labour was unremitting. He translated the Old and New Testament and several religious treatises into the Indian tongue which were printed for distribution chiefly at the expense of the Society for Propagating the Gospel; he composed an Indian grammar, and several treatises on subjects not directly religious, for the use of his converts and pupils, and also wrote a number of English works. Nevertheless he lived to the age of 86, and resigned his pastoral charge at Roxbury only two years before his death, which took place in 1690. A colleague had been appointed to assist him in 1650, in consequence of his necessary and frequent absence. His private character appears to have been very beautiful: he was not only disinterested and zealous, but benevolent, self-denying, and humble. Baxter says, in one of his letters, 'There was no man on earth whom I honoured above him.' (Cotton Mather, *Eccl. Hist.* b. iii., and *Life of John Elliot*. A modern *Life of John Elliot*, Edinburgh, 1828, 12mo., contains a good deal of information concerning the early attempts to convert the Indians.)

ELIOTT, GEORGE AUGUSTUS, was born at Stobbs in Scotland, in 1718. He studied the mathematics and other sciences at Edinburgh, and afterwards went to the University of Leyden, where he made great proficiency in classical literature, and was remarkable for the elegance and fluency with which he spoke the French and German languages. His knowledge of tactics was acquired in the celebrated school at La Fère. Having attained the rank of lieutenant-colonel, he accompanied George II. to Germany in 1743 as his Majesty's aid-de-camp, and was wounded in the battle of Dettingen. In the Seven Years' War, he fought in 1757 under the duke of Cumberland and Prince Ferdinand of Brunswick, and greatly distinguished himself at the head of his celebrated regiment of light-horse, raised and formed by himself, and called by his name. He was second in command in the expedition against the Havannah, the capture of which important place was highly honourable to the courage and perseverance of the British troops. After the peace he obtained the rank of lieutenant-general, and was appointed in 1775 to the government of Gibraltar. His memorable defence of that important fortress against the combined efforts of France and Spain was the last exploit of his life, the splendour of which so far eclipsed all that had preceded it, that he is most familiarly known as 'the gallant defender of Gibraltar.' After the peace he was created a peer by the title of Lord Heathfield. His lordship died at his favourite country seat Kalkofen, near Aix-la-Chapelle, whither he had gone for the benefit of the waters, July 6, 1790, in the seventy-third year of his age. [GIBRALTAR.]

ELIQUATION, an operation by means of which a more fusible substance is separated from another which is less fusible. It was formerly employed in the purification of silver, but is now little used.

ELIS or ELEA, a district of the Peloponnese, included between Achaia, Arcadia, Messenia, and the sea. Its coast line extended from the promontory Araxus to the mouth of the river Neda. Elis was originally divided into three parts, the northern, called hollow Elis (κοιλη Ἠλις), the southern, Triphylia; and that in the middle, Pisatis. The earliest inhabitants of this territory were the Epeans and Pylians, who occupied the whole western coast of the Peloponnese from Araxus to Taÿgetum, the line of demarcation between these two tribes being on a line with Cape Ichthys. (Leake's *Morea*, ii., p. 182.) The chief towns of the Epeans were, in the time of Homer, Elis and Buprasium. (*Iliad*, B. 615, Ψ. 630.) The Eleans were the first people in the Peloponnese who experienced the effects of the Dorian invasion, as their territory was the landing-place of the invaders, and was assigned by them to their ally the Ætolian Oxylus, who claimed to be descended from Ætolus, the son of Endymion, a mythical king of the Epeans. Oxylus and his new subjects conquered Pisa and Olympia, where the Olympian games were established about 1104 B.C., though they were not regularly celebrated till Corœbus gained the prize in 776 B.C. Those games exercised a most important influence on the subsequent destinies of Elis. The reverence with which the Greeks in general regarded this festival was extended to the country in which it took place, and the districts in the neighbourhood of the cities of Olympia and Elis were always free from the ravages of war so long as the games maintained their respectability. In the earlier periods the people of Pisa, which was in the immediate neighbourhood of Olympia, sometimes presided over the celebration of the games; but the wars between Messenia and Sparta enabled the Eleans to form a very intimate connexion with the Spartans, which ended in a tacit understanding that the intervening sea-coast should be divided between the two powers; the resistance of the Pisatæ only brought upon them the destruction of their city and the annexation of all Triphylia to Elis. This happened as early as the 48th Olympiad; and when Agis invaded Elis and occupied Olympia in the 95th Olympiad (400 B.C.), the power of the Pisatæ was so entirely overthrown that the Spartan king would not take the administration of the games from the Eleans, on the ground that those who claimed it were mere peasants and not fit for so great a charge. (Xen. *Hellenica*, iii., c. 2.) The harmony between Elis and Sparta was interrupted during the Peloponnesian war by the countenance which the Spartans afforded to the Lepreatæ, and the Eleans endeavoured to avenge this interference by excluding the Spartans from the Olympic games. After some years of misunderstanding, they were compelled to return to the Spartan alliance by the invasion of Agis, mentioned above. In 365 B.C. they were engaged in a war with the Arcadians, which deprived them of almost all their southern territories. The Eleans were firm supporters of the Ætolians during the social war, and never joined the Achæan league.

The city of Elis was originally called Ephyra, and, according to Colonel Leake, changed its name in the time of Oxylus. (*Travels in the Morea*, i., p. 6.) The site of the antient capital is now called Paleopoli. 'The ruins consist of several masses of Roman tile and mortar, with many wrought blocks of stone and fragments of sculpture scattered over a space of two or three miles in circumference.' (Leake, i., p. 5.) The soil was sandy, argillaceous, or a rich mould, and stone was found only in the mountains. (Leake, ii., p. 179.) The territory was very fertile and populous, and is said to have been the only one in Greece which produced flax. Its principal rivers are the Alpheius (Rofea) and the Peneius (Gastuni). Its chief mountain, Pholoe, was celebrated in antient poetry and mythology. This name appears to have been given to all the high lands of Elis north of the river Alpheius. The principal sea-port of Elis was Cyllene, which Colonel Leake supposes to be the modern Chiarenza. (*Travels in the Morea*, ii., p. 174.)

Coin of Elis.

British Museum. Actual Size. Silver. Weight, 183$\frac{7}{10}$ grains.

ELIXIR OF VITRIOL. [Sulphuric Acid.]

ELIZABETH, queen of England, the daughter of Henry VIII. by his second wife, Anne Boleyn, was born at Greenwich, 7th September, 1533. She was not three years old therefore when her mother was brought to the block, in May, 1536. Very soon after her birth it was declared, by the Act 25 Henry VIII., c. 22, that if Queen Anne should decease without issue male, to be begotten of the body of the king, then the crown, on the death of the king, should go 'to the Lady Elizabeth, now princess, and to the heirs of her body lawfully begotten.' By this act therefore Henry's female issue by his present queen was placed in the order of succession before the male issue he might have by any future wife. By the 28 Henry VIII., c. 7, however, passed after his marriage with Jane Seymour, his two former marriages were declared to be unlawful and void, and both Elizabeth and her elder sister Mary were bastardized. But finally, by the 35 Henry VIII., c. 1, passed soon after his marriage with his last wife, Catharine Parr, it was declared that if Prince Edward should die without heirs, then the crown should remain first to the Lady Mary, and, failing her, to the Lady Elizabeth. This was the last legal settlement of the crown, by which her position was affected, made previous to Elizabeth's accession; unless indeed she might be considered to be excluded by implication by the Act 1 Mary, st. 2, c. 1, which legitimatized her sister Mary, declared the validity of Henry's first marriage, and pronounced his divorce from Catherine of Aragon to be void.

In 1535 a negotiation was entered into for the marriage of Elizabeth to the duke of Angoulême, the third son of Francis I. of France; but it was broken off before any agreement was come to. In 1546 also Henry proposed to the Emperor Charles V., with the view of breaking off a match then contemplated between the emperor's son, the prince of Spain, afterwards Philip II., with a daughter of the French king, that Philip should marry the Princess Elizabeth; but neither alliance took place. Elizabeth's next suitor, though he does not seem to have formally declared his pretensions, was the protector Somerset's unfortunate brother, the Lord Seymour of Sudley. He is said to have made some advances to her even before his marriage with Queen Catharine Parr, although Elizabeth was then only in her fourteenth year. Catharine, who died a few months after her marriage (poisoned, as many supposed, by her husband), appears to have been made somewhat uncomfortable while she lived by the freedoms the princess continued to allow Sudley to take with her, which went beyond ordinary flirtation; the scandal of the day indeed was, that 'the Lady Elizabeth did bear some affection to the admiral.' After his wife's death he was accused of having renewed his designs upon her hand; and it was part of the charge on which he was attainted that he had plotted to seize the king's person and to force the princess to marry him; but his execution in the course of a few months stopped this and all his other ambitious schemes.

In 1550, in the reign of Edward VI., it was proposed that Elizabeth should be married to the eldest son of Christian III. of Denmark; but the negotiation seems to have been stopped by her refusal to consent to the match. She was a favourite with her brother, who used to call her his 'sweet sister Temperance;' but he was nevertheless prevailed upon by the artful and interested representations of Dudley to pass over her, as well as Mary, in the settlement of the crown which he made by will a short time before his death. [Edward VI.]

Camden gives the following account of the situation and employments of Elizabeth at this period of her life, in the introduction to his history of her reign. She was both, he says, 'in great grace and favour with King Edward, her brother, as likewise in singular esteem with the nobility and people; for she was of admirable beauty, and well deserving a crown, of a modest gravity, excellent wit, royal soul, happy memory, and indefatigably given to the study of learning; insomuch, as before she was seventeen years of age she understood well the Latin, French, and Italian tongues, and had an indifferent knowledge of the Greek. Neither did she neglect music, so far as it became a princess, being able to sing sweetly, and play handsomely on the lute. With Roger Ascham, who was her tutor, she read over Melanchthon's Common-Places, all Tully, a great part of the histories of Titus Livius, certain select orations of Isocrates (whereof two she turned into Latin), Sophocles's Tragedies, and the New Testament in Greek, by which means she both framed her tongue to a pure and elegant way of speaking, &c.' (*English Translation in Kennet's Collection.*)

It appears from what Ascham himself tells us in his 'Schoolmaster' that Elizabeth continued her Greek studies after she ascended the throne: 'after dinner' (at Windsor Castle, 10th December, 1563), he says, 'I went up to read with the Queen's Majesty: we read there together in the Greek tongue, as I well remember, that noble oration of Demosthenes against Æschines for his false dealing in his embassage to King Philip of Macedonia.'

On the death of Edward, Camden says that an attempt was made by Dudley to induce Elizabeth to resign her title to the crown for a sum of money, and certain lands to be settled on her: her reply was, 'that her elder sister, the Lady Mary, was first to be agreed withal; for as long as the said Lady Mary lived she, for her part, could challenge no right at all.' Burnett says that both she and Mary, having been allured by messages from Dudley, who no doubt wished to get them into his hands, were on their way to town, when the news of Edward's approaching end induced them to turn back. When Mary came to London after being proclaimed queen, the Lady Elizabeth went to meet her with 500 horse, according to Camden, others say with 2000. Fox, the martyrologist, relates that 'Queen Mary, when she was first queen, before she was crowned, would go no whither, but would have her by the hand, and send for her to dinner and supper.' At Mary's coronation, in October, 1553, according to Holinshed, as the queen rode through the city towards Westminster, the chariot in which she sat was followed by another 'having a covering of cloth of silver, all white, and six horses trapped with the like, wherein sate the Lady Elizabeth and the Lady Anne of Cleve.' Another account says that Elizabeth carried the crown on this occasion.

From this time Elizabeth, who had been brought up in their religion, became the hope of the Protestant party. Her position however was one of great difficulty. At first she refused to attend her sister to mass, endeavouring to soothe Mary by appealing to her compassion: after some time however she yielded an outward compliance. The Act passed by the parliament, which, although it did not mention her by name, bastardized her by implication, by annulling her father's divorce from his first wife, could not fail to give her deep offence. Availing herself of an order of Mary, assigning her a rank below what her birth entitled her to, as an excuse for wishing to retire from court, she obtained leave to go to her house at Ashridge, in Buckinghamshire, in the beginning of December. About the same time Mary is supposed to have been irritated against her sister by the preference shown for Elizabeth by her kinsman Edward Courtenay, whom, after releasing from the Tower, the queen had restored to his father's title of earl of Devon, and is said to have had some thoughts of marrying. It appears to have been part of the design of the rash and unfortunate attempt of Wyatt, in the beginning of the following year, to bring about a marriage between Elizabeth and Courtenay, who was one of those engaged in the revolt. This affair involved Elizabeth in the greatest danger. On the 8th of February, the day after the suppression of the insurrection, certain members of the council were sent with a party of 250 (other accounts say 600) horse to Ashridge, with orders to bring her to London 'quick or dead.' They arrived during the night, and although they found her sick in bed, they immediately forced their way into her chamber, and informed her that she must 'prepare against the morning, at nine of the clock, to go with them, declaring that they had brought with them the queen's litter for her.' She was so ill however that it was not till the fourth night that she reached Highgate. Here, says Fox, 'she being very sick, tarried that night and the next day; during which time of her abode there came many pursuivants and messengers from the court, but for what purpose I cannot tell.' When she entered London great multitudes of people came flocking about her litter, which she ordered to be opened to show herself. The city was at this time covered with gibbets; fifteen had been erected in different places, on which fifty-two persons were hanged; and it appears to have been the general belief that Elizabeth would suffer, as Lady Jane Grey had done a few days before. From the time of her arrival in town she was kept in close confinement in Whitehall. It appears that her case was twice debated in council; and although no evidence had been obtained by all the exertions of the crown lawyers which went farther than to make it probable that Wyatt and Courtenay had solicited her to give her assent to their projects of revolt, her immediate destruction was strongly advised by some of the members. Elizabeth long afterwards used to declare that she fully expected death, and that she knew her sister thirsted for her blood. It was at last determined however that for the present she should only be committed to the Tower, although she seems herself still to have been left in doubt as to her fate. She was conveyed to her prison by water on the morning of the 11th of March, being Palm Sunday, orders being issued that, in the mean time, 'every one should keep the church and carry their palms.' In attempting to shoot the bridge the boat was nearly swamped. She at first refused to land at the stairs leading to the Traitor's Gate; but one of the lords with her told her she should have no choice; 'and because it did then rain,' continues Fox, 'he offered to her his cloak, which she (putting it back with her hand with a good dash) refused. So she coming out, having one foot upon the stair, said, "Here landeth as true a subject as ever landed at these stairs; and before thee, O God, I speak it, having none other friends but thee alone."' She remained in close custody for about a month, after which she was allowed to walk in a small garden within the walls of the fortress. On the 19th of May she was removed, in charge of Sir Henry Bedingfield, to Woodstock. Here she was guarded with great strictness and severity by her new jailor. Camden says that at this time she received private letters both from Henry II. of France, inviting her to that country, and from Christian III. of Denmark (who had lately embraced the Protestant religion), soliciting her hand for his son Frederick. When these things came to the ears of her enemies, her life was again threatened. 'The Lady Elizabeth,' adds the historian, 'now guiding herself as a ship in blustering weather, both heard divine service after the Romish manner, and was frequently confessed; and at the pressing instances and menaces of Cardinal Pole, professed herself, for fear of death, a Roman Catholic. Yet did not Queen Mary believe her.' She remained at Woodstock till April, 1555, when she was, on the interposition, as it was made to appear, of King Philip, allowed to take up her residence at the royal palace of Hatfield, under the superintendence of a Catholic gentleman, Sir Thomas Pope, by whom she was treated with respect and kindness. Philip was anxious to have the credit of advising mild measures in regard to the princess, and perhaps he was really more disposed to treat her with indulgence than his wife. According to Camden, some of the Roman Catholic party wished to remove her to a distance from England, and to marry her to Emanuel Philibert, duke of Savoy; but Philip opposed this scheme, designing her for his eldest son Charles (the unfortunate Don Carlos). Elizabeth also was herself averse to a marriage with the Savoyard.

She continued to reside at Hatfield till the death of Mary, which took place on the 17th November, 1558. The news was communicated the same day, but not till after the lapse of some hours, to the House of Lords, which was sitting at the time. 'They were seized at first,' says Camden (or rather his translator), 'with a mighty grief and surprise, but soon wore off those impressions, and, with an handsome mixture of joy and sorrow, upon the loss of a deceased and the prospect of a succeeding princess, they betook themselves to public business, and, with one consent, agreed that the Lady Elizabeth should be declared the true and lawful heir of the kingdom according to the act of succession made 35 Henry VIII.' It is probable that Elizabeth's outward compliance in the matter of religion had considerable effect in producing this unanimity, for the majority of the lords were Catholics, and certainly both the bishops and many of the lay peers would have been strongly inclined to oppose her accession if they had expected that she would venture to disturb the established order of things. The members of the lower house were now called up, and informed of what had been done by Archbishop Heath, the chancellor. He concluded by saying that, since no doubt could or ought to be made of the Lady Elizabeth's right of succession, the House of Peers only wanted their consent to proclaim her queen. A vote to that effect immediately passed by acclamation: and, as soon as the houses rose, the proclamation took place. Elizabeth came to London on Wednesday, the 23rd: she was met by all the bishops in a body at Highgate, and escorted by an immense multitude of people of all ranks to the metropolis, where she took up her lodgings at the residence of Lord North, in the Charter House. On the afternoon of Monday the 28th she made a progress through the city in a chariot to the royal palace of the Tower: here she continued till Monday the 5th of December, on the morning of which day she removed by water to Somerset House.

One of Elizabeth's earliest acts of royalty, by which, as Camden remarks, she gave proof of a prudence above her years, was what we should now call the appointment of her ministers. She retained of her privy council thirteen Catholics, who had been of that of her sister, including Heath, archbishop of York and lord chancellor; William Paulett, marquis of Winchester, the lord high treasurer; Edward, Lord Clinton, the lord high admiral; and William, Lord Howard of Effingham, the lord chamberlain. But with these she associated seven others of her own religion, the most eminent of whom was the celebrated William Cecil, afterwards Lord Burleigh, whom she appointed to the office of secretary of state, which he had already held under Edward VI. Soon after, Nicholas Bacon (the father of the great chancellor) was added to the number of the privy councillors, and made at first lord privy seal, and next year lord keeper of the great seal, on the resignation of Archbishop Heath. Cecil became lord high treasurer on the death of the marquis of Winchester in 1572, and continued to be Elizabeth's principal adviser till his death in 1598, when he was succeeded by Thomas Sackville, Lord Buckhurst (afterwards made earl of Dorset by James I.). Of the other persons who served as ministers during Elizabeth's long reign, by far the most worthy of note were Sir Francis Walsingham (who was principal secretary of state from 1573 till his death in 1590, and was all the time they were in office together the confidential friend and chief assistant of Cecil the premier, under whose patronage he had entered public life), and Burleigh's son, Robert Cecil (afterwards earl of Salisbury), who succeeded Walsingham as secretary of state, and held that office till the end of the reign. Among the other persons of ability that were employed in the course of the reign, in different capacities, may be mentioned Sir Nicholas Throckmorton; 'a man,' says Camden, 'of a large experience, piercing judgment, and singular prudence, who discharged several embassies with a great deal of diligence and much to his praise, yet could he not be master of much wealth, nor rise higher than to those small dignities (though glorious in title) of chief cupbearer of England and chamberlain of the Exchequer; and this because he acted in favour of Leicester against Cecil, whose greatness he envied;' Sir Thomas Smith, the learned friend of Cheke, who had been one of the secretaries of state along with him under Edward VI., and held the same office again under Elizabeth for some years before his death, in 1577; and Sir Christopher Hatton, who was lord chancellor from 1587 till his death in 1591, and whom Camden, after having related his singular rise from being one of the band of gentlemen pensioners, to which he was appointed by the queen, who was taken with his handsome shape and elegant dancing at a court masque, characterizes as 'a great patron of learning and good sense, and one that managed that weighty part of lord chancellor with that equity and clearness of principle as to be able to satisfy his conscience and the world too.'

The affair to which Elizabeth first applied her attention on coming to the throne, and that in connexion with which all the transactions of her reign must be viewed, was the settlement of the national religion. The opinions of Cecil strongly concurred with her own in favour of the reformed doctrines, to which also undoubtedly the great mass of the people was attached. For a short time however she kept her intentions a secret from the majority of the council, taking her measures in concert only with Cecil and the few others who might be said to form her cabinet. She began by giving permission, by proclamation, to read part of the church service in English, but at the same time strictly prohibited the addition of any comments, and all preaching on controversial points. This however was enough to show the Catholic party what was coming; accordingly, at her coronation, on the 15th January, 1559, the bishops in general refused to assist, and it was with difficulty that one of them, Oglethorp of Carlisle, was prevailed upon to set the crown on her head. The principal alterations were reserved to be made by the parliament, which met on the 25th of this month. Of the acts which were passed, one restored to the crown the jurisdiction established in the reign of Henry VIII. over the estate ecclesiastical and spiritual, and abolished all foreign powers repugnant to the same; and another restored the use of King Edward's book of common prayer, with certain alterations, that had been suggested by a royal commission over which Parker (afterwards archbishop of Canterbury) presided. In accordance with this last statute public worship began to be performed in English throughout the kingdom on Whitsunday, which fell on the 8th of May. By a third act the first fruits and tenths of benefices were restored to the crown, and by a fourth, her majesty was authorized, upon the avoidance of any archbishopric or bishopric, to take certain of the revenues into her own hands; and conveyances of the temporalities by the holder for a longer term than twenty-one years or three lives were made void. The effect of these laws was generally to restore the church to the state in which it was in the reign of Edward VI., the royal supremacy sufficing for such further necessary alterations as were not expressly provided for by statute. A strong opposition was made to the bills in the House of Lords by the bishops; and fourteen of them, being the whole number, with the exception of Anthony, bishop of Llandaff, who, Camden says, 'was the scourge of his diocese,' were now deprived for refusing to take the oath of supremacy. About 100 prebendaries, deans, archdeacons, and heads of colleges, were also ejected. The number of the inferior clergy however that held out was very small, amounting to no more than 80 rectors and other parochial ministers, out of between nine and ten thousand. On this subject it is only necessary farther to state that the frame of ecclesiastical polity now set up, being in all essential particulars the same that still subsists, was zealously and steadily maintained by Elizabeth and her ministers to the end of her reign. The church of England has good reason to look upon her and Cecil as the true planters and rearers of its authority. They had soon to defend it against the Puritans on the one hand, as well as against the Catholics on the other; and they yielded to the former as little as to the latter. The Puritans had been growing in the country ever since the dawn of the Reformation; but they first made their appearance in any considerable force in the parliament which met in 1570. At first their attempts were met on the part of the crown by evasive measures and slight checks; but, in 1587, on four members of the House of Commons presenting to the house a bill for establishing a new Directory of public worship, Elizabeth at once gave orders that they should be seized and sent to the Tower, where they were kept some time. The High Commission Court also, which was established by a clause in one of the acts for the settlement of religion passed in the first year of her reign, was, occasionally at least, prompted or permitted to exercise its authority in the punishment of what was called heresy, and in enforcing uniformity of worship with great strictness. The determination upon which the queen acted in these matters, as she expressed it in a letter to the archbishop of Canterbury, was, 'that no man should be suffered to decline either to the left or to the right hand, from the drawn line limited by authority, and by her laws and injunctions.' Besides the deprivation of their livings, which many of the clergy underwent for their refusal to comply with certain particulars of the established ritual, many other persons suffered imprisonment for violations of the statute of uniformity. It was against the Catholics however that the most severe measures were taken. By an act passed in 1585 (the 27 Eliz. c. 2) every Jesuit or other popish priest was commanded to depart from the realm within forty days, on pain of death as a traitor, and every person receiving or relieving any such priest was declared guilty of felony. Many priests were afterwards executed under this Act.

It was the struggle with popery that moved and directed nearly the whole policy of the reign, foreign as well as domestic. When Elizabeth came to the throne, she found the country at peace with Spain, the head of which kingdom had been her predecessor's husband, but at war with France, the great continental opponent of Spain and the Empire. Philip, with the view of preserving his English alliance, almost immediately after her accession, offered himself to Elizabeth in marriage; but, after deliberating on the proposal, she determined upon declining it, swayed by various considerations, and especially, as it would appear, by the feeling that by consenting to marry her sister's husband on a dispensation from the pope, she would in a manner be affirming the lawfulness of her father's marriage with Catharine of Aragon, the widow of his brother Arthur, and condemning his subsequent marriage with her own mother, the sole validity of which rested on the alleged illegality of that previous connexion. A general peace, however, comprehending all the three powers, and also Scotland, was established in April, 1559, by the treaty of Cateau Cambresis. By this treaty it was agreed that Calais, which had been taken by France in the time of Queen Mary, and formed the only difficult subject of negotiation, should be restored to England in eight years, if no hostile act should be committed by Elizabeth within that period. Scarcely however had this compact been signed when the war was suddenly rekindled, in consequence of the assumption by the new French king, Francis II., of the arms and royal titles of England, in right, as was pretended, of his wife, the young Mary, queen of Scots. Elizabeth instantly resented this act of hostility by sending a body of 5000 troops to Scotland, to act there with the duke of Chatelherault and the lords of the congregation, as the leaders of the Protestant party called themselves, against the government of the queen and her mother, the Regent, Mary of Guise. The town of Leith soon yielded to this force; and the French king was speedily compelled both to renounce his wife's pretensions to the English throne and to withdraw his own troops from Scotland, by the treaty of Edinburgh, executed 7th July, 1560. The treaty however never was ratified either by Francis or his queen; and in consequence the relations between the three countries continued in an unsatisfactory state. Charles IX. succeeded his brother on the throne of France before the end of this year; and in a few months afterwards Mary of Scotland returned to her own country. Meanwhile, although the two countries continued at peace, Elizabeth's proceedings in regard to the church had wholly alienated Philip of Spain. The whole course of events and the position which she occupied had already in fact caused the English queen to be looked upon as the head of the Protestant interest throughout Europe as much as she was at home. When the dispute therefore between the Catholics and the Huguenots or reformed party in France came to a contest of arms, in 1562, the latter immediately applied for assistance to Elizabeth, who concluded a treaty with them, and sent them succour both in men and money. The war that followed produced no events of importance in so far as England was concerned, and was terminated by a treaty signed at Troyes, 11th April, 1564. A long period followed, during which England preserved in appearance the ordinary relations of peace both with France and Spain, though interferences repeatedly took place on each side that all but amounted to actual hostilities. The Protestants alike in Scotland, in France, and in the Netherlands (then subject to the dominion of Philip), regarded Elizabeth as firmly bound to their cause by her own interests; and she on her part kept a watchful eye on the religious and political contentions of all these countries, with a view to the maintenance and support of the Protestant party, by every species of countenance and aid short of actually making war in their behalf. With the Protestant government in Scotland, which had deposed and imprisoned the queen, she was in open and intimate alliance; in favour of the French Huguenots she at one time negotiated or threatened, at another even went the length, scarcely with any concealment, of affording them pecuniary assistance; and when the people of the Netherlands at length rose in revolt against the oppressive government of Philip, although she refused the sovereignty of their country, which they offered to her, she lent them money, and in various other ways openly expressed her sympathy and good will. On the other hand, Philip, although he refrained from any declaration of war, and the usual intercourse both commercial and political long went on between the two countries without interruption, was incessant in his endeavours to undermine the throne of the English queen and the order of things at the head of which she stood, by instigating plots and commotions against her authority within her own dominions. He attempted to turn to account in this way the Catholic interest, which was still so powerful both in England and in Ireland—the intrigues of the Scottish queen and her partizans materially contributing to the same end. The history of Mary Stewart and of the affairs of Scotland during her reign and that of her son must be reserved for a separate article. But it is necessary to observe here, that Mary was not merely the head of the

Catholic party in Scotland, but as the descendant of the eldest daughter of Henry VII., had pretensions to the English crown which were of a very formidable kind. Although she was kept in confinement by the English government after her flight from the hands of her own subjects in 1568, the imprisonment of her person did not extinguish the hopes or put an end to the efforts of her adherents. Repeated rebellions in Ireland, in some instances openly aided by supplies from Spain—the attempt made by the duke of Alva in 1569, through the agency of Vitelli, to concert with the Catholic party the scheme of an invasion of England—the rising of the Catholics of the northern counties under the earls of Northumberland and Westmoreland the same year—the plot of the duke of Norfolk with Ridolfi in 1571, for which that unfortunate nobleman lost his head—the plots of Throgmorton and Creichton in 1584, and of Babington in 1586—to omit several minor attempts of the same kind—all testified the restless zeal with which the various enemies of the established order of things pursued their common end. Meanwhile, however, events were tending to a crisis which was to put an end to the outward show of friendship that had been so long kept up between parties that were not only fiercely hostile in their hearts, but had even been constantly working for each other's overthrow behind the thin screen of their professions and courtesies. The queen of Scots was put to death in 1587, by an act of which it is easier to defend the state policy than either the justice or the legality. By this time also, although no actual declaration of war had yet proceeded either from England or Spain, the cause of the people of the Netherlands had been openly espoused by Elizabeth, whose general, the earl of Leicester, was now at the head of the troops of the United Provinces, as the revolted states called themselves. An English fleet at the same time attacked and ravaged the Spanish settlements in the West Indies. At last, in the summer of 1588, the great Spanish fleet, arrogantly styled the Invincible Armada, sailed for the invasion of England, and was in the greater part dashed to pieces on the coasts which it came to assail. [ARMADA.] From this time hostilities proceeded with more or less activity between the two countries during the remainder of the reign of Elizabeth. Meanwhile Henry III., and, after his assassination in 1589, the young king of Navarre, assuming the title of Henry IV., at the head of the Huguenots, had been maintaining a desperate contest in France with the duke of Guise and the League. For some years Elizabeth and Philip remained only spectators of the struggle; but at length they were both drawn to take a principal part in it. The French war, however, in so far as Elizabeth was concerned, must be considered as only another appendage to the war with Spain; it was Philip chiefly, and not the League, that she opposed in France; just as in the Netherlands, and formerly in Scotland, it was not the cause of liberty against despotism, or of revolted subjects against their legitimate sovereign, that she supported, or even the cause of Protestantism against Catholicism, but her own cause against Philip, her own right to the English throne against his, or that of the competitor with whom he took part. Since the death of Mary of Scotland, Philip professed to consider himself as the rightful king of England, partly on the ground of his descent from John of Gaunt, partly in consequence of Mary having by her will bequeathed her pretensions to him should her son persist in remaining a heretic. Henry IV. having previously embraced Catholicism, made peace with Philip by the treaty of Vervins, concluded in May, 1598; and the death of Philip followed in September of the same year. But the war between England and Spain was nevertheless still kept up. In 1601 Philip III. sent a force to Ireland, which landed in that country and took the town of Kinsale; and the following year Elizabeth retaliated by fitting out a naval expedition against her adversary, which captured some rich prizes, and otherwise annoyed the Spaniard. Her forces continued to act in conjunction with those of the Seven United Provinces both by sea and land.

Elizabeth died on the 24th of March, 1603, in the 70th year of her age and the 45th of her reign. In the very general account to which we have necessarily confined ourselves of the course of public transactions during the long period of the English annals with which her name is associated, we have omitted all reference to many subordinate particulars, which yet strongly illustrate both her personal conduct and character and the history of her government. One of the first requests addressed to her by the parliament after she came to the throne was that she would marry; but for reasons which were probably various, though with regard to their precise nature we are rather left to speculation and conjecture than possessed of any satisfactory information, she persisted in remaining single to the end of her days. Yet she coquetted with many suitors almost to the last. In the beginning of her reign, among those who aspired to her hand, after she had rejected the offer of Philip of Spain, were Charles, archduke of Austria (a younger son of the Emperor Ferdinand I.); James Hamilton, earl of Arran, the head of the Protestant party in Scotland; Erick XIV., king of Sweden (whom she had refused in the reign of her sister Mary); and Adolphus, duke of Holstein (uncle to Ferdinand II. of Denmark). 'Nor were there wanting at home,' adds Camden, 'some persons who fed themselves (as lovers use to do) with golden dreams of marrying their sovereign;' and he mentions particularly Sir William Pickering, 'a gentleman well born, of a narrow estate, but much esteemed for his learning, his handsome way of living, and the management of some embassies into France and Germany;' Henry earl of Arundel; and Robert Dudley (afterwards the notorious earl of Leicester), a younger son of the duke of Northumberland, 'restored by Queen Mary to his honour and estate; a person of youth and vigour, and of a fine shape and proportion, whose father and grandfather were not so much hated by the people, but he was as high in the favour of Queen Elizabeth, who out of her royal and princely clemency heaped honours upon him, and saved *his* life whose father would have destroyed *hers*.' Leicester continued the royal favourite till his death in 1588, disgracing by his profligacy the honours and grants that were lavished upon him by Elizabeth, who, having appointed him commander-in-chief of the forces which she sent to the assistance of the Dutch, insisted upon maintaining him in that situation, notwithstanding the mischiefs produced by his incapacity and misconduct, and, at the perilous crisis of the Spanish invasion, was on the point of constituting him lieutenant-governor of England and Ireland. Camden says that the letters patent were already drawn, when Burghley and Hatton interfered, and put a stop to the matter. Of the foreign princes that have been mentioned, the archduke Charles persisted longest in his suit: a serious negotiation took place on the subject of the match in 1567, but it came to nothing. In 1571 proposals were made by Catherine de' Medici for a marriage between Elizabeth and her son Charles IX., and afterwards in succession with her two younger sons, Henry duke of Anjou (afterwards Henry III.), and Francis duke of Alençon (afterwards duke of Anjou). The last match was again strongly pressed some years after; and in 1581 the arrangement for it had been all but brought to a conclusion, when, at the last moment, Elizabeth drew back, declining to sign the marriage articles after she had taken up the pen for the purpose. Very soon after the death of Leicester the young Robert Devereux, earl of Essex, whose mother Leicester had married, was taken into the same favour that had been so long enjoyed by the deceased nobleman; and his tenure of the royal partiality lasted, with some intermissions, till he destroyed himself by his own hot-headedness and violence. He was executed for a frantic attempt to excite an insurrection against the government in 1601. Elizabeth, however, never recovered from this shock; and she may be said to have sealed her own sentence of death in signing the death-warrant of Essex.

Both the personal character of Elizabeth and the character of her government have been estimated very differently by writers of opposite parties. That she had great qualities will hardly be disputed by any one who duly reflects on the difficulties of the position she occupied, the consummate policy and success with which she directed her course through the dangers that beset her on all sides, the courage and strength of heart that never failed her, the imposing attitude she maintained in the eyes of foreign nations, and the admiration and pride of which she was the object at home. She was undeniably endowed with great good sense, and with a true feeling of what became her place. The weaknesses, and also the more forbidding features of her character, on the other hand, are so obvious as scarcely to require to be specified. Many of the least respectable mental peculiarities of her own sex were mixed in her with some of the least attractive among those of the other. Her selfishness and her vanity were both intense—and of the sympathetic affections and finer sensibilities of every kind she was nearly destitute.

Her literary knowledge was certainly very considerable; but of her compositions (a few of which are in verse) none are of much value, nor evidence any very superior ability, with the exception perhaps of some of her speeches to the parliament. A list of the pieces attributed to her may be found in Walpole's 'Royal and Noble Authors.'

There has been a good deal of controversy as to the proportion in which the elements of liberty and despotism were combined in the English constitution, or in the practice of the government, in the reign of Elizabeth; the object of one party being to convict the Stewarts of deviating into a new course in those exertions of the prerogative and that resistance to the popular demands which led to the civil wars of the seventeenth century,—of the other, to vindicate them from that charge, by showing that the previous government of Elizabeth had been as arbitrary as theirs. Upon this question the reader may consult the elaborate exposition with which Hume closes his account of this reign, along with the remarks upon it in the Introduction to Mr. Brodie's 'History of the British Empire, from the Accession of Charles I. to the Restoration.' There can be no doubt that the first James and the first Charles pursued their object with much less art, and much less knowledge and skill in managing the national character, as well as in less advantageous circumstances, than Elizabeth and her ministers; they did not know nearly so well when to resist and when to yield as she did; but it may notwithstanding be reasonably questioned if her notion of the rightful supremacy of the crown was very different from theirs. However constitutional also (in the modern sense of the term) may have been the general course of her government, her occasional practice was certainly despotic enough. She never threw aside the sword of the prerogative, although she may have usually kept it in its scabbard.

Her reign, however, take it all in all, was a happy as well as a glorious one for England. The kingdom, under her government, acquired and maintained a higher and more influential place among the states of Europe, principally by policy, than it had ever been raised to by the most successful military exertions of former ages. Commerce flourished and made great advances, and wealth was much more extensively and more rapidly diffused among the body of the people than at any former period. It is the feeling of progress, rather than any degree of actual attainment, that keeps a nation in spirits; and this feeling every thing conspired to keep alive in the hearts of the English in the age of Elizabeth; even the remembrance of the stormy times of their fathers, from which they had escaped, lending its aid to heighten the charm of the present calm. To these happy circumstances of the national condition was owing, above all, and destined to survive all their other products, the rich native literature, more especially in poetry and the drama, which now rushed up, as if from the tillage of a virgin soil, covering the land with its perennial fruit and flowers. Spenser and Shakspeare, Beaumont and Fletcher, Raleigh and Bacon, and many other distinguished names, gained their earliest celebrity in the Elizabethan age.

ELIZABETH PETROWNA, daughter of Peter the Great and of Catherine I., was born in the year 1709. After the death of her nephew, Peter II., in 1730, she was urged to assert her claims to the crown, but she declined to do so through indolence or timidity, and her cousin Anna, duchess of Courland, was raised to the throne. After the death of Anna in 1740, Iwan, the infant son of the duke of Brunswick and of Ann, niece to the late empress, was proclaimed emperor under the tutelage of his mother, in conformity to the will of the defunct sovereign. A conspiracy however was soon after hatched by some of Elizabeth's attendants, especially a surgeon of the name of Lestoq, who found great difficulty in conquering her irresolution: the officers of the guards were drawn into the plot, and a military insurrection followed in 1741, when Elizabeth was proclaimed empress, and Ann and her husband, the duke of Brunswick, and the child Iwan, were put in confinement. Several noblemen were sent into Siberia. Bestucheff, who had been minister under the Empress Anna, was retained in office and appointed chancellor. Elizabeth took an active part in the war of the Austrian succession, and sent troops to the assistance of Maria Theresa, and she afterwards concurred in the peace of Aix la Chapelle in 1748. During the Seven Years' War, Elizabeth took part against Frederick of Prussia, it was said, from personal pique at some sarcastic reflections of the Prussian king. The Russian army invaded Prussia, won the hard-fought battle of Kunnersdorf, crossed the Oder, entered Berlin, and reduced Frederick to the verge of ruin and despair. But the illness and death of Elizabeth soon retrieved his fortunes. She died in December, 1761, after a reign of twenty years, and was succeeded by the duke of Holstein Gottorp, son of her sister Anna Petrowna, duchess of Holstein: he assumed the title of Peter III.

The government of Elizabeth was directed in great measure by favorites, who succeeded one another. The empress herself was good-natured and even amiable, but indolent and sensual, and many acts of oppression and cruelty were perpetrated under her reign. She was averse to the punishment of death, but numerous persons were sentenced to the knout and to exile in Siberia. Several ladies, among others Madame Lapoukin, a handsome and clever woman, who had given offence to Elizabeth, experienced the same fate. Elizabeth exerted herself to forward the compilation of a code of laws for the Russian empire, a task begun under Peter the Great, but which was not completed till the reign of Catherine II. She was never married, but left several natural children.

ELIZABETHGRAD or YELISAVETGRAD, a circle in the northern part of the province of Cherson, and in the south of Russia in Europe, lying between 47° 30′ and 49° 4′ N. lat., and 30° 50′ and 33° 8′ E. long. It is bounded on the north by Kieff, on the south by Cherson, and on the west by Podolia. According to Georgi, Elizabethgrad contains 696,490 acres of land fit for the plough, 438,460 of meadows and pastures, and 24,330 of woods and forests. The forests principally consist of pines, occasionally intermixed with limes and beeches. The surface in the northern districts is traversed by a branch of the mountains of the Dnieper, where there are extensive forests, such as the Tshuta, Tshernoylesz, &c. The remaining part of the circle is a steppe. On the whole the soil is rich and fertile, but most cultivated in the north. It produces much grain, and saffron grows in a wild state. The Ingul is the principal river in the circle. It contains one town, and about 180 villages and hamlets. Wild beasts, particularly bears, and in the south wild horses abound: game is plentiful. There are many quarries of millstones, which form a considerable article of export. The population is about 35,000.

ELIZABETHGRAD, the chief town of the circle, is in 48° 30′ N. lat., and 32° 28′ E. long., in a beautiful plain on the banks of the Ingul. It is of an hexagonal shape, defended by six bastions, and was built in 1754. The town and a large arsenal are situated within its walls; but it has besides four suburbs; the whole is regularly built, and has straight broad streets, planted with avenues of trees. There are five churches, a large hospital, numerous magazines, above 1000 houses, and about 12,000 inhabitants, many of whom are Greeks or of Servian origin; but the majority are Rostolnicks, who observe the rites of the primitive Russo-Greek church. The inhabitants depend much upon a large traffic in the produce of the neighbouring parts, and carry on considerable trade with Poland and Moldavia. There is an annual fair at Elizabethgrad, which being the largest in the whole province of Cherson, is attended by many thousand dealers and others. There are no less than thirty-two windmills round the town.

ELK. [Deer, vol. viii. p. 351.]

ELL (Ulna), a measure of length now almost disused. 'It is properly,' says Ducange, 'the length between the ends of both the extended hands, though Suetonius makes it to be only one cubit.' It is not worth while to attempt to follow a measure of secondary importance through its various changes, and this measure in particular has denoted very different lengths in different countries. The three ells which have preserved a place in our arithmetical works, namely the Flemish, English, and French ells, are respectively three, five, and six quarters of a yard.

ELLAGIC ACID. This acid exists in the gall-nut along with gallic acid; and they separate from the aqueous infusion in the state of a yellowish crystalline mass. They are separated by boiling water, which dissolves the gallic acid, and leaves the ellagic unacted upon, but mixed with a little gallate of lime. By treatment with a weak solution of potash the ellagic acid is dissolved, and the gallate of lime remains insoluble; the ellagate of potash is then treated with hydrochloric acid, which uniting with the potash, precipitates the ellagic acid in a pulverulent state.

The properties of this acid are the following. It is of a light fawn colour. It is insipid, slightly soluble in boiling water, and reddens litmus paper slightly. When heated in close vessels it decomposes, yielding a yellow vapour, which condenses in crystals of the same colour. This acid becomes of a blood-red colour by digestion in nitric acid, and is converted afterwards into oxalic acid. It unites with potash, soda, and ammonia, to form neutral salts; the two first are insoluble in water, except when an excess of base is present; and the ellagate of ammonia does not dissolve under any circumstances. Its acid powers are weak, for it is incapable of decomposing the alkaline carbonates.

It is composed of

Two equivalents of		hydrogen .	2	or 2·6
Seven	,,	carbon .	42	55·2
Four	,,	oxygen .	32	42·2
		Equivalent	76	100·

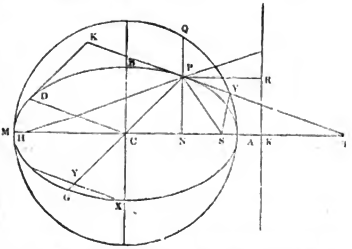
ELLEBORIN, a resin, of an extremely acrid taste, which has been found in the *helleborus hyemalis*. It is obtained by making a tincture of the root with alcohol, and subjecting it to distillation, when the elleborin remains in the state of a nearly white mass, which is soft and granular, and readily melts into an oily fluid. Its taste is extremely acrid, but it has no smell; it dissolves in alcohol, and imparts to it a red-brown colour; it is but little dissolved by water; the spirituous solution precipitates the persalts of iron of a purple colour.

ELLENBOGEN, ELNBOGEN, or ELBOGEN, the most westerly circle of the kingdom of Bohemia, bounded on the north by Saxony, and on the west by Bavaria, consists of four districts, Ellenbogen (nine-tenths of the whole circle), Eger, Asch, and the small territory of the Frais in the south-west. Its area is about 1186 square miles, and it has 27 towns, 13 market-villages, 609 villages and hamlets, and about 220,500 inhabitants: in 1816, 188,427. The great range of the Bohemian Ore mountains (Erzgebirge), which separate it on the north and west from Saxony and Bavaria, spreads its branches over every part but the south-east; between those offsets are numerous small fertile plains, and many large valleys. The principal streams are the Eger, which traverses it from south-west to north-east, the Tepl and Striela in the south, and the Zwoda and Weistritz in the north. The forests produce good timber, &c., but on the whole neither the soil nor climate is well adapted for agriculture; mining, manufactures, and a brisk trade are the chief occupations of the people. The principal mineral productions are silver, tin, lead, iron, sulphur, alum, and saltpetre; and there are several valuable mineral springs, such as those of Carlsbad, Franzensbrunnen (near Eger), Schaben, &c. The chief manufactures consist of woollens, cottons, stockings and hosiery, paper, and iron and steel wares; and nearly three-fourths of the Bohemian lace are made in this circle. Ellenbogen (2100 inhabitants), Carlsbad, Joachimsthal (a mining town of 4400 inhabitants in the north-east), Weipert (3000), Grasslitz (4700), a manufacturing town, Königsberg (3300), Schlaggenwald (3600), Schönfeld (2530), and Schönbach (2230), are the principal towns in the district of Ellenbogen: in that of Eger are Eger, Franzensbrunnen or Egerbrunnen, and Wildstein and Haslau, manufacturing places. In that of Asch are Asch, the chief town, which has considerable manufactures, and about 500 inhabitants, and Rossbach, a manufacturing place.

ELLESMERE. [Shropshire.]

ELLICHPORE, a principal city in the province of Berar in 21° 14′ N. lat. and 77° 36′ E. long. It is only in part surrounded by a wall, and is not a place of any strength. It lies in the Doab, between the Sarpan and the Beechun rivers, which form a junction near Ellichpore, and afterwards fall into the Poorna. This city is held, together with a small surrounding territory, by a petty chief, who is nominally dependent upon the Nizam, but is under the protection of the English. The palace of the chief is a handsome and commodious building, and the bazaars and houses in the vicinity are built of brick, but the rest of the city consists of mud houses, and has a very mean appearance. Ellichpore is 122 miles from Napgore; 319 miles from Hyderabad; 380 miles from Delhi; 671 from Madras, and 844 miles from Calcutta, all travelling distances

ELLIPSE (ἔλλειψις). This curve, which is one of the Conic Sections, ranks next in importance to the circle (which is itself an extreme form of the ellipse) and the straight line. We shall here consider the ellipse independently of the other conic sections, and simply state some of the most remarkable properties which can be exhibited without algebraical symbols.



1. Let any two points S and H be taken, and their distance bisected in C. Set off CA and CM, equal lines, each greater than CS, and let a point P move in such a manner that HP and PS together are always equal to AM. The curve described by the point P is an ellipse.

2. CA is called the *semi-axis major*, CB the *semi-axis minor*, C the *centre*, S and H the *foci*, SP and HP the *focal distances* of the point P, CP the *semi-diameter* of the point P, and CD (drawn parallel to the tangent PT) the *conjugate semi-diameter*, or *semi-conjugate* of CP. Also the fraction which CS is of CA is called the *excentricity* of the ellipse.

3. Let SA be to AK as CS to CA. Then KR is called the *directrix* of the ellipse, and SP is to PR as SA to AK.

4. The tangent PT bisects the angle made by SP and the continuation of HP.

5. CA is a mean proportional between CN and CT.

6. If, A and M remaining the same, the figure of the ellipse be altered by varying S and H, the tangents drawn through the several points in which the ellipses cut NQ will all pass through the same point T of the axis. The circle AQM is the extreme form of the ellipse, when S and H meet in C, and the tangent at Q passes through T.

7. Wherever the point P may be taken, NP bears to NQ the same proportion as CB to CA, and so does the area ANP to the area ANQ.

8. The perpendicular let fall from S upon PT must cut it in a point of the circle AQM.

9. If CD be parallel to the tangent at P, then CP is parallel to the tangent at D.

10. The parallelogram PCDK is equal to the rectangle of BC and CA, and the sum of the squares on PC and CD is equal to the sum of the squares on AC and CB.

11. The square on PN is *less* than the rectangle contained by AN and NM in the proportion of the square on CB to the square on CA. From this *deficiency* the ellipse derives its name, as does the Hyperbola (ὑπερβολὴ) from a corresponding *excess*.

12. PG bisects every line parallel to CD which is bounded at both ends by the ellipse, and the square on XY is to the rectangle contained by GY and YP in the proportion of the square on CD to that on CP.

13. The square on CD is equal to the rectangle contained by SP and PH.

Such are a few of the countless properties which might be exhibited. But it is to be noticed that the most common and elegant theorems are not those which are found most useful. The striking use of this curve lies in its being the nearest representative of a planetary orbit which can be given in a simple manner. If the planets did not attract each other, but were only attracted by the sun, they would describe absolute ellipses. Their mutual actions being small, compared with that which the sun exerts, they consequently move in ellipses *very nearly*. Hence the utility of the ellipse in astronomy: but at the same time the properties of the curve which facilitate the investigation of the heavenly motions present nothing so striking as those which we have given.

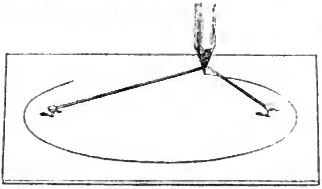
The reader who is not versed in geometry must remember that though an ellipse be an *oval*, yet an oval is not necessarily an ellipse. A figure may be formed by arcs of circles which shall have the appearance of an ellipse, without possessing any of its properties.

ELLIPSOID. [Surfaces of the Second Degree.] See also Spheroid for the most useful part of the subject.

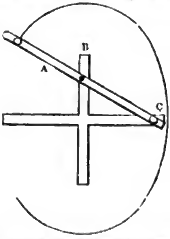
ELLIPSOLITES. [Cornu Ammonis, vol. viii. p. 26.]

ELLIPSOSTO'MATA. M. de Blainville's name for a family (the third) of his second order, *Asiphonobranchiata*, of his first sub-class, *Paracephalephora Dioica*, of his second class, *Paracephalophora*, of his *Malacozoa*. The *Ellipsostomata* of De Blainville comprehend the genera *Melania*, *Rissoa*, *Phasianella*, *Ampullaria*, *Helicina* (including *Ampulleira* De Blainv. and *Olygira*, Say), and *Pleurocerus*. Of these all but *Pleurocerus* are included under the Pectinibranchiate Gasteropods of Cuvier; and as the habits of the included genera are by no means uniform, the genera will be treated of under their several titles. For Ampullaria see vol. i. p. 473.

ELLIPTIC COMPASSES, the name given to any machine for describing an ellipse. We shall only mention two contrivances of the kind out of a large number which have been proposed. The first is the simple and rough method suggested by the first property in the article Ellipse. Let two pins be fastened to the paper at the points in which the foci are to lie, and let a thread, equal in length to the proposed major axis, have one end tied to each pin. Then if a pencil move in such a way as to keep the thread always stretched, it will describe an ellipse.



The second method is as follows: it is known that if any two fixed points in a straight line A be made to move along two other straight lines, B and C, then every other point in A will describe an ellipse. If then two grooves be made (at right angles to each other, for convenience), and if two pins attached to a ruler be made to travel in the grooves, the motion of the ruler will make any pencil attached to it trace out an ellipse. The distances of the pencil from the two pins will be the semiaxes of the ellipse. If the pins be attached to the ruler by clamping screws their distance may be altered, and the instrument may be made to describe any ellipse within limits depending on the length of the ruler and of the grooves.



ELLIPTICITY, a term used in the theory of the figure of the earth. It means the fraction which the excess of the axis major over the axis minor of an ellipse is of the axis minor itself. Thus if the axis major be 9 and the axis minor 7, the ellipticity is $\frac{2}{7}$. This term must not be confounded with the *excentricity*, a word in much more common use. If a and b be the semiaxes major and minor, and if e be the excentricity and E the ellipticity, then

$$E=\frac{a-b}{b},\ e=\sqrt{1-\frac{b^2}{a^2}}$$

if b and a be nearly equal, $e^2=2E$ nearly.

ELLORE, a district forming part of the collectorate of Musulipatam, one of the subdivisions of the Northern Circars, situated between the Krishna and Godavery rivers, and comprising an area of about 2700 square miles exclusive of a mountainous tract on the west whose limits have not been defined. The town of Ellore, which is the place of residence of the Masulipatam collector, is a place of considerable size, lying in 16° 43′ N. lat. and 81° 15′ E. long. It is 183 miles from Hyderabad, travelling distance.

ELM. [Ulmus.]

ELMINA. [Coast, Gold.]

ELMSLEY, PETER, was born in the year 1773, and educated at Westminster and Oxford. In 1798 he was presented to the chapelry of Little Horkesley, in Essex. By the death of his uncle Elmsley, the well-known bookseller, he succeeded to a competent fortune, which enabled him to live in independence, and devote his whole time to literary pursuits. For some time after his uncle's death he resided in Edinburgh, and was one of the earliest contributors to the Edinburgh Review. The articles on Wyttenbach's Plutarch, Schweighäuser's Athenæus, Blomfield's Æschylus, and Porson's Hecuba are generally understood to have been written by him. While at Edinburgh he superintended an edition of Herodotus (1806, 6 vols. 12mo), in which he gave the first proof of the love of Atticisms which always distinguished him, by introducing into the text the Attic forms of the tenses, in spite of all the MSS. He was also an early contributor to the 'Quarterly Review:' his paper on Markland's Euripides (in the seventh volume) is well known to scholars. As soon as the state of Europe permitted, Elmsley went abroad, and collated MSS. in the continental libraries. He spent the whole of the winter of 1818 in the Laurentian library at Florence. In 1819 Elmsley was appointed by the government to assist Sir Humphrey Davy in unrolling and deciphering the papyri at Herculaneum; but the attempt was not attended with success, and in the prosecution of his duties Elmsley caught a fever, from which he never fully recovered.

On his return to Oxford he became Principal of St. Alban's Hall, and Camden Professor of Modern History in that university. He died of a disease of the heart on the 8th of March, 1825. Elmsley's acknowledged works were editions of Greek plays. He published the Acharnians of Aristophanes in 1809: the Œdipus Tyrannus of Sophocles in 1811: the Heracleidæ, Medea, and Bacchæ of Euripides in the years 1815, 1818, and 1821; and the Œdipus Coloneus of Sophocles in 1823. His transcript of the Florentine Scholia on Sophocles was published after his death. As a scholar, Elmsley did not pretend to be more than a follower of Porson, but he did far more for Greek scholarship than any English scholar who followed that great critic. His character has been drawn with great truth by the celebrated G. Hermann of Leipzig (in the Wien. Jahrbücher, vol. liv., p. 236). 'The way laid open by Porson was pursued and enlarged by P. Elmsley, a man worthy of all honorable mention as well on account of his sound scholarship, as his great fairness and earnest love of truth. We owe to his unwearyable accuracy and great application a rich treasure of excellent observations on the Attic dialect; and if he was too fond of making general rules, and for the sake of these rules introducing many wrong or unnecessary emendations, we should remember how easily diligent observation induces one to form a rule, and how easily the adoption of a general rule inclines one to set aside all deviations from it. But Elmsley had too much good sense and too sincere a love of truth not to turn back from his error, and to use it only for a confirmation of the truth and a new advance on the right way: and of this he has given many proofs.'

ELOCUTION. [Oratory.]

E'LOGE, in the French language means praise, being derived from the Latin *elógium*, and that from the Greek *eulógia* (εὐλογία). It has become the name of a considerable branch of French literature, which comprehends panegyrical orations in honour of distinguished deceased persons. It is the custom when one of the members of the French or other academies dies, and a new member is appointed in his place, for the new member to deliver a panegyrical oration on the labours and other merits of his predecessor. These éloges are generally printed and published, and although they are mostly written in a florid rhetorical style, still many of them are really interesting biographies. Such, for example, are the éloges written by Cuvier on several of his brother naturalists. [CUVIER.] The custom of writing éloges of deceased persons is not confined to members of academies. Bailly wrote *Eloges de Charles V., de Molière, de Corneille, de l'Abbé de la Caille, et de Leibnitz*, Berlin, 1770. The Italians have also *Elogii degli Uomini Illustri Toscani*, 3 vols., fol., Firenze, 1766-70, and many other similar compositions.

ELONGATION, an astronomical term for the angular distance between two heavenly bodies as seen from the earth. Custom has confined it to the case in which both bodies are in the solar system, and one of them is generally the sun. Thus we speak of the *distance* of two fixed stars, and of the *elongation* of Mercury from the sun.

ELOQUENCE. [ORATORY.]

ELORA, or **ELLORA**, a town situated near the city of Dowletabad, in 19° 58′ N. lat. and 75° 23′ E. long. This place, although it is now nearly depopulated, was once of considerable importance. The ruins surrounded by the wall of the town occupy a great space; but it is to the excavations near to the town that it owes its present celebrity. These excavations, which occur in a mountain about a mile to the east of Elora, were formerly Hindu temples of great sanctity, although they are now never visited except from curiosity. They are cut out of the solid rock, and the labour which they cost must have been prodigiously great. The largest cave, which is called the Kailasa, is 247 ft. long, and 150 ft. wide. It contains sculptures of almost every deity of the Hindu mythology, and most of them of colossal size. This chamber contains the Great Temple, which is a monolith or solid piece of rock hollowed out: it is 103 ft. long, and its greatest breadth 61 ft.; its interior height is 18 ft.; but its exterior rises in a pyramidal form to the height of more than 100 feet.

There are several other large temple-caves in different parts of the mountain. Those towards the north and the south have evidently been devoted to Buddhist rites, while those in the centre have been the scenes of Brahminical worship. In different parts of the mountain there are found a great number of smaller excavations cut in the face of the rock. These are not ornamented with sculptures, and are supposed to have been the residences of the officiating priests and officers of the temples.

The Brahmins who reside on the spot assert that the whole of the caves were made by Eeloo, rajah of Ellichpore, who lived upwards of 7900 years ago—an assertion incapable of proof, and which does not bear the stamp of probability. Elora being in the immediate neighbourhood of Deoghur (Devagiri), now called Dowletabad, which, previously to the Mohammedan conquest, was the metropolitan city of a powerful state, these temples were most probably constructed at various times and by different princes.

The town of Elora was acquired by the English from Holkar; but in 1820 was, together with the lands attached to it, including the mountain wherein these cave-temples are situated, made over to the Nizam in exchange for other lands situated more conveniently for the British interest. (Seely, *Wonders of Ellora*, London, 1824; *Asiat. Researches*, vol. vi.)

ELPHIN, a bishop's see in the ecclesiastical province of Tuam in Ireland. The chapter consists of dean, precentor, archdeacon, and eight prebendaries. The diocese embraces the greater part of the county of Roscommon, and portions of the counties of Galway and Sligo, with one parish in King's county; and extends in length about thirty English miles, and in breadth from three to thirty. It contains seventy-four parishes, constituting thirty-two benefices. In 1792 there were in this diocese twenty-six churches of the establishment: in 1834 the numbers were, churches of the establishment, thirty-nine; other places of worship in connexion therewith, three; Roman Catholic chapels, eighty; Presbyterian ditto, one; other places of Protestant dissenting worship, eight. The total population of the diocese in the same year was 327,624, of whom there were 16,417 members of the established church, 310,822 Roman Catholics, 250 Presbyterians, and 135 other Protestant dissenters; being in the proportion of nineteen Roman Catholics to one Protestant of whatever denomination, nearly. In the same year there were in this diocese 388 schools, of which fourteen were in connexion with the National Board of Education, educating 24,076 young persons, being in the proportion of $7\frac{35}{100}$ per cent. of the entire population under daily instruction; in which respect this diocese stands eighteenth among the thirty-two dioceses of Ireland.

This see was founded about the end of the fifth century, by St. Patrick, who set over it Asic as its first bishop. Asic, like many others of the primitive Irish bishops, was a distinguished worker in metals, and is said to have bequeathed to his successors several specimens of his skill, which were long preserved with great veneration. There is nothing of importance in the subsequent history of the see. Elphin, when void, is to be united to the diocese of Kilmore, by section 32 of the Church Temporalities' Act of the 3rd and 4th Wm. IV.

ELPHINSTONE, WILLIAM, founder of King's College, Aberdeen, was born at Glasgow in 1437. His father, whose name he bore, entered into holy orders on the death of his wife, and was first rector of Kirkmichael, and at length archdeacon of Teviotdale, in which station he died in 1486, being then also, as it seems, provost of the collegiate church of St. Mary's, Glasgow.

At the head of those who *in congregatione* confirmed the statutes of the faculty of arts in Glasgow college, on the erection of that seminary in 1451, stands the name of William Elphinstone, Dean of Faculty. This was, no doubt, the archdeacon of Teviotdale. Among those incorporated in the university the same year appears also the name "Will$^{us.}$ Elphinstoun." Some* have thought this was the same individual; but it would rather seem, as the learned author of the life of Melville supposes (M'Crie's *Melv.* i. 432), that it was the youthful Elphinstone, who, it is admitted on all hands, was educated at the university of Glasgow. Here he passed A.M. probably in the 20th year of his age. (Keith's Bishops, p. 116.) Afterwards, applying himself to theology, he was made priest of St. Michael's, or Kirkmichael, Glasgow, in which place he served four years, and then proceeded to France, where, after three years' study of the laws, he was appointed professor of law, first at Paris and then at Orleans. He continued abroad till the year 1471, when he returned home at the earnest request of his friends, particularly Bishop Muirhead, who thereupon made him parson of Glasgow and official of the diocese.

On Muirhead's decease, in the end of 1473, the archbishop of St. Andrews made him official of Lothian, which he continued to be till the year 1478. In the spring of that year we find John Otterburn in the office; yet in June following Mr. Elphinstone is marked in the parliament rolls as official of Lothian, and in that capacity elected *ad causas*. He was also made a privy councillor. About the same time he was joined in an embassy to France with the earl of Buchan and the bishop of Dunblane, to compose some differences which had arisen between the two crowns; and on his return, in 1479, he was made archdeacon of Argyle, and then bishop of Ross, whence, in 1484, he was translated to the diocese of Aberdeen.

The same year, as bishop of the latter see, he was one of the commissioners from Scotland to treat of a truce and matrimonial alliance with England, whither he was again dispatched as an ambassador on the accession of King Henry VII. When affairs at home came to be troubled between the king and his nobles, he took the part of the former; and when the Earl of Argyll was sent on an embassy into England, he was, on the 21st February, 1488, constituted lord chancellor of the kingdom, in which place however he continued only till the king's demise in June following. In October of the same year he was in the parliament then held at Edinburgh, where we also find him assisting at the coronation of the new king. He was afterwards sent on an embassy to Germany; and on his return thence was appointed to the office of lord privy seal, where he seems to have remained till his death, which happened at Edinburgh on the 25th October, 1514, while negotiations were pending with the court of Rome for his elevation to the primacy of St Andrews.

Besides a book of canons, extracted out of the antient canons, Elphinstone wrote a history of Scotland, chiefly out of Fordun. He wrote also some lives of Scotch saints; and in the college of Aberdeen are preserved several large folio volumes of his compilations on the canon law. The civil and canon laws indeed were his favourite studies, and to their establishment as the laws of Scotland he long and steadily directed his attention. It is to him we may in all probability ascribe the crafty acts 1487, c. 105, seq. to recover the former large jurisdiction of the chancellor and court of session, as well as the act 1494, c. 54, the object of which appears to have been to enforce in the courts the study of the Roman laws; and we shall not perhaps greatly err in conceiving his zeal to have been employed in the erection of the Court of Daily Council in 1503. It was moreover at his solicitation that the convent of Grey Friars at Stirling and the Chapel Royal were founded in 1494, the same year in which he also obtained a papal bull for the erection of a university at Aberdeen, in place of the narrow seminary previously existing there. To Bishop Elphinstone Aberdeen also owes another great work, namely the bridge across the river Dee: to the completion of his plans the prelate left 10,000 pounds Scots in money lying in his coffers at his death.

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* Report of Commiss. on Scots universities, 1831, p. 223.

ELSHEIMER, or ELZHEIMER, ADAM, was born at Frankfort in 1574, and, according to the most probable account, died in 1620; but the statements of writers on the subject differ extremely. Finding that he was not likely to acquire in his own country that knowledge of the art which he saw to be necessary, he resolved to go to Rome, where he soon formed an intimacy with Pinas, Lastman, Thomas of Landau, and other eminent painters. Having carefully examined the curiosities of Rome and the works of the greatest artists, both antient and modern, he resolved to adopt a style of painting peculiar to himself; this was the designing of landscapes with historical figures on a small scale, which he finished in so exquisite a manner that he was not only far superior to all his contemporaries, but is probably unrivalled in his own line by any artist of subsequent times. He designed entirely after nature; and a most retentive memory enabled him to recollect everything that had struck him, and to make the most judicious use of it in his compositions. It is scarcely possible to speak in too high terms of the rare union of excellences in the works of Elsheimer; he is equally admirable for the fine taste of his design, the correct drawing of his figures, the lightness, spirit, and delicacy of his touch, the beauty of his colouring, the high finishing of his works, so that the minutest parts will bear the closest inspection, and, above all, his admirable management and distribution of light and shade, and perfect knowledge of the principles of chiaroscuro, which was manifested in his pieces representing scenes by torch or candlelight, moonlight, sunrise, or sunset. Even during his lifetime his pictures bore a very high price, which was considerably increased after his death. It is lamentable to add, that he was unable to acquire affluence or even comfort by the exercise of his talents. He had a large family; and though he received very high prices for his works, he spent so much time and labour upon them, that he could not subsist by what he earned. He was at length cast into prison for debt; and though very soon released, the disgrace even of that short confinement preyed on his spirits, and he sunk under his misfortunes. The Italians, who highly honoured and esteemed him, deeply regretted his untimely death; and his friend Thomas of Landau was so grieved at his loss that he could no longer bear Rome, but retired to his own country.

Old Teniers and Bamboccio were indebted for great part of their excellence to their study of the works of Elsheimer.

ELSINORE (in Danish, *Helsingoer*), a considerable seaport and town in the bailiwic of Frederiksborg, in the Danish island of Seeland, and at the narrowest point of the strait between the Kattegat and the Baltic. It is opposite to Helsingborg, a Swedish seaport, and lies in 56° 2′ N. lat. and 12° 37′ E. long. It is the spot where the Danish government collect certain dues on every vessel passing through the Sound. On a tongue of land east of it is the castle and fortress of Kronborg, and there is a handsome palace, called Marienlyst, with an hospital for seamen, built upon a commanding eminence close to it. Elsinore itself is an open town, and has been much improved of late years. It consists of a main street of considerable length, with several lateral streets; has a harbour accessible to ships of small draught, and contains 2 churches, about 650 houses, a town-hall and high-school, an infirmary and hospital, a theatre, a quarantine establishment, and about 7000 inhabitants. Independently of a good foreign trade, the townsmen are employed in making straw hats, arms, refined sugar, brandy, &c., printing cottons, and carrying on fisheries. The harbour is formed by what is here called a bridge, or wooden pier. Elsinore is about twenty miles north of Copenhagen. It was the birthplace of Saxo Grammaticus, a celebrated writer of the twelfth century. The number of vessels which have paid the Sound-dues was in 1777, 9053; 1783, 11,233; 1787, 9758; 1792, 12,114; 1799, 7844; 1802, 12,181; 1817, 13,148; 1823, 9203; 1830, 13,212; and 1833, 10,986, of which last 3195 were British. The average for the three years, 1831 to 1833, was 12,045; and of British, 3766.

ELSTER. [Elbe.]

ELSTOB, WILLIAM, descended from an antient family in the bishopric of Durham, was born at Newcastle-upon-Tyne, January 1, 1673. His father was Mr. Ralph Elstob, a merchant of that place. He received his earliest education in his native town, but was afterwards sent to Eton, and thence to Catherine Hall, Cambridge. Being of a consumptive habit, and the air of the place not agreeing with him, he removed to Queen's College, Oxford, whence, in 1696, he was chosen fellow of University College. In 1701 he translated the Saxon Homily of Lupus into Latin, with notes, for Dr. Hickes; and about the same time he translated Sir John Cheke's Latin version of Plutarch's Treatise on Superstition, which was printed at the end of Strype's Life of Cheke. In 1702 he was presented by the dean and chapter of Canterbury to the rectory of the united parishes of St Swithin and St. Mary Bothaw, in London, where he continued till his death. In 1703 he published, at Oxford, an edition of Roger Ascham's Letters; and in 1709, in the Saxon language, with a Latin translation, the Homily on St. Gregory's day. He intended the publication of several other works in Saxon literature, more particularly the Saxon laws, and Alfred's paraphrastic version of Orosius. He died March 3rd, 1714-15. He published one or two other works, but of less consequence than his Saxon labours. (Pegge's *Hist. Account of the Textus Roffensis;* and of Mr. Elstob and his sister, in the *Bibl. Topogr. Britan.*, No. XXV.: Kippis's *Biogr. Brit.*)

ELSTOB, ELIZABETH, sister of the above, was born at Newcastle, September 29th, 1683. During her brother's continuance at Oxford, she resided chiefly in that city with him, and afterwards removed with him to London, where she joined him in his Saxon studies. The first public proof she gave of this was in 1709, when, upon his printing the Homily upon St. Gregory's day, she accompanied it by an English translation and a Preface. Her next publication was a translation of Madame Scudery's Essay on Glory. By the encouragement of Dr. Hickes, she undertook a Saxon Homiliarium, with an English translation, notes, and various readings, of which a few sheets only were printed at Oxford, in folio, when the work was abandoned. Her transcript of the Saxon Homilies, in preparation for this work is preserved in the Lansdowne Collection of MSS. in the British Museum. In 1715 she published a Saxon grammar, in 4to., the types for which were cut at the expense of Lord Chief Justice Parker, afterwards earl of Macclesfield. After her brother's death, Mrs. Elstob retired to Evesham in Worcestershire, where she subsisted with difficulty by keeping a small school. Each scholar paid her 4*d*. a week. She was subsequently patronized by Queen Caroline, who granted her a pension of 20*l*. a year; but this bounty died with the queen. In 1739 the duchess dowager of Portland took Mrs. Elstob into her family as governess to her children, where she continued till her death, May 30th, 1756. She was buried at St. Margaret's, Westminster. (Pegge's *Account of the Textus Roff.* ut supr.; Tindal's *Hist. of Evesham;* Nichols's *Liter. Anecd.*)

ELTHAM. [Kent.]

ELUTRIATION, the process of separating substances reduced to powder, when of different specific gravities, by means of water. It is also employed as a method of reducing any one substance to a fine powder; thus the creta præparata, or prepared chalk, of the London Pharmacopœia, is prepared by mixing finely-powdered chalk with water, stirring the mixture, and while it is yet turbid allowing the upper portion of the water to run off; and when this is allowed to settle, the chalk or any other substance similarly treated settles in a very fine powder. By the process of elutriation ores, especially those of tin, are separated from earthy matter.

ELVAS, a strongly-fortified town in the province of Alentejo in Portugal, about 125 miles east of Lisbon, situated on a hill in the midst of a plain, which extends to the east as far as the Guadiana. It is a frontier town, being about 12 miles west of Badajoz, the first Spanish town on that side, and on the high road from Lisbon to Madrid. Elvas is the strongest fortress of Portugal: the town is situated between two castles, Fort Santa Lucia and Fort la Lippe, which stand on two summits commanding the town. Elvas is a bishop's see, and the head town of a comarca, or district, of the same name. The town contains about 13,000 inhabitants, and has a fine cathedral, six parish churches, several convents and hospitals, and very extensive barracks, which are bomb-proof. A handsome aqueduct brings water to the town from a distance of about 4 miles, and supplies the various fountains. The country around is productive in corn, wine, and oil. (Miñano, *Diccionario Geografico*; *Views of Elvas*, by H. Smith, London, 1813.)

ELWUND. [ECBATANA.]

ELY, a city in the Isle of Ely in the northern part of the county of Cambridge, 16 miles N.N.E. from Cambridge and 67 N. by E. from London.

According to Bede, the word Ely, which was given to a large district of fens in which the city is situated as well as to the city itself, is derived from Elge or Elig an 'eel,' and consequently has reference to the abundance of eels in the neighbourhood. But most antiquarians derive the appellation from Helig, a British name for the willow, which grows in great quantities in the isle. Etheldreda, daughter of Anna king of East Anglia, and wife of Oswy king of Northumberland, preferring cloistered seclusion to courtly splendour, retired here about the year 670, and soon after founded a monastery, which was dedicated to the Virgin Mary, and of which she became the abbess. In 870 the whole abbey was pillaged and destroyed by the Danes, and all its revenues were annexed to the crown, which retained them till the reign of Edgar. In 970 that king granted the isle with all its appurtenances, privileges, &c., to Ethelwold, bishop of Winchester, who rebuilt the monastery, and provided it with monks. The charter of Edgar was confirmed by Canute and Edward the Confessor, and subsequently by the Pope. The isle was gallantly defended against William the Conqueror, but after repeated attacks the inhabitants were obliged to surrender, many of them were put to the sword, and most of the valuable furniture and jewels of the monastery were seized, but through the firmness of Theodwin, who had been made abbot, the property was restored. In 1107 Ely was erected into a bishopric by Henry I., and Hervey, bishop of Bangor, was appointed to the see. The lands of the monastery were divided between the bishopric and the monks, and the monastery was governed by the prior, who was called the Lord Prior. After the surrender of the monastery to Henry VIII., he granted a charter to convert the conventual church into a cathedral by the title of the Cathedral Church of the Undivided Trinity. The cathedral of Ely is the workmanship of many different periods, and displays a singular mixture of various styles of architecture, but taken as a whole it is a noble structure. The most antient part is the transept, which was erected in the reigns of William Rufus and Henry I. The nave and great western tower were built in 1174, and the other parts of the edifice, which consists of a nave, transept, an octagon tower, choir, antichoir, Trinity chapel, Galilee porch, &c., were erected at different periods between that time and the year 1534.

The interior is exceedingly beautiful; the nave is supported by lofty columns, almost without ornament, which perhaps adds to the imposing effect. The octagon tower combines solidity with gracefulness probably more than any other building of the kind in Great Britain; and the choir is a perfect specimen of the early English style of pointed architecture. The stalls are beautiful specimens of wood carving. The whole length of the edifice, including the Galilee porch, is 517 feet; and the western tower, which is of exquisite workmanship, is 270 feet high.

There are many interesting monuments, among which are the tomb and effigies of Bishop Alcock, and that of Tiptoft, earl of Worcester. The bishops of Ely, like those of Durham, formerly possessed, by grant of Henry I., Jura regalia,[*] and appointed their own chief justice, chief bailiff, &c., but their secular jurisdiction is taken away by the 6th and 7th Will. IV., c. 87, and vested in the king, who is empowered to appoint a Custos Rotulorum for the isle. The gaol is also abolished, and committals are made to the county gaol at Cambridge. The quarter sessions are still held by the justices of the peace of the isle, but the assizes are now held by her majesty's judges who join the Norfolk circuit.

The bishop has considerable patronage at Cambridge; he is visitor of four colleges, appoints absolutely to the mastership and one fellowship of Jesus College chooses one out of two nominated by the society to be master of St. Peter's college, and has besides nearly 100 livings in his gift.

The city is situated on a considerable eminence near the river Ouse, which is navigable for barges from Lynn to Ely. It consists principally of one long street partially paved; in the centre of the town is a spacious market place. The soil in the vicinity is exceedingly fertile, and supplies great quantities of fruit, vegetables, and butter to the London market. There is a considerable manufactory for earthenware and tobacco-pipes, and there are several mills in the isle for the preparation of oil from flax, hemp, and cole-seed. The market is on Thursday for corn and cattle. The fairs are on Ascension-day and the eight following days and October 29th for horses, cattle, hops, and Cottenham cheese. The population of the city is 6189, of whom 3152 are females. there were in 1831 1246 inhabited houses, and 718 families employed in trade and agriculture. The isle of Ely contains a population of 47,152.

The city, exclusively of the liberty of the college, which is extra-parochial, comprises the parishes of St. Mary and the Holy Trinity, in the peculiar jurisdiction and patronage of the dean and chapter. The living of St. Mary's is a perpetual curacy of the clear yearly value of 94*l.* The church is a handsome building, partly in the Norman and partly in the early English style of architecture. The Church of the Holy Trinity is attached to the cathedral, and is what formerly was the Lady Chapel. It was commenced in the reign of Edward II., and is one of the most perfect buildings of that age. It is 200 feet in length, 46 in breadth, and 60 in height; it has neither pillars nor side-aisles, but is supported by strong spiring buttresses, surmounted with pinnacles. The living is of the yearly value of 116*l.* There are places of worship for Baptists, Independents, and Wesleyan Methodists. The grammar-school, founded by Henry VIII. in 1541 is under the control of the dean and chapter, who appoint the master. There is also a national school for boys and girls supported by voluntary contributions. A charity school was founded in 1730 by Mrs. Catherine Needham, who endowed it with lands worth nearly 400*l.* per annum for the instruction and clothing of thirty boys, with each of whom an apprentice fee of 20*l.* is given, issuing out of lands bequeathed by Bishop Lancy for that purpose. James Bentham, whose history of Ely is not only interesting as a local history, but valuable for the observations which it contains on the Saxon, Norman, and Gothic styles of architecture, was educated at the grammar-school of this city. [BENTHAM.]

ELYMA'IS, the name of a district of Persia between Susis and Media, and of a city, its capital, situated on the river Eulæus. The name seems to be the same with Elam, which is used in the sacred writings as a general designation for Persia. According to Strabo (p. 744), the population consisted of husbandmen, who cultivated the plains, and a numerous army, principally archers, who occupied the high lands. The king of Elymais was so powerful in the time of Strabo that he could assert his independence in spite of the Parthians, though it appears from the same writer that the Parthians on one occasion invaded Elymais, and carried off a spoil of 10,000 talents from the Elymæan temple of Artemis at Azara. Antiochus Epiphanes had previously made an unsuccessful attempt to rob the same wealthy temple (Joseph. *Antiq.* xii. c. 13; Justin. lib. xxxii., and *Maccabees* i. vi. 1.) Strabo attributes this attempt to Antiochus the Great, but he is perhaps in error. The author of the second book of the *Maccabees* (ix. 2) calls the chief city of this district Persepolis, probably from having by mistake confused Elymais with Elam, for Persepolis stood upon the Araxes. (Strabo p. 729.)

ELYOT, SIR THOMAS, one of the best writers of the time of Henry VIII., was the son of Sir Richard Elyot of the county of Suffolk. He received his university education at St. Mary's Hall in Oxford. He afterwards travelled through Europe, and upon his return was introduced at the court of Henry VIII., who conferred upon him the honour of knighthood, and subsequently employed him in several embassies, particularly to Rome in 1532 in the affair of the divorce, and afterwards in 1536 to the emperor Charles V. Sir Thomas Elyot's literary and philosophical attainments were various; and he was courted by most of the learned men of his time, and by none in a more friendly manner than by Sir Thomas More. He died in 1546, and was buried in the church of Carleton in Cambridgeshire, of which county he had been sheriff.

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[*] There is an account of the constitution of the court of Ely in Grant v. Bagge, 3 East's Reports, 128.

From a letter of Sir Thomas Elyot to secretary Cromwell, among the Cottonian MSS. in the British Museum, it appears that Wolsey made him clerk of the king's council.

Sir Thomas Elyot's works of greatest note were his book named the Governor, his Castle of Health, and his Dictionary, all of which went through numerous editions between 1531 and 1580. He also published a small treatise 'Of the Knowledge which maketh a Wise Man,' 8vo., London, 1533; and 'The Banquet of Sapience,' 8vo., 1545; besides several translations from Plutarch, Isocrates, St. Cyprian, &c.

ELY'SIA. (Zoology.) [Placobranchiata.]

ELY'SIUM, the name given by the antient Greeks and Romans to the abode of the righteous after death. They fancied that there was, somewhere to the west, a region blessed with perpetual spring, clothed with continual verdure, enamelled with flowers, shaded by pleasant groves, and refreshed by never-failing springs, where the souls of the good repaired, and where they enjoyed each other's society. (Virgil, *Æneid* vi., with which compare the notion of Elysium in the *Odyssey*, iv. 563.) The 'islands of the blest' was another name for this favoured region, which some placed in the midst of the ocean in the farthest west, others in some inaccessible spot in the middle of Asia or Africa. From this notion the appellation of Elysian Fields has been given to certain delightful secluded spots, such as the strip of land on the northern shore of the Mare Morto, or the inner part of the harbour of Misenum near Naples, which is sheltered from the winds by the surrounding hills, and where no winter is felt. It seems to have been originally a vast cemetery, planted with trees and adorned with tombs; but the imagination of the poets confounded the repository of the perishable bodies with the abode of the immortal souls. [Baiæ.] Those antient philosophers who had more spiritual notions of the nature of souls discarded the vulgar idea of the Elysium being in any part of our globe, and placed the abode of the departed in the heavens or firmament. (Cicero, *Somnium Scipionis*.) The Parisians have given the name of Champs Elysées to a much-frequented walk planted with trees, at the western extremity of Paris, extending from the Place Louis XV. to the Barrière de l'Etoile, and which, with the exception of the shade which the trees afford, has none of the attributes ascribed to the true Elysium; for it is dusty, noisy, and vulgar, and very inferior in point of comfort to the neighbouring gardens of the Tuileries.

ELZERI'NA. [Cellariæa, vol. vi. p. 402.]

ELZEVIRS, the name of a family of celebrated printers and publishers at Amsterdam, Leyden, the Hague, and Utrecht, who adorned the republic of letters with many beautiful editions of the best authors of antiquity. The right name of the family was Elzevier. They are believed to have come originally either from Liege or Louvain. In neatness and in the elegance of small type they exceeded even the family of the Stephens. [Estienne.] Their Virgil, their Terence, and their Greek Testament are considered the master-pieces of their productions; but the Virgil is said to be incorrect.

The first trace of the name of Elzevir is found in an edition of Eutropius, printed in 1592, published at Leyden by Louis Elzevir, who was still living there in 1617. Matthew, his eldest son, died at Leyden in 1640. Giles, his second son, was a bookseller at the Hague in 1599. Isaac, the eldest son of Matthew, was the first printer of his family, and printed from 1617 to 1628. Abraham and Bonaventure, the third and fourth sons of Matthew, were printers and booksellers. Bonaventure was a partner with his father in 1618, and occurs associated with his brother Abraham in 1626. The set of Elzevirs which the French call 'Les Petites Républiques,' the Accounts of the Nations of the World, were published by Abraham and Bonaventure; and, in fact, gave to the family their celebrity. Their brother Jacob printed at the Hague in 1626. Both Abraham and Bonaventure died at Leyden in 1652. Louis, the second of the name, the son of Isaac, was established as a printer at Amsterdam from 1640 to his death in 1662. Peter, son of Arnout, the second son of Matthew Elzevir, printed at Utrecht in 1669, and was living in 1680. John and Daniel were sons of Abraham, and printed in partnership in 1652: but John printed alone in 1655, when Daniel appears to have been associated with his cousin Louis. John died in 1661; Daniel in 1680. Daniel left children who carried on the business, but passes for the last of the family who excelled in it.

The Elzevirs printed several catalogues of their editions; but the best, as being the latest lists and accounts of them, are contained in the 'Notice de la Collection d'Auteurs Latin, Français, et Italiens, imprimée de format petit en 12mo, par les Elzevier' in Brunet's 'Manuel du Libraire,' 3rd edit., 8vo., Paris, 1820, vol. iv. p. 533-567; and in 'Essai Bibliographique sur les Editions des Elzevirs; précédé d'une Notice sur ces imprimeurs célébres;' 8vo., Paris, Didot, 1822.

The usual imprint upon the Elzevir editions is either 'Apud Elzevirios,' or 'Ex officina Elzeviriorum' or 'Elzeviriana:' the names of the different branches of this family are rarely found in the title pages of their editions. *Else*, in Dutch, signifies an elm, and by extension of signification, wood in general; *vuur*, is fire. These words explain a device of a wood-pile burning in the title-pages of some of the Elzevir productions, as in that of the Sleidanus, 1631, of Cunæus de Republica Hebræorum, 1632, the Cæsar and Terence of 1635, the Memoirs of Comines, &c.

EMANCIPATION, Emancipátio. To understand the legal effect of emancipation by the Roman law, it must be premised that all children born in lawful marriage were said to be in the father's power, as well as all his son's children so born before the son was emancipated; and no person who was in the power of another could acquire any property of his own. (Gaius, ii. 86, &c.) Whatever property, then, a son acquired while in his father's power strictly belonged to his father. If the son was by will appointed heir (heres in the Roman sense), he could not accept without his father's consent, and all that he took was for the benefit of his father: the same rule held as to a legacy. It is unnecessary here to mention the exceptions to the general rule above laid down, or to describe the father's power over the son's person. 'There is hardly any nation,' observes Gaius (i. 55), 'in which fathers have such power over their children as we have.' The rigour of the antient Roman law, however, was gradually relaxed, though the remarks of Gaius, who wrote at least after the time of Antoninus Pius, show that it was not then entirely fallen into disuse. The father's power was dissolved by his natural death, and also by the civil death of the father or the son. (Gaius, i. 128.)

Emancipation was the act by which the power was dissolved or released in the lifetime of the father; and it required the consent of both parties. The emancipation, which was made according to the Laws of the Twelve Tables, was effected by an imaginary sale from the father to another person. In the case of a son, this sale was made three times, as if the father were selling a slave, and the person to whom the sale was made, who of course was some friend, manumitted the son after each sale. After each of the first two sales, the son, being manumitted, became again in his father's power; but the last manumission was final, and extinguished all the father's paternal rights. It was however usual for the son, after the third sale, to be resold to his natural father, who then manumitted him, and thus acquired the rights of a patronus over his emancipated son, which would otherwise have belonged to the purchaser who gave him his final manumission. In the case of a daughter or a grandson, a single sale and manumission was sufficient. (Gaius, i. 132; *Dig.*, lib. 28, tit. 3, l. 8; *Cod.*, lib. 8, tit. 49, l. 6; *Instit.*, lib. i., tit. 12, §. 6.)

The Emancipatio Anastasiana, or that introduced by the Emperor Anastasius, was by Imperial Rescript. (*Cod.*, lib viii., tit. 49, l. 6.)

The Emancipatio Justiniana was effected by a simple declaration of a father before the proper magistrate, that he released his son from the paternal authority; but the father still retained the rights of a patronus over his emancipated son. (*Ibid.* l. 6.)

The immediate legal effect of emancipation was, that the person emancipated possessed over his own children the paternal right: he could acquire property, and bequeath it by will. If a son married and had children before he was emancipated, his children were in the power of their grand father, who could emancipate them without emancipating their father; and such emancipation continued in force after the grandfather's death.

It was also a consequence of emancipation that the emancipated children stood to their father in the relation of strangers, and consequently, in case of intestacy, could not take the parent's property, which could only be claimed by those who corresponded to the legal description of heredes sui, agnati, and gentiles. But this injustice of the civil law (juris iniquitates), observes Gaius, was remedied by the prætor's edict, or, as we should term it, the equity, which was gradually introduced in order to soften the rigour and strict rules of the civil law. [Edict.] The prætor's edict, however, did not extend to give the same advantage to an emancipated son in succeeding to the property of an intestate brother. The Emperor Anastasius remedied this under certain restrictions; and finally Justinian put emancipated and non-emancipated brothers and sisters and their children on the same footing in all respects as to sharing in the property of a deceased parent or brother or sister. (*Cod.*, lib. vi., tit. 57, l. 15; *Instit.*, lib. v., tit. 5.)

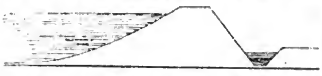
As to emancipation under the Code Napoléon, see liv. i., chap. 3, tit. 10.

EMARGI'NULA. [Cervicobranchiata, vol. vi. p. 444.]

EMBALMING. [Mummy.]

EMBANKMENT. It is often necessary to raise mounds or dykes along the course of rivers to keep them within their channels, and prevent their flooding the lands which lie near them, when the waters rise above their usual level. Those alluvial lands which lie near the mouths of rivers and are below the line of high water cannot be cultivated to advantage unless they are secured from inundation by proper embankments; and as these alluvial deposits are generally very fertile, it amply repays the expense of constructing dykes and keeping them in repair. The whole of the provinces of Holland and Zeeland and several other districts in the Low Countries could not be inhabited if the sea were not kept out by strong embankments; and the destruction of a dyke frequently desolates great tracts of country. The art of constructing dykes and of keeping them in repair is therefore one of the greatest importance to the proprietors of low lands situated as above described.

The first thing to be attended to in forming embankments is to enable them to resist the pressure of the highest floods which are likely to occur, and to prevent the effect of the waves and currents in washing them away. When it is the simple pressure of a column of water which is to be withstood, a simple earthen bank made of the soil immediately at hand, provided it be not of a porous nature, is sufficient. Its form should be a very broad base with sloping sides and with a flat top, which may serve as a path or even a carriage-road, if the bank be of considerable dimensions. The side towards the water should slope more gradually than towards the land, where it may form an angle of 45° with the horizon. A ditch is usually dug along the inside of the bank, and sometimes on both sides, when the dyke is at some distance from the usual channel of the water, and is only a precaution against unusual floods. The inner ditch collects the water which is produced by rains or may find its way by filtration through the bank or the soil.



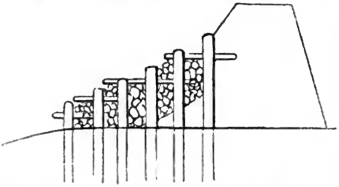
To raise these simple dykes nothing is requisite but to carry the earth from below, and consolidate it by treading it in a moist state, that no interstices be left. Such are the dykes along the slow-running rivers and canals in Holland. But where a considerable river winds through an extensive plain and is apt to change its bed by the wearing away of the banks in some places and the deposition of mud in others, more skill and more expensive works are required to keep it within its banks and to prevent the effects of a rapid current in destroying them. In this case strong piles are driven deep into the ground, and instead of earthen dykes, stone walls are opposed to the force of the water.

The embanking of a considerable river often requires the course of the stream to be changed, and instead of the winding course which rivers naturally take through plains, straight channels are artificially made for them. At first sight it would seem that a straight channel is the natural course of a stream; but this is far from being the case. A straight course can never be maintained without artificial means; water never flows in a straight line, but always in curves. The slightest inequality in the bottom or sides partially obstructs its course and produces a circular motion in the water; and this, acting on soft banks, soon hollows them out, which, increasing the eddies, accelerates the change in the current. When a river is turned into a new channel, the banks must be strengthened with piles or masonry, and the foundations of the works must be laid below the gravel or stones which may have accumulated, that they may not be undermined by the percolation of the water.

When the dykes are only intended to check the waters at the time when they flow over their natural banks, it is best to raise them at some distance from the river on each side and parallel to its course; because, in sudden floods, the water, having a greater space to flow through, will not rise so high, and will sooner recede. The natural banks must be carefully attended to in this case, that they may remain nearly the same, without being subjected to that continual change which we have noticed before. Those who have long attended to these changes and their immediate causes will find no difficulty in checking them in the outset by very easy and simple means. Whenever a bank begins to be undermined, a few piles driven in judiciously, and some stones thrown into the river above the place where its banks begin to wear away, will cause a change in the current, and throw it over to the opposite side. Indeed, if this is done injudiciously, the banks opposite will begin to wear away; but by continued attention and prevention, rather than correction, any river having a moderate current may be kept within its proper bed.

It sometimes happens that rivers near their mouths form shallow æstuaries, and occupy much ground which might be usefully employed. In this case an entirely new outlet may sometimes be made, through which the river may at once discharge itself into the sea; and the whole course will probably be soon filled up by the deposition of soil and mud brought in by the tides; for it is the current which clears the channel, and when this is taken away the channel soon fills up. In the course of a short time the old mouth of the river will be so filled up as scarcely to admit the tide; and an embankment across it may lay a large fertile tract of land quite dry.

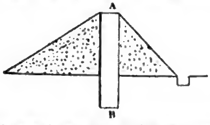
Where embankments are made against the sea, greater skill is required to resist the force of the waves. If there are materials at hand to lay a bank of stones imbedded in clay, with a broad base, and the sides sloping very gradually upwards, a very safe barrier may be opposed to the waters. It is not the direct impulse which is the most destructive, waves striking against a sloping surface lose their force and rise over it; but it is in returning that they draw the materials with them, and scoop out the foundations. If the stones are well joined together, the retiring wave will have no effect in loosening them; but if any one of them can be singly removed from its place, they will soon disappear one after another, till a breach is made; after which a single storm may destroy the whole embankment. There are many parts of the coast of England where whole estates would soon be swept away, if it were not for continual attention to the embankments. Near the mouth of the Thames, in particular, on the north side, and all along the coast of Essex, the sea is only kept out by incessant attention to the sea-walls. In various places the ingenuity of scientific men has been exercised to invent various modes of resisting the force of the sea. In some exposed points piers of solid oak have been made, which oppose a smooth surface obliquely to the force of the waves; in others, rows of piles have been driven in, forming lines at right or oblique angles to the line of the shore, in order to intercept the waves, and break their force before they reach the bank. In a place where the rounded stones called shingles were usually thrown up by the waves, and the bottom was a strong clay, their retreat has been intercepted by rows of strong piles driven in a line along and parallel to the shore, and covered with boards nailed to them on the land side. By this means the sea has been made to provide the materials of the embankment, and to lay them down. In one night the shingles have been thrown over the piles; and being retained by the boarding, have formed a perfect wall. A second row of piles between the first and the sea, and a third if required, forms a sea wall which might defy any storms. We mention this an example of the advantage which may be taken of particular circumstances by which a great expense may sometimes be saved. In other situations where the shingle is not thrown up, and the wall is not so immediately exposed to the action of the waves, an excellent facing of the wall is made by several rows of piles from five to fifteen feet long, driven along the side of the earthen bank in the form of steps rising above each other. These piles are driven very close together, and the distance between the rows is about two feet. This interval is filled with stones, and bushes are pinned down over them by means of wooden pins driven horizontally through holes made in the piles. This contrivance effectually prevents the washing away of the bank.



Where the land lies very flat for a considerable distance from the shore, it is of advantage to have two complete banks, one within the other; so that if the outer bank is broken through, the second will keep back the waters, until the first can be repaired. The ground between the two lines of banks is usually left in pasture. In this case the damage done by an inundation of salt-water will not be so great as if the land were arable; and unless it remain flooded for a considerable time, the herbage suffers little, if anything, from it.

The water which accumulates within the banks and is collected in the internal ditch and those which divide the marshes must be let off occasionally by means of channels and sluices at the time when the tide is out, and the water outside the bank is lower than that which is within it. In small embankments a wooden trunk or pipe may be laid through the bank, with a valve opening outwards, by which means the superfluous water may flow out, and none flow back. It is useful to carry this trunk a considerable way outside the bank, if it empties itself immediately into the sea, in order that it may not be choked up with sand or shingles. Cast-iron pipes are conveniently used for this purpose, and they may be carried out so far as to empty themselves below low-water mark. But when the embankment is very extensive, and there are streams flowing through the part which is embanked, larger flood-gates and more extensive works are necessary. These being opened and shut as occasion may require, serve to keep the channel clear, by producing occasionally a considerable rush of water to carry away mud and sand which would otherwise have accumulated at the mouth of it. When the level of the land which is embanked is below the usual level of the waters which are without, the water is raised by means of engines over the banks, as is the case in the fens. [DRAINING.]

In the forming of the banks, where the soil may not be quite impervious to water, it is useful to begin by digging a ditch in the line of the intended bank, of such a depth as to reach an impervious subsoil. This ditch is to be filled up with clay or tempered earth, and as the bank is raised, the middle of the bank should be composed of the same materials, which will thus form a vertical wall A B up to the top; and the more porous earth being heaped up against the sides of this wall will form the slopes of the bank: thus the whole will be perfectly impenetrable to the water. The clay should be well trod in with the feet in a moist state, and no pieces of wood, or even straw should be in it; for a straw may be the cause of the water finding a passage through a bank, and this passage gradually widening will soon produce a hole, which may in the end cause the destruction of the bank. Moles and worms are great enemies to dykes. In Holland the storks are held in great veneration, and are never molested, because they are supposed to destroy a worm which often does great mischief to the dykes by perforating them.



EMBARGO, the word used to denote the act by which the public authorities of a country lay an arrest on ships to prevent their leaving its ports. On the breaking out of war with any nation it has been usual for the government of each country to lay an embargo upon such of the enemy's ships as are within reach, with a view to their being declared good and lawful prize. During the progress of war, when any expedition is on foot against the enemy, and it is desirable to keep the circumstance from the knowledge of the party to be attacked, it is usual to lay an embargo upon all private vessels, as well those under the national flag as foreign vessels, until the object to be attained by secresy is accomplished. An embargo may also be laid by the government upon ships belonging to its subjects with a view to their employment for the service and defence of the nation. In all these cases it is clear that embargoes are detrimental to commerce; the only case in which they have an opposite character is when a foreign vessel of war or privateer frequents a neutral port, and is restrained from quitting the same until a certain time shall have elapsed after the departure from the port of any vessel of which it might otherwise make prize.

EMBER-DAYS and WEEKS, certain seasons of the year set apart for imploring the blessing of the Almighty on the produce of the earth by prayer and fasting, observed in the Christian church as early as the third century. Pope Calixtus, who first directed them to be observed, also ordained that the same seasons should be especially devoted to the preparation of the clergy before their ordination. These seasons are mentioned in the laws both of Alfred and Canute. At first the Ember-days were not uniformly observed by different churches at the same time; but the Council of Placentia, A.D. 1095, fixed the spring and summer Ember-days to be the Wednesdays, Fridays, and Saturdays after the first Sunday in Lent and Whitsunday; those of autumn and winter upon the same days after the feast of the holy cross (September 14th) and St. Lucia (December 13th). The Sundays immediately following all these seasons are still appointed by the thirty-first canon of the Church of England for the ordination of ministers. The four weeks in which the Ember-days severally occur are called Ember-weeks. Shakspeare speaks of Ember-eves. The etymology of Ember-days is uncertain. Some have derived the term from *ember*, ashes; others from ἡμέραι, days; and others from *ymbren*, which in the Anglo-Saxon means a circle or revolution, the Ember-days being set seasons in the course or circuit of the year. (Broughton's *Dict. of all Religions*, p. 357; Brady's *Clavis Calendaria*, 8vo. Lond. 1812, vol. i. p. 223-226.)

EMBERI'ZIDÆ. (Zoology.) The Latin name for the birds, popularly known in England by the name of Buntings. [FRINGILLIDÆ.]

EMBEZZLEMENT, from the old French word *besler* or *embesler*, to filch, is the fraudulent appropriation by servants and others of money or goods entrusted to their care, or received by them on account of their employers.

By Clerks and Servants. Is an indictable offence under the 7th and 8th Geo. IV., cap. 29, sect. 46, and by that statute is declared to be larceny, and punishable with transportation for a term not exceeding fourteen or less than seven years, or by imprisonment for any term not exceeding three years. If the offender be a male he is liable to be once, twice, or thrice publicly or privately whipped (if the court shall so think fit) in addition to such imprisonment. This statute extends to the clerks and servants (both male and female) of all persons, whether in or out of trade, provided they are entrusted to receive moneys for their employers.

By Agents, Bankers, Attorneys, &c. Of moneys and securities, when entrusted to them for any special purpose, is constituted a misdemeanour by the same statute, cap. 49, and subjects the offender to transportation, as in the case of clerks and servants, or to fine and imprisonment, in the discretion of the court.

By Public Servants. Under the 2nd Wm. IV., cap. 4.

sect. 1, persons employed in the public service and embezzling any moneys or securities entrusted to them are to be deemed guilty of felony, and are punishable in the same manner as clerks and servants for the like offence, except being whipped.

As to bankrupts and insolvents, see BANKRUPT and INSOLVENT.

EMBLEM: in Greek, *ἔμβλημα* (from *ἐν* and *βάλλειν*, to cast in), a thing inserted, inlaid work, Mosaic, or the like. In English, an emblem is a figurative representation; a representation which by virtue of association suggests to our minds something not expressed to our senses. For instance, a lion is the emblem of courage, a cock of watchfulness, because watchfulness and courage are qualities commonly associated in our minds with those animals, as their characteristics. So by historical association, without any intrinsic fitness, one thing may become the emblem of another, as the wheel and other instruments of torture are emblems of saints who have perished by them. Any device, however arbitrary, when established by usage as a distinctive mark, may become the emblem and be put for that which assumes it, either in writing or in imitative art; as for instance in Wordsworth's lines:—

> From town to town, from tower to tower,
> The red rose is a gladsome flower, &c.

The red rose is the emblem of, and is universally understood to mean, the house of Lancaster, though no mention of that house has been made.

EMBLEMENTS, from the French words *emblavence de bled* (corn sprung or put above ground), in its strict signification means the profits of land sown, but in its usual sense it extends to roots planted and other annual artificial profits which arise from the soil, as for example, standing corn, hemp, saffron, flax, hops, and garden produce growing above ground, as melons and cucumbers, all of which annually require either sowing, planting, or manuring at the expense of the tenant, and are not a permanent or natural product of the soil.

By a rule of law founded on public policy, and for the encouragement of husbandry, all persons are entitled to the emblements of land sown by themselves in which they have an uncertain interest, and which is determined either by the act of God, or of the law, between the time of sowing or planting and the severance of the crop.

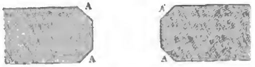
Thus the representatives of a tenant for life, who dies previous to harvest, are entitled to the growing crops as a compensation for the labour and tillage bestowed on the lands by the deceased. The same rule also exists with regard to a strict tenant at will, if his tenancy is determined by the landlord previously to the corn being reaped, and for this reason, that as the tenant could not know when the landlord would determine his will, he could not therefore make any provision against it, and having sown the land upon a reasonable presumption of taking the produce, the law will not suffer him to be a loser by it. If, on the other hand, a tenant for life or at will puts an end to his occupation by his own act, he will not be entitled to the crops, as no uncertainty can exist on his part, which is the point upon which all cases of emblements rest.

The parochial clergy and their under-tenants, being also tenants for lives, and their representatives, are in like manner entitled to all the advantages of emblements by the 28th Henry VIII., c. 11, sect. 6; and under that statute they are enabled to bequeath by will grain growing upon the glebe land, manured and sown at their own cost; but for the reason above mentioned, a person who resigns his living is not entitled to the emblements.

Fruit trees which cannot be presumed to be planted in contemplation of present profit, but rather of being permanently useful to a succession of tenants, and grass which grows of itself without annual expense and labour on the part of the tenant are not included within the meaning of emblements. (Godolphin's *Orphan's Legacy*; Woodfall's *Landlord and Tenant*.)

EMBRACERY, an attempt to influence or corrupt a jury, or induce them to favour one of the parties in a cause. It is punished by fine and imprisonment. [ATTAINT.] The crime of embracery is completed whether the jury on whom the attempt is made give any verdict or not, or whether the verdict given be true or false.

EMBRASURE (in Architecture) is the indent of a battlement. [BATTLEMENT.] It signifies also the splay of a door or window. In walls of some thickness the apertures are splayed on the inside or outside, or both, in order to admit more light, thus making the angles of the wall obtuse instead of rectangular: thus—



AA are splays forming the embrasure. The term is derived from the French.

EMBRASURE (in fortification) is an opening made in an epaulement or parapet for the purpose of allowing a gun to be fired through it. Embrasures are usually two feet wide at the neck, or interior extremity; and, at the mouth or exterior extremity, their width is equal to half the thickness of the epaulement, that is about nine feet. The cheeks or sides are frequently formed vertically at the neck, that the men who serve the guns may be covered as much as possible; but, beyond that part, each side declines gradually from a vertical plane outwards, in order that it may be less injured by the fire of the piece; and, at the mouth, this deviation amounts to one foot. The sole or lower surface of the embrasure is five feet below the top of the epaulement, or two feet six inches above the platform on which the gun-carriage is placed; and it is either parallel or inclined to the horizon, according to the position of the fixed object against which the fire is to be directed.

In general the axis of the embrasure is perpendicular to the length of the epaulement, but when the confined nature of the ground does not permit the epaulement to have the required direction, the embrasure is necessarily cut obliquely, in which case the breadths above given are still set out perpendicularly to the axis.

In permanent fortifications the sides of the embrasures are generally reveted or lined with brickwork; but in field-batteries the earth at the sides is either without support, or is kept up, about the neck, only by gabions or fascines.

EMBROCATION (from Embroche, *Ἐμβροχή*), a moistening, a term employed to denote certain external applications, which had for their object to soften and dissipate swellings: in this sense they do not differ from fomentations; but the word has been extended beyond its original meaning, and signifies oleaginous or spirituous compounds, which may excite the vessels of the skin to increased action, and produce all the effects of counter-irritants, or by their influence on the extremities of the nerves may assist in resolving spasm, and so act as antispasmodics.

EMBRUN, a frontier fortress of France in the department of Hautes Alpes, on the north-west bank of the Durance, about 353 miles in a straight line south-south-east of Paris.

Embrun was known to the Romans by the name of Ebrodunum, Eburodunum, Hebridunum, or Eburonum. It obtained various privileges from the Roman emperors; and in the division which was made of Gaul in the later period of the Roman domination was included in the province of Alpes Maritimæ (the Maritime Alps), of which it was one of the chief towns. It became early the seat of a bishopric; afterwards of an archbishopric. The see continued to exist up to the period of the French revolution.

The archbishop of Aix still takes the additional title of archbishop of Embrun, but the diocese has not been restored. Embrun was in the middle ages the capital of the district of Embrunois, in Dauphiné. The town suffered in the religious wars of the sixteenth century, and was taken in 1693 by the duke of Savoy.

Embrun is fortified and tolerably well built. Among the most remarkable buildings are the former cathedral, the foundation of which is ascribed to Charlemagne, and the archiepiscopal palace. There is a central house of correction, the buildings of which were formerly occupied as a seminary for the priesthood. The population in 1832 was 2392 for the town, or 3062 for the whole commune. The chief trade carried on is in sheep: there are several tan-yards, and some hat manufactories. Excellent slates are quarried near Embrun, and there are orchards and vineyards near it. The site is at a considerable elevation above the level of the sea.

Embrun is the capital of an arrondissement, which had in 1832 a population of 30,828.

EMBRYO. [FŒTUS.]

EMDEN, or **EMBDEN**, the chief town of a bailiwic, in the north-western part of the province of Aurich, formerly East Friesland, in the kingdom of Hanover. It lies in 53° 22′ N. lat. and 7° 12′ E. long., a little below the efflux of the Ems into the Dollart, a bay of the German Ocean, and is connected with that river by a canal about two miles long, called tho Delf Canal, which was constructed at the expense of the town in 1769. Emden is surrounded with walls and towers, and consists of Faldern, the old town, and two suburbs, which contain about 2250 houses and 12,500 inhabitants, of whom about 450 are Jews. It has all the appearance of a Dutch town, and is intersected by canals, over which there are thirty bridges. Its spacious townhall, with an old armoury and library, is one of the finest buildings in East Friesland. There are six churches, of which three belong to the Dutch form of worship, one to the French Protestant, one to the Lutheran, and one to the Roman Catholic; there are also a synagogue and Mennonite chapel, a gymnasium, schools of navigation and design, elementary schools, a richly-endowed orphan asylum, a castle and custom-house, and societies of the fine arts and national antiquities.

Emden owes its prosperity to a colony of Dutchmen, who sought refuge in it, and communicated so great an impulse to its commercial enterprize that in the year 1652 the population amounted to 20,000, and owned upwards of 600 vessels. A century afterwards viz., in 1749, the town had so much declined that the population did not exceed 8000. It came into the hands of Holland in 1808, was made the chief town of the French department of Ostem in 1810, and on the 15th of December, 1815, was, with the whole of East Friesland, incorporated with the kingdom of Hanover. It would rival Hamburg and Bremen in trade but for the shallowness of its harbour. It has been a free port ever since the year 1751; but the Delf canal, which unites the harbour with the town, and is drained and cleansed by means of five inland canals, has frequently no water in it, and can be entered at high water only; and even then it is not navigable by vessels which draw more than 13 or 14 feet of water. All ships of greater draught are obliged to discharge their cargoes in the fine roadstead called Delf, into which the canal opens. There is a treckshuyt, or towing canal, about 14 miles in length, between Emden and Aurich.

Emden is the chief commercial place in Hanover; and ship-building is carried on to a considerable extent. As early as the year 1682 it had an African trading company, and in the middle of the last century an East India company. The herring fishery off Scotland, which is a source of great profit to the place, is carried on by four companies, who send out between fifty and sixty ships. This branch of its fishery alone employs above 1500 individuals, and produces annually from 12,000 to 13,000 tons of fish. Emden has brandy distilleries and sawing and oil-crushing mills, besides manufactures of fustian, cottons, stockings, sail-cloth, cordage, needles, leather, soap, tobacco, &c. It has considerable trade in linens, thread, grain, butter, and cheese (Embder kaese), the last of which is in much repute. Between 900 and 1000 vessels enter the port every year. The dykes and sluices, which protect the neighbouring country from inundation, are a cause of great expense to the municipality; it is estimated that they gain about two miles square of soil every forty years by pushing out the embankments into the Dollart. Emden is the birthplace of Backhuysen, the celebrated marine painter. Opposite the harbour, in the Dollart, are the small remains of the Island of Nessa, or Nesserland. It is separated from Delf by a swampy arm of the Ems, and previously to the inundations which overwhelmed it between the years 1277 and 1287, formed a beautiful spot of about 80 square miles, with a town called Torum, 2 market-towns, numerous villages, and several monasteries and convents. All that is left of it at the present day is a church and five or six houses, built on high mounds of earth, but protected by dams so slight that they are in imminent danger from the sea.

The bailiwic of Emden has an area of about 78 square miles, and contains 1 town, 1 market-village, Oldersum, on the Ems, with about 820 inhabitants, 4 villages, and 30 parishes. The population amounts to about 11,500.

EMERALD. [BERYL.]

EME'RITA. (Zoology.) [HIPPA.]

EMERSION (Astronomy), the reappearance of one heavenly body from behind another after an eclipse or occultation.

EMERSON, WILLIAM, an eminent mathematician, philosopher, and mechanist, was born at Hurworth, a village about three miles from Darlington, in June 1701 he died May 20th, 1782, at his native place, aged nearly eighty-one years.

His father, Dudley Emerson, was a schoolmaster, and is said to have been a tolerable proficient in the mathematics of that time: this circumstance furnished his son with ample means of cultivating his taste for the same science, both by means of a good mathematical library which his father possessed, and the good mathematical tuition which he received in his earlier years. A young clergyman, then curate of Hurworth, also lodged in his father's house, and from him he received all requisite assistance in the study of the Greek and Roman classics, in which he became well versed.

After the death of his father, Emerson attempted to continue the school, which however he soon relinquished; but whether it arose from the impetuosity of his temper which rendered him unfit for such an occupation, or that a small competence left him by his father (he being an only child) rendered it a matter of indifference to him to increase his income, cannot be ascertained. He devoted his long life to writing a series of mathematical works, which, except those of Simpson, were, till a comparatively recent time, the very best in our language. He also contributed largely to the different mathematical periodicals of his time, though almost always under some fanciful name, as Merones, Philofluentimecanalgegeomastrolongo, &c.

Mr. Emerson was in person rather short, but strong and well-formed, with an open honest countenance and ruddy complexion. A portrait of him, by Sykes, was painted and engraved in the latter part of his life; but it is not often to be met with, as only a few copies of it were circulated. His health was generally excellent till near the latter part of his life, when he became a great sufferer from the stone.

Emerson was in many respects a very eccentric person, fancifully coarse in his dress, and uncourteous in his conversation. He was, nevertheless, when in his happier moods, a delightful companion, and his discourse full of instruction, deep thought, and startling originality of opinion.

All his books were published in London; and it was his invariable practice to walk to town and shut himself up in some obscure lodging to devote himself sedulously to the correction of the successive sheets of his works with a care never exceeded even by Hamilton or Cruden; and certainly, of all the mathematical works that have ever been published, those of Emerson are the freest from errata.

Emerson was married, but had no children. He amused himself with fishing, a diversion to which he was much attached, and would frequently stand up to his middle in the water for hours together when he found it gave him a better position for the use of his fly or his angle. He was an excellent practical mechanic, and of most of the machines described in his work on mechanics he had made very good models. The spinning-wheel delineated in that work was the one on which his wife employed her leisure hours. He had also a very profound knowledge of the musical scales, both antient and modern, although he was but a poor performer: still he was dextrous in the repair of musical instruments, and was generally employed to tune the harpsichords and clean the clocks throughout the district in which he resided.

The bold and frank manner in which Emerson spoke on all subjects has led some persons to affirm that he was a sceptic in religion. Of this however there is not the slightest evidence; but it appears to have arisen from the insinuations of his scientific opponents, who thus attempted to crush his reputation with the world, and thereby weaken his authority in matters connected with science—a course too often adopted in our own day by those who contend for victory rather than truth. Emerson was through a long life universally accounted a man of integrity; but his honesty often led to dogmatism, and his indignation at error to an expression of feeling that gave his controversial writings an air of ungracious severity.

A considerable number of Emerson's processes are marked with peculiar elegance and considerable powers of invention; still there is apparent in all of them a want of that power of generalisation which distinguishes the highest order of minds. His Method of Increments is the most original of his works; and his Doctrine of Fluxions is perhaps the most elegant. His Mechanics is the work by which he is most generally known, a circumstance probably owing to its containing descriptions of so many of the more usual and useful machines: but it is a work singularly crude and ill-digested, and not less singularly incomplete in even the enunciation of the most important principles of mechanical science.

The following is a list of his works, all in 8vo., except his Mechanics and Increments in 4to., and his Navigation in 12mo.

1. Doctrine of Fluxions. 2. Projection of the Sphere, Orthographic, Stereographic, and Gnomonic. 3. The Elements of Trigonometry. 4. Principles of Mechanics. 5. A Treatise on Navigation. 6. A Treatise on Arithmetic. 7. A Treatise on Geometry. 8. A Treatise on Algebra. 9. The Method of Increments. 10. Arithmetic of Infinities, and the Conic Sections, with other curve lines. 11. Elements of Optics and Perspective. 12. Astronomy. 13. Mechanics, with Centripetal and Centrifugal Forces. 14. Mathematical Principles of Geography, Navigation, and Dialling. 15. Commentary on the Principia, with a Defence of Newton. 16. Miscellanies.

EMERY. [CORUNDUM.]

E'MESA. [SYRIA.]

E'META, a vegetable alkali obtained from ipecacuanha root, in which the powers of that medicine reside. In order to prepare it, the root is reduced to powder, and then treated with sulphuric æther to separate a fatty substance, and afterwards with boiling alcohol. The alcoholic solutions, when evaporated, leave a bitter brown extract, which contains emeta combined with gallic acid. This is to be redissolved in water, and boiled with an excess of magnesia, which decomposes the gallate of emeta; the magnesian precipitate is to be washed with a little cold water, and then boiled in alcohol. The emeta dissolved in the alcohol is separated by evaporation; but as it is coloured, it is recombined with an acid, and after being decoloured by animal charcoal, it is to be again precipitated by magnesia.

Emeta, when pure, is white, pulverulent, and uncrystallizable; its taste is rather bitter, and it melts at 104° Fahrenheit, and afterwards decomposes at a temperature below 212°. It suffers no change by exposure to the air; it is slightly soluble in cold water, but readily dissolved by alcohol; the solution restores the blue colour of litmus paper which has been reddened; it is precipitated by tincture of galls; acids are but imperfectly saturated by it, and it yields with them uncrystallizable salts, which have been but little examined.

In the dose of half a grain it is stated to act as a powerful emetic, and in larger doses its effects are extremely violent. It is composed of—

Hydrogen . .	7·77
Carbon . .	64·57
Oxygen . .	22·95
Azote . . .	4·30
	99·59

EME'TICS (*ἐμετικὰ, emética*) are substances which influence the stomach in a peculiar manner, so as to invert its action and cause vomiting; and this effect is produced without reference to the quantity of matter introduced into that organ or into the circulation. This definition is intended to exclude, on the one hand, the mere inversion of the stomach by the introduction of food or drink, either in inordinate quantity, or of too stimulating a quality; and, on the other, to comprise those means of causing vomiting by their direct introduction into the circulation by injection into a vein. The action of emetics must be viewed in two stages, the primary and secondary. The primary effects of emetics are limited to the emptying of the stomach, compressing, during the act of vomiting, the gall-bladder and pancreas, and exciting to contraction the muscular parietes of the abdomen and thorax, as the machinery by which the process of vomiting is chiefly accomplished. We shall here briefly trace the obvious phænomena of this process, without attempting to account for their occurrence.

Soon after a quantity of an emetic substance or solution (such as ipecacuanha or emetic tartar) has been received into the stomach, a feeling of anxiety is experienced in the epigastrum, a general uneasiness termed nausea is felt, which progressively becomes greater, till it ends in the forcible expulsion of the contents of the stomach. This gives a succussion to the whole frame, every part of which experiences more or less of a vibratory motion. The condition of the system is considerably different prior to and during the act of vomiting. In the preliminary stage, the countenance is pale and collapsed; the pulse is small, contracted, irregular, but quick more generally than slow; chilliness is felt, and a cold perspiration may ooze from the surface, all which symptoms disappear when the expulsive movement takes place. Then the face appears flushed; the pulse becomes quicker, fuller, and stronger, and rarely subsides till some time after all vomiting has ceased. If, after a brief interval, the expulsive action be not renewed, a state of languor succeeds, with tendency to sleep, and generally a considerable flow of warm perspiration.

Such are the effects of an emetic, when given in a dose sufficient to produce vomiting; but, if given in a smaller quantity, and repeated at intervals, it will merely create a state of nausea, during which the appetite is lowered, and arterial action is much diminished, while the function of absorption is roused to great activity.

The secondary effects of emetics depend upon the succussion of the frame, the equalization of the circulation, the increased secretion from the mucous membrane of the stomach, and also of the duodenum as well as the liver and pancreas, and frequently from the skin.

The secondary effects of nauseating doses are diminished arterial action and augmented absorption.

We shall now state a few of the morbid conditions to which these agents are suited, and a few of those for which they are unfit.

In fever. Whatever opinions may be entertained respecting the nature and origin of fever, there can be no question but that the sanguiferous system powerfully feels and shows disturbance, and in no point more conspicuously than in the capillaries. These become the seat of those morbid actions, to counteract which is the chief aim of the early treatment. By these vessels, too, are executed the functions of secretion, deposition of the nutrient material, exhalation, and, in some degree, the evolution of animal heat. The consequences of deranged action of the capillaries are—diminished or vitiated secretion, suspended nutrition, altered exhalation, and the animal heat augmented or diminished, or unequally diffused. But while the diseased impression is confined to the general circulation, which it always is for some time (varying in different cases and constitutions), the series of morbid actions may be arrested by venesection, purgatives, or more certainly by an emetic. This should be administered at as early a period of the disease as possible; but even should it fail in cutting short the febrile movement, still it clears the stomach, and fits it to retain whatever may subsequently be had recourse to in order to moderate or regulate the future condition of the system. Emetics invariably render the disease milder, owing to the greater freedom of the secretions which follows their use; and they may be advantageously repeated even in the more advanced stage, frequently inducing sleep and a moist state of the skin. They may be employed in epidemic, typhus, common fever, and exanthematous fevers, especially measles, scarlet fever, and small-pox. For the slight febrile affections of children, generally caused by something offending the stomach, nothing is so well suited or so efficacious as a gentle emetic. In bilious fevers emetics are required, especially at the beginning. In intermittent fevers, if given before the paroxysm, they early bring on the sweating stage, thus concentrating the fit into a short period. Their tendency to produce perspiration often renders them useful in rheumatic fevers. In common inflammation of the throat, and still more so in croup, emetics are of decided utility. In common catarrh they frequently shorten the disease; and in the suffocative catarrh and catarrh of old age, emetics mechanically unload the lungs, and render the respiration freer. Dr. James Clark and Dr. Carswell even think that they can dislodge tubercular matter from the lungs in the early stages of consumption. (See Clark *on Consumption*.)

Few agents are more useful in hooping-cough than emetics; and in many cases of indigestion, especially if accompanied with sick headache or hypochondriasis, emetics give effectual relief.

Emetics are very improper where there is a disposition to apoplexy, or tendency of blood to the head, or where the patient is liable to hæmorrhage from any organ, or is subject to hernia. They are also to be avoided during pregnancy.

EMIGRATION, may be defined to be a man's leaving his native country with all his property to settle permanently in another. Emigration is therefore necessarily implied in the word colonization, and it is by the terms of our definition easily distinguished from a man's temporary absence from his native country and from the kind of absence specially called absenteeism.

Though a man may be properly called an emigrant who leaves Great Britain or Ireland, for instance, and settles in France or Germany or elsewhere in Europe, the term has in modern times come to have a more restricted and particular sense. By the term emigrant we generally understand one who leaves an old and thickly peopled country to settle in a country where there is abundance of land that has never been cultivated before, and where the native population is thinly scattered, and the foreign settlers are yet either few compared with the surface, or none at all. The countries to which emigration is mainly directed at present are the British possessions in North America, the United States of North America, and the great island of Australia with Van Diemen's Land.

An emigrant to any of these remote countries must be either a capitalist or a labourer, or he may combine in himself both conditions; but even a mere labourer cannot emigrate without some capital, though the amount may be only enough to convey him to the spot where his labour and skill will be in demand. It was long a prevalent notion among nations, or perhaps we may rather say with those possessed of power at the head of nations (who have generally been slower in learning any great practical truth than the mass of the people, whose understanding is sharpened by a nearer view of their own interest), that emigration should be discouraged or prevented, as tending to weaken a nation. The objection, we believe, was generally founded rather on a notion that the nation lost by its diminished population, than that it suffered from the abstraction of capital. As to the matter of population, however, some observers even then could not fail to remark, that emigration did not seem to diminish the population, but that on the contrary it seemed to be soon followed by an increase. This was observed with respect to Portugal at the time when she was extending her conquests and colonies, and is a fact confirmed by more recent experience, the explanation of which presents no difficulty. The abstraction of capital, skill, and industry might seem, and indeed is primarily, so much good taken from the mother country; but inasmuch as the emigrants retain in their new settlements, through the medium of commercial exchange which is daily becoming more rapid and easy, a connexion with the parent state, it may be and often is the fact, that they ultimately contribute more to the wealth of the mother country when in the new settlements than they could have done at home. Many of those, for example, who settle in the western States of America or in Canada with no capital beyond their hands, by their industry become the possessors of a well-cultivated piece of land, and ultimately consume more of the products of British industry, for which they must give something in exchange, than if they had remained in their native country. And as, in order that emigration to new countries may be a successful undertaking to those who emigrate, and ultimately advantageous to the mother country, there must be an emigration both of capitalists and labourers, it would seem to follow that a state, if it consult the happiness of its citizens, should place no impediments to the emigration either of capitalists of all kinds or of labourers or artizans of any kind, but should on the contrary give reasonable facilities. The objections that have been made and the legislative obstacles that once existed to the exportation of numerous articles from this country, and still exist with reference to some descriptions of machinery (for instance), are founded on a total misconception of the state and condition of newly settled countries, as to their capabilities for manufactures, and on an absurd notion that the exportation of anything can be prevented whenever the demand for it is sufficiently great to cover the risk of evading an absurd enactment. [Contraband.]

If a state then should be wise enough not to discourage emigration, it may be asked, should it aid and direct it? So far as a state should aid and direct emigration, there must be two distinct objects kept in view by the state; one must be to benefit the parent country, the other to benefit those who emigrate. On the contrary, as to the individual who emigrates, whether he emigrates under the protection and direction of the government or not, his sole object is of course to better his own condition.

One cannot well conceive why a state, or any section or part of a nation, should make any contribution or raise any fund for the purpose of aiding emigration, except it be with the view of bettering the condition of some who cannot find employment at home, and at the same time adopting some systematic plan for improving the condition of those who are left behind. Yet any system of emigration thus conducted by government, or by societies, or by the inhabitants of particular districts, would fail in its primary object, relief to the emigrants, unless a corresponding amount of capital should be taken out of the country by other emigrants who might settle in the same place to which the emigrant labourers were sent. To effect such an adjustment between capital and labour, not only should both these elements of wealth in due proportion be transported to the new country, but such proportion should, for some time at least, be maintained by the body which superintends such system of emigration; an arrangement which seems impracticable, except by some such provisions as are hereinafter mentioned.

It is further to be observed that, as no persons can ever succeed as emigrants who are not sober, intelligent, and industrious, and as such alone are consequently fit people to go to a new country, such alone should be sent out by a state or a society, if it interferes in the matter of emigration. But if a large number of the most industrious labourers should emigrate from a given district, and leave behind them the worthless and idle, though the emigrants might better their condition and improve the settlement of which they go to form a part, the mother country would be no gainer by this change. We are not inclined to consider that any advantage, at all commensurate to the expense, would result from any emigration, however extensive, from districts where there is a superabundant and pauperized, or a pauperized and not superabundant population. If the idle, the ignorant, and the vicious, were exported wholesale, they would only die a few years sooner in the land of their new settlement, without conferring any benefit on it, and those of the same kind who were left behind would hardly be more susceptible of improvement for the absence of any part of their numbers which did not amount to pretty nearly the whole number; while the industrious and the intelligent, who, by the supposition, remain at home and are willing to labour whenever it is in their power, would hardly derive any benefit by this removal of the bad from among them, at all commensurate to the amount of capital which must be expended on such wholesale exportations. Besides, as already observed, unless a proper supply of emigrant capitalists can be secured, all general plans for the emigration of labourers can only lead to disappointment and starvation. Any plan therefore which shall have for its object the amelioration of a population sunk in ignorance or debased by pauperism, must be one of an internal character, one which must gradually and on certain fixed principles aim at removing the evils which exist in the social system. Emigration must be left to the free choice of individuals, and must be recommended to the young, the sober, and industrious solely on the grounds of offering to them a reasonable prospect of bettering their condition in a new country.

The disadvantages of emigration however, when there is no plan, no controlling or directing power, are obvious. Emigrants often go to a new country without any definite or clear notion of what they are going to. Dissatisfied or unhappy at home, imagination pictures to them a remote and unknown country as an asylum from all the evils of life; or if they have any distinct idea of the new kind of existence which they are going to adopt, they often underrate the difficulties of the undertaking, or form a false estimate of their own capabilities to meet them. It is no wonder then that so many, on landing in the New World, are startled at the obstacles which then stare them in the face, and shut their eyes to the real advantages, such as they are, which a fertile unoccupied soil presents to a hardworking industrious man.

We have stated that any system of emigration for labourers without a corresponding emigration of capitalists would be fruitless; it is also obvious that if capitalists only were to emigrate without being able to secure a supply of labour, the result would be equally unfortunate. And further, it is clear that any system of emigration of labourers to Canada or the United States could produce no good effect, because voluntary emigration of labourers is still going on, and cannot be checked, and the emigration of capitalists to the same countries is now equally beyond control or direction.

It seems that considerations like these have recently led to the formation of a scheme of emigration which is original in its design. We allude to the South Australian Colony, the first Annual Report of the Commissioners for which was ordered to be printed by the House of Commons, 28th July, 1836. To adopt the language of this Report, 'the distinguishing and cardinal principles of the colony of South Australia are, that all public lands shall be sold, and that the proceeds of the sale shall be employed in conveying labourers to the colony.' Further: 'it is essential to the prosperity of a new colony in which there are neither slaves nor convicts, that there should be a constant supply of free labourers willing to be employed for wages. No productive industry worthy of the name can be undertaken, unless several hands can be put on the same work at the same time; and if there be not, in a colony in which the compulsory services of slaves or convicts cannot be obtained, a constant supply of labour for hire, no extensive farm can be cultivated, no large and continuous work can be carried on, and the capital imported must perish for want of hands to render it reproductive.'

It is also the object of the Commissioners to prevent the labourers, for some time after their arrival in the colony, from purchasing land. It is proposed to effect this by fixing the price of land sufficiently high to prevent the labourer from being tempted too soon to exchange that condition which is for the time the most profitable both to himself and the body of emigrants for the apparently higher character of a land-owner.

It is justly remarked in the Report that the result of such premature purchases 'would be alike disastrous to the capitalist and to the labourer; as the supply of labour for hire being thus diminished, improvements requiring the co-operation of many hands would be suspended, and capital would waste and perish for want of means to use it; and the labouring population becoming separated upon small patches of land, each family would be obliged to perform every species of work for themselves; and the absence of all division of employment and combination of labour would so reduce the efficacy of their industry, that instead of advancing in wealth and civilization, they would fall back to a semi-barbarous state.' Such a result has already been witnessed in numerous new settlements, and such a result must inevitably follow the dispersion of small capitalists and labourers who aspire to be land-holders over a large uncultivated surface, however rich it may naturally be. The practical problem which the Commissioners have undertaken to solve is not without its difficulties, and time alone can show how far they will succeed. In the mean time we recommend to the reader the perusal of the First Report, together with the other publications that have appeared on this interesting subject.

We know no recent publication which is better adapted to give a correct notion of the kind of difficulties which an emigrant has to meet, even under circumstances not the most unfavourable, than a little work entitled the 'Backwoods of Canada,' published under the superintendence of the Society for the Diffusion of Useful Knowledge.

The number of persons who, according to the Custom House accounts, have emigrated from the United Kingdom to the British colonies in North America, the United States, the Cape of Good Hope, and the British settlements in Australia, in each year from 1820 to 1836, has been as follows:—

Years.	British North American Colonies.	United States of America.	Cape of Good Hope.	Australian Settlements.	Total.
1820	17,921		1063	..	18,984
1821	12,470		404	320	13,194
1822	11,282		192	875	12,349
1823	8,133		184	543	8,860
1824	7,311		119	780	8,210
1825	8,741		114	485	9,340
1826	12,818		116	903	13,837
1827	12,648		114	715	13,477
1828	12,084		135	1056	13,275
1829	13,607		197	2016	15,820
1830	30,574		204	1242	32,020
1831	49,383		58	423	49,864
1832	66,339	32,980	202	3792	103,313
1833	28,808	29,225	517	4134	62,684
1834	40,060	33,074	288	2800	76,222
1835	15,573	26,720	325	1860	44,478
1836	34,226	37,774	293	3124	75,417

The above statement is almost necessarily defective, because many persons proceed from the United Kingdom as emigrants on board vessels which are not wholly devoted to the conveyance of passengers, and of whom no record is kept at the Custom House. The following statement, giving the number of emigrants who landed at Quebec and Montreal, at New York, and in New South Wales, in each year from 1829 to 1835, is compiled from returns made by the government agents, and is probably correct as regards those particular places, which are the principal points to which the tide of emigration from this country is continually tending:—

	Quebec and Montreal.	New York.	New South Wales.
1829	15,945	11,501	564
1830	28,000	21,433	309
1831	50,254	22,607	457
1832	51,746	28,283	2,006
1833	21,752	16,100	2,685
1834	30,935	26,540	1,564
1835	12,527	16,749	1,428
1836	27,722	59 075	——

The countries from which the emigrants have proceeded who landed at Quebec and Montreal, as stated above, were—

	1829.	1830.	1831.	1832.	1833.	1834	1835	1836.
Eng. and Wales	3,565	6,799	10,343	17,481	5,198	6,799	3,067	12,188
Ireland	9,614	18,300	34,135	28,204	12,013	19,206	7,108	12,590
Scotland	2,643	2,450	5,354	5,500	4,196	4,591	2,127	2,224
Hamburg and Gibraltar	..	..	..	15	..	..	..	..
Nova Scotia, Newfoundland, West Ind., &c.	123	451	424	546	345	339	225	235
Hâvre de Grace (Swiss and Bavarians)	..	..	..	..	..	..	..	*485
	15,945	28,000	50,254	51,746	21,752	30,935	12,527	27,722

The arrivals at New York in the four years from 1829 to 1832, since which time this information has not been afforded, were—

	1829.	1830.	1831.	1832.
From England	8,110	16,350	13,808	18,947
Ireland	2,443	3,499	6,721	6,050
Scotland	948	1,584	2,078	3,286
	11,501	21,433	22,607	28,283

A large proportion of English emigrants who land at New York have no intention of remaining in the United States, but take that route in preference to the Saint Lawrence, the navigation of which is tedious and dangerous, and proceed to Upper Canada: it is not possible however to state precisely their ultimate destination. The distribution of those emigrants who landed at Quebec and Montreal during the last three years is given by the agent for emigration in Canada as follows—:

	1834.		1835.		1836.	
LOWER CANADA.						
City and District of Quebec	1,500		825		1,000	
District of Three Rivers	350		132		200	
District of St. Francis and Eastern Townships	640		200		6,000	
City and District of Montreal	1,200		790		1,500	
Ottawa District	400		350		900	
		4,090		2,297		9,600
UPPER CANADA.						
Ottawa, Bathurst, Midland, and Eastern Districts to Kingston included	1,000		2,000		3,600	
District of Newcastle and Townships in the vicinity of the Bay of Quinte	2,650		900		1,500	
Toronto and Home District, and Settlements round Lake Simcoe	8,000		2,500		3,000	
Hamilton, Guelph, and Huron Tract	2,660		1,300		1,400	
Niagara Frontier and District, and round the head of Lake Ontario to Hamilton	3,300		1,300		1,500	
Settlements bordering on Lake Erie, including the London District, Adelaide Settlement, and on to Lake St. Clair	4,600		1,800		2,000	
		22,210		9,800		13,000
Died at Grosse Isle	. . . .		10		58	
,, at Marine Hospital, Quebec	. . . .		3		30	
Returned to United Kingdom	350		117		—	
,, to Picton	. . . .		. . . .		67	
Gone to United States	3,483		300		4,973	
Died of Cholera	800		—		—	
		4,633		430		5,128
Total		30,933		12,527		27,728

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* Proceeded to the United States.

The emigrants who arrived at Quebec and Montreal in each of the years 1835 and 1836 were divided, as regards sex, &c., as follows:—

	1835.	1836.
Males	5,597	14,447
Females	3,866	7,833
Children under 14 years of age	3,064	5,448
	12,527	27,728
Of these there were sent out by parochial aid	1,043	4,640
Went at their own expense	11,484	23,088
	12,527	27,728

The parochial emigrants in 1836 were sent from Hampshire, Wiltshire, Norfolk, and Kent.

The following list of Reports may be useful.—

Report from Select Committee on Emigration from the United Kingdom, 1826. Three Reports from same Committee, 1826-27. Report to Colonial Department by Col. Cockburn, on the subject of Emigration, January, 1827. Reports from Commissioners for Emigration to the Colonial Secretary, 1832. Annual Reports from the Agent for Emigration in Canada, 1833 to 1836.

EMIR-AL-OMRAH, or more correctly *emîr-al-omarâ*, i. e. 'the prince of princes,' or 'chief of chiefs,' is the designation of an office under the caliphat, endowed with almost unlimited authority, which was created in the year of the Hegira 324 (A.D. 935), became hereditary in the year 333 (A.D. 944), and continued till near the middle of the following century. The disturbed state of the empire, in which the governors of the provinces frequently broke their allegiance to the sovereign, induced the caliph Al-Radhi, who had ascended the throne in the year 322 of the Hegira (A.D. 934), to seek for stronger aid in the management of public affairs than the previously existing office of a vizier, or prime minister, was able to afford; and with this view he sent for one of the refractory vassals, Mohammed ben Râyek, the governor of Waset, invited him to come to Bagdad, appointed him commander-in-chief of the army, and entrusted to him the superintendence of all his dominions, conferring upon him at the same time the title of emîr-al-omarâ, and directing his name to be inserted in the public prayers in the mosques throughout the empire, next to that of the caliph himself. The vizier Ebn Moklah, known as the reputed inventor of the Neskhi character, or Arabic current hand, was dismissed, and severely punished for an attempt to recover his station. Mohammed ben Râyek himself appointed a vizier in the person of Fadhl ben Jaafar, the governor of Egypt and Syria. Not two years elapsed after the elevation of Mohammed ben Râyek, before he was obliged to yield his place to the Turk Yahkam (called by Abulfeda, Bahkam), a freed slave, who had raised himself into power, and had been appointed governor of Ahwâz by Mohammed ben Râyek This post he had been obliged to relinquish on account of the rising power of the Buides (Bawaihides) in Persia: he had in consequence taken possession of Waset, and now marched to Bagdad, and forced the caliph to submit to his dictation. Mohammed ben Râyek quitted the capital, but soon returned with an army, when a contest followed, which terminated in his being appointed governor of Harran, Roha (Edessa), Kinnesrin, and Awâsim, and subsequently of nearly the whole of Syria. Bahkam remained emîr-al-omarâ till his death, which took place shortly after the accession of Mottaki billah to the caliphat (A. Heg. 330, A.D. 941): he was, according to some, killed by the Curds on a hunting excursion; according to others, he was assassinated by order of Mottaki, whom his arrogant behaviour had exasperated against him. Abdallah al-Baridi, governor of Basra, made an unsuccessful attempt to possess himself of the office of emîr-al-omarâ. Kurtekîn, another Turkish chief, who succeeded him, held the office during eighty days, at the expiration of which Mohammed ben Râyek returned from Syria to Bagdad, took Kurtekîn prisoner, and was re-appointed emîr-al-omarâ by the caliph. But after a very short time Mohammed was assassinated by the order of Naser-ed-daulah, the governor of Mosul, who succeeded him during a period of three months. In A. Heg. 331 (A.D. 942), Mottaki appointed Tûzûn emîr-al-omarâ. In the ensuing year the caliph quitted Bagdad, and fled towards Mosul in consequence of a disagreement with Tûzûn: the latter followed him, as the caliph had offered terms for a reconciliation; but when they had met, Tûzûn ordered both the eyes of the caliph to be put out, led him back to Bagdad, and compelled him to resign the throne in favour of Mostakfi billah. In A Heg. 334 (A.D. 945) Tûzûn died, and the Turkish guards at Bagdad chose Zairat, son of Shîrzâd, as his successor, in which capacity he was confirmed by the caliph Mostakfi. But before the end of the year Moëzz-ed-daulah, the Buide (Bawaihide) prince of Ahwaz, entered Bagdad at the head of an army; Zairak and the Turkish guards fled to Mosul, and the caliph created Moëzz-ed-daulah his emîr-al-omarâ. Of this appointment he had soon reason to repent; for Moëzz-ed-daulah dethroned him, and made Al-Moti-lillah caliph in his stead. 'The caliphat,' observes Abulfeda, 'which was conferred upon Moti-lillah, was divested of nearly every prerogative of sovereignty: the officers of Moëzz-ed-daulah ruled throughout Irak, and to the caliph nothing was left but what Moëzz-ed-daulah out of his own free will conceded to him.' The authority of Moëzz-ed-daulah was for a time contested by Naser-ed-daulah of Mosul; but in A. Heg. 337 (A.D. 948) Moëzz-ed-daulah took Mosul, and his opponent fled to Nisibis. Moëzz-ed-daulah now continued undisturbed in the possession of his high authority till his death, which took place A. Heg. 356 (A.D. 966). How great his power was cannot perhaps be better shown than by mentioning the fact, that he was the first Mohammedan prince who sold an appointment of judge (for 200,000 dirhems), and that in a Sunnite country he, a Shiite, directed a public mourning in memory of the death of the caliph Hossain [ALI BEN ABI TALEB]. He was succeeded by his son Bakhtiar Azz-ed-daulah, an indolent and voluptuous prince, between whom and the chiefs of the Turkish body-guard, Sebuktekin and Aftekin, frequent dissensions and at last open hostilities took place. Bakhtiar was obliged to quit Bagdad, and to apply for assistance to his cousin Adad-ed-daulah. The latter conducted him back to the capital, but induced him to resign his office, which he himself assumed, till compelled by his father Rokn-ed-daulah to restore it to Bakhtiar. At the suggestion of Sebuktekin, Mosti-lillah had, in A. Heg. 363 (A.D. 973), abdicated the caliphat in favor of Tayi-lillah his son. In A. Heg. 366 (A.D. 976), Rokn-ed-daulah died, and Adad-ed-daulah, who succeeded him as sovereign of Persia Proper, Arjan and Kerman, now for the second time prevailed on Bakhtiar to surrender to him his post as emîr-al-omarâ: a war followed, in which Bakhtiar was taken prisoner and executed. Bardas, a rebel governor under the Greek empire, applied to Adad-ed-daulah for support; to prevent which Nicephorus was sent twice as ambassador from the court of Constantinople to that of the emir. Adad-ed-daulah remained emîr-al-omarâ till his death, A. Heg. 372 (A.D. 982). He encouraged literature and science, and was himself an accomplished poet. He restored and embellished the principal towns of the empire, which had been damaged during the civil wars: at Bagdad he erected an hospital; and in Persia Proper he inclosed the river Cyrus [BEND EMIR] with extensive dykes. After his death, his son Samsam-ed-daulah was chosen emir; but in A. Heg. 376 (A.D. 986) his brother Sharf-ed-daulah forced the caliph to confer that dignity upon him, and Samsam-ed-daulah was blinded. Sharf-ed-daulah died A. Heg. 379 (A.D. 989-990), and was succeeded by his brother Behâ-ed-daulah, who remained emîr-al-omarâ till his death; but was obliged to make concessions to the Turkish body-guards, and thereby diminished his power. He induced the caliph Tayi-lillah to resign in favor of Kader-billah, A. Heg. 381 (A.D. 991). Behâ-ed-daulah was, in A. Heg. 403 (A.D. 1012) followed by his son Soltan-ed-daulah, who was compelled by a military insurrection, in A. Heg. 411 (A.D. 1020), to appoint his brother Mushrif-ed-daulah commander-in-chief of the army, by whom he was subsequently deprived of his office. Soltan-ed-daulah died in A. Heg. 415 (A.D. 1024); Mushrif-ed-daulah in the following year. After an interval of two years, during which Bagdad seems to have suffered much from the insolence of the Turkish guards, Jelâl-ed-daulah, another son of Behâ-ed-daulah, was invited by the army to come from Basra to the capital; and the caliph confirmed his election as emîr-al-omarâ. During his administration the caliph Kader-billah died, A. Heg. 422 (A.D. 1031), after a nominal reign of forty-one lunar years, and was followed by his son Kâyim-bi-amr-allah. The latter, instead of seeking an intimate union with Jelâl-ed-daulah, whom he considered to be of little influence, made a treaty with another Buide prince, Fîrûz Abû-Kâlenjâr of Shiraz. Insurrections at Bagdad, and predatory incursions of bands of wandering Arabs became more and more frequent; and the authority of both the caliph and the emîr-al-omarâ, who were moreover often of different opinions, seemed to be at an end. When Jelâl-ed-daulah died, A. Heg. 435 (A.D. 1043), Fîrûz Abû-Kâlenjâr was elected emîr-al-omarâ. During his administration the power of the Arabian empire began to yield to the conquest of the Seljuks, who had taken possession of Jorjan, Tabaristan, Khovarezm, and the Persian Irak, and were advancing towards Bagdad. He died on an expedition into Kerman against Bahram, the governor of that province, who had broken his allegiance to the court of Bagdad. His son Malek-er-Rahîm succeeded in suppressing the revolt in Kerman; but in the mean time Togrul Bek, the sovereign of the Seljuks, had taken possession of Isfahan, and a dissension which had broken out between the caliph and Basasiri, the governor of Irak, rendered the conquest of that province and of the capital itself a matter of little difficulty for the Seljuks. In A. Heg. 447 (A.D. 1055), Togrul Bek entered Bagdad. Malek-er-Rahîm abdicated his office, and remained as a prisoner in the hands of Togrul, who thus put an end to the dominions of the Buide emîr-al-omarâs.

(Umbreit, *Commentatio exhibens historiam Emirorum al Omrah ex Abulfeda*, Göttingen, 1816, 4to.; Wilken, *Mirkhond's Geschichte der Sultane aus dem Geschlechte Bujeh*, Berlin, 1835, 4to.)

EMLY, a bishop's see in the ecclesiastical province of Cashel in Ireland. The chapter consists of dean, procentor, chancellor, archdeacon, and four prebendaries. This diocese lies in the counties of Tipperary and Limerick, and contains forty-two parishes, constituting seventeen benefices. Its extent is about forty-one English miles by fifteen. In 1792 there were in Emly diocese thirty-five churches of the establishment; in 1834 the numbers were, churches of the establishment, eleven; other places of worship in connexion therewith, four; Roman Catholic chapels, thirty-one. In the same year the total population was 98,363, of whom there were 1246 members of the established church; 97,115 members of the church of Rome; one Presbyterian; and one other Protestant dissenter; being in the proportion of rather more than ninety-eight Roman Catholics to one Protestant of whatever denomination. In the same year there were in this diocese seventy-four schools, educating 4835 young persons, being in the proportion of $4\frac{92}{100}$ per cent. of the entire population under daily instruction; in which respect Emly stands last but one among the thirty-two dioceses of Ireland, being only superior in educational rank to the diocese of Ardfert and Aghadoe.

The see of Emly was founded by Saint Ailbe, who died in the year 527. It was united to the archiepiscopal see of Cashel in 1568, which union still subsists. [CASHEL.]

(Beaufort's *Memoir of a Map of Ireland*; *Parliamentary Returns, &c.*)

EMMANUEL COLLEGE, Cambridge, was founded in 1584, by Sir Walter Mildmay, on the site of the monastery of the Black Friars, which he had purchased of a Mr. Sherwood. The original foundation was only for a master, three fellows, and four scholars. There are now twelve, which are called foundation fellowships, besides one founded by Mr. Gillingham, the holder of which receives a dividend arising from a distinct estate, but is in most other respects on an equality with the foundation fellows. These fellowships are open to all counties, but there cannot be more than one fellow of the same county at the same time; and no one can be a candidate till he has taken the degree of M.A., or is at least B.A. of the third year. He must be twenty-one years of age, and have been six years a member of the university. The four senior fellows are obliged to take priests' orders. Sir Wolstan Dixie, some time lord mayor of London, a contemporary of the founder, gave lands for the support of two fellows, distinct from those of the foundation. These fellows have no vote in college affairs, nor have they any claim to college livings: candidates for these fellowships must have taken the degree of B.A., and must be related to the founder, or have received their education at Market-Bosworth School. There are likewise four scholarships of Sir Wolstan Dixie's foundation, subject to the same restrictions. The foundation scholarships of Emmanuel College are open to Englishmen of all counties, but there cannot be more than three scholars of the same county at the same time. The scholars receive upwards of 12*l*. per annum in addition to the weekly payment of 7*s*. 6*d*. during residence. Besides these there are many scholarships and exhibitions, founded by various benefactors, to be given to the candidates most distinguished for learning and exemplary conduct. Among the principal are five by Dr. Thorpe of 24*l*. per annum, with a preference, cæteris paribus, to the sons of orthodox clergymen; one by Mr. Hubbard of 12*l*. per annum to the best of Dr. Thorpe's scholars; ten by Mr. Ash of 10*l*. per annum; four by Archdeacon Johnson of 24*l*. per annum, with a preference to candidates from Oakham and Uppingham schools; one by Dr. Smith of 16*l*. per annum, with a preference to Durham and Newcastle schools; two by Mr. Richards of 12*l*. per annum, with a preference to Christ's Hospital; one by Sir Busick Harwood of 10*l*. per annum, with a preference to a medical student; and two by Lady Romney of 12*l*. per annum each. Various annual prizes are given in this college: amongst them, plate to the amount of 12*l*. to the best proficient among the commencing bachelors of arts. The number of members of this society upon the college boards, according to the University Calendar of 1837, is 224. There are eighteen benefices in the patronage of the society. To one of these, the rectory of Twyford in Hants, the college nominates, and the heirs of Carew Mildmay, Esq., present: to two others, Wallington rectory in Herts, and Fressingfield-cum-Withersdale vicarage in Suffolk, the master nominates, and the society presents: to two other livings a Dixie fellow is to be presented alternately with one on the foundation. A copy of the statutes of Emmanuel College is preserved among the Sloane Manuscripts in the British Museum, No. 1739. Among the eminent persons who have been members of Emmanuel College, were Bishop Hall, Matthew Poole, author of the 'Synopsis Criticorum,' Joshua Barnes, Dr. Wallis the mathematician, Sir William Temple, Anthony Blackwall, and Dr. Richard Farmer, the commentator upon Shakspeare, who was master of this college. (Lysons' *Magna Brit.—Cambridgeshire*, p. 128; *Cambridge University Calendar for* 1837.)

EMMERICH, or **EMRICH**, a town on the left bank of the Rhine, with a good harbour, in 51° 50′ N. lat. and 6° 13′ E. long. It lies in the circle of Rees, in the northern extremity of the county or administrative circle of Düsseldorf, in Rhenish Prussia, close to the frontiers of Holland. It was formerly in the Hanseatic league. There are 4 churches, 2 Roman Catholic and 2 Protestant, a Mennonite place of worship, a minor gymnasium, an ecclesiastical seminary, 2 orphan asylums. The town is surrounded by walls and ditches. In 1765 the population was 3491; in 1817, 4412; and in 1831, 5569. There are manufactures of woollens, stockings, hats, galloons, soap, oil, &c., besides tanneries, wax-bleaching grounds, and a public salt factory.

EMMIUS UBBO, was born at Gretha, in East Friesland, in the year 1547. His father was a clergyman of the Lutheran communion. Emmius studied at Bremen, Rostock, and lastly at Geneva, where he became intimate with Beza. He afterwards returned to his native country, and in 1589 was made rector of the school of Norden, in East Friesland. In 1594 he was appointed to the chair of history and the Greek language in the College of Groningen, and when the University of Groningen was instituted in 1614 Emmius was made rector of the same. He was deeply imbued with classical learning, and he excelled in the knowledge of history, antient and modern. Among his historical works, the most important is the 'Vetus Græcia illustrata,' 3 vols., Leyden, 1626. The first volume consists of a description of antient Greece, including the islands; the second contains a history of that country; and the third, which is the most elaborate and interesting, gives an account of the political institutions and social manners of the various Greek states; namely, of Athens, Sparta, Creta, Argos, Thebes, Corinth, Syracuse, Corcyra, Samos, Chios, Rhodes, Achaia, Ætolia, Massilia in Gaul, Locri in Italy, and Lycia in Asia. The author has also introduced a brief sketch of the Carthaginian republic. The appendix contains an account of the decline and fall of three of the above states, Athens, Carthage, and Sparta. Emmius gives a long list of antient authors from whom he derived his information. The work is altogether useful, and was still more so at the time of its appearance, when good works on classical learning were more scarce than they are at present. The other works of Emmius are, 2. 'Opus Chronologicum,' or a General Chronology, fol., 1619; 3. 'Rerum Frisicarum Historia, à gentis origine usque ad ann. 1565,' Leyden, 1632.

It is a good history of Friesland, the author's native country, to which is added 'De Frisiorum Republica Commentarius,' published before separately at Embden, 1619. 4. 'De Agro Frisiæ inter Amasum et Lavicum flumina;' 5. 'Historia nostri Temporis,' Groningen, 1732. Emmius Ubbo died in 1625, in his 78th year. At the time of his death he was busy writing a history of Philip of Macedonia, the father of Alexander the Great, which he intended as a warning to the republic of the United Provinces against the designs and intrigues of their enemies. He had written as far as the fifteenth year of Philip's reign. Emmius was acquainted with, and appreciated by, most of the learned men of his time, such as De Thou, Gruter, Gomar the theologian, Pezelius, and others. He was especially a favourite with William Louis, of Nassau, the governor of Friesland and Groningen. (*Elogium Ubbonis Emmii, Historiarum et Græcæ linguæ in Academia Groningensi Professoris ejusque Rectoris primi*, Groningæ, 1628.)

EMPALEMENT, an obsolete name of the stamen of a flower.

EMPANNEL, the writing and entering the names of a iury on a parchment schedule or roll of paper by the sheriff, which be has summoned to appear for the performance of such public service as juries are employed in. [PANEL.]

EMPE'DOCLES, a native of Agrigentum in Sicily, who flourished about B.C. 450: he was distinguished not only as a philosopher, but also for his knowledge of natural history and medicine, and as a poet and statesman. It is generally believed that he perished in the crater of Mount Ætna. The story that he threw himself into it in order that by disappearing suddenly and without a trace, he might establish his claim to divinity, and the charge of arrogance founded upon that pretension, seems to have rested on a misconception of his doctrine that the human soul (and consequently his own) is divine and immortal.

His masters in philosophy are variously given. By some, like the Eleatæ generally, he is called a Pythagorean, in consequence of a resemblance of doctrine in a few unessential points. But the principles of his theory evidently show that he belongs to the Eleatic school, though the statement which makes him a disciple of Parmenides rests apparently upon no other foundation than a comparison of their systems; as, in like manner, the common employment of the mechanical physiology has led to an opinion that he was a hearer of his contemporary Anaxagoras.

He taught that originally All was one:—God, eternal and at rest: a sphere and a mixture (*σφαῖρος, μίγμα*)—without a vacuum—in which the elements of things were held together in undistinguishable confusion by love (*φιλία*)—the primal force which unites like to unlike. In a portion of this whole, however, or, as he expresses it, in the members of the Deity, strife (*νεῖκος*)—the force which binds like to like—prevailed and gave to the elements a tendency to separate themselves, whereby they first became perceptible as such, although the separation was not so complete, but that each contained portions of the others. Hence arose the multiplicity of things: by the vivifying counteraction of love organic life was produced, not however so perfect and so full of design as it now appears; but at first single limbs, then irregular combinations, till ultimately they received their present adjustments and perfection. But as the forces of love and hate are constantly acting upon each other for production or destruction, the present condition of things cannot persist for ever, and the world which, properly, is not the All, but only the ordered part of it, will again be reduced to a chaotic unity, out of which a new system will be formed, and so on for ever.

There is no real destruction of anything, only a change of combinations. It must be remarked that the primal forces, love and hate, must not be supposed to be extrinsically impressed upon matter; on the contrary, while strife is inherent in the elements separately, love is in the mass of things—nay, more, is one with it—God. Of the elements (which he seems to have been the first to exhibit as four distinct species of matter), fire, as the rarest and most powerful, he held to be the chief, and consequently the soul of all sentient and intellectual beings which issue from the central fire, or soul of the world. The soul migrates through animal and vegetable bodies in atonement for some guilt committed in its unembodied state when it is a dæmon; of which he supposed that an infinite number existed. The seat of the dæmon when in a human body is the blood.

Closely connected with his view of the objects of knowledge was his theory of human knowledge. In the impure separation of the elements it is only the predominant one that the senses can apprehend, and consequently, although man can know all the elements of the whole singly, he is unable to see them in their perfect unity wherein consists their truth. Empedocles therefore rejects the testimony of the senses, and maintains that pure intellect alone can arrive at a knowledge of the truth. This is the attribute of the Deity, for man cannot overlook the work of love in all its extent; and the true unity is only open to itself. Hence he was led to distinguish between the world, as presented to our senses (*κόσμος αἰσθητός*), and its type the intellectual world (*κόσμος νοητός*).

His explanation of the cognitive faculty, which rested upon the assumption that 'like can only be known by like,' is drawn naturally enough from his physical view. Man is capable of knowing outward things, since he is, like them, composed of the four elements, and of the two forces love and hate; and it is especially by the presence of love within him that he is able to arrive at an intellectual knowledge of the whole, however imperfect and inferior to the divine.

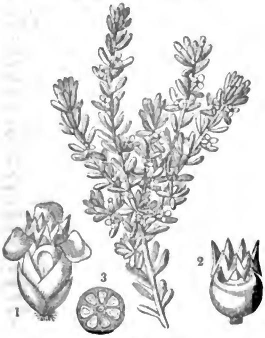
The Fragments of Empedocles were published with a commentary by Fr. W. Sturz, Leipzig, 1805, 8vo.; see also Empedoclis and Parmenidis *Fragmenta, ex Cod. Taur. Bibl. restituta et illustrata*, ab A. Peyron, Lips. 1810, 8vo.

EMPEROR, from the Latin *Imperator*. Among the early Romans the title of Imperator was bestowed by the acclamations of his soldiers in the camp and by a vote of the Roman senate, on a commander-in-chief who had signalized himself by killing a certain number of the enemy. (Tacit. *Annal.* iii. 74.) The term was gradually extended to signify a commander-in-chief sent on any important expedition. (Cic. *Pro Lege Manil.*, c. 2.) But it still continued usual for the appellation to be bestowed as a special title of honour for some military service: thus we find that the small military exploits of Cicero conferred on him the title of Imperator. C. J. Cæsar assumed the name as a prænomen, (Imperator C. J. Cæsar), a practice which was followed by his successors, as we may observe on their coins. (Suetonius, *Cæsar*, 76.) As examples of this title see the coins of ANTONIUS, AURELIUS, &c. On the reverse of the coin of Aurelius we observe Imp. VIII., that is, Imperator octavum, or imperator the eighth time, which shows, as indeed can be proved from a variety of examples, that the Roman emperors often assumed the title on special occasions when they or their generals had obtained some signal victory. This term Imperator then, it will be observed, under the early emperors, cannot be considered as denoting any sovereign power. It was indeed given to private individuals on the occasion of great military success, certainly as late as the time of Hadrian, and perhaps later. (Appian, *Civil Wars*, lib. 2.)

After the time of the Antonines the term Imperator seems to have gradually grown into common use as one of the titles which expressed the sovereign of the Roman world, though the name Princeps was also long used as indicating the same rank and power. (See the Dedication of J. Capitolinus to Constantine.) It may be difficult to state when this term Imperator became exclusively the designation of the Roman sovereign. In the introduction to the Digest (De Conceptione Digestorum), Justinian assumes the title of Imperator Cæsar Flavius Justinianus, &c., semper Augustus. [AUGUSTUS.] In the proemium to the Institutes, Justinian uses the terms Imperatoria majestas to express his sovereign power, and yet in the same paragraph he calls himself by the name of Princeps, a term which dates from the time of the so-called Republic, and expressed the precedence given to one particular member of the senate. The term Princeps was adopted by Augustus as the least invidious title of dignity, and was applied to his successors.

From the emperors of the West this title, in the year 800, devolved to Charlemagne, the founder of the second or German empire of the West. Upon the expiration of the German branch of the Carlovingian family, the imperial crown became elective, and continued so until the last century. The title of emperor of Germany now no longer exists, Francis II. having laid it aside, and assumed the title of emperor of Austria. [AUSTRIA, p. 151.] The only other European potentate who uses the style of emperor is the autocrat of Russia, the monarchs of which country, about the year 1520, exchanged their former title of duke or great duke of Russia, for that of Czar or Tzar. [Czar.] In early times it was asserted by the civilians that the possession of the imperial crown gave to the emperors of Germany, as titular sovereigns of the world, a supremacy over all the kings of Europe, though such was never attempted to be exercised; and they denied the existence of any other empire: but in spite of this denial it is certain that several of the kings of France of the second race, after they had lost the empire of Germany, styled themselves Basileus and Imperator. Our own King Edgar, in a charter to Oswald bishop of Winchester, styled himself 'Anglorum Basileus omnium que regum insularum oceani que Britanniam circumjacentis cunctarum que nationum quæ infra eam includuntur *Imperator et Dominus*.' Alfonso VII. also, in the 12th century, styled himself emperor of Spain. It might be easily shown how the title and rank of king and emperor have been feudalized, as it were, in passing through the ordeal of the middle ages.

EMPETRA'CEÆ, a small natural order of polypetalous exogens, related to Euphorbiaceæ. They consist of unisexual heath-like plants with minute flowers, having a calyx with a few imbricated sepals that change into about three membranous petals, a small number of hypogynous stamens, and a superior ovary with from three to nine cells, in each of which there is a single ascending ovule. The fruit is fleshy and berried. They are small acrid plants, of no known use. Empetrum nigrum, the crakeberry or crowberry, is wild on the mountainous heaths in the north of England. Its black fruit forms an article of food in the northern parts of the world, but is reported to be unwholesome, and to cause headach. A sort of wine has been prepared from it for many centuries in Iceland and Norway; whence the report of real wine which was used at the sacrament being made in those countries.



Empetrum rubrum.

1, A female flower, much magnified; 2, a pistil; 3, a transverse section of the same.

EM'PHASIS, in articulation, is the mode of drawing attention to one or more words in a sentence by pronouncing them with a greater volume and duration of sound, and in a higher or lower note, than the adjoining words. In written language there are several symbols by which emphasis is denoted. In manuscript the emphatic word is commonly underlined; in printing it is common to employ a different character, particularly the inclined character called the Italic. The German printers have introduced the mode of placing the letters of the emphatic word farther apart from one another. In modern languages the employment of some symbol for emphasis is more requisite than in the antient languages. In the latter, where the arrangement of words was less fixed, it was generally practicable by the very position of a word in a sentence to denote its emphatic power. Thus, in the Latin language, the first word of a sentence, or even of a clause, is generally emphatic; so also is the last word; and even in the middle of a sentence the verb is often so placed as to give emphasis to the preceding word. Indeed so closely connected is the order of words in a Latin sentence with the principle of emphasis, that the utter neglect of this principle in the schools of the present day may be set down as one of the chief obstacles in the acquirement of the Latin language.

EMPIRIC. This word is derived from the Greek (ἐμπειρικός, empeírikos) and means a man who derives his knowledge from experience. A medical sect which arose in opposition to that of the dogmatics assumed the name of empirics. Serapion of Alexandria and Philinus of Cos are regarded as the founders of this school. Ever since the world has existed, the human mind, in striving to find out the principles of truth, has considered the matter in two opposite ways. According to one system, the human mind contains the seeds of knowledge; according to the other, the mind is nothing but a blank sheet of paper, on which experience writes that which man perceives through the senses. Aristotle and Plato are still the representatives of the two opposite systems.

The science of medicine has been of necessity under the influence of one of the two opposite opinions, and the doctrine of Serapion or Philinus is nothing but the application of the Aristotelian theory, that nothing can be known by the understanding which has not been previously known by the senses.

Accordingly they maintained that experience was the only true knowledge which was derived from the unerring testimony of the senses; that dogmatism was erroneous, because it derived its principles from mere imagination. They opposed to the theorists their contradictions, and sneered at their learning and acuteness of reasoning as inadequate means of curing diseases.

The empirics admitted three kinds of experience, the one acquired by chance, the second by experiments, the third by imitation; and these three they called the tripod of medical science. However, it is evident that their mode of experience is nothing but a disguised mode of reasoning by analogy. Epilogism, as they called it, is as theoretical as pure dogmatism; for, how can we judge by analogy, if we do not assume some general laws to which the particulars are subjected?

If the empirics had remained true to their principles their name would stand high among the medical profession. But having abandoned the study of nature, and with it all scientific pursuits, they sank into such disrepute, that their name became a stigma. And even in our days when the natural sciences have, by the impulse given by Lord Bacon to genuine experiment, risen to a high degree of perfection, and empiricism is the character of modern science and philosophy, the name of empiric is still bestowed as an opprobrious term upon all ignorant pretenders in the medical art. (Celsus, *De Medicina;* Curt Sprengel, *Geschichte der Medizin*.)

EMPYREUMA denotes the peculiar and disagreeable smell and taste resulting from the action of a considerable degree of heat upon vegetable or animal substances in close vessels, which prevent such an access of air as is required for perfect combustion: in this way destructive distillation goes on so as frequently to produce an oil which has a strong, burnt, or, as it is termed, empyreumatic smell and taste.

EMS, a river in the north-west of Germany, which has its source in 51° 50′ N. lat., and 9° 11′ E. long., on the Havelhof, at the foot of a hill called Stapelag, which is at the south-eastern end of the Teutoburg Forest, and to the north-west of the town of Paderborn in Westphalia. From this point the river pursues a sluggish westward course between low banks to Rietberg, then turns to the north until it approaches Harsewinkel, where it bends again to the west past Wahrendorf and Telgte, and thence flows north-westwards to Schütdorf, in Hanover, below the town of Rheine, where it quits the Prussian territory. At Fuestrup, about five miles below Telgte, it is from four to five feet deep; and about five miles lower down it becomes navigable for small flat-bottomed vessels. It enters the Hanoverian dominions above Schütdorf, and traverses them for about 70 miles. The general direction of this part of its course, in which it makes numerous bends, is due north, until it quits the landrostei or circle of Osnaburg, in passing through which it approaches within a short distance of the town of Lingen, and has that of Meppen on its right bank. The Ems in this part, though full of water in the rainy season, is so shallow in dry weather that a canal, called the Ems canal, has been opened at a very heavy expense from Haukensfähe, about eight miles above Lingen, which runs parallel with the river, has a depth of five feet, and rejoins the Ems at the confluence of the Hase at Meppen. From this town to Papenburg its bed has been deepened, so that in the shallowest spots it has a depth of three feet. Just above Papenburg, which lies on the borders of the circle of Aurich, or East Friesland, the river winds eastwards, and then inclining somewhat to the north-east, runs on to Leer, whence it pursues a northerly course till it has passed Vornhusen, and from this spot turns to the north-west, and ultimately enters the Dollart, a bay of the North Sea, in 53° 18′ N. lat. The Oster (East) and Wester (West) Ems, which are formed by the sand banks Ransel and Borkum-rif, are the channels by which the Ems discharges its waters into the North Sea. Between the Ransel and Dollart the Ems is wide, and separates East Friesland from the Dutch province of Groningen. The Ems below Leer widens to a breadth of 300 feet, and between the Dutch and Hanoverian territories its width varies from five to nine miles. The whole length of this river is estimated at about 210 miles, and it is navigable for vessels of 80 or 100 tons burden as high as Papenburg, where it ceases to be affected by the tides. There are bridges across it at Telgte, Wiedenbrück, Wahrendorf, Schönflint, Greven, Hembergen, and near Rheine, in Westphalia, and at Meppen in Hanover. Its principal tributaries on the right bank are the Hase, which, passing Osnaburg, falls into it at Meppen, after a course of about 125 miles; and the Leda, which enters Hanover from the duchy of Oldenburg, and joins the Ems near Leer, after a course of about 56 miles. On the left bank the Ems receives the Aa to the south-west of Papenburg. The basin of the Ems has an area of about 4914 square miles, the smallest area of any of the rivers which fall into the North Sea.

The Ems is mentioned by Roman writers under the Latinized form Amisia. (Tacit. *Annal.* i., 60, 63, &c.)

EMU. [STRUTHIONIDÆ.]

EMULSION, a term applied to mixtures which generally have a milky appearance, and which, in some cases, are partial solutions, in others merely mechanical suspensions, of oily or resinous substances: thus the oil of the almond seed may be for a time diffused through water by trituration, but will ultimately separate and float on the surface. Many resins are formed into emulsions by means of the yolk of an egg or of gum-arabic; while gum-resins contain in themselves the means of forming emulsions with water. Frequently syrups and distilled waters are added to render the compound more palatable; but alcohol and acids should never be used. Emulsions should be used soon after being formed, as in a few hours the constituent parts separate or become acid.

EMYDOSAURIANS. [CROCODILE, vol. viii. p. 162.]

EMYS. [TORTOISES.]

ENALIOSAURIANS, a name for certain fossil marine lizards. [ICHTHYOSAURUS, &c.]

ENAMEL (of the Teeth). [DENTITION.]

ENAMELS are vitrifiable substances, or a peculiar preparation of glass, to which different colours are given, sometimes preserving, sometimes depriving it of its transparency. Authors distinguish three kinds of enamels; those which are used to imitate precious stones, those employed in enamel painting (painting on enamel), and those with which an infinite variety of small works are made. The preparation of enamels is very various. In general ten parts of lead and three parts of tin may be oxidized by continued heat and exposure to air. To the mixed oxides thus obtained must be added ten parts of powdered quartz or flint and two parts of common salt, and the whole must be properly melted in a crucible; thus we obtain a white enamel and the basis of coloured enamel, metallic oxides being added in the preparation at the very beginning to give the required colour. The addition of oxide of lead or antimony produces a yellow enamel; reds are obtained by a mixture of the oxides of gold and iron; that composed of gold is the most beautiful and durable. The oxides of copper, cobalt, and iron, give greens, violets, and blues; and a great variety of intermediate colours is produced by mixing them in different proportions. The oxides are sometimes mixed before they are united to the vitreous basis. These are the principal ingredients in the composition of enamels; but the proportions in which they are used, the degree and continuance of the heat required for their perfection, are secrets which the manufacturers carefully keep to themselves as far as they are able.

ENAMELLING is of great antiquity, and was practised by the Egyptians, from whom it probably passed to the Greeks, and subsequently to the Romans, who are supposed to have introduced the art into Britain, because Roman antiquities have been dug up in different parts of our island in which parts of the ornaments consist of enamels. The art was in use also among the Britons, the Saxons, and the Normans successively, as is proved by various specimens still existing; and it would not be difficult to trace its progress down to our own times. It appears, however, that antiently enamels were principally applied to ornamental purposes, but since the invention of clocks and watches, their usefulness has increased in an extraordinary degree, there being probably no substance for dial-plates equal to enamel in durability and beauty. The various processes in the practice of enamelling have probably never been completely made known to the public; they require extraordinary care and attention, and artists who may have been so fortunate as to discover any improved mode of operating are commonly too jealous to make it known.

Enamels being commonly laid on a metal ground, the first business is to prepare the plates, technically called *coppers*, to receive the enamel. This preparation requires much care and nicety, and the process is extremely curious. The metals used to enamel upon are gold, silver, and copper. Of the other metals some are too fusible to bear the fire, and the others, as platinum, &c., are too *strong*, as it is termed, for the enamel. The best substance to enamel upon is gold, the richness of the colour giving a beautiful tinge through the enamel; but, except for watch-cases and valuable articles of jewellery, copper is generally used on account of its cheapness. Both the gold and the copper should be of the finest kinds.

Enamelling is now divided into two branches, dial-plate enamelling and transparent enamelling; the former including the manufacture of clock and watch plates, with fluxed plates for enamel painting; the other the enamelling of watch-cases, brooches, and other trinkets. The former is divided also into hard and soft or glass enamelling; the hard requiring the most time, skill, and labour. The coppers being duly prepared, the next process is that of enamelling, properly so called.

The enamel as it comes from the maker is commonly in small cakes four, five, or six inches in diameter. In preparing it for use it is split, by means of a small hammer applied to the edge of the cakes, into thin flakes, which are put into an agate mortar and finely pulverized, and then washed with water. The moistened mass is then laid very smooth on the metal ground with a spatula, and when dried is melted, or, as it is called, fired, under a muffle, in a small furnace heated with coke and coal. The back of the coppers is first covered with enamel, and then the face, to which two coats are given, the operation of firing being applied to each. The plates are then carefully polished, for which various substances are used; and when this is complete, they are put for the third and last time into the fire before painting.

ENAMEL PAINTING, which should be called painting on enamel, is of modern date. It was indeed long believed that the encaustic painting of the antients was the same thing as our enamel painting. But though the antients possessed the art of colouring glass, which might have led to enamel painting, they do not seem to have acquired this latter art, the invention of which, as it is practised in our days, is ascribed to the French. In 1632, Jean Toutin, a goldsmith at Châteaudun, painted on enamel, and he and his disciple, Gulden, taught others. Jean Petitot, born at Geneva in 1607, an admirable painter in miniature, carried the art of painting on enamel to a degree of perfection never before attained. He resided long in England, and French writers affirm that he obtained the knowledge of the most beautiful and durable colours for enamel painting from Sir Theodore Mayence, at London, an eminent physician and chemist, who generously communicated his secrets to him, and recommended him to Charles I., after whose death he went to Paris, where he was highly favoured by Louis XIV., and gained a large fortune. After the revocation of the edict of Nantes he withdrew to Geneva. The difficulty of preparing the plates for enamel painting, and more especially the care and caution required in burning in the colours, with the very great risk attending the operation, had, till within our own memory, restricted the ordinary size of fluxed plates, and consequently of enamel paintings, to five or six inches; and French writers think it would be little short of madness to attempt such works on a larger scale. But English artists have of late years so far exceeded these limits, that it would be absurd to hazard any dogmatic opinion respecting the possible extent to which they may go. The late Mr. Horace Hone was, we believe, the first who ventured much to exceed the usual size. We have seen a beautiful whole length portrait of a lady, which, if we remember rightly, was about twelve inches high, and broad in proportion; but this has been far exceeded by Mr. H. P. Bone, whose copy from the famous picture of Bacchus and Ariadne by Titian, in the National Gallery, measures 18 inches by 16½. The same artist had also in the exhibition of the Royal Academy, this year, 1837, a copy of the Virgin and Child, by Vandyke, of even larger dimensions.

When we contemplate such works finished in the most exquisite manner, we cannot but admire the courage of the artist in undertaking them. The brilliancy and permanency of the colours are indeed a great temptation and an ample reward for success. But chances of failure are great, and increase, as we understand, with the size of the work, which is not safe till it has undergone the operation of being exposed to the fire for the last time. Indeed the whole process from the very outset requires in every stage the utmost care and attention, and a degree of skill in the management which only long practice can give. No fault in the design can be corrected; it must be traced in the first instance with perfect accuracy: the fire may destroy the work, but what it fixes, whether good or bad, is unalterable.

ENCAMPMENT is the lodgment or station of an army, with its artillery, baggage, and stores, when it has taken the field for the purpose of a review, or of acting against an enemy.

Under the word CAMP (ROMAN) there has been given an account of the antient castrametation, and, till the employment of fire-arms in war, it is probable that the manner of occupying ground for military purposes which had been adopted by the Romans continued to be used by the nations formed on the ruins of their empire, such alterations only being made in the internal arrangements of the camp as were rendered necessary by differences in the numerical strength of the principal divisions of the troops.

The camps of the antient Britons, and those of the Anglo-Saxons and Danes in this country, seem to have been intrenched by breast-works made of felled trees, or of earth and stones rudely heaped together. Concerning the disposition of the troops within the inclosure, we only know that the Saxons drew up their cavalry in one dense body surrounding the standard, and that they placed the foot soldiers with their heavy battle-axes in front. In a description of the camp formed by Edward II. during his expedition to Scotland in 1301 is contained the first hint we have of any regularity in the distribution of an English army while in the field; this amounts however to little more than that the ground was marked out, and that to every one his proportion of the space was assigned. Within the spaces tents of white or coloured linen were set up, and huts were constructed, the latter probably for the private soldiers. (Grose, *Mil. Antiq.*, vol. ii., p. 205.)

Antiently, both the English and French commanders of armies appear to have fortified their encampments when they undertook the siege of any place, particularly if it appeared likely to be of long duration; and P. Daniel states, that when cannon was used, it was placed for the protection of the army in large redoubts of wood or earth, called *Bastilles*, constructed at intervals along the circumvallation. The same author relates that the English, while they made war in France, went by parties into the country, carrying with them strong palisades to form an intrenchment, behind which they were protected while using their cross-bows. (*Hist. de la Milice Françoise*, liv. vii., ch. 2.)

In the modern system of war, from the necessity of avoiding as much as possible the destructive effects of the enemy's artillery, and the desire of affording all possible development to the fire of their own infantry, commanders of armies have been compelled to abandon the square form of the antient encampments, and to adopt that of long and narrow lines. But with this arrangement it seldom happens that the ground will permit a perfect regularity in the dispositions of the several battalions and squadrons; and the occurrence of streams or other accidents of the country may break the continuity of the line, or may render it necessary to give it a bent or waving direction. When however an army is encamped under tents, it may be regarded as a general rule that the line should correspond to that in which the troops are to be drawn up to engage the enemy; also that the tents of each battalion should not occupy a greater space in front than the battalion itself would cover when in order of battle,—a practice which is said to have originated with Gustavus Adolphus.

The length of the front of a battalion of 750 men, two deep, allowing 21 inches to each file, will be 219 yards; and this would be the extent of the line of tents, were it not that the line is regulated by the probable number of effectives, instead of the numerical strength of the establishment. The depth of the encampment for a battalion is of less importance; but, when the ground will permit, it may be regulated by the following disposition, which is considered as affording sufficient convenience.

The tents of the privates may be ranged in two lines parallel to the front, with an interval of about 12 feet as a street between every two companies in each line, and those of the captains and subalterns may be in one line in the rear of these; the field-officers and the commanding officer may occupy a fourth line; the staff a fifth; and the line of kitchens may be in the rear of all. By this arrangement the depth, including a space for the sutler's tent, the bâtmen and horses, will be about 90 yards; but an interval of 16 yards should separate the front of the men's tents from the line of parade, which is parallel to that front. Opposite the centre of the battalion, and about 60 yards in front of the line of parade, are the tents of the party which forms what is called the quarter-guard; and at about 15 yards in rear of the kitchens the party forming the rear-guard is situated. Including all these intervals, the depth of the encampment for infantry will be 183 yards.

The length of front for a complete regiment of cavalry, consisting of eight troops, when formed two deep, is about 320 yards; and this may be considered as the extent occupied by the regiment in the line of the encampment. The seven tents of each troop are ranged in a line perpendicular to the front, and the horses are attached to pickets in lines parallel to those of the tents; the remainder of the space, reckoned parallel to the front, being occupied by the breadths of the streets. In rear of the men's tents and parallel to the front are arranged the subalterns' horses in one line; the tents of the captains and subalterns in another; those of the field-officers and commanding officer in a third, and the kitchens in the rear of all. The standards are placed parallel to the front at 10 yards before the tents of the privates; and the distance from thence to the line of parade is 30 yards: with these dispositions the whole depth of a regiment of cavalry will be 216 yards.

A large army is encamped in two lines which, if the ground will permit it, are parallel to, and at the distance of about 300 yards from each other; and a reserve, generally consisting of the best troops, is formed in rear of the second. The stations of the cavalry are on the flanks of each line. The artillery attached to an army is formed into brigades, and is posted either on the flanks of the camp or with the reserve in the rear; the extent of front, for a heavy brigade, is 69 yards, and the depth, including the line of guns, of limbers, and three lines of waggons, is 82 yards.

The circular tents at present in use are 13 feet 3 inches diameter within the walls (the canvas which hangs vertically between the conical part of the tent and the ground). Of the cavalry 12 men, and of the infantry 15 men, are appointed to each tent.

From a document which is supposed to be of the time of Elizabeth it appears that then an English camp was divided into six portions, of which three were assigned to the cavalry and three to the foot soldiers; and that between every division was a street 80 feet wide. There was also a space allotted for the market, and within this was the park of artillery, surrounded by carriages. It was regulated that no man should pitch his tent within 140 feet of the ring, or periphery of the camp.

The soldiers' huts or tents were placed 25 deep; each was eight feet square, and contained two men; the depth of the encampment, including the depôts, the officers' tents, and the cross streets, was 300 feet; and, including the streets, the whole extent in front of a regiment consisting of 13 companies, each of 150 men, was 712 feet. Originally, it seems, the officers' tents were placed in front of those occupied by the men; but Sir James Turner states that Henry of Nassau changed that custom, and caused them to be placed in the rear, as they are at present, in order that the soldiers might be enabled to have more easy access to the parade in front of the line. (Grose, ii., pp. 213, 214.)

The great extent of the space which, for the reasons before mentioned, is unavoidably occupied by an army in the field, renders it, in most cases, impossible to fortify the site of the encampment by a continuous line of parapet like that with which the Roman armies surrounded themselves on taking up a defensive position; and the security of a modern army against surprises is now obtained principally by the situation being difficult of access, from streams, marshes, or inequalities of the ground, and by keeping numerous advanced posts to watch all the approaches by which an enemy might arrive at the camp.

There are, however, some circumstances which render it indispensable that an encampment should be strengthened by fortifications; as when the troops are inexperienced or the army is deficient in cavalry; but chiefly when a position is occupied which it is of the utmost importance to hold, because the possession of it would be advantageous to the enemy. The latter may then be reduced to the alternative of attacking the encampment at a disadvantage, or of suffering a loss of valuable time in making the movements necessary to turn it. In these cases, every resource of the engineer in the construction of works and in obstructing the approaches should be put in practice for the purpose of augmenting the resistance which the army may be capable of making.

A continuous line of works may therefore be admissible for an army inferior to that of the enemy, provided the extent of the line be not so great as to prevent the intrenchments from being sufficiently manned in every part; but a camp so fortified would possess no advantages for an army which is strong enough to assume the offensive on a favourable occasion presenting itself; and it is evident that, in this case, it would be sufficient to construct merely a few redoubts in situations from whence a fire of artillery might be directed for the purpose of defending the approaches, while the disposable force of the army might be kept in masses ready, at a proper time, to make a movement to the front through the intervals between the works.

This principle does not, till lately, appear to have been well understood; and the cautious spirit with which a campaign was conducted during the eighteenth century contrasts strongly with the bold measures generally pursued in the late war. Marshal Daun, though always superior in number to the Prussians, intrenched himself with the utmost anxiety; and in 1759, when he took up a position near Dresden, though the king of Prussia had lost the battle of Kunersdorf, and the Austrian army was encamped upon steep rocks, covered by a stream difficult to pass, yet the marshal surrounded himself with works so numerous, that even the smallest paths were protected by them, and so strong, that twenty years afterwards they were in existence. But one of the most celebrated of these intrenched camps was that which, in 1761, the king of Prussia took up at Buntzelwitz in order to cover Breslau. This camp was formed within a chain of hills protected on three sides by streams: six salient points on the contour were fortified by bastions, the fires from which would have flanked the intermediate parts of the line, and these were further protected by *flèches* constituting a sort of broken curtain between every two redoubts. Nearly 180 pieces of artillery were planted to defend the avenues, and the camp was surrounded by abatis and other obstacles by which the approach of an enemy might be impeded. (Jomini, *Traité des Grandes Operations Militaires*, tom. iv.) Such intrenchments however avail nothing when the army is not commanded by a man of great military genius. The French camp at Malpaquet, in 1709, is stated to have been fortified with a triple line, consisting of breastworks, hedges, and felled trees; it was forced however, though with great loss, by the allies under the duke of Marlborough.

It is remarkable that, during the war in Spain, which in general was distinguished by inattention to the means of strengthening the positions occupied by the troops, one of the finest examples of an intrenched camp was afforded in that which the British army occupied before Lisbon in 1810. This consisted of a double line of detached redoubts constructed on all the commanding points of ground, for the purpose of defending the four great roads and the accessible passes by which the enemy could approach to that city. The first line began at the mouth of the Zizandra on the Atlantic; it crowned the heights above Torres Vedras, and following the chain of Monte Graça, extended to the Tagus at Alhandra, its whole length being about 29 miles. The second was about six miles in rear of the first; it began at the mouth of the S. Lorenzo, on the ocean, passed over the heights at Mafra, Montechique, and Bucellas, and reached the Tagus at Quintella, its whole extent, in length, being about 24 miles. The weakest part seems to have been the valley of Calhandria, near the Tagus, on the exterior line; but this part was afterwards strengthened by a double row of abatis, besides breast-works of earth and thick stone walls. When the lines were completed, they consisted of 152 redoubts, armed, in all, with 534 pieces of ordnance, and required above 34,000 men for their garrisons. The disbursements for their construction amounted to nearly 100,000*l*. (Colonel Jones, *Memoranda on the Lines about Lisbon*, p. 107.) [LINES OF INTRENCHMENT, MILITARY POSITIONS.]

ENCAUSTIC PAINTING (*ἐγκαυστικὴ*, encaústike) is a kind of painting in which by heating or burning in (as the Greek term implies), the colours were rendered permanent in all their original splendour. It was not however enamelling, as some have imagined, but a mode of painting with heated or burnt wax, which was practised by the antients, various specimens of which have been preserved in the East, and which, according to some historical statements, was in use at Venice even to the time of Titian. Pliny, in his 'Natural History' (xxxv. 11), gives a short account of the invention and nature of this art. He says, 'Ceris pingere ac picturam inurere, quis primus excogitaverit non constat.' But though he expressly says wax, some persons have imagined that by *ceris* he here means some composition different from wax, and capable of bearing the fire, and that *inurere* means to enamel. In the same chapter he says that there were antiently two modes of encaustic painting, 'cera et in ebore, cestro, *i.e.*, viriculo. Hoc tertium accessit, resolutis igni ceris, penicillo utendi.' The Marchese Haus, in accordance with Pliny, assumes three kinds of encaustic painting, distinguishing as an essential point, whether the cestrum (a style, or a graving tool) or the pencil was employed in the execution. In the first mode, the wax was melted, mixed with as much earth colour finely powdered, as it could imbibe, and then this mass spread on wood, or on a wall with a hot spatula. When it became cold, it was the ground, in which the designer cut the lines with a cold pointed tool (style, cestrum), and thus, properly speaking, it was not the painting but the wax ground that was burnt in, and the name encaustic was improperly given to the painting. With regard to the second kind, encaustic painting on ivory, the most erroneous notions were long entertained. Professor Grund, of Florence, who has devoted much attention to encaustic painting, seems to be nearest to the truth. When the practice of drawing on hard wax had been brought to some degree of perfection, they proceeded to apply it on a small scale to ivory, which was at that time in the highest estimation. Ivory tablets were therefore covered with red or black wax, and the design cut in it with the style, the object being to use the clear and smooth surface of the ivory for the lines, that they might look the more beautiful. This therefore was nothing more than applying to ivory what had previously been done on wood, or walls. The third kind is the applying the colours with the pencil. With respect to the manner in which this was executed, opinions differ. The most correct notion seems to be that the wax was dissolved, the colours mixed with it, and laid on with the pencil, and the painting then finished by careful approximation to the fire, whence this kind of painting became properly encaustic. For this purpose a hot iron (cauterium) was used. When painting had been greatly improved by the invention of the pencil, a new method of encaustic was attempted. Encaustic wax painting had hitherto been designing on a coloured ground: it now became painting with wax colours burnt in. When the artist had laid on the wax ground, and traced the outlines with the style, he proceeded to the colouring. From the wax mixed with the colours he separated with the hot style as much as he wanted to cover a certain space, and spread it over the ground, put a second, third, &c., colour next the first, so that he had local tint, half tint, and shade together, which he softened into each other with the hot style. After the whole art of encaustic painting had long been lost, the memory of it was recovered by Count Caylus, in France, who announced to the Academy of Painting the method of painting in wax in 1752: a Mr. Bachelier however had actually painted a picture in wax in 1749, and is the author of a treatise on the art and secret of wax painting; and he was the first who communicated to the public the method of performing the operation of inustion, which chiefly characterizes encaustic painting.[*] The count kept his method secret for a time, and in 1754 exhibited at the Louvre a head of Minerva painted in the manner of the antients. This was much admired, and it was affirmed that in wax painting the colours were more permanent, purer, and brighter than in oil painting. Several other persons have made essays in this art, as Bien, Bertscher, Bar. Taube in Mannheim, W. Kalan, painter in Berlin, and Reifenstein. As neither Pliny, nor Vitruvius, nor any other antient author, has left a clear account of the methods employed, it may be reasonably doubted whether any one among the various processes employed or recommended by the moderns is the same as those of the Greeks. J. G. Walter, in Berlin, and Professor J. Roux, in Heidelberg, have recently turned their attention to wax painting; the latter is said to have left many very successfully executed wax paintings; but he did not publish his secret, though he strongly recommended it to painters in his treatise on colours (Die Farben, Heidelberg, 1828). Since 1826 Mr. Peter Kraft, at Vienna, has painted several paintings on walls, in which however only the warmed ground was covered with wax, and the colours mixed with oil of turpentine laid on it. The process made known by Montabert in his 'Traité de la Peinture,' vols. vii. and viii., has a greater resemblance to encaustic painting, properly so called. The laying on is nearly in the manner last mentioned, but a wax varnish is spread over the colours, and melted in by means of a kind of brasier. A series of paintings has been executed, according to his direction, on the walls of the royal palace at Munich, since 1831; but even here all the difficulties with respect to the durability of the ground and the colours have not been overcome.

ENCKE'S COMET, one of the periodic comets which have been ascertained to belong to the solar system, revolving round the sun in about 1200 days, within the orbit of Jupiter.

A full account of this body is contained in a memoir by Encke, published in numbers 210 and 211 of the *Astronomische Nachrichten*, and translated by Mr. Airy, under the title 'Encke's Dissertation,' &c., Cambridge, 1832. See also the 'Reports of the British Association,' vol. i. (1831-1832), and the tract of M. Arago 'Des Comètes en général,' in the 'Annuaire' of 1832.

This comet is now known to have been seen in 1786 by Méchain and Messier, in 1795 by Miss Herschel, and in 1805 by M. Pons of Marseilles, and others. But the train of investigation which established it as a *periodic* comet (all the preceding observations having been supposed to be of different bodies) dates from the observations of M. Pons in 1818-19. A comet having been then discovered by him, and its elements determined, Encke (from whom the comet has its name) immediately showed that it was the body which had been seen in 1805. Olbers detected it to be the comet of 1795; and Encke (Berlin Ephemeris, 1822 and 1823) having established the fact that its revolution was completed in about 1200 days, predicted approximately the part of the heavens in which it would reappear in 1822. The prediction was verified by the observations of M. Rumker at Paramatta, since which time it has regularly taken its place as one of the bodies of the solar system.

Upon the question which has been raised relative to the gradual approach of this comet to the sun, and the consequent presumption of the existence of a resisting medium, see COMET. The memoir of M. Encke (translated by Mr. Airy, as cited) enters fully into the discussion of this question.

The elements of this body, adopted by M. Encke for its reappearance in 1832, are as follows:—

Passage through perihelion, 1832, May 3·99.
Longitude of perihelion, 157° 21′
Longitude of ascending node, 334° 32
Inclination, 13° 22′.
Angle of eccentricity, 57° 43′.
Mean daily sidereal motion, 1071″·1.
Perihelion distance, ·3435 } Earth's mean distance from
Aphelion distance, 4·101 } sun being unity.
Periodic time, 1210 days.

ENCRINITES, the name by which the petrified radiated animals commonly called *Stone Lilies* have been long known in Britain; it is frequently applied to the *Crinoidea* generally, both recent and fossil.

Lamarck arranged the genus *Encrinus* in his fifth order of Polypes (*Polypi natantes*), fixing its position between *Virgularia* and *Umbellularia*, and recording but two species, one recent, viz. *Encrinus Caput Medusæ* (*Isis Asteria Linn.*), from the seas of the Antilles, the other fossil, viz., *Encrinus liliiformis, Lilium lapideum* (Stone Lily) of Ellis and others.

Cuvier included the encrinites among his pedicillated echinoderms, considering that they should be placed near the *Comatulæ;* and, in the Règne Animal, they are, accordingly to be found between the great group of the *Starfishes* and that of the *Echinidans*.

De Blainville observes that the beautiful work of Guettard (Acad. des Sc. 1755) upon the living and fossil encrinites showed long ago the great relationship which there is between these and the stellerideans, now known under the name of *Comatulæ*, and he remarks upon the arrangement of Lamarck, who followed Linnæus and his adherents in placing them among the zoophytes, notwithstanding Guettard's exposition and Ellis's confirmation. After alluding to Miller's work on the family, and to Mr. Thompson's description of the living specimen found on the coast of Ireland, De Blainville takes as the basis of his terminology the parts which exist in *Comatula*, and adopting the views of Rosinus, rejects that proposed by Miller in his interesting memoir, objecting to the terms *pelvis, costal, intercostal scapula, hand, fingers*, &c., as derived from animals of an entirely different type of form and inapplicable to the radiated structure.

We find, then, that the *pelvis* of Miller is the *centro-dorsal joint* (*l'article centro-dorsal*) of De Blainville. The *costal* is the first *basilary joint* of each ray. The *intercostal* is the second *basilary joint*. The *scapula* is the third, or that on which the radii are supported. The *hand* is the part of the ray which is divided but not separated. The *fingers* are the *digitations* or divisions of the rays. Finally, the *pinnules* are the lateral divisons of the digitations; and De Blainville, like Miller, divides the *rays* into *principal rays* and *accessory* or *auxiliary rays*.[*]

Habits, &c. Dr. Buckland (Bridgewater Treatise), who uses the phraseology of Miller, speaks of these animals as destined to find their nourishment by spreading their nets and moving their bodies through a limited space, from a fixed position at the bottom of the sea; or by employing the same instruments, either when floating singly through the water, or attached like *Pentelasmis* (CIRRIPEDA) to floating pieces of wood. He refers to Miller for several instances of their power of repairing casual injuries, and figures a recent *Pentacrinus*, one of whose arms is under the process of being reproduced, as crabs and lobsters reproduce their lost claws and legs, and many lizards their tails and feet, observing that the arms of starfishes also, when broken off, are in the same manner reproduced. The same author remarks, that although the representatives of the crinoïdeans in our modern seas are of rare occurrence, this family was of vast numerical importance among the earliest inhabitants of the antient deep. 'We may judge,' say Dr. Buckland, 'of the degree to which the individuals of these species multiplied among the first inhabitants of the sea, from the countless myriads of their petrified remains which fill so many limestone-beds of the transition formations, and compose vast strata of entrochal marble, extending over large tracts of country in Northern Europe and North America. The substance of this marble is often almost as entirely made up of the petrified bones of encrinites as a corn-rick is composed of straws. Man applies it to construct his palace and adorn his sepulchre, but there are few who know, and fewer still who duly appreciate, the surprising fact, that much of this marble is composed of the skeletons of millions of organized beings, once endowed with life, and susceptible of enjoyment, which, after performing the part that was for a while assigned to them in living nature, have contributed their remains towards the composition of the mountain masses of the earth. Of more than thirty species of crinoïdeans that prevailed to such enormous extent in the transition period, nearly all became extinct before the deposition of the lias, and only one presents the angular column of the pentacrinite: with this one exception, pentangular columns first began to abound among the crinoïdeans at the commencement of the lias, and have from thence extended onwards into our present seas. Their several species and even genera are also limited in their extent; e. g. the great lily encrinite (*E. moniliformis*) is peculiar to the muschel-kalk, and the pear encrinite to the middle region of the oolitic formation.'

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[*] It is necessary to put the student on his guard against the confusion and error manifest in this part of M. de Blainville's useful work. This was not a little puzzling when considered as coming from a pen of such high reputation as his; till the arrival of the 'Nouvelles additions et corrections' brought the information that.' par une transposition singulière du manuscrit, il y a eu une sorte de mélange entre les paragraphes qui appartiennent aux genres *Encrinus* et *Pentacrinus*.' In short, among other mistakes, the titles *Encrinus* and *Pentacrinus*, together with whole paragraphs, have been misplaced.

The same author, speaking of the joints which composed the stem, says, 'the name of Entrochi, or wheelstones, has with much propriety been applied to these insulated vertebræ. The perforations in the centre of these joints affording a facility for stringing them as beads, has caused them in antient times to be used as rosaries. In the northern parts of England they still retain the appellation of St. Cuthbert's beads.

> On a rock by Lindisfarn
> Saint Cuthbert sits, and toils to frame
> The sea-born beads that bear his name.

'Each of these presents a similar series of articulations, varying as we ascend upwards through the body of the animal, every joint being exactly adjusted to give the requisite amount of flexibility and strength. From one extremity of the vertebral column to the other, and throughout the hands and fingers, the surface of each bone articulates with that adjacent to it, with the most perfect regularity and nicety of adjustment. So exact and methodical is this arrangement, even to the extremity of its minutest tentacula, that it is just as improbable that the metals which compose the wheels of a chronometer should for themselves have calculated and arranged the form and number of the teeth of each respective wheel, and that these wheels should have placed themselves in the precise position fitted to attain the end resulting from the combined action of them all, as for the successive hundreds and thousands of little bones that compose an Encrinite to have arranged themselves in a position subordinate to the end produced by the combined effect of their united mechanism, each acting its peculiar part in harmonious subordination to the rest; and all conjointly producing a result which no single series of them acting separately could possibly have effected.' (*Bridgewater Treatise.*)

De Blainville characterizes his Fixed Astorencrinideans (*Astérencrinides fixés*) as having a *body* more or less bursiform, supported upon a long articulated stem, and fixed by a radiciform part.

Genera. Apiocrinites.

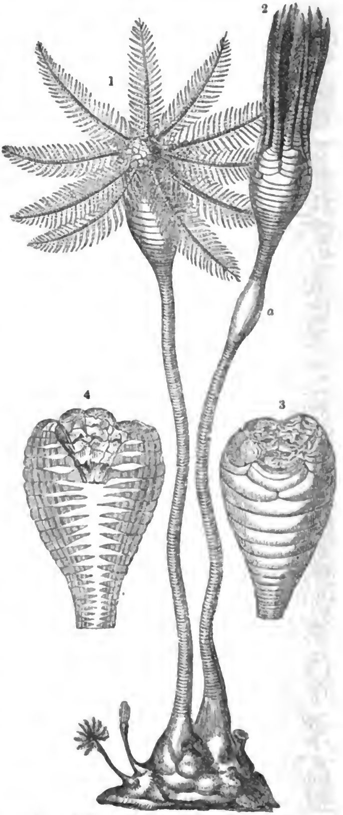
Miller, who established this genus, characterizes it as an animal with a column gradually enlarging at the apex, composed of numerous joints, of which the superior is marked by five diverging ridges, dividing the surface into as many equal portions, sustaining the pelvis, formed of five sub-cuneiform joints, supporting others of a figure nearly similar, from which proceed the arms and tentaculated fingers formed of simple joints having the figure of a horse-shoe.

De Blainville thus defines it. *Body* regular, circular, for the rest unknown, contained in a sort of cupule or conical test (têt), composed of three superposed rows, each consisting of five scaphöid plates, united or joined throughout, the upper one supporting on a radiated surface the rays which are formed by a simple series of non-pinnated (?) articulations. *Stem* round, at first as large as the body, attenuating by degrees down to the root; articulations circular, little elevated, pierced by a round hole, and radiated at their surface. Auxiliary rays scattered.

Geological Distribution.—The genus has occurred hitherto in a fossil state only, and has only been found in strata posterior to the lias. Example, *Apiocrinites rotundus.* Round-columned, Pear-like, Lily-shaped animal (Miller).

Description.—This appears to be the *Astropoda elegans* (stem) of Defrance. It is the *Bradford Pear Encrinite* of Parkinson, and is described by Miller as a *Crinoidal animal*, with a *round column*, composed of joints adhering by radiating surfaces, of which from ten to fourteen gradually enlarge at its apex, sustaining the pelvis, costæ, and scapulæ, from which the arms and tentaculated fingers proceed. *Base* formed by exuding calcareous matter, which indurates in laminæ, and permanently attaches the animal to extraneous bodies.

Locality.—(Oolite, middle region.) Bradford in Wiltshire, Abbotsbury, near Weymouth, Dorsetshire, Soissons, Rochelle, &c



Apiocrinites rotundus restored and reduced: 1. expanded; 2. closed; a. the remedial effect of calcareous secretions in repairing an injury of the joints of the stem: two young individuals, and the surfaces of two truncated stems appear at the base: 3. pear-shaped body of Apiocrinites rotundus, showing at its upper extremity the internal disposition of the bones surrounding the cavity of the stomach; 4. vertical section of the body, showing the cavity of the stomach, and a series of lower cavities, or hollow lenticular spaces, between the central portions of the enlarged joints of the upper portion of the vertebral column. These spaces are considered by Miller as enlargements of the alimentary canal, which descends through the axis of the entire column. The surfaces of the joints of the vertebral column are striated with rays on the adjacent plates, and allow of flexure without risk of dislocation. (Dr. Buckland, *Bridgewater Treatise.*)

It will be observed, that De Blainville speaks of the rays as being formed of a simple series of articulations without pinnæ: he adds, it is true, a note of interrogation. Miller in his restoration has made the rays pinnated; and Dr. Buckland, from whose work the cuts above given are by permission taken, has continued Miller's restoration: nor do we see any reason for objecting to the views of the last-named authors. The absence of pinnæ on the rays would make the apparatus a very imperfect organ of capture; but the presence of those appendages produces at once the net like structure observable in many others of the family, so admirably adapted for taking and securing the prey which might come within the sphere of the Encrinite's action.[*]

Miller describes and figures a second species, *Apiocrinites ellipticus* (*Bottle Encrinite, Strait Encrinite*, and *Stag-Horn Encrinite* of Parkinson; Goldfuss refers to it as *A. elongatus*), and gives the chalk-pits of Wiltshire and Kent as its localities. The bodies, &c., of this species are the *Chalk Bottles* of the quarrymen.

M. Goldfuss, in his great work, records four additional species, viz. *A rosaceus, A. mespiliformis*, and *A. Milleri* (Schlotheim), and *A. flexuosus*, and *A. obconicus* (Goldfuss), retaining Miller's *A. ellipticus*, and referring to Miller's description of that species for *A. elongatus* also.

Encrinus. (Encrinites, True Lily-shaped animal of Miller.)

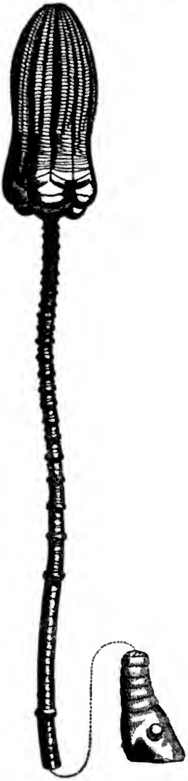
Miller characterizes his genus *Encrinites* as a crinoidal animal, with a column formed of numerous round depressed joints, adhering by a radiating grooved surface, and becoming subpentangular near the pelvis, which is composed of five pieces, giving a lateral insertion to the first series of costal plates, to which the second series and scapulæ succeed, whence the tentaculated arms or fingers proceed, formed by double series of joints. He observes, that the animals of this genus have not hitherto been found in a living state, nor does he believe that their remains have been discovered in England. Only one species known, viz. *Encrinites liliiformis* of Lamarck.

Description, &c.—This is the *Encrinites moniliformis, Bead-columned, True Lily-shaped animal* of Miller, who describes the species as a crinoidal animal, with a column formed of numerous round joints, alternately, as they approach the pelvis, larger and smaller, becoming subpentangular when nearly in contact with it. On the pelvis, formed of five pieces, adhere laterally the first series of costæ, on which the second series of costæ is placed, succeeded by the scapulæ, from which the ten tentaculated arms or fingers proceed. Animal permanently affixed by exuded indurated matter.

We consider his *Encrinites moniliformis* as the *Encrinus liliiformis* of Lamarck, the *Encrine*, and *Lys de Mer*, of the French, the *Lilium lapideum* of some of the older writers, and the *Stone Lily* of the English. Locality, (Muschel-kalk) Hildesbeim, Rakenberg, near Goslar, Obernscheden and Azzenhausen, not far from Gemenden, in Lower Saxony; Scwerven in Juliers, in Westphalia; the village of Erkerode, in Brunswick, about two miles from the town bearing this name, near a wood called the Elm, &c. In this last-named locality the quarry is on the declivity of a hill overgrown with wood, on which account the inhabitants oppose the digging after them. The stratum containing them is hardly fifteen to eighteen inches in thickness. Under the surface of the earth is a friable, porous, argillaceous limestone, containing millions of columns and columnar joints; but many hours' digging is necessary before a good specimen of the superior part, or stone-lily, can be procured, since the moisture in the stone contributes to their rapid destruction, and their occurring on large pieces of stone makes them liable to separation, which accounts for the many mended specimens. Another and harder stratum under the above contains numerous crinoidal remains; but, according to the quarrymen, no stone lilies. (Miller.) The author last quoted adds that there is good reason to believe that the formation in which the remains are found near Brunswick corresponds with the white lias of England, as it appears to repose on the newer red sandstone, containing salt and gypsum.

Fine specimens of this fossil have always been and still are sought for with great eagerness by collectors. In the 'Beytraege zur Naturgeschichte,' Altenburg, 1774, it is stated that the emperor of Germany offered one hundred dollars for a stone lily free from the matrix, and attached to its column.

'The peculiarly fine lily encrinite,' writes Miller, 'figured by Knorr. tab. 11. *a*, was, it is said, purchased (Naturforscher, Stück 3) from the labourers at the limestone quarry at Schrapland, near Halle, by Inspector Wilkens, for thirty-two groschen, and given to Professor Lange, who sold it to baron Niegart. However in the same publication (Stück 6), it is stated that it was not bought by Wilkens, but by Mr. Vitigo, at Farrenstadt, near Querfurt, for two dollars, and given to Lange, who sold it for three louis d'or. If my memory does not misgive me, I think I saw the specimen about twenty years ago in the collection of the Naturforschenden Geselschaft, at Danzig. Where is it now?'



Encrinus liliiformis.

Pentacrinus. (Pentacrinites vel Pentacrinus, Five-angled Lily-shaped Animal. Miller. Pentagonites Rafinesque.

The following is Miller's *Generic character*. An animal with a column formed of numerous pentangular joints, articulating by surfaces with pentapetalous semistriated markings. Superior columnar joint supporting a pelvis of five joints, on which five first costals rest, succeeded by five second costals and five scapulæ, from which ten arms proceed, having each two hands, composed of several tentaculated fingers. *Column* long, having numerous auxiliary side-arms. *Base* not ascertained.

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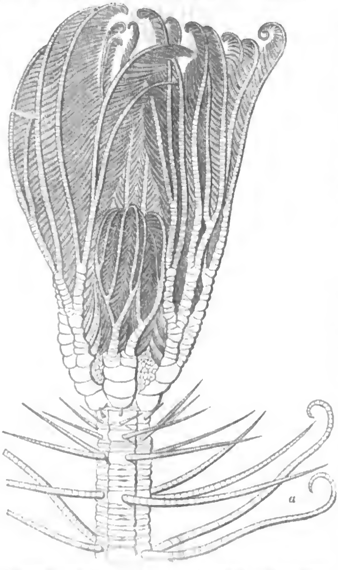
[*] Since the above was written, we find that M. de Blainville has corrected himself: for, in the 'Nouvelles Additions et Corrections,' he says, speaking of Apiocrinites, 'in the characteristic, instead of *three*, read *four*,' and add, 'rays bifid to the base, and composed of simply pinnated articulations.'

Recent species.

Pentacrinus Caput Medusæ. Description. A crinoidal animal having a column formed of numerous pentangular joints, articulating by surfaces with pentapetalous, ovate, striated markings; five auxiliary side-arms formed of round joints proceeding from the column at intervals. Superior columnar joints supporting a pelvis of five plates, to which the first costals, second costals, and scapulæ, succeed, from which ten arms proceed, each supporting two hands, subdividing into three fingers. Lower extremity, or base, unknown. (Miller.)

This is the *Encrinus Caput Medusæ* of Lamarck, *Isis Asteria* of Linnæus. Locality, the seas of the Antilles. Near the island of Barbadoes (Dr. Hunter's specimen)—that of Nevis (specimen formerly belonging to James Tobin, Esq., now in the British Museum)—and Martinique (specimen in the Paris Museum). There is also a specimen in the Museum of the Royal College of Surgeons in London, and one in that of the Geological Society of London.



Pentacrinus Caput Medusæ. In the front of the figure two of the arms are much smaller than the others, showing that the animal had suffered mutilation, and had employed its power of reproducing the lost parts. *a*. The auxiliary side-arms, articulating at distant intervals with the vertebral column, capable also of being reproduced. (Miller and Buckland.)

Mr. Miller, in speaking of Mr. Tobin's specimen, says, 'In the drawing it up from the bottom of the sea, the animal has clearly been broken off, leaving its posterior portion behind; thus we have lost the chance of ascertaining the fact, whether it adhered by a fixed base, or had a locomotive power. The same accident has befallen the other recent individuals that have been mentioned when speaking of the locality of this species. However, judging from its analogy to the *Encrinus moniliformis*, from its long column, numerous auxiliary side-arms, and the associated manner in which groups of the following species are sometimes found preserved on the surface of a single slab, with the columns all tending towards the same point, as if issuing from a common base, I conceive that this species also adhered by a base to extraneous matter. This idea gains some further ground, from all the recent specimens hitherto found having broken abruptly off in the endeavour to remove them, as not being able to free themselves from the points of adhesion, which certainly would have been the case had the animal possessed a locomotive power.' This inference acquires additional confirmation from the observations made by the late J. Tobin, Esq., on another specimen, viz.—'Some years ago I was in possession of a larger Pentacrinite, which was brought to me so fresh out of the sea that at the bottom (where it plainly appeared to have been broken off from the rock to which it was fixed) the blood was actually oozing from the vertebræ. This specimen I endeavoured to preserve, but it was totally destroyed by the ants, who ate every cartilage, so that it fell to pieces.' Miller observes upon this, that the 'blood' was the fluid in the alimentary canal, and refusing to admit the assertion of Walch, that the Pentacrinite is an animal crawling along the bottom of the sea, conceives it to have generally stood more or less erect in the sea, yielding to the fury of the storm in bending down, and adhering for additional security with its side-arms to extraneous matter, or closing them to the column, and thus offering the least surface possible to the element. The latter, he thinks, is the most probable idea, since he had frequently met with specimens in that state, but had never seen any side-arms clasping round extraneous matter. The author elsewhere states that he has in vain endeavoured to trace apertures at the terminating points of the fingers and tentacula, although Guettard alleges that here orifices existed serving as mouths to the animal in taking its food.

Miller observes that columnar fragments, smaller and rather neater than those of this species, occur in the oolite at Dundry, the forest marble at Chippenham, and the chalk near Lyme, but that it remains to be ascertained, by the acquisition of perfect specimens, whether these belong to a variety of *P. Caput Medusæ*, or possess peculiar characters sufficient to distinguish them as a new species.

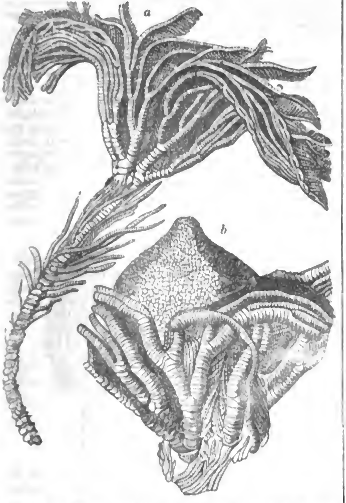
FOSSIL SPECIES.

We select, as an example, the Briarean Pentacrinite, *Pentacrinus Briareus*, thus characterized by Miller. 'A crinoidal animal, having a large column formed of numerous pentagonal joints, alternately larger and smaller, articulating by surfaces with pentapetalous compressed semistriated markings; five auxiliary arms, formed of much compressed suboval joints, proceeding at intervals from the column; five joints of the pelvis, supporting five first and five second costal joints, on which the scapulæ affix, from which ten arms proceed, each having two hands, formed of numerous fingers, sometimes amounting to sixteen.'

Dr. Buckland observes that the root of the Briarean Pentacrinite was probably slight, and capable of being withdrawn from its attachment. The absence of any large solid secretions like those of the Pear Encrinite, by which this Pentacrinite could have been fixed permanently at the bottom, and the further fact of its being frequently found in contact with masses of drifted wood converted into jet, leads him to infer that the Briarean Pentacrinite was a locomotive animal, having the power of attaching itself temporarily either to extraneous floating bodies or to rocks at the bottom of the sea, either by its side-arms or by a moveable articulated small root. We confess that we cannot entirely concur with the professor on this point. That in early youth the animal may have floated till it found a substance fit for it to adhere to, we do not deny; but we think that after it was once established and had attained a good size, it was fixed for ever. The great length of the stem and the numerous side-arms must have secured for it a field of action beyond that of the Pear Encrinite and the Lily Encrinite, both of which we know had permanent roots; and if we are to judge by analogy, there is pregnant evidence that the specimens of the living species, more especially the larger one mentioned by Mr. Tobin, who saw it quite fresh out of the sea, and to whose expressions above given we refer the reader, suffered their stems to be torn asunder without quitting their moorings.

Locality.—Lower strata of the oolite formation, especially the Lias: Lyme, Watchet, Keynsham, &c.

Mr. Miller gives three other fossil species, viz., *P. subangularis*, *P. basaltiformis*, and *P. tuberculatus*. Goldfuss has recorded the following additional species, viz., *P. scalaris* (Goldfuss), *P. cingulatus* (Münster), *P. pentagonalis* (Goldfuss), *P. moniliformis* (Münster), *P. subsulcatus* (Münster),. *P. subteres* (Münster), *P. dubius* (Goldfuss), and *P. priscus* (Goldfuss), and, with a note of interrogation, Pentacrinus? *paradoxus*.

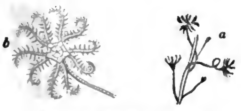


a, Pentacrinus Briareus reduced (Lyme); *b*, rare and beautiful specimen of Briarean Pentacrinite (nat. size), from the lias at Lyme Regis, in the collection of Mr. Johnson, of Bristol, showing the plated integument of the abdominal cavity, terminated upwards by a flexible proboscis, and surrounded by the commencement of the arms and fingers. (Figures and description from Dr. Buckland's 'Bridgewater Treatise.')

Phytocrinus.

(De Blainville;—Hibernula, Fleming; Pentacrinus, Thompson.)

Generic Character.—Body regular, circular, covered and surrounded above by a sort of solid cupule, composed of a centro-dorsal undivided piece, round which are articulated, first, a single row of accessory unguiculated rays, then another row of great didymous and pinnated rays on the other side of three basilary joints, of which the first only partially touch each other. *Stem* articulated, round, and without accessory rays. *Mouth* central in the midst of five scales, which are foliaceous and bordered by a row of tentacular cirrhi; a large tubular orifice a little behind the mouth. Example, *Phytocrinus Europæus, Pentacrinus Europæus*, Thompson.



Pentacrinus Europæus of Thompson.

a, Several individuals in different stages of development adhering by the base of an articulated column to the stem of a coralline; *b*, one of the individuals expanded and magnified.

M. de Blainville states that he has thus characterized this genus, which he had not seen, from the excellent description and figure of Mr. Thompson; and that it seems to M. de Blainville that there are sufficient differences to warrant the generic distinction of the animal. He observes that in *Phytocrinus* the stem is round, perhaps even inarticulate and flexible; that there are no accessory rays except at the summit; and, besides, that the great rays are all otherwise conformed in their basilary as well as in their pinnated part. It may be supposed, he adds, that the membranous part of the body differs equally both in the disposition of the mouth and in that of the visceral pouch; but of this there is no assurance, that part not being known in the great living Pentacrinite. He remarks that Dr. Fleming, admitting the doubt of Mr. Gray as to the existence of the visceral pouch in this last, has also characterized the European Pentacrinus under the name of *Hybernula*, a name which he allows may be adopted, though he gives the preference to his own as being more analogous to those invented by Mr. Miller for the Crinoideans. M. de Blainville goes on to declare that he has already had occasion to say that Mr. Thompson's memoir has destroyed all doubt as to the place of the living and fossil Encrinites, and has clearly demonstrated the justice of the views of Rosinus, adopted by Guettard, Ellis, Parkinson, and Cuvier, in opposition to that of Linnæus followed by Lamarck. 'An *Encrinus*, so to speak,' says M. de Blainville, 'is no more than a *Comatula* reversed, (even supposing that this position is not equally natural to it, which I am strongly inclined to think,) and which, instead of hooking on by means of accessory rays, is fixed by a prolongation of the centro-dorsal part.'

However more appropriate the name proposed by M. de Blainville may be, that of Dr. Fleming would have the right of priority according to the law of nomenclature; but if Mr. Thompson be right we are spared all consideration on this point; for in the 'Proceedings of the Royal Society of London' (June, 1835), he has expressed his opinion that his *Pentacrinus Europæus*, discovered in the Cove of Cork, and on other parts of the coast of Ireland, is fixed by its stem to other bodies in early life only; that it is produced from the ovum of *Comatula*, becomes afterwards detached, and forms a perfect Comatula, capable of moving freely in the ocean, crawling sometimes among submarine plants, and at others floating or swimming like the Medusæ.

Poteriocrinites.

Generic Character.—A crinoidal animal, with a round column, composed of numerous thin joints, having in their centre a round alimentary canal, and articulating by surfaces striated in radii. Round auxiliary side-arms proceeding at irregular distances from the column. Pelvis formed of five pentagonal plate-like joints, supporting five hexagonal intercostal plate-like joints, and five plate-like scapulæ, having on one of the intercostals an interscapulary plate interposed. An arm proceeding from each of the scapulæ. *Base* probably fascicular, and permanently adhering. (Miller.)

The author of this generic character says, 'It is with considerable hesitation that I describe these five plates as belonging to the pelvis; the analogy of their lower articulating surfaces seems perhaps rather to indicate their belonging to the first costal series. I have never yet had an opportunity of seeing the connection of these plates with the first column or joint fairly developed, and it seems possible that the true pelvis may be small and almost concealed. This doubt will be done away by the acquisition of more instructive specimens, and my thus stating the case must be considered as resulting from an anxious desire to check errors. It is not unlikely that the real joints forming the pelvis are so much abbreviated as not to be visible externally. Every one acquainted with fossils must be aware how difficult it is to trace always organic details in them correctly, and how many specimens are sometimes necessary to ascertain a single fact.'

M de Blainville observes that this genus does not appear to differ from Apiocrinites, excepting inasmuch as that the stem is not enlarged at its superior part, and that the basilary pieces of the rays are less approximated, and without doubt less immoveable. The details given by Mr. Miller point out a form differing strongly from that of Apiocrinites, and, if his data be admitted, there can be little doubt of the generic difference which he records.

Example. *Poteriocrinites tenuis. Thin, vase-like, lily-shaped animal.*

Description.—A crinoidal animal, with a column formed of numerous round thin joints, surface of articulation radiating and striated. The plate-like joints forming the cup-like body, articulating by minute striæ. One arm proceeding from each scapula, supporting two fingers. Locality, the mountain-limestone of the Mendip Hills, and in the Black Rock (the fourteenth bed of Dr. Bright's series (*Geol. Trans.*, vol. iv. p. 193), near the river Avon, Bristol, belonging to the same formation. (Miller.)

The other species recorded by Miller is *Poteriocrinites crassus*, from the mountain-lime in Yorkshire, and the mountain-lime at Bristol, near the river Avon, Bed 1. and 14. of Dr. Bright's paper in Trans. of Geol. Soc., vol. iv., p. 193, and in the magnesian beds of the mountain-limestone, Clevedon Bay, Somersetshire. Miller further states that the specimen mentioned in Dr. Woodward's catalogue of foreign fossils (page 19, 8. 1.) as coming from Syria, is of this species, and that he (Miller) is indebted to the Rev. A. Sedgwick, Woodwardian Professor, Cambridge, for ascertaining this fact, he having kindly furnished Mr. Miller with a drawing made from the original, now in Dr. Woodward's collection, and under his care.

Platycrinites.

Generic Character.—A crinoidal animal, with an elliptic or (in one species) pentagonal column, formed of numerous joints, having a few side-arms at irregular distances. Pelvis saucer-shaped, formed of three unequal pieces, from which five large plate-like scapulæ proceed. *Base* provided with numerous fibres for attachment. Miller, who thus characterizes the genus, observes that the want of costæ supplied by the large plate-like scapulæ gives the superior part of these animals a pentagonal appearance, and furnishes so conspicuous a character, that they are readily distinguished from all other genera.

Example. ***Platycrinites lævis, smooth, broad-plated, lily shaped animal.***

Description.—A crinoidal animal, with a column formed of very muscular elliptical joints adhering by a transverse ridge. Round side-arms occasionally proceeding from the column, whose joints adhere by radiated surfaces. Pelvis saucer-shaped, with the five scapulæ adhering to it, from each of which an arm proceeds supporting two hands, having each two fingers. Pelvis and scapulæ smooth. Locality, in the mountain-limestone of the Mendip Hills, the Black Rock (14th bed of Dr. Bright's series, in Geol. Trans., vol. iv.) near Bristol; Dublin; Cork. (Miller.)

Miller remarks that he has noticed in the collection of Richard Bright, Esq., of Ham Green, near Bristol, numerous joints, probably appertaining to an animal forming a variety, or a distinct species. They came, he states, from Muir-kirk, in Dumfriesshire; and he adds that the scapulæ are shorter in proportion than those of the former species, and that the columnar joints are finely tuberculated.

The same author records the following species:—*P. rugosus*, from the mountain-limestone at Caldy Island, on the south coast of Wales; and at the Mendip Hills; *P. tuberculatus*, from the mountain-lime strata; *P. granulatus*, from the mountain-limestone of the Mendip Hills; *P. striatus*, from the Black Rock (14th bed of Dr. Bright's series); and *P. pentangularis*, from the mountain-lime of the Mendip Hills, at Weston-super-mare, Black Rock near Bristol, and at Mitchel-Dean; also occasionally in transition limestone of Dinevawr Park, and Dudley.

Goldfuss names and describes two additional species, viz. *P. depressus* and *P. ventricosus.*

Cyathocrinites.

Generic Character.—A crinoidal animal, with a round or pentagonal column, formed of numerous joints, having side-arms proceeding irregularly from it. On the summit adheres a saucer-shaped pelvis of five pieces, on which are placed in successive series five costal plates, five scapulæ, and an intervening plate. From each scapula proceeds one arm, having two hands. Locality, transition and mountain-limestone strata. (Miller.)

Example. *Cyathocrinites planus.*

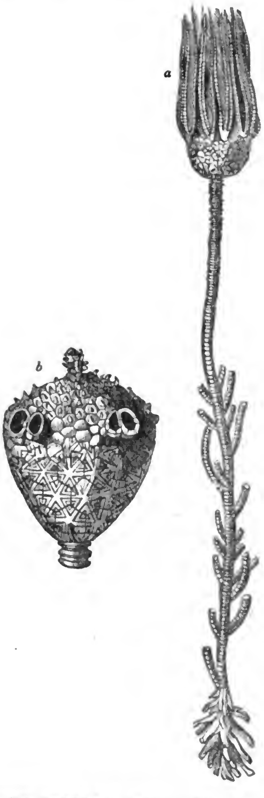
Description.—A crinoidal animal, with a round column formed of numerous depressed joints, articulating by radiating surfaces, and perforated by an alimentary canal, pentagonal near the pelvis, which becomes round further from it. From each of the scapulæ, which rest on the summit of the cup formed by the pelvis and costæ, proceeds an arm supporting two hands, each being provided with two series of fingers. Locality, Clevedon, in the magnesian beds of the mountain-limestone; at Wood-spring, Black Rock (14th bed of Dr. Bright's series), near Bristol. (Miller.)

Miller observes, that a specimen had occurred to him where the columnar joints were alternately smaller and larger, but that he was not aware whether it possessed sufficient character to be considered a variety of the former species. The same author records three other species, and Goldfuss has added three more, viz. *C. pinnatus*, *C. geometricus*, and *C. pentagonus.*

Actinocrinites.

Generic Character.—A crinoidal animal, with a round column composed of numerous joints, perforated by a round alimentary canal. At the summit of the column is placed a pelvis formed of three plates, on which five first costals and one irregular costal adhere, which are succeeded by the second costals and intercostals and the scapulæ, from whence five arms proceed, forming two hands with several tentaculated fingers. Round side-arms proceed at irregular distances from the column, which terminates at the base in a fascicular bundle or root of fibres.

Example. *Actinocrinites Triacontadactylus.* Thirty-



a, Actinocrinites Triacontadactylus (reduced); b. Body of the same (nat. size). (Miller and Buckland.)

fingered, radiated, lily-shaped animal. (Miller.) *Rock Plant* (Beaumont), *Nave Encrinite* (Parkinson).

Description.—A crinoidal animal, with a round column formed of many joints, on whose summit is placed a pelvis of three plates supporting five hexagonal and one pentagonal costal plate, on which the second costals, intercostals, and scapulæ, in series adhere, the latter sending off five arms, having each two hands provided with three fingers. Column sending off at irregular distances auxiliary side-arms, and terminating at the base in a bundle of fibrous elongations resembling roots. Locality, mountain limestone at the villages Broughton and Stokes, in Craven, Yorkshire (Lister, 1674), mountain lime formation of the Mendip Hills (Beaumont), and the Black Rock near Bristol (Miller).

Miller describes another species, *A. polydactylus*, from the mountain limestone of the Mendip Hills and Caldy Island. De Blainville observes that among the five (seven) new species which Goldfuss refers to this genus, viz. *A. granulatus*, *A. tesseracontadactylus*, *A. cingulatus*, *A. muricatus*, *A. nodulosus*, *A. moniliferus*, and *A. tesseratus*, *A. tesseracontaductylus* appears to De Blainville to offer a new combination of the pieces of the test, and even, perhaps, of the ten rays of the root, each division being dichotomous.

Melocrinites. (Goldfuss.)

Generic Character.—Column smooth, perforated by a smooth or quinquelobate canal. *Auxiliary arms.* . . . *Pelvis* composed of four articulations or pieces. *Primary* and *secondary costals* five, hexagonal, alternately placed (sibi invicem impositi). *Intercostals* five, hexagonal. *Scapulæ* five, hexagonal, placed upon the costals. *Interscapulars* four, in the region of the mouth five. *Arms* five. *Mouth* at the side of the vertex.

Example. *Melocrinites hieroglyphicus.* (Goldfuss).

Description.—Melocrinites with the articulations or pieces of the cup or calyx nodulous. Locality, mountain lime, calcareum montanum Eifliæ.) Goldfuss records a second species, viz. *Melocrinites lævis.*

Rhodocrinites. (Miller.)

Generic Character.—A crinoidal animal, with a round and sometimes slightly pentagonal column, formed of numerous joints perforated by a pentapetalous alimentary canal. The pelvis formed of three pieces supporting five square plates, in the spaces of whose lateral bevelled angles five heptagonal first costals are inserted. From the scapulæ proceeds an arm supporting two hands. (Miller.)

Example. *Rhodocrinites verus, true rose-like lily-shaped animal.* Locality, upper bed, No. 1, and one of the lower beds, No. 15, of Dr. Bright's series, distinguishing the mountain limestone formation along the river Avon near Bristol, the Mendip Hills, Mitchel-Dean, the transition limestone at Dudley. (Miller.)

Goldfuss adds four species, viz. *R. gyratus*, *R. quinquepartitus*, *R. canaliculatus*, and *R. echinatus*, the last being *Encrinus echinatus* of Schlotheim.

Eugeniacrinites. (Miller.)

Generic Character.—Superior columnar joint subpentangular, enlarging above, having the five plates of the pelvis adhering to it by a solid anchylosis. Base, column, joints resting on the pelvis, and fingers unknown. (Miller.)

Example, *Eugeniacrinites quinquangularis* (Miller). *Clove Encrinite* of Parkinson, *Caryophyllus lapideus*, *Caryophyllite* of Knorr. Locality, Switzerland, at Mount Randen (Knorr); also in the canton Zurich and Schaffhausen. (Miller.) Goldfuss records the following additional species, viz. *Eu caryophyllatus*, *Eu. nutans*, *Eu. compressus*, *Eu. pyriformis*, *Eu. moniliformis*, and *Eu. Hoferi.* (Münster).

Solanocrinites. (Goldfuss.)

Generic Character.—Column very short, pentagonal, perforated by a pentagonal canal, radiato-rugose at the base, depressed or hollowed out at the sides by the glenoid cavities of the auxiliary arms, articulated with the pelvis by slightly prominent rays which are trochitic and coadunate. Pelvis with five articulations. Scapulæ, arms? Auxiliary arms of the column thick and close-set. (Goldfuss.)

Example. *Solanocrinites costatus.* (Goldfuss.)

Description.—S. with a turbinated column, 10 or 15-ribbed longitudinally; articulations of the pelvis linear. Silicified. Locality, Wirtemberg Jurassic limestone. (Goldfuss.)

M. Goldfuss describes two other species, *S. scrobiculatus* (Münster), and *S. Juegeri* (calcareous) (Goldfuss), from the Jurassic limestone, Baireuth.

Caryocrinites. (Say.)

Generic Character.—Pelvis of four plates. *Costal* plates six. *Column* not dilated. Alimentary canal round. Articulating surface of the columnar joints radiated. *Auxiliary side-arms* cylindrical and placed irregularly.

Example. *Caryocrinites ornatus.*

Description.—Costals, four pentagonal and two hexagonal. *Column* inserted into a cavity at the base of the pelvis: *pelvis* rather large; two of the plates quadrangular, attenuated to the base, where they are truncated and a little recurved at the junction with the column; disks, particularly towards the base, granulated, with a distinct elevated interrupted line; two remaining plates pentangular, attenuated to the base where they are truncated and a little recurved at the junction with the column; disk with elevated granules, and with two elevated interrupted lines extending to the terminal angles: *costals*, four pentagonal and two hexagonal, all with elevated interrupted lines, radiating from the centre to the angles, with a series of truncated granules on each side and a few granules in the intervening spaces; interscapulars, two hexagonal, situated immediately above the hexagonal costals; *scapulars* six pentagonal, the upper sides of which are more or less irregular by projecting a little between the scapulæ, all with prominent lines granulated, similar to those of the preceding: *arms* six: *capital plates* with a heptagonal one in the middle, surrounded by five heptagonal plates and two irregular ones at the mouth: mouth not prominent, situated on one side of the middle, a little within the line of the arms, closed by small valvular pieces, its inferior side resting on the superior angle of one of the scapulars. Longitudinal diameter from three quarters to one inch and a half; transverse diameter from seven tenths to one inch and two fifths. Mr. Say, who gives this description, records and describes another species with one of the costals hexagonal, viz. *C. loricatus.* Locality Found by Dr. Bigsby loose in brown clay at the foot of the ravine at Lockport, in which the New York canal mounts the parallel ridge of Lake Ontario.

Marsupites (Mantell), Marsupiocrinites (De Blainville).

Generic Character.—Body regular, oval, bursiform, rounded at the dorsal extremity, truncated and flattened at the other, enveloped in a sort of shell or test composed of great polygonal plates, articulated to each other, one centrodorsal, and three rows superposed, of which the terminal one supports ten simple rays. *Mouth* in the midst of four squamiform pieces. *Stem* none. This is De Blainville's character; the following is Miller's:—An unattached animal with a subglobose body containing the viscera protected by calcareous plates, of which that in the centre at the base is angular, having a series of costal plates resting on it, admitting intercostals at their superior angles, these giving insertion to the scapulæ from which the arms proceed. Space between the scapulæ covered by an integument, protected by numerous small plates.

Example. *Marsupites ornatus, ornamented purse-like* animal (Miller), *Tortoise Encrinite* (Parkinson).

Description.—A purse-like* animal, having the central plate at the base of its subglobose body containing the viscera; pentagonal, supporting at its edge five similar costals, which admit at their superior angles five hexagonal intercostals, into the angles of which five scapulæ are inserted sending off the arms. All the plates ornamented by ridges proceeding from the centre, and forming angular markings near the corners. Locality, Offham Chalk-pits near Lewes; Clayton Chalk-pits, Hurstpoint, Sussex; Preston Chalk-pits, near Brighton (Mantell); Chalk-pits of Kent, and Chalk-pits, near Warminster. (Miller.)

Mr. Miller does not admit Marsupites among the *Crinoidea*, but considers it as the immediate link between that family and *Euryale.*

Pentremites. (Say.)

Generic Character.—Column cylindrical, perforated; segments articulating by radiated surfaces, with cylindrical side-arms at irregular intervals; *pelvis* of three unequal pieces, two pentagonal and one tetragonal; scapulæ large, very profoundly emarginate for the reception of the lips of the radiating ambulacræ, obliquely truncated at the extremities on each side, for the reception of one side of a subrhomboidal plate or interscapular; ambulacræ five, radiating from the summit, and terminating at the tips of the emarginations of the scapulæ: each with a longitudinal, indented line, and numerous transverse striæ which terminate in a marginal series of pores, for the transmission of respiratory tubes; *summit* with five rounded openings (ovaries) and an angulated central one (mouth and anus). (Say.)

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* Miller's expression is 'a Marsupial animal:' this is objectionable when considered in reference to the Vertebrated Marsupialia.

'This singular genus,' observes Mr. Say, 'is so remotely allied to any hitherto discovered, that I do not think it can, with propriety, be referred to any family yet instituted. By its columnar support it is related to the family *Crinoïdea*; but the total absence of arms and hands excludes it from that very natural group. The superior termination, in which the ambulacræ, the rounded openings, and the central angulated one, are situated, has some affinity to the family *Echinidea* (Echinidæ), but the columnar support shows that it cannot be arranged there. Having thus on its inferior portion a resemblance to the Crinoidea, and on its superior surface a decided analogy to the *Echinidea*, I think it may with propriety form an intermediate family under the following name and characters: Family, *Blastoidea*. *Column* composed of numerous articulating segments, supporting at its summit a number of plates, so united as to form a calyciform body containing the viscera; arms none; branchiæ arranged in ambulacræ. In a natural series their bodies constitute the link between the Crinoidea and the Echinidea, on the one hand; whilst, on the other, the former is unquestionably, but not more obviously connected with the Stelleridiea (Stellirideans) by the unequivocal intervention of Comatula and Marsupites. Of all the genera of Crinoidea, it is to Platycrinites that Pentremite seems most closely related.'

Mr. Say describes three species, viz. *P. globosa*, brought from England, and said to have been found in the vicinity of Bath; and *P. pyriformis* and *P. florealis*, from Kentucky. He gives, as the synonyms of the latter, *Kentucky Asterial Fossil* (Parkinson), and Encrinites *florealis* (Schlotheim), as quoted by Miller, and thus proceeds: 'This is extremely abundant in many parts of Kentucky, and on the margins of the Mississippi in a few places. Near Huntsville they are very numerous; and on the surface of a fragment of rock, three inches long by two and a quarter wide, sent to the Academy by Mr. Hazard of that place, I have enumerated eighteen specimens of this species more or less entire, and two specimens of the preceding species (*P. pyriformis*). On another still smaller piece of rock are twenty one specimens, all in *alto relievo*, two of which are of the preceding species. On a third fragment of rock thirty may be counted, and on a fourth upwards of fifty. That these animals were pedunculated and fixed, there cannot be any doubt. We see at the base of the pelvis a small rounded surface, perforated in the centre for the passage of the alimentary canal, and on the outer margin are very short but distinct radii of elevated lines, evidently intended for articulation with the first joint of the column. The column itself is always found in fragments accompanying the body of the animal, but never attached to it. I think it highly probable that the branchial apparatus communicated with the surrounding fluid through the pores of the ambulacræ by means of filamentous processes: these may also have performed the office of tentacula in conveying the food to the mouth, which was perhaps provided with an exsertile proboscis; or may we not rather suppose that the animal fed on the minute beings that abounded in the sea water, and that it obtained them in the manner of Ascidia, by taking them in with the water. The residuum of digestion appears to have been rejected through the mouth.'

Mr. G. B. Sowerby, in a '*Note on the foregoing paper, together with a description of a new species of Pentremites*,' observes, that all the specimens received in this country from Kentucky were changed into a sort of calcedony or chert, a circumstance which has perhaps not only prevented British naturalists from forming a correct judgment of their natural affinities as a family, but appears also to have had the effect of preventing them from recognising the generic resemblance to the species that occur here, which, bearing so much greater a similarity to some of the *Echinidæ*, has caused some of our naturalists to class them together: for it is observable, he remarks, that of perhaps twenty specimens of the Kentucky Asterial Fossil that he had examined, only one individual showed the sutures that separate what Say calls the 'pelvic scapular and interscapular plates or pieces.' The examination of the new species however suggested to Mr. Sowerby the probability that part of the three unequal pieces which Say calls the pelvis, may in fact prove to be *costals*, thus evidencing one more relation to the *Crinoidea*. Mr. Sowerby records and describes two species, premising that the circumstance of Say's first species, *P. Globosa*, having been brought from England, led Mr. Sowerby at first to suppose that Say might refer to one of those species that had come into Mr. Sowerby's hands. Say's description however in Mr. Sowerby's opinion is so incomplete, and the terms he has used are so vague, that Mr. Sowerby had not been able to ascertain the fact, but thinks, nevertheless, that '*Pelvis* deep saucer-shaped convex' may serve to distinguish it from both. Mr. Sowerby's two species are *Pentremites Derbiensis* from Derbyshire (limestone) and *Pentremites elliptica* from near Preston in Lancashire.

In a second paper (*Zool. Journ.*, vol. iv.) Mr. Sowerby changes the name to *Pentatrematites*, and records three more species, viz. *P. angulata*, *P. inflata*, and *P. oblonga*; all from the calamine mines belonging to the duke of Buccleuch, on the Lancashire side of the Hodder; and in the last volume of the 'Zoological Journal,' he describes three in addition, viz. *P. orbicularis*, *P. acuta*, and *P. pentangularis*; the last he considers to be the *Platycrinites pentangularis* of Miller, the arms being imaginary in his figure. Goldfuss describes a species from the transition limestone near Dusseldorf

M. de Blainville places this genus at the end of the Crinoideans. It appears to be the connecting link between the Crinoidea and the Echinidæ, but to have a much stronger relationship to the former than to the latter. Marsupites we consider with Miller, Say, and others, to be the connexion between the true *Crinoideans* and the *Comatulæ*.

N.B. Goldfuss's *Glenotremites paradoxus* appears to approximate somewhat to *Pentremites*.

ENCYCLOPÆDIA. [DICTIONARY.]

ENCYCLOPE'DIE is the name of several general dictionaries of the arts and sciences in the French language. [DICTIONARY.] The first work published under this name was edited by Diderot and D'Alembert, is written in alphabetical order, and is styled 'Encyclopédie, ou Dictionnaire raisonné des Sciences, des Arts, et des Métiers,' 17 vols. fol. and 11 vols. plates, Paris, 1751-72, to which are added a Supplement in 4 vols. fol. of text and 1 vol plates, Paris, 1776-77, and a Table des Matiéres, or General Index, 2 vols. fol., Paris, 1780, in all 35 vols. folio. For a brief sketch of the history of this work and the judgment which the editor himself passed upon it, see DIDEROT; and for its plan and arrangement, see the preface to the work itself, written by Diderot and D'Alembert. The Encyclopédie exercised a considerable influence on the political as well as religious opinions of the French reading public of the last century. But the incorrectness of many of its articles, and the rashness and dogmatism of many of its propositions becoming notorious, a new Cyclopædia was planned by a society of men of letters, upon a scale of greater magnitude, and on a different arrangement, every branch of learning being treated separately, and the whole being written in general with considerable impartiality, and being more free than the former Encyclopédie from party purposes and prejudices: the title of it is 'Encyclopédie Méthodique, ou par ordre de Matières.' It is the largest work of the kind ever published, consisting of 201 volumes 4to., including 47 volumes of copper-plates. It began to appear in 1782, and was completed only in 1832, the publication having thus lasted half a century. Each science makes a dictionary of itself in two, three, or more volumes, arranged in alphabetical order, and the whole work is therefore a collection of dictionaries. The principal sciences contained in it are: geography antient and modern, physical geography, mathematics, logic and metaphysics, philosophy history, theology, jurisprudence, political economy and diplomacy, grammar and literature, commercial science, naval art, military art, antiquities, financial science, chemistry, pharmacy, and metallurgy, natural history, ornithology, history of mammalia, anatomy, physics, botany, medicine, surgery, agriculture, fine arts, architecture, music, &c. Other but inferior works have appeared since in France under the name of Encyclopédie, but the Encyclopédie Méthodique remains the standard work of its kind in the French language.

ENDEAVOUR STRAIT. [Torres Strait.]

ENDE'CAGON, a figure of eleven sides.

ENDECA'NDRIA, the ninth class of the Linnæan system of botany, distinguished by having nine stamens separate from each other.

ENDEMIC (ἔνδημος, *endémus*, from ἐν, in or among; and δῆμος, people, that which is among a people). By this word are expressed those peculiar forms of disease which arise spontaneously, as it is termed, in a country or in particular localities, and which are ordinarily produced by the peculiar climate, soil, air, water, &c. Thus, ague is the endemic disease of marshy countries or localities; the swelled throat or bronchocele is endemic in the Alps, and the plica in Poland. The word bears pretty much the same signification in relation to the diseases of a country that the term indigenous does to its plants. It is used in contradistinction to *epidemic*. [Epidemic.]

ENDIVE, or **CICHO'RIUM ENDI'VIA**, the parent of all the varieties of garden endive, was introduced to Britain about the beginning of the seventeenth century from the northern provinces of China. It is a species belonging to the narcotic lactescent division of Compositæ, to which it gives the name Cichoraceæ.

There are now many varieties in cultivation, which are divided, by those who have classed them, into two principal groups, Batavian and Curled-leaved; arranging under the former all those with broad ragged leaves, and under the latter those in which the leaves are narrower and curled. The French call the first of these *Scaroles* and the last *Chicorées*.

As it is the leaves of this plant, and not its flowers or seed, which are used in culinary operations, it is necessary to be particular as to the time of sowing; for if sown early in spring, it will, instead of forming fine leaves, produce flowers and seed, and so frustrate the object of the cultivator. A little seed may be sown in the beginning of May for early use; but for a general crop, throughout the months of June, July, to the middle of August, will be found to be the proper time for sowing. The soil upon which the endive is sown or planted should be light and rich. After the plants are strong enough to be removed from the seed-bed and planted out where they are intended to remain, various methods are practised in order to blanch the leaves. Some gardeners plant in drills two or three inches deep, and earth up the plants as they grow; others, after they are fully grown, cover them with flower-pots or something of that description, and so exclude the light; while others again simply tie the leaves close together with a piece of matting, when the same result is obtained. The effect of thus blanching the plants is not merely to render the endive colourless when employed as salad, but to diminish its natural bitterness, which in its concentrated state would render it unfit for food.

Endive-plants are impatient of wet in cold weather, being apt to rot in open situations. Care, therefore, should be taken to protect them by mats or boards upon the approach of winter.

In this country the cut-leaved or 'curled' endive is preferred for table; but the dwarf white Batavian endive is much more delicate and agreeable to the palate.

E'NDOGENS. One of the large primary classes into which the vegetable kingdom is divided bears this name in consequence of its new woody matter being constantly developed in the first instance towards the interior of the trunk, only curving outwards in its subsequent course downwards. That palm-trees grow in this way was known so long since as the time of Theophrastus, who distinctly speaks of the differences between endogenous and exogenous wood.

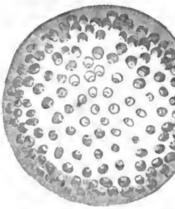
But that this peculiarity is also extended to a considerable part of the vegetable kingdom is a modern fact, the discovery of which we owe to the French naturalists Daubenton and Desfontaines. The path being thus opened, the inquiry has subsequently, and more particularly of late years, been much extended, especially by Professor Mohl, in an elaborate essay upon the anatomy of palms. In the following observations we shall be found to differ in some respects from all the previous writers upon this subject, but at the same time a considerable part of our statements will necessarily be in accordance with those of one observer or another. We do not think it advisable, except here and there, to interrupt the thread of our argument by any references to these discrepancies; the reader learned in such matters will be able to separate the views that are new from such as have previously been promulgated others would be little interested in the matter.

Mohl is of opinion that the first year's wood of an exogen is analogous in arrangement to that of an endogen, the woody bundles of each leaf curving upwards and outwards to the base of the leaf, and downwards and outwards towards the bark, crossing through those which have been previously developed.

For convenience we will take the phænomena of growth in a palm-tree as typical of the endogenous structure. In the beginning the embryo of a palm consists of a cellular basis, in which a certain number of cords of ligneous fibre are arranged circularly (fig. A, p. 396), down the radicle, deriving their origin from the plumule. Immediately subsequent to germination, and as soon as the rudimentary leaves of the plumule begin to lengthen, spiral vessels appear in their tissue in connection with the ligneous cords; the latter increase in quantity as the plant advances in growth, shooting downwards though the cellular tissue, and keeping parallel with the outside of the root. At the same time the cellular tissue increases in diameter to make room for the descending ligneous cords (or woody bundles, as they are also called). At last a young leaf is developed with a considerable number of such cords proceeding from its base downwards, and, as its base passes all round the plumule, consequently passing downwards alike on all sides of the centre that it surrounds. Within this a second leaf gradually unfolds, the cellular tissue increasing horizontally at the same time; the ligneous cords, however, soon cease to maintain any thing like a parallel direction, but curve outwards as they pass downwards, losing their extremities in the roots, or in the cellular integument on the outside of the first circle of cords (fig. A); at the same time the second leaf pushes the first leaf a little from the centre towards the circumference of the plane or cone of growth; the consequence of which is that the ligneous cords next the base of the first leaf are drawn a little outwards, and form descending axes which henceforwards are found at first to curve inwards towards the centre of the young stem, and afterwards outwards towards its circumference. In this manner leaf after leaf is developed, the horizontal cellular system enlarging all the time, and every successive leaf, as it forms at the growing point, emitting more woody bundles curving downwards and outwards, and consequently intersecting the older arcs at some place or other; the result of this is that the first formed leaf will have the upper end of the arcs which belong to it longest and much stretched outwardly, while the youngest will have the arcs the straightest; and the appearance produced in the stem will be that of a confused entanglement of woody bundles in the midst of a quantity of cellular tissue. As the stem extends its cellular tissue longitudinally while this is going on, the woody arcs are consequently in proportion long, and in fact usually appear to the eye as if almost parallel, excepting here and there, where two arcs abruptly intersect each other. As in all cases the greater number of arcs curve outwards as they descend, and eventually break up their ends into a multitude of fine divisions next the circumference, where they form a cortical integument, it will follow that the greater part of the woody matter of the stem will be collected near the circumference, while the centre is kept comparatively open, and will consist chiefly of cellular tissue; and when, as in many palms, the stem has a limited circumference, beyond which it is its specific nature not to distend, the density of the circumference must, it is obvious, be proportionably augmented. It is however a mistake to suppose that the great hardness of the circumference of old palm wood is owing merely to the presence of augmenting matter upon a fixed circumference; this will account but little for the phenomena. We find that the woody bundles next the circumference are larger and harder than they originally were, and consequently we must suppose that they have the power of increasing their own diameter subsequent to their first formation, and that they also act as reservoirs of secretions of a hard and solid nature, after the manner of the heartwood of exogens.

When the growth of the stem of an endogen goes on in this regular manner, with no power of extending horizontally beyond a specifically limited diameter, a stem is formed, the transverse section of which presents the appearance shown in the following cut.

There is a number of curved spots crowded together in a



confused way, most thick and numerous at the circumference, comparatively small and thinly placed at the centre; and the only regular structure that is observable with the naked eye is that the curves always present their convexity to the circumference.

When there is no limited circumference assigned by nature to an endogen, then the curved spots, which are sections of the woody arcs, are much more equally arranged, and are less crowded at the circumference. Never is there any distinct column of pith, or medullary rays, or concentric arrangement of the woody arcs; nor does the cortical integument of the surface of endogenous stems assume the character of bark, separating from the wood below it; on the contrary, as the cortical integument consists very much of the finely divided extremities of the woody arcs, they necessarily hold it fast to the wood of which they are themselves prolongations, and the cortical integument can only be stripped off by tearing it away from the whole surface of the wood, from which it does not separate without leaving myriads of little broken threads behind.

We therefore do not understand Professor Mohl when he asserts that the young wood of an exogen is the same as that of an endogen, and that they principally differ in exogens forming new wood between the old wood and liber, while endogens produce separate cords of woody tissue. On the contrary, exogens are, from the beginning of their growth, extremely different, collecting their woody cords in a parallel manner between those horizontal prolongations of the cellular system called medullary rays; there are no arcs developed; the cortical integument is altogether separate from the woody system, without any breaking off of the woody tubes; and, finally, there is a distinct column of cellular medulla, around which the wood itself is more or less concentrically disposed. We know very well that the disposition to form woody arcs in the pith, in addition to the concentric wood, which is so very conspicuous in Zamia, is also found elsewhere, as in Piper; and that something like it, although far from being correctly understood by Schultz, occurs in the pith of certain nyctaginaceous plants, as well as in elder, where it has been noticed by Henslow; but these cases are far from showing anything like identity between endogens and exogens, as will be more particularly explained in another place. [EXOGENS.]

While however we object to Mohl's identification of exogens and endogens, as most forced and unnatural, and essentially at variance with observation, we are far from adopting the language of Link, who calls a palm stem a *cauloma*, as if it were not a stem at all. That there is in the stem of an endogen and an exogen the same elementary matter, that the woody bundles of the former are analogous to the woody plates of the latter, that the function of their stems, although not made out with much precision, is nevertheless essentially similar, are facts about which we cannot anticipate any dispute, and therefore the new term cauloma, as distinguished from caulis, is just as superfluous as the old name of frond as distinguished from leaf.

In many of the larger kinds of endogens the stem increases principally by the development of a single terminal bud, a circumstance unknown in exogens, properly so called. In many however, as all grasses, the ordinary growth takes place by the full development of axillary buds in abundance.

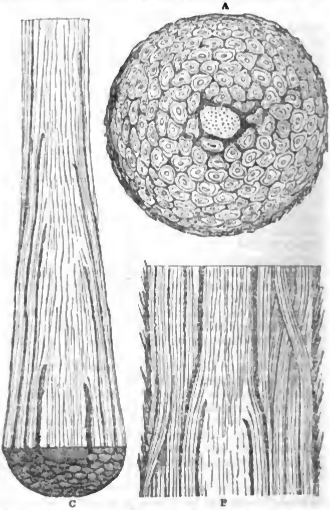
In general there is so great a uniformity in the structure of an endogenous stem that the common cane or asparagus illustrate its peculiarities sufficiently. There are however anomalous states that require explanation.

Grasses are endogens with hollow stems strengthened by transverse plates at the nodes. This is seen in the bamboo, whose joints are used as cases to hold rolls, or in any o. our indigenous species. In this case the deviation from habitual structure is owing to the circumference growing faster than the centre, the consequence of which is the tearing the latter into a fistular passage, except at the nodes, where the arcs of ligneous tissue originating in the leaves cross over from one side of the stem to the other, and by their entanglement and extensibility prevent the possibility of any rupture taking place. That this is so is proved by the fact that the stems of all grasses are solid, or nearly so, as long as they grow slowly; and that it is when the rapidity of their development is much accelerated that they assume their habitual fistular character. Independently of that circumstance their organization is quite normal.

Xanthorhœa hastilis has been shown by De Candolle to have an anomalous aspect. When cut through transversely, the section exhibits an appearance of medullary rays proceeding with considerable regularity from near the centre to the very circumference. (*Organographie Végétale*, t. 7.) But such horizontal rays are not constructed of muriform cellular tissue like real medullary processes, but are composed of ligneous cords lying across the other woody tissue; they are in fact the upper ends of the woody arcs pulled from a vertical into a horizontal direction by the growth of the stem and the thrusting of the leaves to which they belong from the centre to the circumference. Such a case throws great light upon the real nature of the more regular forms of endogenous wood.

Other appearances are owing to imperfect development, as in some of the aquatic species of this class. *Lemna*, for example, has its stem and leaves fused together into a small lenticular cavernous body; and in *Zannichellia* and others, a few tubes of lengthened cellular tissue constitute almost all the axis; but the examination of such cases is comparatively unimportant, and would lead too much into details of subordinate interest.

By far the most striking kind of anomaly in the stem of endogens is that which occurs in *Barbacenia*, and which has been already slightly noticed by the writer of this sketch. (*Nat. Syst. of Botany*, p. 334.) It is so very important that we shall describe it more particularly on this occasion. In an unpublished species of *Barbacenia* from Rio Janeiro, allied to *B. purpurea*, the stems appear externally like those of any other rough-barked plant, only that their surface is unusually fibrous and ragged when old,



and closely coated by the remains of sheathing leaves when young. Upon examining a transverse section of it, the stem is found to consist of a small firm pale central circle having the ordinary endogenous organization, and of a large number of smaller and very irregular oval spaces pressed closely together but having no organic connection; between these are traces of a chaffy ragged kind of tissue which seems as if principally absorbed and destroyed. (See fig. A.)

A vertical section of the thickest part of this stem exhibits, in addition to a pale central endogenous column, woody bundles crossing each other or lying parallel, after the manner of the ordinary ligneous tissue of a palm stem (fig. B), only the bundles do not adhere to each other, and are not embodied as usual in a cellular substance. These bundles may be readily traced to the central column, particularly in the younger branches (fig. C), and are plainly the roots of the stem, of exactly the same nature as those aërial roots which serve to stay the stem of a screw pine (*Pandanus*). When they reach the earth the woody bundles become more apparently roots, dividing at their points into fine segments, and entirely resembling on a small scale the roots of a palm-tree. The central column is much smaller at the base of the stem than near the upper extremity.

Nothing can well show more distinctly than this, that the woody bundles of an endogenous stem are a sort of root emitted by the leaves, plunging down through their whole length into the cellular substance of the stem in ordinary cases; but in barbacenia soon quitting the stem and continuing their course downwards on the outside. The observation of Du Petit Thouars, that when dracænas push forth branches, each of the latter produces from its base a quantity of fibres, which are interposed between the cortical integument and the body of the wood, forming a sort of plaster analogous to what is found in the graft of an exogen; and that of the fibres just mentioned the lowermost have a tendency to descend, while those originating on the upper side of the branch turn downwards and finally descend also· that observation had already rendered the above-mentioned conclusion probable. The case of barbacenia can scarcely leave a doubt upon the subject, and leads to the important conclusion that the theory of the wood of exogens being also a state of roots belonging to the leaves of the stem, is well founded also.

The age of endogenous trees has been little studied. When the circumference of their stem is limited specifically, it is obvious that their lives will be limited also; and hence we find the longevity of palms inconsiderable when compared with that of exogenous trees. Two or three hundred years are estimated to form the extreme extent of life in a date palm and in many others. But where, as in Dracæna, the degree to which the stem will grow in diameter is indefinite, the age seems, as in exogens, to be indefinite also· thus a famous dragon tree, *Dracæna Draco*, of Oratava in Teneriffe, was an object of great antiquity so long ago as A. D. 1402, and is still alive.

Important as the character furnished by the internal manner of growth of an endogen obviously is, it is much enhanced in value by its being found very generally accompanied by peculiarities of organization in other parts. The *leaves* have in almost all cases the veins placed in parallel lines, merely connected by transverse single or nearly single bars. Straight-veined foliage is therefore an external symptom of an endogenous mode of growth. When such an appearance is found in exogens it is always fallacious,

ENDOGENOUS VEGETATION.

Palmaceæ, consisting of Cocos capitata (a); Manicaria saccifera (b); Iriartea ventricosa (f). *Pandanaceæ*, represented by Pandanus odoratissimus (e); *Musaceæ*, by Musa Sapientum (d); *Graminaceæ*, by Bambusa arundinacea (c); and arborescent *Amaryllidaceæ*, by Agave Americana (g). The fore and back grounds are composed of small palms, grasses, rushes, and liliaceous plants.

and is found to be owing to the excessive size and peculiar direction of a few of the larger veins, and not to be a general character of all the venous system; as is sufficiently obvious in Plantago lanceolata, Gentiana lutea, and many more.

The *flowers* too of endogens havė in most cases their sepals, petals, and stamens corresponding with the number three, or clearly referrible to that type; and the pistil usually participates in the same peculiarity. Where such a proportion exists in exogens, it is usually confined to the sepals and petals by themselves, or to the pistil by itself, not extending to the other organs. In endogens it is almost universal in all the whorls of the flower, although sometimes obscured by the abortion, dislocation, or cohesion of particular parts, as happens in the whole of the extensive natural order of grasses.

The effect of the manner of growth in endogens is to give them a very peculiar appearance. Their trunks frequently resemble columns rising majestically with a plume of leaves upon their summit; and the leaves, often very large—the fan-shaped leaves of some palms are from 20 to 30 feet wide—have most commonly a lengthened form, resembling a sword blade if stiff, or a strap if weak and broad. A landscape consisting entirely of endogens would have such an appearance as is presented by the cut in the preceding page.

These peculiarities are connected with others belonging to endogenous vegetation in its most rudimentary condition. The embryo of an endogen is, in its commonest state, a small undivided cylinder, which protrudes from within its substance a radicle from one end and a plumule from a little above the radicle; in other cases its embryo has a slit on one side, in the cavity of which the plumule reposes, or, finally, the embryo is a flat plate as in grasses, with the plumule and radicle attached to its face near the base. In the latter case the flat plate is a solitary cotyledon, which, in the second instance, is folded together so as to give the embryo the appearance of being slit, and which in the first, or most habitual, condition is not only folded up, but united at its edges into a case entirely burying the plumule and cotyledon. Hence the embryo of an endogen is called monocotyledonous; a name that is really unexceptionable, notwithstanding the occasional appearance of a second rudimentary cotyledon, as occurs in common wheat.

It has already been stated that the radicle is protruded in germination from within the substance of the embryo; the base of the radicle is consequently surrounded by a minute collar formed of the edges of the aperture produced by the radicle upon its egress. For this reason exogens are called *endorhizal*.

Hence the great natural class of plants forming the subject of these remarks has five most important physiological peculiarities, by all which combined, or usually by each of which separately, the class may be characterized.

1. The wood is endogenous.
2. The leaves are straight-veined.
3. The organs of fructification are ternary
4. The embryo is monocotyledonous.
5. The germination is endorhizal.

This explains why Endogens are also called *Monocotyledons* and *Endorhizæ;* they have moreover been called *Cryptocotyledoneæ* by Agardh, *Acroblastæ* by Reichenbach, and *Caulophytæ* by the school of Oken; but these names have been given upon mere hypothetical grounds, and are not of sufficient importance to deserve explanation in this place

It may however be readily supposed that, viewed as a large class of plants, Endogens are essentially characterized only by the combination of these five peculiarities, and that occasional deviations may occur from every one of them. Thus in Nais, Caulinia, Zanuichellia, and others which constitute a part of what Professor Schultz names *Homorganous floriferous* plants, the whole organization of the stem is so imperfect that the endogenous character is lost; but their true nature is nevertheless sufficiently indicated by their straight veins, monocotyledonous embryo, &c. Again, in Smilax, the common reticulated leaves of exogens are found; but the endogenous stem, the ternary organs of fructification, the embryo and germination of that order, are all good evidence of its real nature; and so with other cases. Such occurrences are instances of endogenous development tending towards the exogenous, and are usually looked upon as cases of transition from one form to the other—perhaps not very correctly. Of this nature are the resemblances between the columnar Cycadaceous Gymnosperms and Palms, between the livid, fœtid, one-sided calyx of Aristolochia and the equally livid, fœtid, one-sided spathe of araceous endogens, or, in another point of view, between such lenticular plants as lemna in endogens, with the leaves and stems fused, as it were, together, and similar forms of stem and leaf among marchantiaceous acrogens.

With regard to really intermediate forms of vegetation connecting endogens with other classes, they are extremely uncommon. One of the most striking is that which occurs between Ranunculaceæ and Nymphæaceæ on the part of exogens, and Alismaceæ and Hydrocharaceæ on that of endogens; if Ranunculus lingua, or better R. parnassifolius, is contrasted with Alisma plantago, or Damasonium, leaving out of consideration subordinate differences, it will be found that there is little of a positive nature to distinguish them except the albuminous dicotyledonous seeds of the former as compared with the exalbuminous monocotyledonous seeds of the latter; and the resemblances between Hydropeltis and Hydrocharis in the other case, are so very great that Schultz and others actually refer them to the same class.

Endogens probably contain more plants contributing to the food of man, and fewer poisonous species in proportion to their whole number, than exogens. Grasses, with their floury albumen, form a large portion of this class, to which have to be added Palms yielding fruit, wine, sugar, sago, Araceæ, Marantaceæ, some Amaryllidaceæ, &c., producing arrow-root, the nutritious fruit of the plantains, the aromatic secretions of Zingiberaceæ, Orchidaceæ forming salep, and Dioscoreaceæ, the mothers of yams. Among the deleterious species we have little worth notice beyond the poisonous mucilage in the bulbs of certain Amaryllidaceæ, and the acrid secretions of Araceæ.

What proportion endogens bear to the whole vegetable kingdom is unknown. De Candolle computes the proportions of the three great classes into which plants used to be divided, thus:

Exogens, or Dicotyledons . .	636
Endogens, or Monocotyledons .	144
Acrogens, or Acotyledons . .	220
	1000

But these numbers can only be regarded as loose approximations to the truth.

In these, as in all other large groups, we find the extremes of development so exceedingly far apart, that one would be almost tempted to doubt the possibility of their being mere forms of each other, were it not certain that numerous traces exist in the vegetable kingdom of a frequent tendency to produce the typical structure of a natural association of whatever kind in both an *exaggerated* and *degraded* state, if such figurative terms may be employed in science. For instance, the genus Ficus contains some species creeping on the ground like diminutive herbaceous plants, and others rising into the air to the height of 150 feet, overspreading with the arms of their colossal trunks a sufficient space of ground to protect a multitude of men; the type of organization in the willow is in like manner represented on the one hand by the tiny *Salix herbacea*, which can hardly raise its head above the dwarf moss and saxifrages that surround it; and on the other by *Salix alba*, a tree sixty feet high. Then among natural orders we have the Rosaceous structure, exaggerated, on the one hand, into the arborescent Pomeæ, and degraded, on the other, into the apetalous imperfect Sanguisorbeæ; the Onagraceous type, highly developed in Fuchsia, and almost obliterated in Halorageæ; the Urticaceous, in excess in Artocarpus, and most imperfect in Ceratophyllum; grasses, presenting the most striking differences of perfection between the moss-like Knappia, and Bamboos a hundred feet high; and the Liliaceous occurs in equally different states of development, when asparagus is compared with the Dragon-tree, or an autumnal squill with an arborescent Yucca. So, in like manner, we find at one extreme of the organization of the class of Endogens, palms, plantains, and arborescent liliaceous plants, and at the other, such submersed plants as Potamogeton, Zannichellia, and duckweed, the latter of which has not even the distinction of leaf and stem, and bears its flowers, reduced to one carpel and two stamens, without either calyx or corolla—therefore at the minimum of reduction, if to remain flowers at all—in little chinks in its edges.

The classification of endogens is not a subject upon which there is any very great diversity of opinion among botanists; if the natural orders are sometimes not distinctly limited, they are, upon the whole, grouped much better than those of exogens; and although it may be expected, whenever more positive rules for classification than are yet known shall have been discovered, that great changes will be introduced into this part of systematic botany, yet we do not contemplate the probability of disturbing the limits of the natural orders themselves to any considerable extent.

According to the views of the writer of this article (*Nat. Syst. of Botany*, ed. 2, p. 320, &c.), there are six principal groups into which endogens may be divided. Of these, four have the organization of the flowers *perfect*, there being in all cases a distinct calyx and corolla, and a regular consolidated cotyledon; and two are *imperfect*, the calyx and corolla being either altogether absent or in an incomplete condition, as in Araceæ, where scale-like bodies are all that represent the floral envelopes, or grasses, in which for calyx and corolla are substituted imbricated scales, and the cotyledon is very commonly rolled up without consolidation or actually flat.

The perfect groups consist, firstly, of plants whose leaves are those of exogens, having reticulated veins, a taper footstalk disarticulating from the stem, and the habit of Menispermaceæ or Aristolochiaceæ: these form the *Retose* group; secondly, of straight-veined plants, some of which have a superior and others an inferior ovary: all those with a superior ovary form the *Hypogynous* group. Those with an inferior ovary separate into two series, of which one has a distinct style and stamens (*Epigynosæ*), and the other those parts consolidated into a central column (*Gynandrosæ*).

The two groups of imperfect endogens are the *Spadicose*, in which a coloured spatha is usually present, and the flowers either altogether naked or provided only with rudimentary scales: in these plants the cotyledon is rolled up, but its edges are not united, so that it appears to have a slit on one side; and the *Glumose*, where the flowers have imbricated scales representing the calyx, and frequently minute scales in lieu of a corolla; in these the cotyledon is very usually flat, with the double cone, formed by the plumule and the radicle, adhering to its face at the lower end.

The following table presents this arrangement in one view, and shows under which of the groups the different natural orders are stationed. Of all the more important of the latter, some account will be found in this Cyclopædia at the proper places.

Endogens.

* Perfect. *Flowers complete.* (*Cotyledon usually rolled up and consolidated over the plumule and radicle.*

Group 1. Epigynous. Zingiberaceæ, Marantaceæ, Musaceæ, Amaryllidaceæ, Hæmodoraceæ, Burmanniaceæ, Taccaceæ, Iridaceæ, Bromeliaceæ, Hydrocharaceæ.

Group 2. Gynandrous. Orchidaceæ, Vanillaceæ, Apostasiaceæ.

Group 3. Hypogynous. Palmaceæ, Pontederaceæ, Melanthaceæ, Gilliesiaceæ, Liliaceæ, Commelinaceæ, Butomaceæ, Alismaceæ, Juncaceæ, Philydraceæ.

Group 4. Retose. Smilaceæ, Dioscoreaceæ, Roxburghiaceæ.

* * Imperfect. *Flowers incomplete.* (*Cotyledon not consolidated, frequently quite flat and open.*)

Group 5. Spadicose. Pandanaceæ, Cyclanthaceæ, Araceæ, Acoraceæ, Typhaceæ, Naiadaceæ, Juncaginaceæ, Pistiaceæ.

Group 6. Glumose. Graminaceæ, Cyperaceæ, Desvauxiaceæ, Restiaceæ (Eriocauleæ), Xyridaceæ.

ENDORHIZÆ. [Endogens.]

ENDORSEMENT. [Bill of Exchange.]

ENDOSMOSE is the attraction through an animal or vegetable membrane of thin fluid by a denser fluid. Mons. Dutrochet found that if he filled the swimming bladder of a carp with thin mucilage and placed it in water, the bladder gained weight by attracting water through its sides: to this phenomenon he gave the name of *Endosmose*. He also found that if he filled the same bladder with water and placed it in thin mucilage, it lost weight, its contents being partially attracted through its sides into the surrounding mucilage; this counter phenomenon he named *Exosmose*. The same circumstances were seen to occur in the transmission of fluids through the tissue of plants; it was found possible to gorge parts of vegetables with fluid by merely placing them in water, and to empty them again by rendering the fluid in which they were placed more dense than that which they contained. It was also ascertained that this phenomenon took place with considerable force: Dutrochet says that water thickened with sugar in the proportion of 1 sugar to 2 water, was productive of a power of endosmose capable of sustaining a column of mercury of 127 inches, or the weight of 4½ atmospheres.

This phænomenon is by its discoverer considered sufficient to explain many of the movements of the fluids both of plants and animals; his first book upon the subject is entitled *L'Agent immédiat du Mouvement Vital, dévoilé dans sa nature et dans son mode d'action chez les Végétaux et chez les Animaux*, Paris, 1826, and in his numerous more recent writings he sustains the same opinion. To the effects of endosmose he refers the motion of sap; the sleep of leaves; the various directions taken by plants under the influence of external agents, such as turning to the light or away from it; many kinds of irritability; the attraction of fluids to particular points, and the like. That Mons. Dutrochet's arguments are extremely ingenious, and his observations highly curious, no one will deny; but we quite agree with De Candolle, that, supposing this celebrated physiologist's views to be correct, we must still have recourse to vital force as the great and inexplicable cause of all such phænomena. When organic tissue dies, it does not lose its mere hygrometrical powers, nor do its tubes cease their capillarity, but no more vital movement of fluids takes place; yet mere endosmose will take effect through dead membranes, as is proved by the instrument called an endosmometer. We can only then allow endosmose to be one of the powers which, in combination with vital force, assists in producing some of the phenomena of life.

Dutrochet considers endosmose to be owing to what he calls intercapillary electricity, grounding his opinion partly upon the experiment of Porret, who found that when two liquids of different levels are separated by a membrane, they may be brought to a level by establishing an electrical current between the two, thus rendering the membrane permeable; and partly upon experiments of his own. But M. Poisson, on the contrary, has demonstrated that endosmose may be the result of capillary attraction joined to differences in the affinity of heterogeneous substances. (*Ann. de Chim.*, 1827, v. 35, p. 98.)

ENEMATA. [Clysters.]

ENFEOFFMENT. [Feoffment.]

ENFIELD, WILLIAM, was born at Sudbury, in Suffolk, on March 29, 1741, of humble but truly respectable parents. The disadvantages of his early education, arising from the condition of life in which he was born, were made amends for, in a great degree, by a fondness for reading and incessant labour towards improving his mind. This disposition to literary application introduced him to the notice of Mr. Hextall, the dissenting minister of the place, who kindly and judiciously directed him in his studies. Mr. Hextall's encouragement and advice led to his devoting himself to the Christian ministry. In his seventeenth year he was admitted to the Academy or Dissenting College at Daventry, then conducted by the Rev. Dr. Ashworth. Here he passed through the usual course of study of five years, and was distinguished for his habitual diligence and for an unusual facility and elegance of composition. It was here also that he, with some others of his fellow-students, were among the first of the dissenting ministry who formed the design of making Christian morality the principal object of their discourses, rather than points of faith or the dogmas of sectarianism.

Immediately on leaving the Academy, he was invited to the office of minister to the congregation of Benn's Garden, in Liverpool. In 1767 he married Mary, the only daughter of Mr. Holland, draper in Liverpool; a connexion which constituted his principal happiness for the rest of his life. In 1768 and 1770 he published two volumes of sermons, which were very favourably received. One of these volumes, now scarce, is rather remarkable for being embellished with vignette sketches illustrative of the subject of each discourse, from the pencil of Fuseli.

He took his leave of Liverpool on being invited to the office of tutor in the belles lettres and resident conductor of the discipline at the academy of Warrington. These offices he accepted in conjunction with that of minister to the dissenting congregation of Warrington. Of Dr. Enfield's qualifications for the office of tutor in the belles lettres there could be no doubt; but if, as was supposed, his mild disposition and amiable manners disqualified him for a disciplinarian, it must in justice be acknowledged that sterner deportment and stricter discipline have also failed in preserving dissenting academical institutions from the fate that has so frequently attended them. The degree of doctor of laws was obtained from Edinburgh for him and others of the tutors by the trustees of the academy.

Of Dr. Enfield's industry some idea may be formed from the following list of the works which he published during his residence at Warrington and in the midst of his other various and important occupations:—

'The Preacher's Directory,' 4to., 1771. 'The English Preacher; a Collection of Sermons abridged and selected from various Authors,' 9 vols. 12mo., 1773. 'An Essay towards the History of Liverpool, principally from the Papers of Mr. George Perry,' fol., 1774. 'Observations on Literary Property,' 4to., 1774. 'The Speaker; or Miscellaneous Pieces selected from the best English Writers, for the purposes of Reading and Speaking,' 8vo. 1774. 'Biographical Sermons on the Principal Characters of the Old and New Testament,' 12mo., 1777. 'Exercises in Elocution, being a Sequel to the Speaker,' 8vo., 1781. 'A Translation of Rosignol's Elements of Geometry,' 8vo. 'Institutes of Natural Philosophy, Theoretical and Experimental,' 4to., 1783. And besides these, various occasional sermons.

'Several of the above,' as Dr. Aikin observes, 'belong to the humble but useful class of compilations; yet in them he found occasion to display the elegance of his taste and the soundness of his judgment.' The 'Speaker' was one of the first, and is still, perhaps, one of the best selections from our English classical writers.

After the dissolution of the academy, Dr. Enfield remained two years at Warrington, occupied in the education of private pupils, and in his duties as minister of the congregation. In 1785 he accepted an invitation from the Octagon dissenting congregation at Norwich. He first settled at the village of Thorpe, where he received private pupils, and afterwards removed to Norwich, where, at length, he devoted his whole time to literary occupations and his official duties. It was during his residence at Norwich, that besides being engaged as a writer in the Monthly and Analytical Reviews, he undertook an abridgment of Brucker's 'History of Philosophy,' in 2 vols., 4to. In this task he was kindly encouraged by Dr. Bagot, at that time bishop of Norwich, and accommodated by him with books from Cambridge and from his own library.

Dr. Enfield published also while at Warrington another small volume of sermons on the principal characters of the Old and New Testament; and Dr. Aikin says, that while there he drew up a series of discourses on the principal incidents and moral precepts of the gospel, in which he displayed both his talents as a commentator and his skill in expanding into general lessons of conduct those hints and particular observations which occur in the sacred narratives. This work was not published, but a selection of twenty sermons from it forms the last of three volumes of discourses which were published after his decease by subscription for the benefit of his widow: and these productions of his maturer years will be found much superior to those sermons which were given to the world at an early period of his life. The series of discourses on the gospels was written chiefly, if not altogether, at Norwich.

Dr. Enfield was also a frequent contributor to the Monthly Magazine at its commencement, in which the papers under the title of the 'Enquirer' are mostly from his pen. His last literary undertaking was that of a General Biographical Dictionary, in conjunction with one of his oldest and most valued friends, Dr. John Aikin. He resided at Norwich till his death, which, after a short but painful illness, took place on November 3rd, 1797, in the fifty-seventh year of his age.

As a sermon-writer, Dr. Enfield obtained so great a reputation as not only to be applied to for assistance by his less industrious dissenting brethren, but also, through the agency of a London bookseller, by several of the clergy of the Establishment, for sermons on particular occasions, for which he was liberally remunerated.

As a preacher, his manner of delivery was, as Dr. Aikin characterizes it, grave and impressive, affecting rather a uniform dignity than a variety of expression. It was entirely free from what is called tone, and though not highly animated, was by no means dull, and never careless or indifferent.

As a companion, he was universally esteemed in every situation, and at every period of his life. That influential intercourse with a congregation, formerly considered a more essential part of the duty of a dissenting minister than it now is, in the case of Dr. Enfield, who never assumed the priest, had uniformly a beneficial tendency. He was one whose entrance into any society of those who knew him instantly diffused pleasure. In small parties he frequently exhibited the rare talent of good reading, and with equal effect in the humorous and the pathetic. Both at Warrington and at Norwich he was instrumental in forming societies for the free discussion of the most interesting topics, without limitation or exclusion. He thus did much towards delighting, elevating, and refining the circle in which he moved; and the mildness and amiability of his disposition and manners aided the gentle and unobtrusive influence of his benevolent heart.

ENFIELD. [Middlesex.]

ENFILADE is the denomination applied to a fire of artillery or musketry when made in the direction of an enemy's line of troops, or to that which is made from any battery to the interior of an enemy's rampart or trench, and in the direction of its length. When an artillery fire is so employed by the besiegers of a fortress, the intention is to dismount the guns of the defenders; and this end it accomplishes with more certainty than if the fire were directed from the front towards the mouths of the embrasures, both because the side of a gun-carriage presents a larger surface than the muzzle of the piece to the action of the shot, and because the same shot may take effect against two or more guns placed upon the same line of rampart. An enfilading fire of artillery is also used by the besiegers to destroy the palisades or other obstacles behind a glacis, and to prevent the defenders from remaining at their parapets. When employed by the defenders of a fortress, it is intended to sweep any of the besiegers' trenches which may from necessity, or through the fault of the engineer, lie in a direction tending towards some part of the ramparts of the fortress.

The destructive effects of an enfilading fire, when directed against the guns on a rampart, are diminished by constructing traverses across the rampart at intervals, or by placing the guns in blindages. And, to avoid such fire in the trenches of the besiegers, the practice is to form those trenches in zig-zag directions, tending alternately to the right and left of the general line of the approaches, so that, if produced, they may fall on the exterior of all the ramparts from whence a fire might be directed towards the approaches: when this is not possible it becomes necessary to raise traverses in such trenches as are thus exposed to the fire.

In Sir John T. Jones's Journals of the Sieges in Spain, there is given an account of the ingenious attempt made by a French corporal to cause one of the trenches of the besiegers before Badajos to be enfiladed by the guns of the fortress: the man contrived secretly in the evening to displace on the ground the tracing cord which the British engineer had stretched in order to indicate the intended direction of the trench; and the attempt only failed because the officer who came on duty for the night accidentally discovered, before darkness came on, the error in the position of the line. [Ricochet.]

ENFRANCHISEMENT. [Copyhold.]

ENGADIN, the valley of the Upper Inn in the canton of the Grisons, in Eastern Switzerland, runs from south-west to north-east, from the sources of the Inn at the foot of Mount Maloya to the defile of Finstermünz, where the Inn enters the Tyrol, a length of about 50 miles. It is the largest valley in Switzerland next to the Valais, and one of the finest; it lies between two massive and lofty ridges of the Rhætian Alps, both of which branch off from Mount Maloya. The northern ridge, which contains the summits known by the names of Julier (6800 feet), Albula (7200), Scaletta (8000), Fluela, Piz Linnard, Selvretta, &c., divides the waters of the Inn from those of the Albula, the Lanquart, and the Iller, which flow into the Rhine. The southern range consists of the Monte dell' Oro (8000 feet), the Bernina (6200), the Casanna, the Fraele, the Piz Pisogg, Sursas, Pizlat, &c., and divides the valley of the Inn from that of the Adda, called also Valtelina, and from the valley of the Upper Etsch or Adige in the Tyrol. More than twenty transverse valleys open into the longitudinal valley of Engadin. The width of the plain which forms the bottom of the valley of Engadin is from one to two miles in its widest parts, but it is much narrower in many places.

The slopes of the mountains are covered with forests or pastures. The cultivated grounds produce some barley, rye, and oats, potatoes, turnips, peas, and other vegetables. The Upper Engadin being more elevated than the lower part of the valley, has a keener air and sharper winters, yet Kasthofer (*Voyage dans les petits Cantons et dans les Alpes Rhétiennes*) saw at Celerina, about 5300 feet above the sea, barley and oats, and at St. Moriz, which is about the same elevation, he saw cabbages, peas, carrots, turnips, and lettuce. Potatoes sometimes succeed in certain localities, but the barley harvest is uncertain. The Lower Engadin enjoys a milder climate; at Zernetz, 4400 feet above the sea, barley, rye, peas, potatoes, and hemp succeed; lower down the valley, flax is cultivated with success. The cherry and other fruit trees are also met with. But the chief wealth of Engadin and especially of the upper part, consists in its cattle; its cheese equals that of Gruyère, and is largely exported. Many of the men emigrate to foreign countries, especially to Lombardy and the Venetian States, where they follow the trade of pastry cooks and confectioners. Some of them make money, with which they return home, and build fine houses, which are conspicuous objects in most of the villages. Their fields are therefore either left to the care of the women or let, and such is the scarcity of native labourers, that about 1500 hay makers from the neighbouring countries repair to Engadin for the hay harvest, and are paid at the rate of 1½ to 2 florins a-day, besides a plentiful allowance of victuals. Masons, carpenters, and smiths are mostly foreigners. Leather is imported, while a quantity of raw hides are exported. Most of the pastures on the high Alps are let to herdsmen from Bergamo and other parts of Lombardy, who migrate thither with their cattle in the summer months. These herdsmen take along with them very fierce mastiffs, which are dangerous to stray pedestrians or hunters.

The villages of Engadin are chiefly along the road which follows the course of the Inn for the whole length of the valley, and then leads into Tyrol by St. Martinsbruck, and joins the high road coming from Italy by the Stilfser Joch to Innspruck. [BORMIO.] Several paths lead from Engadin into the other valleys of the Grisons; the principal one is over the Julier leading into the valley of the Albula, and thence to Chur or Coira. Another path over the Maloya leads into the Val Bregaglia, which belongs likewise to the Grisons, and thence to the Chiavenna. Other paths lead over the southern ridge into Valtelina; the most frequented is that over the Bernina into the valley of Poschiavo, also belonging to the Grisons, and from thence to Tirano and Sondrio on the Adda. A road leads from Zernetz in Lower Engadin by the Val del Forno, and over the Buffalora mountain, 6000 feet high, into the Munster Thal, also a Grison district, bordering upon Tyrol, and which opens into the valley of the Etsch.

Upper Engadin has eleven communes or parishes, and reckons about 800 men fit to bear arms, and Lower Engadin has ten communes and 1300 men fit for military service. The whole population is estimated at about 8000, of which Lower Engadin contains 5000. Upper Engadin returns three members and Lower Engadin four to the great council or legislature of the canton. Every commune elects its municipal magistrates, and each of the two divisions of the valley has its landamman and its court of justice, the members of which are renewed every two years.

The people of Engadin are Protestants of the reformed Swiss church, with the exception of the commune of Tarasp, which is Catholic, and which belonged to the house of Austria till 1801. They speak the Ladin, a dialect of the Romane or Romance language, which has much resemblance to the Italian. There are books printed in Ladin.

Schuols, in Lower Engadin, is the largest village in the whole valley; it contains nearly 200 dwelling-houses, and a handsome parish church. Zernetz, also in Lower Engadin, has about 450 inhabitants. Samaden, which is the principal village of the Upper Engadin, has about 500 inhabitants, some fine houses, and three churches. The families of Salis and Planta, which had once very extensive feudal powers in these parts, and whose rivalry occasioned much bloodshed, are originally from Engadin, the history of which is connected with that of the Grisons' country. [GRISONS.] (Leresche, *Dictionnaire Géographique de la Suisse*, 1836; Dandolo, *Lettere sulla Svizzera, Cantone dei Grigioni*.)

ENGHIEN, LOUIS ANTOINE HENRI DE BOURBON, DUKE OF, was born at Chantilly, August, 1772. He was the son of the duke of Bourbon and grandson of the prince of Condé, being a lateral branch of the then reigning family of France. After the French revolution broke out, young d'Enghien served under his grandfather in the corps of the French emigrants who fought on the Rhine. At the peace of Luneville with Austria, in 1801, the corps was disbanded, and Enghien fixed his residence at Ettenheim, a château on the German side of the Rhine, a few miles from that river, and in the territories of the margrave of Baden. An attachment between him and the princess Charlotte of Rohan, who resided at Ettenheim with her relative the Cardinal de Rohan, induced the duke to remain there. After the war had broken out again between England and France, in 1803, the English government took the French emigrants again into its pay, and they were directed to go to the German side of the Rhine to act when required. The duke of Enghien was looked upon as their head. Meantime the conspiracy of Georges and Pichegru against the person of the first consul, Bonaparte, was discovered at Paris. It has never been proved that the Duke of Enghien was privy to that conspiracy, but it is evident that he was led to expect an insurrectionary movement in France in favour of the Bourbons, of which he intended to avail himself by entering France at the head of the emigrants. This he did not deny. Bonaparte, alarmed at the conspiracy and at the avowed intention of Georges to assassinate him, seems to have persuaded himself that the Duke of Enghien was connected with the Paris conspirators, and that the whole was a plan directed by the Bourbons in England and by the English government. That all the above parties desired his overthrow is undoubted, and is no more than might be expected, as they were his declared enemies, but considerable difference may have existed as to the means which they intended to employ. Georges and his Chouan friends preferred assassination as the shortest and most congenial to their habits, but there is no evidence that they had instructions to that effect, or were countenanced in it by any of the higher parties, who really seem to have expected an insurrectionary movement in Paris, in which Moreau, Pichegru, and other influential persons would have participated. The insurrection, however, if successful, would, in all probability, have occasioned the death of Bonaparte, if not by assassination, at least in the scramble and fight which must have taken place. How far the persons engaged in or countenancing such a plot were justifiable, is a question which cannot be resolved by any code of political justice yet in existence. Bonaparte, on his part, determined upon getting rid of his enemies by summary means similar to those which they employed against him. He dispatched a party of gens d'armes, who crossed the Rhine, entered without ceremony the neutral territory of Baden, surrounded the château of Ettenheim, and took the duke of Enghien prisoner, the 15th of March, 1804. [For the following part of the transaction, see BONAPARTE.] The duke was tried before a secret court, which was evidently influenced in its decision by fear of the first consul, and whose sentence was carried into execution with a most indecent haste. The duke was found guilty of all the charges preferred against him, some of which were never proved. Even the recommendation of the court for a respite to the prisoner was overruled by Savary, who was present at the sitting as a sort of extra-judicial authority to watch over the proceedings. It was altogether a dark affair worthy of the worst times of the old monarchy. Bonaparte at the time openly avowed to the Council of State his firm purpose of making an example of the duke in order to deter the other Bourbon princes and their partizans from plotting against him in future. (Thibaudeau *Le Consulat et l'Empire*, vol. iii. ch. 41.) And again, at St. Helena, almost at his dying hour, he took upon himself alone the whole responsibility of that deed. (*Testament de Napoléon*.) After the Restoration, Hullin, president of the court, Savary, Caulincourt, and others who had a share in the arrest, trial, and execution of the duke, wrote each in justification or extenuation of their respective conduct. The fate of the duke of Enghien excited interest and commiseration throughout Europe; he was young, brave, amiable, and one of the most promising of the Bourbon princes.

ENGHIEN. [HAINAULT.]

ENGINEERING (from the French word *engin*) is properly the art of constructing and using engines or machines; but the term is also applied to that of executing such works as are the objects of civil and military architecture, in which machinery is in general extensively employed.

A distinction has long been made between the civil and military engineer; and since every thing relating to the service of artillery is now confided to a particular corps, the duty of the military engineer may be said to comprehend the construction of fortifications, both permanent and temporary, including the trenches and batteries required in besieging places; also of barracks, magazines, and other works connected with warlike affairs.

The profession of the civil engineer comprehends the design and execution of every great work by which commerce and the practice of the useful arts may be facilitated. Thus, in creating or improving the communications of a country, he would be called upon to form a road through hills or over valleys or rivers, or to excavate a canal in connection with the waters by which it may be supplied, and to build the locks for retaining the surface at different levels, in different places, when the inequalities of the ground are considerable. He raises embankments to resist the encroachments of the sea or to reclaim the land which it may have covered, and dams to break the force of its waves at the mouths of natural harbours. He renders rivers navigable when their course is obstructed by rocks or banks; he forms docks or artificial harbours where ships may remain in security; and he is required to penetrate by mines to vast depths for the purpose of seeking the mineral treasures contained within the bosom of the earth. Such are the occupations of this important class of men; and it is necessary to observe that they frequently, in addition, practise the avocation of the machinist in executing the presses, mills, looms, and other great machines employed in the arts and manufactures; particularly in constructing steam-engines and the apparatus by which they are rendered available for giving motion to ships, carriages, or machinery.

In France the title of engineer is extended to persons who are employed for the public service in trigonometrical surveying in the interior of a country or on the coasts, and in the practice of naval architecture. The French have thus a corps of ingénieurs géographes, of ingénieurs d'hydrographie, and of ingénieurs de marine.

Engineering must have originated with the first application of a lever for the purpose of moving a mass of any material which exerted a resistance exceeding the unassisted strength of man: by observing the effects produced in operations of that nature, the laws of the action of bodies on one another were gradually discovered, and mechanics, the science of the engineer, arose.

Archimedes, in addition to the title of geometer, may with justice claim that of mechanician; and in fact he is the first person who is known to have applied himself to the cultivation of the mixed mathematical sciences. Besides demonstrating the fundamental property of the lever, he determined the centre of gravity in bodies of certain forms, and the positions in which bodies remain in equilibrio in a fluid; and from the celebrity he acquired among the antients by the mechanical contrivances which, according to Polybius, he put in practice for the defence of Syracuse, we may conclude that if those contrivances were not his own inventions, they must have contained improvements upon such as had been in use before his time.

Vitruvius wrote his treatise on architecture during the reign, as it is generally believed, of Vespasian. In that treatise he describes the manner of building the walls and towers for fortifying towns, the construction of temples, basilicæ, theatres, and private dwellings; he describes the principal military engines which were then in use; he also gives some account of machines for drawing and raising weights, of engines for raising water, and of mills turned by water for grinding corn. The work may therefore be considered as comprehending every important object connected with engineering at the time in which he lived. Now he states, in the proem to the first book, that he had been appointed by the emperor to have the charge of the warlike engines; and in another place, that he had designed and executed a basilica at Fanum; it is evident therefore that he united in his person the character of engineer and architect; and among the antients the profession of the former seems to have been always included in that of the latter. The 'machinarius' was probably the artificer who executed the civil and military machines, or the petty officer who, at the siege of a fortress, superintended the service of the engines.

Of the national works executed by the antients, and which are to be considered as properly falling within the province of the engineer, one of the first of which we have any intimation is the canal uniting the Red Sea and the Nile, which, according to Pliny, was begun by Sesostris, or, according to Herodotus, by Necos, the son of Psammetichus, and finished by Darius the First. The canal of Xerxes across the isthmus of the peninsula of Athos is another example of works of this kind. The introduction of arches in works of magnitude may be said to have constituted an epoch in the profession of the architectural engineer, as the idea of giving to blocks of stone a form which would enable them to sustain themselves in balanced rest by their mutual pressures, the discovery of the means of arranging them on a curve surface, and the determination of the magnitudes of the piers or abutments so that the lateral pressure of the vault might be adequately resisted, imply a higher degree of intellectual power than is exhibited in covering a space with a horizontal roof. The Cloaca Maxima [CLOACÆ] at Rome is probably the most antient example in Europe of this scientific construction; the dome of the Pantheon, and the various arches of the Thermæ and of other public buildings both at Rome and in the provinces, such as aquoducts and bridges, attest the grandeur of the design, combined with purposes of public utility, which characterized the architects who lived under the early emperors.

Vitruvius enumerates several Greeks who had written on machinery; but from his time to that in which Italy rose again to importance after the fall of the empire, little is known concerning the state of engineering in Europe. Subsequently to the last-mentioned epoch, Cardan, Guido Ubaldi, Valerius, and Galileo, in that country, and Stevinus, Huygens, and Descartes, in the north, are distinguished as cultivators of theoretical mechanics. Galileo particularly deserves to be named for his discovery of the laws of motion, his application of the pendulum to the measurement of time, and for his theory of projectiles. From his day to the present almost every distinguished mathematician, both on the continent and in this country, has contributed to the advancement of the mechanical sciences.

Previously to the commencement of the eighteenth century the most celebrated practical engineers were Brunelleschi, who built the dome of St. Mary at Florence; Peruzzi, San Gallo, and Michel Angelo, who executed that of St. Peter at Rome; San Michæli, the supposed inventor of the bastion system of fortification; and to these may be added Sir Christopher Wren, the architect of St. Paul's Cathedral in London.

In Holland and in the north of Italy the necessity of securing the low grounds against the inundations of the seas and rivers, and of obtaining an inland navigation for the purposes of commerce, gave rise to the cultivation of that branch of engineering which relates to hydraulic constructions; and the invention of the lock for canals is believed to have taken place in the former country about the middle of the thirteenth century. Indeed we find the profession practised in those countries on an extensive scale when there was not a man in England capable of undertaking the formation of a canal to drain the ground. Before the reign of Charles I. it appears to have been the practice to send to Holland for an engineer when any work of that nature was to be undertaken.

But the extension of the manufactures of this country soon after that period, and the consequent augmentation both of its internal and foreign commerce, called forth all the energies of the people, who, at length, in the works performed for facilitating the means of communicating between one place and another, and in the practice of the useful arts, rose to an eminence which other nations have not been able to attain. Among the former may be mentioned the numerous canals and railways which intersect the country; the majestic bridges executed in stone over the Thames; in cast-iron over the Avon, the Thames, &c.; and those on the suspension principle at the Menai and at Hammersmith. And among the men to whose useful talents in this branch of engineering the nation is indebted may be named Brindley, Smeaton, Jessop, Telford, the Rennies, and Brunel.

The invention of the steam-engine, or rather its improvement in 1769, opened a new field for the talent of the engineer in the numerous uses to which the machine became applicable. Before the time of Watt it had been employed only as a pump to raise water; but this mechanician, by converting the reciprocating motion of the beam into a rotatory motion, rendered it capable, not only of replacing, with greatly augmented energy, the power of wind, water, or horses, in giving motion to machinery for the purposes required in the arts, but also of serving as a first mover for propelling vessels through water, or for drawing carriages over land.

The course of education by which a student may qualify himself to become an engineer, whether civil or military, must necessarily comprehend a greater extent both of the pure and physical sciences than would be required for a person who is to follow any other profession. It will be, perhaps for ever, a matter of opinion how much mathematics should enter into a school course of engineering; and there are, no doubt, some persons who contend that no more is required than would serve to compute the cost of materials and the wages of labour; this, and the observation of existing examples, being supposed sufficient to enable a man to enter upon the practice of the profession. It is not however with such knowledge only that an engineer is qualified to design an important work which it may be required to conduct under new and difficult circumstances. Mere science certainly cannot make a man an engineer; for analytical formulæ relating to mechanical equilibrium or operations, being necessarily founded on the erroneous assumption that materials are perfectly hard, perfectly smooth, &c., and that the actions of bodies on one another are subject to invariable laws, have no practical utility unless corrected by observation and experiment. On the other hand, mere diligence in observing the results of practical operations will never raise a man to proficiency in art unless he is gifted with very extraordinary powers. A judicious combination of theory and practice is indispensable, and such a combination can only be made by a man in whom great natural talent is blended with all the aids that the sciences can afford.

Of the military engineer it may be said that a greater knowledge of the more minute details of construction is required than would suffice in the civil practitioner; because it may happen that the former is called upon to exercise his profession in some colony where workmen adequately skilled in the mechanical operations may be wanting. The accomplishment of the work may then become impossible, should the officer not be qualified to give the necessary instructions to those who are placed under his direction.

It is to be regretted that in the schools of this country there prevails an almost exclusive attention to the studies which may be comprehended under the general term 'literature;' and that, notwithstanding the vast importance of the sciences and arts in promoting the prosperity of the nation, there is not, if we except the military schools at Woolwich, Sandhurst, and Addiscombe, any place of education where young men are instructed in the *science of the engineer*. In a discourse delivered by M. Bureaux de Pusy, which was printed in 1790, it is stated that the pupils, on entering the Ecole de Génie at Mézières, were required to undergo an examination in arithmetic, algebra, geometry, the infinitesimal calculus, mechanics, hydraulics, and drawing. And these branches of science are said to be but the key to those taught at the institution itself, which are stereotomy (the art of representing the sections of solids), the principles of carpentry, civil and military architecture, perspective, the theory of shadows, and surveying; and with these are said to have been combined the science of military tactics and a course of chemistry. If the above branches of study were considered requisite for the Ecole de Génie, much more, omitting only that which relates to tactics, would they be proper for the civil engineer, who is called upon to design and carry into execution works of far greater complexity than those which appertain to the science of war.

It is easy to conceive that the knowledge which a boy, at the age of entering a public school, can have of the infinitesimal calculus and mechanics must be very superficial; and it would perhaps suffice if he then possessed a competent knowledge of plane geometry, trigonometry, mensuration, and common algebra. But it is correct to say that, before a youth is placed in the office of a practical engineer, his education should have comprehended most of the subjects above enumerated, particularly the principal propositions in mechanics, hydrostatics, and pneumatics; since it is scarcely probable that the means of instruction will afterwards be within his reach, even were he led by inclination to seek them.

The institution of civil engineers which was formed at London in 1828 cannot fail, by the publication of its transactions, to be the means of greatly assisting such persons as may hereafter enter the profession; and, through them, of rendering service to society itself. Even established practitioners may occasionally derive benefit from the theoretical investigations and the practical details of construction which are the subjects of the papers read at the meetings of the members.

The professions of an architect and of an engineer, as they are practised at present, may be said to coincide with one another to a certain extent. The members of both must be able to form a judgment of the quality of the ground in which the foundations of their buildings are to be laid; they must be acquainted with the capacities of different materials, wood, stone, and iron, for resisting the strains to which such materials may be exposed, so that sufficient strength may be obtained with a due attention to economy; and they must equally attend to the principles of equilibrium in their roofs, arches, and domes, arranging the beams, bars, or voussoirs so that they may remain at rest with as little strain as possible upon the connecting ties by which the joints are strengthened. But here the two professions diverge from one another: while the engineer has to determine, by a process of levelling, the profile of the ground on perhaps an extensive line of country, for a road or a canal; or has to determine the forms and dimensions of his retaining walls so that they may resist the pressure of earth or water against them; or, finally, to devise methods of rendering the action of his moving powers uniform, and of transmitting them through a train of machinery to the place where the effect is to be produced,—the architect is engaged in designing the external forms and internal arrangements of edifices, in which, whether intended as palaces or private dwellings, or as buildings consecrated to the service of religion or of the state, architectonic beauty must be combined with fitness for the purposes for which they are intended.

ENGLAND, originally *Engla-land*, *Engle-land*, and *Engle-lond*, means the land of the Angles, Aengles, or Engles. The vowel in the first syllable appears to have preserved its proper sound most completely in the French *Angleterre*. In the languages of the Teutonic family it has generally slid into the thinner sound of *E* or *Ae*, which is nearly, but not quite, the same with our English *a* in such a word as *made*. Thus the Dutch say *Engeland*, and the Germans *England*, spelling the word exactly as we do. It is to be observed, however, that in this country we have receded still farther from the original form of the word in our pronunciation than in our spelling; for both in *England* and *English*, the first syllable is pronounced as if the vowel were not *e*, but *i*. This last fact connects itself, in some way or other, with the manner in which the nations of the south of Europe both pronounce and write the word; the Italians saying *Inghilterra*, the Spaniards *Ingleterra*, and the Portuguese *Inglaterra*. But these forms may have been adopted either from an imitation of the English pronunciation, or from some tendency peculiar to the languages of the Latin family (in which case it is possible that our present pronunciation of the word may be an innovation derived, probably not longer ago than the latter part of the sixteenth century, from Spain or Italy); or the Italian, Spanish, and Portuguese forms on the one hand, and the English mode of pronouncing the word on the other, may be so many independent exemplifications of a tendency to farther and farther attenuation natural to the vowel sound in this position, the reduction from *e* to *i* being only a continuation of the process by which the broad *a* had been previously converted into *e* or *ae*.

There can be no doubt, at all events, that the meaning of the word is, as we have just explained it, the land or country of the Angles. It is usual to speak of the people who occupied the south of Britain before the Norman Conquest by the names of the Saxons or the Anglo-Saxons; but each of these appellations is apt to lead to some misapprehension. To begin with the latter: by the Anglo-Saxon people and language seem commonly to be understood the nation and language of the English Saxons, as distinguished from the Saxons of Germany; indeed the Anglo-Saxons are often called the English Saxons (for instance, in Gibson's translation of Camden's Britannia, pp. 154-168). In this sense, however, we believe, the word is altogether a modern formation. Our ancestors before the Norman Conquest did not call themselves Anglo-Saxons, as meaning the English Saxons or the Saxons of England. Asser indeed designates Alfred as Angul-Saxonum Rex; but the meaning intended to be conveyed by this awkward compound term appears to have been, not the English Saxons, but the Angles or English and the Saxons. When the Saxon part of the population alone was spoken of, they were never called the Anglo-Saxons or English Saxons, but simply the Saxons, or, as the case might be, the West or East or South Saxons. Then, secondly, with regard to the term Saxons: that name, we believe, was never used among our ancestors themselves, in the times before the Norman conquest, as applicable to the general population of South Britain: they confined it to that particular portion of the population which was of Saxon lineage, and which did not occupy half the country. It is true that foreigners did not always strictly observe this distinction, but often spoke of the whole people as Saxons, naturally misled both by the greater celebrity of that name for some ages before the settlement of the Saxons and the other kindred tribes in Britain, and by the circumstance that the first of those invaders that arrived in the country appear to have been Jutes and Saxons. We easily account in this way for the application of the term Saxons to the entire body of the new population by the Welsh writer Gildas, and for its having apparently been generally used in the same comprehensive sense both by the Welsh and the Scots of North Britain from the earliest times. The *Sassenagh* is still the name given to the English by the Scottish Highlanders and by the Welsh; and antiently the southern part of the present Scotland, which was chiefly occupied by a population of English descent, was known in the more northern parts by the name of Saxonia or Saxony. The prevalence, again, of the term Saxon in modern times, as applied to the entire population of England before the Norman Conquest, and to the language then spoken in the country, is to be attributed principally to the appropriation of the term English in another sense, namely, to the inhabitants and the language of the country since the Conquest, and also perhaps in part to the circumstance of the state which eventually obtained the general sovereignty in the times previous to the Conquest having been a Saxon state. But the name by which the entire population was commonly described in those times by natives of the country was certainly not the Saxons, but the Angles or the English; and that from the earliest date to which our evidence on the subject extends. It is commonly said that the use of the term English as the common national appellative is probably to be traced to the circumstance of Bede, himself an Angle, having entitled his history 'Historia Ecclesiastica Gentis Anglorum,' and having, in conformity with that title, applied the name Angli throughout the work as the general designation of his countrymen. But the use of the name in that comprehensive sense appears to be considerably older than the time of Bede, who died in A.D. 735. We find the Kentish king Ethelbert, considerably more than a century before this, subscribing himself to a charter 'Ego Ethelbertus, Rex Anglorum,' in virtue apparently of his dignity as Bretwalda or supreme monarch, which he held from about the year 589 till his death in 616. Taking this fact along with the other, which is unquestionable, that the kings of Wessex, after they acquired the sovereignty of the whole country, although their own state was Saxon, yet called themselves, not kings of the Saxons, but kings of the Angles and of England, we may safely conclude that the latter had all along been the names by which the whole people and country were commonly known, and that Bede in employing them as he did only followed antecedent usage. We believe the country to have been called England, and the people and their language English, from the time of the introduction of Christianity.

To the circumstances of that introduction we would trace this use of the names. The captives from Britain exposed for sale in the market-place of Rome, who first drew upon their country the attention of Gregory, afterwards pope, were Angles, as the well-known pun, 'They would be not Angles, but angels, if they were but Christians,' which the name of their nation and their fair appearance suggested to Gregory, may remind us. It was the Angles, therefore, that Gregory formed the desire of converting; and it was to the inhabitants of Britain considered as Angles that Augustine and his companions were some years afterwards sent as missionaries. These circumstances were enough to fix the name as the proper Christian appellation of the nation. It was that by which the people had been known to the missionaries before their arrival among them, and which the anecdote of Gregory would doubtless endear to these holy men and to their disciples. Hence its assumption by their royal convert Ethelbert, taking, in his quality of supreme monarch, the title of Rex Anglorum, as already noticed. It was of course also the most appropriate appellation which Bede, writing the history of the church thus planted, could employ. And although we cannot suppose that he was the first who so applied it, the constant use of it in his great work may be reasonably supposed to have had much effect in establishing its acceptation in the sense in which it had been there employed. In this way the terms England and English very soon came into universal use as the proper names of the country, the people, and the language, just as they are at this day.

According to the statement of Bede, which, repeated in the Saxon Chronicle, is the only distinct account we possess of the invaders from the Continent who effected the conquest of South Britain in the fifth and sixth centuries, they consisted principally of three nations or tribes, the Jutes, the Saxons, and the Angles. (*Hist. Eccles.* i. 15.) In another place, however (v. 10), he mentions Frisians as being mixed with these; and there are other antient testimonies to the same effect, especially a remarkable passage in Procopius (*Bell. Goth.* iv. 20), where, in his account of the island under the name of Brittia, he describes it as inhabited by three nations, the Angles, the Frisones, and those of the same name with the island, the Britons (Ἄγγιλοί τε και Φρίσσονες καὶ οἱ τῇ νήσῳ ὁμώνυμοι Βρίττονες), each of which nations had a king. Sir Francis Palgrave (*Rise and Progress of the Eng. Com.*, pp. 41, 42) considers the name Frisians in this passage to include both the Jutes and the Angles, as well as the Frisians proper, all these apparently being alike Belgic tribes. 'By the Frisians,' he adds, 'Hengist is deemed to be a Frisian king; and the legend of Rowena, or, as they term her, Ronix, is incorporated in their history. A better proof of affinity is to be found in the resemblance of the Frisic and Anglo-Saxon languages, which in many instances amounts to an absolute identity. But the most conclusive argument of the unity of the nations is deduced from the judgments dictated by Wulemar, and incorporated in their respective laws of the Frisians and Angles, showing thereby that they obeyed the dictates of a common legislator.' It is to be recollected, that antiently the Frisians appear to have been spread, in detached settlements, along the whole line of the coast from the Schelde to the North Sea. Down to the eighth century, what was called the Greater Friesland (or Frisia Major), then forming part of the empire of Charlemagne, extended all the way from the Schelde to the Weser. But the Frisians who passed over into Britain with the Saxons, Angles, and Jutes, were most probably the Strandfrisii, or inhabitants of the small district called the Lesser Friesland (Frisia Minor), lying opposite to the isle of Northstrand, on the western coast of Schleswig. (See further upon this subject Usher, *Antiq. Eccles. Brit.*, p. 397; and Turner, *Hist. Ang. Sax.* i. 306.)

We may here observe that, although it has been commonly assumed that our present Teutonic speech was brought over by these Saxons, Angles, and other kindred tribes in the fifth and sixth centuries, there are not wanting some writers who contend that it has been known in the island from a much earlier date. Sir John Clerk of Penicuick was, as far as we are aware, the first who advanced the opinion that the Belgic tribes who, according to Cæsar, occupied the whole or the greater part of the southern coast before the arrival of the Romans, spoke, not a Celtic, but a Teutonic dialect; in other words, a language radically the same with that brought over many ages afterwards by the Angles and Saxons. His 'Dissertation on the Antient Language of Britain,' although written forty years before, was not published till 1782, when it appeared in the first volume of the 'Bibliotheca Topographica Britannica,' 4to., London. Pinkerton, in his 'Inquiry into the History of Scotland' (first published in 1789), claims the credit of having made the same discovery two years before he saw Sir J. Clerk's Dissertation. 'It is one,' he observes, 'which in the history of no other country would have been reserved for this century, and which I will venture to say is more important to English history than any yet made, or that can be made. For it not only adds seven centuries to the history of Englishmen, as such, but will, if duly attended to, put the whole history of law, manners, antiquities, &c., in England, upon quite a new and far more interesting footing.' Sir Francis Palgrave, in his work quoted above also inclines to the presumption that 'a dialect closely allied to the Anglo-Saxon was spoken in Britain long before the arrival of the last invaders' (p. 27). This supposition certainly would enable us to explain some difficulties not otherwise to be easily got over, especially the remarkable fact, that, while the old inhabitants cannot be believed to have been wholly swept from the soil by their invaders and conquerors, but were most probably retained in great numbers as slaves, both domestic and predial, no hint or indication is to be found of any distinction of language having existed between the two races that were thus associated.

The first of the Germanic invaders that arrived after the departure of the Romans are described as having been a body of Jutes, under two leaders named Hengist and Horsa. They arrived A.D. 449 at Ebbsfleet, now an inland spot, but then on the coast of the Isle of Thanet, and near the mouth of the Wansum, now a mere rivulet, which divides Thanet from the rest of Kent. The name of the Jutes is variously written Jutae, Juitae, Jotuni, Geatani, Giotae, Gutae, Jetae, &c. It is probably the same name with Getae, and that again is probably identical with Gothi, Scythae, and Scoti. (See upon this subject Pinkerton's *Dissertation on the Scythians or Goths*, chap. i.) The Jutes who came to Britain with Hengist and Horsa, however, appear to have come immediately from what was formerly called South Jutland, and is now the duchy of Schleswig. They were probably, therefore, in part at least, from the district called the Lesser Friesland, which, as already mentioned, was situated on the coast of South Jutland. The Jutes, according to Bede, were the ancestors of the people of Kent, and also of the inhabitants of the Isle of Wight, and of the part of the coast of Hampshire opposite to it: that is to say, the Jutes settled in those parts, mixing most probably with the former inhabitants.

The Jutes under Hengist and Horsa were followed in A.D. 477 by a body of Saxons under Ella, who made their descent on the coast of Sussex. The next leader that arrived was Cerdic, with another colony of Saxons, in A.D. 495. He probably landed somewhere on the south coast, perhaps at Southampton, although one account makes Yarmouth (in Norfolk) to have been the place. The general history of the Saxons, of which their connection with Britain forms only a very small portion, will be treated of in another article. At this period the name, in its most comprehensive acceptation, appears to have been used as that, not of one nation, but of a great confederacy of nations, the territories occupied by which extended from the Baltic far into the interior of Germany. We are inclined however to derive the Saxon invaders of Britain from the immediate vicinity of the Baltic, most probably from the country now forming the duchy of Holstein, with perhaps part of the north of Hanover, or the west of Mecklenburg. Thus situated, they would be the next neighbours of the Jutes and the Angles. And this appears to be the district which their English descendants recognized as the country of their ancestors, or the land, as they called it, of the Old Saxons, as we may learn from the account of Germany which Alfred has inserted in his translation of the Geography of Orosius. The 'Eald Seaxan' are here described as lying to the north of the Thyringas (or Thuringians); to the south-east of the Frisians (this must mean the Strandfrisians); to the east of the mouth of the Aelfe (the Elbe) and Frysland; and to the south-east of Angle and Sillende (Zealand), and part of Dena (Denmark). Bede expressly brings the English Saxons from 'the land now called the country of the Old Saxons.' They appear to have eventually occupied Sussex, Essex, Middlesex, the south part of Hertford, Surrey, Hampshire (with the exception of the coast opposite to the Isle of Wight), Berks, Wilts, Dorset, Somerset, Devon, and part of Cornwall.

It was not till the year 527 that the first Angles arrived. From that time they made a succession of descents under various petty chiefs, whose names have not been preserved, upon the coasts of Suffolk and Norfolk. In 547, however, a much more numerous body of them than had yet appeared landed under the conduct of Ida on the coast between the Tweed and the Forth, and eventually established themselves in the country to the north of the Humber. Tacitus, who in his 'Germany' has mentioned neither the Saxons nor the Jutes, merely notices the Angli along with several other tribes as lying beyond the Longobardi, and surrounded by the natural protection of their rivers and woods. As far however as anything can be made of his vague account, he appears to place them somewhere in the peninsula of Jutland. This is the situation which is assigned to them both by Bede and other antient English writers. 'From the Angles,' says Bede, 'that is to say, from the country called Anglia, and which from that time till now is said to have remained waste, between the provinces of the Jutes and the old Saxons, descended the East Angles, the Mercians, the race of the Northumbrians, and all the rest of the nations of England.' Alfred, in his 'Orosius,' also places the Angles in the Danish countries on the Baltic. And Etheiwerd, a writer of the eleventh century, describes Old Anglia as situated between the Saxons and the Jutes, and as having the city of Schleswig for its capital. This account is adopted by Camden: 'Seeing,' he observes, 'that between Juitland and Holsatia or Holstein (the antient seat of the Saxons) there is a small province in the kingdom of Denmark, and under the city of Flemsburg, called at this day Angel, which Lindebergius in his Epistles terms Little England, I am pretty well assured that I have found the antient seat of our forefathers, and that from this very place the Angles came into our island.' (*Brit. Introd.*) This district of Angel, or Angeln, is thus described by Dr. Edward Clarke in his 'Travels,' part iii. 4to., Lon. 1819:—'It is called Angeln,' he says, 'but this word is pronounced exactly as we pronounce England, or Engelonde. (This is not very intelligible). 'We were surprised at the number of English faces we met; and resemblance is not confined to features. Many articles of dress, and many customs, are common to the two countries. The method of cultivating and dividing the land is the same in both; the meadows bounded by quickset hedges, or by fences made of intertwisted boughs, reminded us of Kent, Surrey, and Sussex. The natural appearance of the country is also like the south of England, being diversified by numerous hills and valleys, adorned with flourishing woods and fertile fields.' Angeln, however, is not, as Dr. Clarke calls it, 'the part of the duchy of Sleswick which a traveller must pass in his route from Flensburgh to Apenrade.' It lies all to the south of Flensburg. [ANGELN.] The Angles obtained possession of the whole of what is now called England, with the exception of the parts already mentioned as occupied by the Jutes and Saxons; in other words, of all England to the north of the Bristol Avon and the Thames, except the present counties of Essex, Middlesex, and part of Hertford. They also extended their settlements over a great part of the south of Scotland.

The following were the kingdoms founded by the several invading bands, the dates being those assigned in the valuable summaries of Anglo-Saxon history, given by Sir F. Palgrave in his Appendix of *Proofs and Illustrations* to his *Rise and Progress of the English Commonwealth*, p. ccxxix—cccxl:—

1. Kent, consisting of the present county of that name, founded by Hengist and Horsa, whose followers were Jutes, A.D. 457. From Æsc or Eric, the son and successor of Hengist, the kings of Kent acquired the name of Æscingas. Kent subsisted as an independent state till its conquest by Cenwulf, king of Mercia, in 796. In 823 it was finally annexed to Wessex by Egbert; but for at least a century after that date it is still mentioned as a separate though subordinate kingdom.

2. Sussex, consisting of the present county of that name, founded by Ella, whose followers were Saxons, A.D. 491. In A.D. 686 it was conquered by Ceadwalla, king of Wessex, and appears to have remained ever after in subjection either to that state or to Mercia. In 828 it finally submitted to Egbert; and 'from this period,' says Sir F. Palgrave, 'Sussex and Surrey appear to have been considered as integral portions of the empire of Wessex, but as annexed to the kingdom of Kent and passing with it.'

3. Wessex, including (in its greatest extent) Surrey, Hants with the Isle of Wight, Berks, Wilts, Dorset, Somerset, Devon, and part of Cornwall, founded by Cerdic and his son Cynric, whose followers were Saxons, A.D. 519. The Jutes of the Isle of Wight were conquered by Cerdic and Cynric, A.D. 530; but in 661 the island was wrested from Wessex by Wulfere, king of Mercia; some time after which it appears to have asserted its independence, which it maintained under kings of its own till the beginning of the 10th century, when it submitted to Edward the Elder. In the reign of Egbert (A.D. 800—836) the kingdom of Wessex attained a supremacy over the other states, which it never lost afterwards. [EGBERT.]

4. Essex, including the present counties of Essex and Middlesex, and the southern part of Hertfordshire, supposed to have been founded by Æscwin, or Ercenwine, whose followers were Saxons, A.D. 527. 'It is doubtful,' says Sir F. Palgrave, 'whether this monarchy ever enjoyed independence.' It certainly became subject to Mercia in

the course of the seventh century, and in 823 it finally submitted to Egbert of Wessex.

5. Northumbria, consisting of the sometimes separate but commonly united states of Bernicia and Deira; the former (from the native name Bryneich) including the county of Northumberland, and the south-eastern counties of Scotland as far as the Forth, founded by Ida, whose followers were Angles, A.D. 547; the latter (from the native name Deifyr) including the counties of Cumberland, Durham, Westmoreland, York, and Lancaster, founded by Ella, whose followers were also Angles, A.D. 560. These two states appear to have coalesced before the beginning of the seventh century; and after the year 655 they were never separated, so long as they retained their independence. The limits of the kingdom of Northumbria to the north varied greatly from time to time according to the fortunes of the almost constant warfare which it carried on with the Scots, the Picts, and the kingdom of Strathclyde. From the middle of the eighth century the history of Northumbria consists of little else than a detail of civil dissensions, confusion, and bloodshed, arising from the claims of rival competitors for the throne. The Northumbrians made a formal submission to Egbert of Wessex in 829. In 867 the country was conquered by the Danes; and from this time it may be considered to have remained independent under princes of Danish race till 924, when both the Danes and the English inhabitants acknowledged the supremacy of Edward the Elder. Northumbria, however, continued to be governed by princes of its own, who, although nominally subject to the English monarch, took the title of kings, till 952. After this its rulers were only designated earls; the district forming sometimes one earldom, sometimes two, under the names of Bernicia and Deira, or Northumbria and York. It was not till some time after the Norman conquest that the territories which had formed this Saxon state came to be considered as strictly included within the realm of England.

6. East Anglia, including Norfolk, Suffolk, Cambridge, and part of Bedfordshire, founded by Uffa, whose followers were Angles, and from whom the kings of this state took the name of Uffingas, A.D. 571. The East Angles placed themselves under the sovereignty of Egbert of Wessex about the year 823, but they continued for some time after this under the immediate government of their own kings. The country was conquered by the Danes in 883; and it was not completely brought back under subjection to the English crown till after the accession of Athelstane in 925. From this time it appears to have been governed by aldermen or dukes.

7. Mercia, including the counties of Chester, Derby, Nottingham, Lincoln, Shropshire, Stafford, Leicester, Rutland, Northampton, Huntingdon, Hereford, Worcester, Warwick, Gloucester, Oxford, Buckingham, and parts of Hertford and Bedford, said to have been founded by Crida, whose followers were Angles, A.D. 585. The name Mercia has been derived, by Camden and others, from the word mearc, a limit; 'for the other kingdoms,' it is said, 'bordered upon it.' Lingard thinks that the people were called Mercians, 'perhaps from the marshy district in which they first settled.' The most probable explanation, however, appears to be that given by Macpherson, in his 'Annals of Commerce,' who observes that the Saxon name *Myrcnaric* properly signifies the woodland kingdom, 'which,' he adds, 'agrees very closely with *Coitani*, the Latinized name of the old British inhabitants, signifying woodland-men, or foresters.' About the middle of the seventh century Mercia was conquered by Oswio, king of Northumbria; but after a few years it recovered its independence; and before the end of the next century it had reduced to subjection both the neighbouring states of East Anglia and Kent. It was eventually subjugated however about the year 825, by Egbert of Wessex, and although for some time considered as a separate kingdom, it continued ever after dependent upon that state, with the exception of a short period in the latter part of that century, during which it was overrun and taken possession of by the Danes.

This assemblage of states has been commonly called the Heptarchy, for which Mr. Turner has proposed to substitute the Octarchy, on the ground that Deira and Bernicia ought to be considered as two distinct kingdoms. But in truth it may be doubted if there ever was a time when so many as seven of the states co-existed separately and independently. Various small districts also appear to have for longer or shorter periods preserved an all but nominal independence in the midst of the larger states, to some one or other of which they were severally considered as annexed. Such were the Isle of Wight; the Suthrige, or Southern Kingdom, now Surrey; the district of Hwiccas, or Magesettam, which was conterminous with the antient bishopric of Worcester; and others, of which the annals have been for the first time collected by Sir Francis Palgrave. But above all it would be difficult to show that either term is perfectly admissible, if it be intended to imply (as in strict propriety both heptarchy and octarchy would seem to do) that the several states were all connected together into any sort of union or confederacy; that they formed, in fact, any political system entitled to be designated by one word at all. We know that they were constantly at war with one another, and of the existence of any general controlling authority, except such as one king was occasionally enabled to maintain over the rest by his sword, their history affords no trace. To certain of the kings however by whom this temporary supremacy appears to have been asserted in the most marked manner, Bede, and after him, the Saxon Chronicle, have attributed the title of Bretwalda, that is, as it has been interpreted, Wielder or Emperor of Britain; and it is probable that a species of superior honour and dignity, such as this title would imply, may have been claimed by the princes in question, and accorded to them by those of their neighbours whom they had brought under subjection, or who, although unsubdued, preferred not to provoke their enmity. The following is the succession of the Bretwaldas as given by Bede:—1. Ella, or Aelli, who was king of Sussex from 491 to 518; 2. Coelin, or Ceawlin, who reigned in Wessex from 560 to 591, and is supposed to have held the place of Bretwalda from 568 to 589; 3. Ethilbert, or Aedilberct, who was king of Kent before 568, and is supposed to have been acknowledged as Bretwalda from 589 till his death in 616; 4. Redwald, king of East Anglia, from 616 to 624; 5. Edwin, of Northumbria, from 624 to 633; 6. Oswald, of Northumbria, from 635 to 642; 7. Oswio, of Northumbria, from 642 to 670. Egbert of Wessex is reckoned the eighth Bretwalda, and is considered to have attained the dignity in the year 827. This account, it will be observed, makes the country to have been without any general sovereign for about one half of the whole period that elapsed between the death of Ella and the accession of Egbert. The enumeration also omits some kings, such as Ina of Wessex, and Offa of Mercia, who were certainly possessed of as much power as any of those, excepting Egbert, upon whom the title of Bretwalda is bestowed.

Upon the whole, the title of Bretwalda cannot well be regarded as any thing more than an ostentatious and empty assumption of some of the Saxon kings, or an epithet of distinction bestowed upon them by the flattery of the chroniclers. It certainly carried with it no real or legal authority. In the same manner we may dismiss the vaunting claims put forward by or for the Saxon Bretwaldas to the sovereignty of the Scots, the Picts, the Irish, and all the nations of other lineage inhabiting the British islands, founded as they are on little else than the interpretation put upon this title.

Lists of the kings of the several states of the heptarchy do not exist in a complete form. The most perfect that have been compiled are those published by Sir Francis Palgrave, which are stated to have been examined and verified by Mr. Allen. The more remarkable names are noticed in this Cyclopædia in separate articles.

Egbert of Wessex, although not strictly entitled to be called the first king of all England, certainly laid the foundation of what afterwards became the English monarchy. The royal house of Wessex never lost the ascendancy which he acquired for it so long as the Anglo-Saxons remained masters of England. It will be convenient therefore to begin from him the chronological table of the kings of the country, which is all that we shall now add, an account of the events of each reign from this period being given in separate articles.

Kings of Wessex, with which Kent, Essex, and Sussex were sometimes incorporated, sometimes connected as vassal states, and to which also East Anglia, Mercia, and Northumbria acknowledged a more qualified subordination:—

A.D. 800. Egbert, acknowledged as Bretwalda from A.D. 827.

836. Ethelwulf;—with Athelstane till 852, and then Ethelbert, in Kent, Essex, and Sussex.

A.D. 855. Ethelbald;—with Ethelwulf (the preceding king) as supreme till 856, and Ethelbert as subordinate, in Kent, Essex, and Sussex.
860. Ethelbert.
866. Ethered, or Ethelred I.
871. Alfred the Great.
901. Edward the Elder.

Kings of all England, of the House of Wessex :—

925. Athelstane.
941. Edmund I.
946. Edred.
955. Edwy.
958. Edgar.
975. Edward the Martyr.
978. Ethelred the Unready
1016. Edmund Ironside.

Danish Kings of England :—

1017. Canute the Great.
1035. Hardacnute, or Hardicanute, with Harold Harefoot in Mercia and Northumbria
1037. Harold Harefoot.
1040. Hardacnute restored.

House of Wessex restored :—

1042. Edward the Confessor.

Line of the Earls of Kent, &c. :—

1066. Harold II.

Norman Line :—

1066. William the Conqueror.
1037. William Rufus.
1100. Henry I.
1135. Stephen.

Line of Plantagenet.—

1154. Henry II.
1189. Richard I.
1199. John.
1216. Henry III.
1272. Edward I.
1307. Edward II.
1327. Edward III.
1377. Richard II

House of Lancaster :—

1399. Henry IV.
1413. Henry V.
1422. Henry VI.

House of York :—

1461. Edward IV.
1483. Edward V.
1483. Richard III.

House of Tudor :—

1485. Henry VII.
1509. Henry VIII.
1547. Edward VI.
1553. Jane Grey.
1553. Mary.
1558. Elizabeth.

House of Stewart :—

1603. James I.
1625. Charles I.

Commonwealth, from the execution of Charles I. in 1649 :—

1653. Oliver Cromwell, Protector.
1660. Richard Cromwell, do.

House of Stewart restored :—

1660. Charles II.
1685. James II.

House of Orange :—

1689. William III., with Mary II. till 1695.

House of Stewart restored :—

1702. Anne.

House of Hanover :—

1714. George I.
1727. George II.
1760. George III.
1820. George IV.
1830. William IV.
1837. Victoria.

ENGLAND. The general description of this part of the island is under the head of GREAT BRITAIN; and that of Roman Britain under the head of BRITANNIA.

ENGLAND, NEW, is a name which, in the seventeenth and eighteenth centuries, was applied to the English settlements on the eastern coast of North America, north of 41° N. lat. But as, in the progress of colonization, the British population increased, the country was divided into several provinces, which, at the time when these countries acquired their independence, were formed into so many states. The provinces formerly comprehended under the name of New England were the present states of New Hampshire, Massachussets, Rhode Island, and Connecticut; but the states of Maine and Vermont, which, before the revolution, did not form provinces, were also considered as portions of New England, though some later writers think that the state of Vermont never belonged to it. At present the term New England is rarely used.

ENGLISH ARCHITECTURE. [GOTHIC ARCHITECTURE.]

ENGLISH CHANNEL, called by the French La Manche, is that narrow sea which separates the southern shores of England from the northern shores of France. On the west it opens into the Atlantic Ocean by a wide mouth, between the Land's End and the French island of Ushant (Ouissant), where it is about 100 English miles across. On the east it is united to the North Sea by the Straits of Dover (Pas de Calais of the French.) This strait, which must be considered as a part of the channel, is formed on the English side by the shore between the South Foreland and Folkstone, and on the French side by that between the harbour of Calais and Cape Grisnez, and at its narrowest point between Folkstone and Cape Grisnez is only about 20 English miles across, and at other points very little more. West of the strait of Dover, the channel rapidly increases in width; between Brighton and Havre is more than 90 English miles across. Farther west however it is narrowed by the peninsula of Cotentin, which projects from the French coast into the channel, and terminates in Cape de la Hogue, its most north-western point. Between St. Catherine's Point on the Isle of Wight and Cape Barfleur, the eastern termination of the peninsula of Cotentin, the shores of both countries are hardly 70 miles from one another. West of the peninsula is the widest part of the channel, which between St. Alban's Head in Dorsetshire and the harbour of St. Malo is nearly 140 English miles across. The remainder of the channel to its junction with the Atlantic is between 100 and 110 miles wide.

Though there is no perceptible current in any part of the channel, it can hardly be questioned that a current generally, if not constantly, is running up it from the west. This is evident from the eastern tides being stronger than the western or ebb tides, and their running longer in stormy weather from the west. It is also observed, that at the same time the surface of the channel is raised two feet or more above that of the North Sea, and consequently discharges a great quantity of water into that sea. The ports of the channel are some feet deeper in strong westerly winds than at ordinary times. It is worthy of remark, that the French ports along the channel are shallow, and that none of them are deep enough to admit men-of-war, while England has some of its finest harbours on the coast-line of the channel. As this circumstance secures to England a great advantage over France in time of war, the French government at different times have been at great expense in attempting to deepen the harbour of Cherbourg, but hitherto they have not succeeded, the works being in a short period again filled up with sand. It is not improbable that this is owing to the current, as the coast of France does not lie parallel to it, like the shores of England, but meets it in an oblique line. The channel is well stocked with fish, which gives constant occupation to a considerable number of fishermen on the coasts of England and France; the most important branch is the fishery of pilchards along the coast of Cornwall and Devonshire.

ENGLISH DRAMA. Under the head DRAMA the reader will find the history of the Greek and Roman, or what is commonly called the Antient Drama. Under the present title we have placed the History of the Modern Drama in Europe, distributed under the following heads:

1. Italian. 2. Spanish. 3. French. 4. German. 5. English.

ITALIAN DRAMA.

After the long sleep of the true dramatic and theatrical spirit in the middle ages, which began to dawn again in mysteries and moralities independent of classical models, the first endeavour to imitate the antients in their theatre, as in other departments of art and poetry, was made by the Italians. Nevertheless, apart from the religious plays, we find in the earliest dramatic attempts of modern Italy upon secular subjects a thorough independence of the classical rules. Among these first essays we find the 'Philodoxeos, o l'Amico della Gloria' of Leon Battista Alberti; and others might be cited which, written first in Latin and afterwards in Italian, combined in like manner all the elements of tragedy, comedy, and pastoral. For although, for instance, 'L'Orfeo' of Politian, performed at Mantua, and 'Il Cefalo, o L'Aurora' of Niccolo da Correggio at Ferrara, were given under the name of pastorals, while, on the other hand, a certain Antonio da Pistoja gave that of tragedies to two dramas of his entitled 'Il Filostrato e Panfilo' and 'Il Demetrio,' yet these designations were determined merely by the predominance of particular elements in the respective pieces, and not at all by adherence to or regard for the strictly classical system of keeping those elements as much as possible apart. In this respect, whatever their rudeness, these pieces were the native growth of their age and country, appearing among the numberless proofs that the marked separation between tragedy and comedy which existed in the antient theatre had no foundation in the essence of human nature and human life, but resulted from the peculiar social and religious circumstances of the people amongst whom it arose, together with the distinction and opposition in spirit and qualifications which existed among their most powerful dramatic writers.

The first specimen of the Grecian or Greco-Roman comedy that was presented to the Italians in their own language was a translation, by Collenuccio, of the 'Amphitryo' of Plautus; and soon after, Bojardo brought upon the stage 'Il Timone Misantropo.' This was about the commencement of the sixteenth century; and in 1529 was performed at Bologna, in the presence of the Emperor Charles V. and Pope Pius VII., 'The Three Tyrants' (I Tre Tiranni) of Agostino Ricchi, a piece which, though in itself original and ingenious, is now chiefly worthy of notice as marking the commencement of the long war between the *classic* and the *romantic* species. This author not only disregards the Aristotelic *unities* in the construction of his piece, but states his reasons for doing so, urging that, as the laws, customs, and manners of his own time were so different from those of antiquity, it was necessary for the moderns to pursue a different plan in the dramatic art; and to give the announcement of this principle the greater authority, he makes Mercury himself deliver it in the prologue. Sound and reasonable, however, as this doctrine is, it could not at first prevail against the countenance which the opposite system derived from the ablest writers of the period, inveterately prepossessed as they were by their sedulous study of the antique *forms* as well as spirit. Already the first example of a *regular* modern tragedy had been given in the 'Sophonisba' of Trissino, a piece not otherwise remarkable; and now Ariosto, Bibbiena, and Macchiavelli appeared as the first distinguished cultivators of the classic comedy. Of these, Ariosto was the closest imitator of the antients; while yet very young he wrote in prose, as a kind of exercise, 'La Cassaria' and 'I Suppositi;' and, pleased with these first essays, he next wrote 'La Lena,' 'Il Negromante,' and 'La Scolastica,' in 'versi sdruccioli,' a kind of verse in which he satisfied himself so well that he re-wrote in it his two former pieces. These productions are full of that spirit at once keen and polished for which their author was so distinguished; and though under the necessity of respecting the prejudices of the petty court of Ferrara, to which he was attached, yet he spares neither the lawyers and magistrates of the country, nor those other characters, much more powerful in those days, the astrologers, the courtiers, and the ecclesiastics; he was the first who ventured to exhibit on the stage a Dominican friar in the character of an inquisitor, which he did in 'La Scolastica' abovementioned. Bernardo Divizio da Bibbiena, confidential secretary to Pope Leo X., and afterwards cardinal, showed a more decided originality in 'La Calandria,' though it was partly modelled after the 'Menæchmi' of Plautus. This piece, indeed, may be considered as the most faithful mirror of the court of Rome at that remarkable period: amidst the extreme liberty of manners which prevailed in that court, for whose entertainment 'La Calandria' seems chiefly to have been written, we find frequent indications of a certain philosophic spirit which it would be vain to seek there in later times. Bibbiena seems to have aimed at nothing beyond amusement; but Macchiavelli, whose historical and political writings exhibit so forcibly the characteristic Florentine acuteness, betrays, in his 'Mandragola,' a deeper intention. In the person of Fra Timoteo, in this piece, who most conscientiously panders to the vicious appetites of an individual to promote the interests of his convent, the author has given a most humorous and piquant exhibition of the *fratismo*, or monkish domination, which degraded the society of his time: it was nevertheless acted with applause before the indulgent eyes of Leo X. and his cardinals.

The comedies of these three distinguished writers all appearing near the commencement of the sixteenth century, while no other nation had anything of equal merit to oppose to them, made such an impression that all the best writers zealously strove to follow their dramatic system. Although, in the political [illegible] of Italy the influence of Spain was becoming predominant, the Spanish plays, composed on the opposite system, had not yet exhibited that strength and fire of genius which afterwards gave the Spanish theatre so powerful an influence upon the dramatic literature of Europe; so that the Italians still adhered closely to the antique models. In this kind of secondhand imitation of the antients, the Florentines most distinguished themselves by a certain subtle grace of dialogue derived from the richness of their idiom and their proverbial expressions. Among the comic writers of Florence, Aretino is certainly not to be cited for elegance and correctness, but he surpassed all the others in licentiousness and causticity. These qualities he displays yet more strikingly in his comedies than in his prose writings; and in that respect approaches perhaps, of all the moderns, the nearest to Aristophanes, attacking all ranks and all institutions. The school of Aretino had many disciples; countenanced by the example of the court of Leo, it established itself more especially in Venice, where liberty was rapidly being corrupted into licentiousness. Lodovico Dolce, indeed, the most distinguished follower of Aretino, strove to justify this unbounded license on the ground, certainly not altogether fallacious, that there was no other possible way of delineating the manners of the time. Some, however, there were, who, scandalized at the excessive liberty of the comic poets, strove to reclaim them by example to a more moderate and decent course; but these efforts, wanting comic power, only served to raise a belief that the true comic spirit was inconsistent with any moral restraint, and so confirmed the evil instead of removing it.

Among the successful comic poets of this period, the most distinguished was Giambattista de la Porta, who flourished at the close of the sixteenth century and the beginning of the seventeenth. He was a Neapolitan gentleman with a truly encyclopædic genius, who from the deepest scientific studies could pass to the lightest amusements of literature. After forming among his countrymen the first academy of experimental philosophy, he pleased himself with instructing a company of amateur performers in the comic art, and producing a number of comedies for exhibition at his own house. Though he drew both the subjects and the form from the same source as his predecessors, yet he displayed so much happy invention in the contrivance and conduct of his pieces as to give them an air of considerable originality. Though most of his comedies were of the familiar species, and some of them even bordered on farce, yet a few rose to the noble and pathetic tone: of the latter kind are 'La Furiosa,' 'La Cintia,' 'Le Due Fratelli Rivali,' 'La Sorella,' and 'Il Moro.'

But the Italian public were satiated by such an accumulation of these regular productions. The Spanish theatre was now approaching the meridian of its glory; and the political influence of Spain on the Italian territory, being now at its height, greatly favoured the introduction of the Spanish taste in dramatic composition. These circumstances gave birth to such pieces as 'La Donna Costante,' and 'L'Amante Furioso' of Raffaele Borghini, 'L'Erofilomachia,' 'La Prigione d'Amore,' and 'I Morti Vivi' of Sforza d'Oddi, the very titles of which indicate the school to which they belong; and in which the imaginations of the zealous followers of the classic school were horrified by such incidents as that of a young lady suffering herself to be buried alive as her only means of avoiding a hateful marriage, and that of an unfortunate lover letting himself be carried like a thief to the gallows, having no other way to preserve his mistress's honour. It does, indeed, appear that the first endeavours at this period to introduce the Spanish taste went directly over from the one extreme to the other, proceeding, not so much according to higher and freer views of dramatic art itself than had hitherto prevailed on the Italian stage, as on the erroneous principle which has been too often acted on in similar cases, that what was farthest from the old system in every respect must be the best. It was probably the first extravagances of this dramatic innovation that induced Tasso, in his latter days, to compose, as a burlesque of the new romantic taste, a play entitled 'Love Intrigues' (Gl' Intrichi d'Amore), which was acted in 1598 and printed in 1604. The matter of this piece well corresponds with its title; for so prodigious a number of wonderful intrigues are accumulated in it that it is not so much a comedy as a whole bundle of comedies all rolled up into five acts. Some years after, a yet more open attack was made upon the romanticists by Scipione Errico of Messina;

in a comedy which he entitled 'The Revolt of Parnassus,' (Le Rivolte di Parnaso,) wherein, with little comic force, he not only introduces Trissino, Ariosto, and Tasso as rival suitors of Marini to the muse Calliope, but also, to little purpose, arrays Trajano Boccalini, Cesare Caporali, Petrarch, Boccacio, Dante, and Homer himself, in his classic phalanx.

We find a curious evidence of the transitional state of the public taste at this time in the productions of a poet of high name who thought fit to try his powers in each of the rival species. This was Michel Angelo Buonarroti the younger, nephew of the great Michel Angelo, who composed two comedies of totally different characters, entitled 'La Tancia' and 'La Fiera.' In the former he adhered closely to the classic rules. It is one of the class of pieces much in vogue at that time, and denominated *rustiche*, wherein the characters were made to speak in the dialect peculiar to that part of Italy to which they belonged; and sometimes in the same piece persons were introduced from different provinces, talking a diversity of dialects, as the Venetian, the Paduan, the Bergamask, the Milanese, &c. The most distinguished productions in this species were, this 'La Tancia' of Buonarroti, and the 'Rosa' of Cesare Cortese, a Neapolitan; the latter displaying the characteristic diction of the Neapolitan people, as the former did that of the Florentines. The other production of Buonarroti, 'The Fair' (La Fiera), is a remarkable work, the very conception of which implies a total departure from the classical restrictions. The author, passionately fond of his native language, was desirous of exhibiting a full development of its resources as applicable to all ranks and professions. He therefore chose for his subject a fair, wherein most of the conditions, transactions, and occurrences of human life could be conveniently exhibited. Here, each class of society appears in succession, and the author has ample opportunity to display the riches of his mother tongue in assigning to each one its peculiar diction. To execute such a design, it was necessary not only to multiply incident, action, and character, but also to vary the scene, and extend the time beyond the narrow space of a single day. No unity, in short, was here admissible, beyond that of the one magistrate who superintends all the transactions of the fair. The whole composition forms a connected series of five plays, of five acts each, which were actually performed at Florence on five successive nights. Indeed the scale was now decidedly turned against the predominance of the classic system; and another circumstance contributed at this time to prevent the return of that predominance for a very considerable period.

This was the invention, by Ottavio Rinuccini, of the *melodrama*, which more commonly took the name of *opera per musica*, and which we now briefly term the opera. The magic power of this union of music with the romantic drama completed the triumph of the latter among the Italians of the seventeenth century; for not only was this musical melo-drama thenceforward their prime theatrical favourite, but the ordinary drama itself was no longer tolerated except under the romantic garb. To the despair of the few who still adhered to the classic school, the very names of *tragedy* and *comedy* were for a while laid aside; and the public would hear of nothing but those *azioni*, which went by the various names of *reali*, *reali-comiche*, *tragi-comiche*, *tragi-satiro-comiche*, &c., and seem to have been all translations or imitations of Spanish pieces.

At the same time the public continued their favour to a species of comedy, or rather comic recitation, which in Italy seems to have been in all times peculiarly national. This was called the *commedia a soggetto* or *commedia dell 'arte*. It consisted of the mere outline of a dramatic composition, wherein the parts very slightly sketched were assigned to the several performers, who were to fill them up extemporarily. These sketches were called *scenarj*, from their containing merely the argument of each scene: those of the comedian Flaminio Scala were particularly celebrated. Some of these *improvisatori*, especially those who appeared in the standing masks of Arlecchino, Pantalone, Puncinella, &c., displayed a liveliness of humour which, in spite of the great mass of empty buffoonery by which they were accompanied, made this kind of performance long continue to be well received by the Italians, until the more general cultivation given to the higher dramatic departments, and the general advance of social refinement, caused the improvisatory masks to be finally abandoned to the populace.

At the commencement of the eighteenth century, no great original genius had yet arisen in Italy, as in Spain and England, to establish the romantic drama on an unshaken foundation. The political preponderance of Spain, too, had now given place to that of France; and hence it is not surprising that the French taste now began to invade the Italian theatre as it subdued the Spanish. Girolamo Gigli, of Sienna, an ingenious critic and an elegant writer, gave, in his 'Litiganti,' a free translation of the 'Plaideurs' of Racine; recast Molière's 'Tartuffe' in his 'Don Pilone;' and endeavoured to bring upon the stage 'La Sorella di Don Pilone,' wherein, it is believed, were exhibited the caprices of the author's wife and the bigotry of her Jesuit confessor. This period is also remarkable for the production of a number of comedies expressly devoted to the service of the literary warfare of the time, in the mutual satire by the literati of each other's peculiar systems and opinions: these pieces, as may well be supposed, were much more academical and erudite than theatrical and entertaining.

In the *reform* or *purification* of the Italian stage, as the endeavours now making to follow the *classic* steps of the French were denominated, Maffei led the way in the tragic department. The first classical tragedy that had appeared in modern Italy, or indeed in modern Europe, the 'Sophonisba' of Trissino, already mentioned, was a dull work of diligence without any poetic spirit; wherein, however, it is singular that while all the antique forms, including the chorus, are scrupulously retained, the author has abandoned the field of mythology for that of Roman history. The pastoral dramas of Tasso and Guarini, which appeared about the middle of the sixteenth century, and in which the subject, though for the most part not tragical, is elevated and even ideal, though more important in the history of poetry than of the stage, were certainly intended for the theatre. Their choruses indeed float like lyrical voices in the air, and do not appear in person; but the pieces were exhibited with great splendour at Ferrara and Turin. With all their noble and exquisite poetic grace and beauty, they at the same time show us the infant state of the *dramatic* art in the languid progress of the action. After 'Sophonisba' and a few other pieces of the same period, which Calsabigi, an Italian critic wholly devoted to the French system, calls the first tragic lispings of Italy, a number of similar works of the sixteenth and seventeenth centuries might be cited, but not one of them has preserved any considerable reputation. Though all these writers laboured, as they thought, according to the rules of Aristotle, we have the following description of their tragical abortions from Calsabigi himself:—'Distorted, complicated, improbable plots, misconception of scenic regulations, useless personages, double actions, inconsistency of character, gigantic or childish thoughts, feeble verses, affected phrases, total absence of harmonious and natural poetry; all this decked out with ill-timed descriptions and similes, or idle political and philosophical disquisitions; in every scene some silly amour, with all the trite insipidity of commonplace gallantry; but of tragic strength, of the conflict of passions, of overpowering dramatic catastrophes, not the smallest trace.' Maffei, however, to whom we must now return, printed a selection of the best of these tragic attempts, and produced a tragedy of his own, entitled 'Merope,' which had great success in Italy on its first publication, and obtained a high reputation in other countries from its competition with Voltaire's tragedy on the same subject. Both writers attempted to restore in some sense a lost piece of Euripides, highly estimated by the antients from the account given of its contents by Hyginus. Maffei's work, however, is rather the production of a learned antiquary than of a mind naturally adapted for and practised in the dramatic art; it is not therefore unfair to attribute its great reputation in Italy to the previous low state of Italian tragedy.

The task of classicizing the musical drama was undertaken first by Apostolo Zeno, and afterwards, with more success, by the Abate Metastasio. The marks of the French taste in Metastasio, as pointed out by Schlegel, are, the total absence of the romantic spirit, a certain faultless insipidity of composition, his manner of handling mythological and historical materials, which is not properly either historical or mythological, and the endeavour to produce a certain tragic purity which degenerates into monotony. The unity of place, however, it was impossible for him to observe, as a change of scene was required of the opera poet: in his rich intrigues too he followed Spanish models.

and borrowed especially a great deal from Calderon. 'The merits,' says the German critic, 'which have gained him the reputation of a classic among the Italians of the present day, and have made him in some degree for them what Racine is for the French, are, the most perfect purity, clearness, elegance, and sweetness of language in general, and in particular the softest melody and the greatest loveliness in the songs. Perhaps no poet ever possessed in a greater degree the talent of comprehending in a few lines the essential features of a pathetic situation: the songs with which the characters make their exit are almost always the purest musical extract of their state of mind that can possibly be given.' On the other hand, he has lines which, for dignity and vigorous conciseness, are perfectly suited to tragedy; yet on the whole, it is evident that a certain melting effeminacy in feeling and expression rendered Metastasio the delight of his countrymen and of courtly society throughout Europe. Only a few of his operas have still possession of the stage, as the change of taste in music demands a different arrangement of the text. Metastasio seldom has choruses, and nearly all his airs are for a single voice. 'We now,' says Schlegel, 'require more frequent duos and trios, and a crashing finale. In fact, the most difficult problem for the opera poet is, the mixing the complicated voices of conflicting passions in one common harmony without injuring their essence; a problem, however, which is generally solved by both poet and musical composer in a very arbitrary manner.'

The first endeavour to restore what the classicists denominated the *true comedy* was made by Luigi Riccoboni, a theatrical manager, who attempted, on the Venetian stage, to revive the 'Scolastica' of Ariosto. The result was remarkably curious: the audience, idolizing in Ariosto the painter of the romantic loves of Orlando and Angelica, and eagerly expecting to see something of a kindred spirit in this long neglected dramatic production from such a pen, showed such indignation at the disappointment they received from this *regular* comedy, that Riccoboni hastily quitted Venice, and repaired to Paris, where, of all places in Europe, classicism was in greatest honour and glory. Venice, however, was destined shortly after to be the scene of a successful struggle on the part of the same comic school to re-establish itself in the public estimation. A native of that city, Carlo Goldoni, nursed, both as a comedian and a poet, in the study of Macchiavelli and Molière, and, it should seem, admirably qualified by nature for developing all the resources that can enter into that comparatively narrow dramatic circumscription, sedulously applied himself, in a series of original compositions, to the task in which Riccoboni had made so unlucky an experiment. He displayed such abundant nature and fertility in painting the manners and the follies of his own age and country, that at length he brought the comedy of *character* into vogue, to the discredit both of the improvisatory farce and the melodrame. His first successes, however, received a severe check. The injury sustained by the masked and improvisatory comedy, for which the company of Sacchi in Venice had the highest talents, was one of the causes that led to the production, at this period, of the fantastic dramas of Gozzi. These are fairy tales in a dramatic form, in which, however, along with the wonderful, versified, and serious part, this author introduced the whole of the masks, and allowed them the most unrestrained development. When his imagination was in some degree wearied with oriental tales, he applied himself to the re-modelling of Spanish plays, especially those of Calderon; and although the ethereal poetry of the Spaniard lost much of its delicacy under this kind of handling, yet the extravagant caricature of the Italian masks formed an admirable contrast to the wild wonders of the fairy tale. This bold and original flight in the romantic region so fascinated the Venetians, that Goldoni was fairly driven from the field, and retired to Paris, as Riccoboni had done before him. There, by his production of 'Le Bourru Bienfaisant,' &c., he had the satisfaction of exhibiting himself to the French as the ablest follower that had yet appeared in the track of Molière, and of being honoured and applauded accordingly

It is a remarkable instance, too, of the sway which French criticism at that day exercised over the European continent, that Goldoni's Parisian success mainly contributed to his speedy reinstatement in Italian favour, and to the proscription of the wildly romantic pieces of Gozzi. From the pen of Goldoni we have about a hundred and fifty pieces, of which no enumeration can here be attempted. Among the comic dramatists of his own country he still occupies the highest place; and though some very respectable writers in the same department have succeeded him, they have done little either to extend or to enrich the dramatic field. We shall therefore, in enumerating the principal of these, dismiss them with all possible brevity.

Francesco Albergati Capacelli, a Bolognese gentleman of a distinguished family, and on that account more familiar than Goldoni with the tone of good society, displays in his comedies a purer style, more dignified manners, and occasionally more elevation in his characters, but wants the nature and vivacity of his predecessor. Camillo Federici, a Piedmontese, who had originally entered the order of Jesuits, afterwards became a comedian and a prolific writer of comedies: taking his characters chiefly from history, romance, or allegory, he inclined much to the romantic school; but, though he was very popular in his time, and though his countrymen the Piedmontese strove to rank him as high in comedy as Alfieri in tragedy, yet he did not exhibit powers at all capable of permanently establishing the romantic drama in public favour. Gherardo de Rossi, of Rome, was a tamely correct follower of Goldoni; and the Conte Giraud, also a Roman, full of natural wit and liveliness, is the most spirited successor of the latter that has yet appeared, and has succeeded accordingly. We find Vittorio Alfieri himself devoting, in his latter years, his austere pen to comedy. He translated some pieces from the antients; and in his original comedies he appears to have made Aristophanes his principal model, mixing up the historical and the actual with the fictitious and the allegorical. Four of these bearing the quaint but significant titles of 'The One' ('L'Uno'); 'The Few' ('I Pochi)'; 'The Too Many' ('I Troppi'); and 'The Antidote' ('L'Antidoto), are thoroughly political, being designed to exhibit, under the veil of antique names and manners, the several effects of despotism, of oligarchy, of simple democracy, and of rational liberty. The small pieces of the Neapolitan Giulio Genoino, written for the exercise and instruction of youth, are worthy of mention as being among the best in that peculiar and rather difficult line of theatrical composition. These comedies, ten in number, first appeared not many years ago, under the title of 'Dramatic Ethics' (Etica Drammatica), five of them being designed for boys, and five for girls. In none of them is there the slightest trace of the passion of love, or any injudicious exhibition of high-flown heroism. The quiet sentiments and duties they are designed to inculcate are sufficiently indicated in their titles—'Religion;' 'Love of our Neighbour;' 'Gratitude;' 'Modesty;' 'Friendship;' Prudence;' 'Filial Piety;' 'Conscience;' 'Generosity;' 'Beneficence;' and the author has succeeded in giving to these juvenile plays a greater warmth of interest than might be expected from the very circumscribed nature of his plan. Alberto Nota, born of a good family at Turin in 1775, and bred to the law, but early addicted as a recreation to dramatic writing, is the most celebrated and productive among the living comic writers of the school of Goldoni: with stricter moral views than the latter, his most characteristic excellence with respect to art is the great correctness and purity of his Italian style, in which the best critics of his country have declared him to be unsurpassed.

In the latter period of the last century, Alfieri opened a new æra of Italian tragedy. He adhered indeed to the established classic school, took his subjects chiefly from antient story, and was a strict observer of the unities. But, indignant at the voluptuous degeneracy of his countrymen, his muse too uniformly appears with a stoical severity and simplicity which, how well soever they might be suited to the purposes of the moral and political reformer, are unfavourable to the primary objects of dramatic art; and hence the productions of Alfieri have ever been found to give more satisfaction in the closet than on the stage. As a dramatist, he has been the most successful in painting, as in his 'Virginia,' the public life of the Roman republic; and in his tragedy of 'Saul' we find, with a certain Oriental splendour, great lyrical sublimity of expression. Since Alfieri, that nobler and more masculine-spirited Italian tragedy, of which he is justly regarded as the founder, has been cultivated by several distinguished writers with a less rigid adherence to antique subjects and to classic forms. Among the most estimable of these recent productions we may particularize the 'Aristodemo,' the 'Cajo Gracco,' and the 'Galeotto Manfredi,' of Vicenzo Monti; 'Il Conte di Carmagnola,' and 'L' Adelchi,' of Alessandro Manzoni, better known in England as an historical romance-writer, and the 'Antonio Foscarini,' the 'Giovanni da Procida,' the 'Ludovico Il Moro,' and the 'Nabucco' of Giovan Battista Niccolini, who in this latter piece has ably exhibited, under fictitious names, Napoleon and some of his contemporaries, and of whose future efforts his countrymen have the highest expectations.

In the musical drama, though, for a long time past, the poetry has been cultivated as little more than a mere vocal accessary to the musical composition, there have been some very meritorious exceptions to this, as in the case of the recent productions, by the Conte Pepoli, 'I Puritani,' and 'Malek Adel,' which last is founded on Madame Cottin's well known romance of the time of the crusades, and was first performed at Paris in 1836.

SPANISH DRAMA.

In Spain, as elsewhere, it was the church that gave birth to the modern drama; but this remarkable circumstance is peculiar to Spain, that while in the other great nations of Europe the mature development of the drama detached it wholly from the service of religion, in the peninsula, on the contrary, the greatest dramatic geniuses constantly devoted a large portion of their efforts to religious compositions for ecclesiastical purposes; and the most perfect of all the Spanish theatrical poets made such compositions his favourite occupation. Owing to this very striking peculiarity of the Spanish stage, the source of which also will be indicated below, we defer some further notice of the spiritual plays of the Spaniards until we come to particularize the several species of their dramatic productions as exhibited in the most advanced period of their theatre.

The earliest performance that can strictly be called theatrical of which we find any mention in the Spanish annals, is that exhibited in 1414 at the coronation festival of Ferdinand the Good, king of Arragon. It was from the pen of the marquis De Villena, a man who possessing intellectual acquirements prodigious for the time in which he lived, marched boldly, as a writer, in advance of his age and tion—so boldly, indeed, that all his writings were burned ger his death, and this piece among them, so that its very title has perished. We only learn that it was an allegorical play, wherein figured the personages of Justice, Peace, Truth, and Clemency; so that it seems to have belonged to the class of *moralities* in vogue for a while in the infancy of the Spanish drama, and which Cervantes afterwards revived. Shortly after this attempt of Villena, his friend, the marquis de Santillana, a man of equally extensive knowledge, and of equal freedom both of thought and pen, dramatized, under the title of 'Comediete de Ponza,' the incidents of a naval action which took place in 1435, near the island of Ponza, between the Genoese and the Arragonese, and in which the latter were defeated. This piece was never acted, nor was it printed among the author's works; its title, quoted in his letters, was all that was known of it until Sr. Martinez de la Rosa (lately prime minister of Spain) recently discovered it among the manuscripts in the Royal Library at Paris. This interesting relic of the earliest efforts of the dramatic genius of Spain exhibits remarkable skill in the handling of an historical occurrence, as well as great beauty of plot, dialogue, and versification.

It was near the close of the fifteenth century that a sort of theatre was first established in Castile. The earliest dramatic attempt in this division of the peninsula was made by Juan de la Encina, who excelled in light poetry, and whose numerous works form a cancionero of themselves. After extending the field of religious representations by composing for exhibition on festival days a number of autos, wherein we find, not mere paraphrases of Scripture, but conceptions of the poet's own, together with a certain dignity of action and language, he formed the project of carrying the stage beyond the walls of the church. With this view he composed some small pastoral pieces, which he denominated eclogues. These pieces, in which he himself enacted the principal parts, were first exhibited at the houses of the Admiral of Castile and the Duchess del Infantado. As their name indicates, they consisted of nothing more than a dialogue between two or more shepherds. The author, imitating Virgil, used this expedient in the first instance to celebrate, by means of allusion, some particular event, such as the conclusion of a peace, or the return of a prince; and next, he invented some short and simple action wherein he brought into play the passions of his interlocutors themselves. These little pieces, interrupted by dances and ending with songs (villancicos), usually contained also some farcical scene; so that they may be said to have comprised at once the elements of the comedy, the ballet, and the vaudeville. These premature efforts have in them much grace and wit, as well as nature and liveliness. The first performance of these pastoral comedies took place in the year 1492, so memorable in the Spanish annals as being that of the conquest of Granada and the discovery of the New World.

About the same time appeared the famous 'Celestina,' begun by Rodrigo Cota and finished by Fernando Rojas de Montalvan. Though entitled a 'tragi-comedy,' it was never performed, nor was it capable of being so, as it was in reality but a tale told in dialogue. Yet the singular merit of this truly primitive composition, which went through several editions, and was translated into almost every European language, contributed much to the advancement of the stage by furnishing a genuine model of dramatic diction.

It was in the beginning of the sixteenth century that to these various attempts succeeded the first regular Spanish dramas, but, through a singular concurrence of circumstances, they appeared out of Spain. One Bartolome de Torres-Naharro, long a captive in the hands of the Moors, and residing at Rome after his redemption, there composed some comedies in his native language, and got them performed at the tasteful and voluptuous court of Leo X. at the same time that, as we have already seen, the 'Mandragola' of Machiavelli and the productions of Aretino were being exhibited there. In the compositions of Torres-Naharro, though little known, and unjustly depreciated by Signorelli in his 'Historia Critica del Teatri,' there is much happiness of invention, well-drawn character, and spirited dialogue; they have also the licentious tone of the Italian comedies of that period, and contain some strokes of a malicious boldness peculiar to the author, who, though a priest, and living at the pontifical court, composed satires against the church such as Luther himself might have dictated. On printing his comedies at Naples in 1517, under the title of 'Propaladia,' he published along with them some 'Precepts on the Dramatic Art,' the first that made their appearance in the Castilian tongue. He there draws a very distinct line between tragedy and comedy; he divides the latter into historical comedy (comedias a noticia), and comedy of invention (comedias a fantasia). He too it was that invented the introïto, or prologue, and gave to the acts the name which they have ever since borne, of jornadas, that is, journeys or stages, alluding to the pauses or resting-places for the actor and the spectator, which seem to constitute the chief utility of such division.

No sooner did Naharro's pieces find their way to Spain (about 1520) than they were proscribed by the Inquisition, so watchful to extirpate every trace of Protestantism. The like sentence fell upon those written shortly after in Germany by the author of the 'Satire on Women,' Cristoval de Castillejo, secretary to the emperors Maximilian and Ferdinand. These latter pieces, which it was not deemed prudent to publish among the author's works when the prohibition was taken off in 1573, but which are known to have been of the satirical and licentious class, are entirely lost. So that the Spanish stage presents the singular phænomenon of having really had two infancies. The first attempts in regular dramatic composition being suppressed by the formidable authority above-mentioned, found no imitators, and even seem to have been completely forgotten, for it was a play of Ariosto's that was exhibited at the marriage of an infanta in 1548. Some few classical scholars, indeed, as Villalobos, Fernan Perez de Oliva, and Simon de Abril, strove to bring forward the antients as dramatic models, by translating Plautus, Terence, and Aristophanes; but their works were still less adapted to take possession of the national mind. So that while, of those dramatic productions which Spain already possessed, one part lay hidden in the libraries of a few of the learned, and the other buried in the archives of the Inquisition, the people were abandoned to the gross merriment of the jugglers and buffoons Hence it is that Schlegel, Bouterweck, Sismondi, and almost every other foreign critic, apparently ignorant even of the names of the first dramatic writers of Spain, make no mention of them, but fix the middle of the sixteenth century as the period of the earliest origin of the Spanish drama.

The founder of the truly national and popular theatre of Spain was Lope de Rueda, of Seville, who quitted his trade of a goldbeater to join a company of strollers, of whom he shortly became the chief, or, according to the Spanish expression, the *autor*. This title, derived, not from the Latin *auctor*, but from *auto*, an act or performance, was at that time given to one who composed and recited pieces, and is still retained to signify the manager of a company of comedians. He was also called *maestro de hacer comedias*. Lope de Rueda united the two kinds of talent necessary to an *autor* of that period; had prodigious success; was unanimously declared to be both a great poet and a great performer; and so entirely forgotten were the dramatic attempts which had preceded him, that he had the credit of being the inventor of the division into *jornadas* or acts, and of the prologue, called at first *introïto*, and afterwards *loa*. For a number of years Lope perambulated from town to town; but his great reputation at length made him in request at court; and the grandees of the time crowded to the diversion which his exhibitions afforded them from the gloomy gravity of the palace of Philip II. The few of his plays, pastoral dialogues, &c., that remain, are distinguished for natural grace and liveliness; and though these are all in prose, he wrote with equal facility in verse. We find a curious fact, illustrative of the indulgence which the Spanish ecclesiastics of that day extended even to the profane drama, recorded by Diego de Colmenares, the contemporary historian of Segovia,—that on occasion of the grand festival held on the opening of the new cathedral there in 1558, Lope's company, on a stage erected within the church, exhibited, after 'solemn vespers,' a 'pleasant play' (*una gustosa comedia*). And Lope himself, on his death at Cordova in 1567, was interred there with great honour in the choir of the great cathedral church.

'In the time of this celebrated Spanish actor,' says Cervantes in the Preface to his own published plays, 'the whole wardrobe of an *autor* could be thrust into a bag: there were three or four close vests of white skin trimmed with gilt leather, and the like number of beards, wigs, and trunk hose. The plays were colloquies in the manner of eclogues, between two or three shepherds and some shepherdess, and were eked out with two or three interludes (*entremeses*), exhibiting sometimes the character of a negress, sometimes of a bravo, sometimes of a simpleton, sometimes of a Biscayan; for these characters and many others Lope represented with the greatest truth and perfection imaginable. At that time there were neither machinery, nor decorations, nor combats between Moor and Christian, on foot or on horseback: there were no figures made to issue through the boards of the stage as from the centre of the earth; still less were any angels or souls let down from heaven upon clouds. The stage consisted of four planks, laid in a square form across four benches, which raised them four hands from the ground. The whole decoration consisted of an old coverlet, which was drawn from one end to the other by two cords, to make what was called the *vestiario*, or dressing-room, and behind which were the musicians, who sang, without the guitar, some antient *romance*.'

At the same period (1561), the Spanish court, which had hitherto migrated from one provincial capital to another, fixed itself permanently at Madrid, a circumstance favourable to the dramatic art, as it established a permanent theatre. Authentic documents attest, that a year after the death of Lope de Rueda, there were play-houses (*corrales de comedias*) at Madrid. There were then, in the capital as well as in the provinces, various troops of actors, distinguished one from another by whimsical and ludicrous names, and sufficiently numerous to be classified by a Spanish writer of that day under eight different species. Shortly after, Juan de Malara, a celebrated professor of the *humanities*, caused a versified drama of his, entitled 'Locusta,' which he had written at first in Latin, to be acted at Salamanca. Then came an actor of Toledo, named Navarro, who, Cervantes tells us, converted the manager's clothes'-bag into the more important-looking form of trunks and portmanteaus; brought forth the music from behind the hanging; took the false beards from the chins of those whose parts did not require them; invented machinery, clouds, thunder and lightning, duels and battles. Moral development, too, accompanied this material progress: the pieces now began to display something like a plot, and some of the animation which arises from conflicting interests and passions. The titles of a few of these may afford some notion of this transitional, or, more properly, adolescent period of the Spanish theatre: there were, for instance, 'Dido and Æneas, or the Pious Trojan,' 'The Grand Prior of Castile,' 'Loyalty against one's King,' 'The Sun at Midnight and the Stars at Noon,' 'The Taking of Seville by St. Ferdinand,' and 'The Cortes of Death;' the costume of which latter piece is so humorously described in a passage of the second part of Don Quixote.

About 1580 were established at Madrid the two theatres *de la Cruz* and *del Principe*, which are still existing; and now some superior minds turned their efforts to dramatic composition, which had hitherto been left entirely to the managers of strolling companies. Cervantes, just returned from his eventful Algerine captivity, was one of the earliest adventurers in this career. 'I was the first,' he tells us, 'that exhibited the imaginings and hidden thoughts of the soul, by bringing forward moral characters on the stage, which I did with warm and general applause from the public. I wrote at that period some twenty or thirty plays, which were all acted unsaluted by cucumbers or any other matters convenient for pelting with; they ran their course free from hissing, shouting, or clamour.' Cervantes, indeed, advanced the Spanish drama most importantly, both as to dramatic invention and moral dignity. His 'Numancia,' in particular, one of the only two of these his earlier dramatic productions that have found their way to the press, is very remarkable in the dramatic history of Europe. 'It stands altogether,' observes Schlegel, 'on the elevation of the tragical cothurnus; and, from the unconscious and unsought-for approximation to antique grandeur and purity, forms a remarkable phenomenon in the history of modern poetry. The idea of destiny prevails in it throughout; the allegorical figures which enter between the acts supply, though in another way, nearly the place of the chorus in the Greek tragedies; they guide our consideration and propitiate our feeling. A great deed of heroic determination is completed; the extremity of suffering is endured with constancy, but it is the deed and suffering of a whole nation, whose individual members may almost be said to appear only as examples, while the Roman heroes seem merely the instruments of fate. There is a sort of Spartan pathos in this piece; every separate consideration is swallowed up in the feeling for country; and by a reference to the modern warlike fame of his nation, the poet has contrived to connect the antient history with the circumstances immediately before him.' On the whole, however, it appears that the mind of Cervantes was more inclined to the *epic*, taking the word in its more extensive signification for the narrative form of composition in general; and that the soft and unassuming manner in which he chiefly delights to excite the feelings is not the best suited to the rapid compression required on the stage.

Cervantes wrote at Madrid; and at the same time Juan de la Cueva produced some dramas on the stage of Seville, reducing to four the number of jornadas, or acts, which had hitherto been five or six. The day's performance then consisted, besides the principal piece, of three *entremeses*, or interludes, played between the acts, and a little ballet. Valencia, too, which had always, in arts and letters, its rival school to that of Seville, made some advances in the dramatic career. It was a Valencian poet, Cristobal de Virues, who further reduced the number of acts from four to three, which latter number was thenceforward adhered to by all Spanish writers. 'Until then,' according to the ludicrous conceit of Lope de Vega, 'the Spanish drama had *gone on all fours*, like a child, because it was yet in its infancy.'

The scenic pomp of the Spanish theatre had already made great progress. The same writer, Rojas, who said that in the days of Lope de Rueda an *autor* and his company might have deposited their bundle of *properties* upon a spider's back, relates, that in the time of Cueva and Virues, women played their parts in dresses of silk and velvet, with chains of gold and pearls; that, in the interludes, airs were executed by three or four voices; and that even horses were introduced in the warlike plays to complete the illusion.

It is well worthy of remark that already, in the sixteenth century we find, in Spain the contest fully and warmly engaged between the claims of the dramatic writers to an absolute independence of the classic rules, and the critics demanding a rigid adherence to the precepts of Aristotle. Thus, while the rhetorician Pinciano was zealously conjuring the theatrical writers to respect the unities, for which they showed little regard, one of them, Juan de la Cueva, openly undertook, in his 'Exemplar Poetico,' the defence of the dramatic liberties. He claimed them as the offspring of that succession of ages which had abolished all antique laws,—as more favourable to the boldest flights of imagination,—and, in fine, as better adapted to please the public. But, while delivering this judicious opinion, he lays down such maxims for the regulation of this dramatic freedom as good sense and good taste must ever dictate, though his countrymen, in their fiery impatience of any such restriction, have not paid them sufficient attention.

This uncontrollable fervour of imagination was however but a necessary result of the very peculiar circumstances which for a long course of ages had operated to form and to confirm the Spanish national character. 'The Spaniards,' to use the words of Schlegel, 'act a glorious part in the history of the middle ages, a part too much forgotten by the envious ingratitude of modern times. They were then the forlorn outpost of Europe; they lay on their Pyrenean peninsula as in a camp, exposed to the incessant irruptions of the Arabians, and always ready for renewed conflicts without foreign aid. The re-establishment of their Christian kingdom, for centuries from the time when the descendants of the Goths who had been driven back into the northern mountains rushed forth again from those places of refuge, down to the complete expulsion of the Moors from Spain, was one single and long-continued adventure; nay, the preservation of Christianity in that land against such a preponderating power seemed even to be the wondrous work of more than mortal guidance. Ever accustomed to fight at one and the same time for his liberty and his religion, the Spaniard clung to the latter with a fiery zeal, as to an acquisition dearly purchased by the noblest blood. Every consolation of divine worship was a reward of heroic exertion; every church might be considered by him as a trophy of his ancestors.' In later times, 'the Spaniard never presumed to examine into the conduct of his spiritual and worldly superiors, but carried on their wars of aggression and ambition with the same fidelity and bravery which he had formerly displayed in his own wars of defence. Personal fame and a supposed zeal for religion blinded him as to the justice of his cause. Unexampled enterprises were successfully executed; a newly discovered world beyond the ocean had been subjugated by a handful of bold adventurers; individual instances of cruelty and rapine had stained the splendour of the most determined heroism, but the mass of the nation remained unaffected by this degeneracy. The spirit of chivalry nowhere survived its political existence so long as in Spain: long after the internal prosperity of the nation, together with its foreign influence, had experienced a deep decline in consequence of the ruinous errors of Philip II., that spirit propagated itself down to the flourishing period of their literature, and imprinted its stamp upon it in a manner which cannot be mistaken. The fancy of the Spaniards was bold, like their active powers; no mental adventure seemed too dangerous for it. The predilection of the people for the extravagantly wonderful had already been shown in the chivalry romances. They wished to see the wonderful once more on the stage; and when their poets, standing on a high eminence of cultivation in art and social life, gave it the requisite form, breathed into it a musical soul, and purified it from corporeal grossness to colour and fragrance, there arises from the contrast between the subject and the form an irresistible fascination. Their spectators imagined they perceived a refulgence of the world-conquering greatness of their nation, then half lost, when all the harmony of the most varied metre, all the elegance of fanciful allusion, all that splendour of imagery and comparison which their language alone could afford, were poured out into inventions always new, and almost always pre-eminently ingenious. The treasures of the most distant times were procured in fancy, as in reality, for the gratification of the mother country; and we may say that in the dominions of this poetry, as in those of Charles V., the sun never set.'

Such was the public mind upon which Lope de Vega now arose to exercise his marvellous fertility of dramatic invention and facility of metrical composition. He had the first great requisite for success in this career, a most thorough knowledge of the tastes and passions of the people for whom he wrote; but that farther and nobler merit, an elevated view of his art and deep devotion to it for its own sake, he never evinced. Success, in the more vulgar acceptation of the term, was not only his first object, as with every popular dramatist it ought to be—it seems to have been his only care—and that success he attained even to an unparalleled degree; affording, perhaps, the most conspicuous instance upon record of the sacrifice of high and permanent literary reputation for unbounded living popularity. We do not, indeed, as so many writers have done, make it any subject of reproach to him that, as he himself tells us in his 'New Art of Play-writing' ('Arte Nuevo de hacer Comedias'), whenever he was going to write a play he used to shut the door upon Terence and Plautus, that they might not cry to heaven against him; but in the interests of art it is impossible to admit the excuse which, in the same treatise, he broadly offers for his extravagancies, namely, 'I write pieces for the public; and as the public pay, it is but right that, to please them, I should talk to them the language of fools.' After reading such an admission as this from his own pen, we need not wonder at finding in the large portion that remains to us of his countless dramatic productions, that his exhaustless invention of incident, his varied skill in delineating characters and exhibiting the play of the passions, with all the spirit and subtlety of his dialogue—that all these brilliant qualities have, as it were, nearly stifled one another by their own unpruned luxuriance.

Neither in his own country, however, nor in Europe, had Lope any model to guide him or rival to excite his emulation. Italy had not yet got farther than the *Mandragola*, nor France beyond her first uncouth imitations of the antients; Germany had not yet emerged from the *mysteries;* and England, except politically, was a terra incognita to the Spanish writers.

In 1621, twelve years before the death of Lope de Vega, happened that of the gloomily devout Philip III., who was succeeded by a young prince addicted to pleasure and passionately fond of the theatre. Philip IV. liked the conversation of literary men, received them at his court, and amused himself with enacting along with them that sort of improvisatory pieces which were then so much in vogue in Italy. He is even the reputed author of some dramatic works which were brought out under an anonymous designation; and such was his prepossession in favour of the national drama that he would not allow the introduction of the Italian opera, then in general favour at the continental courts. These circumstances added force to the impulse already given by Lope de Vega, and introduced the most brilliant period of the Spanish drama. During Lope's lifetime, a multitude of writers endeavoured to tread in his steps—as the Drs. Ramon and Mira de Mescua, the licentiates Mexia and Miguel Sanchez, the canon Tarraga, Don Guillen de Castro, Aguilar, Luis Velez de Guevara, Antonio de Galarza, Gaspar de Avila, Damian Salustrio del Poyo, and a great many others;—but all were merely his imitators, and fell far below him; it was not until near the close of his dramatic reign that the rival appeared who was destined to dethrone him.

This was Calderon de la Barca, who, with no less intimate a knowledge of his public than Lope himself, had all that high devotion to his art which was wanting to the latter. As the compositions of this great writer occupy the summit of the truly national drama of Spain—as they fully equal those of Lope in variety and more nearly approach them in number than those of any other of his countrymen—and as, consequently, they afford us the most perfect specimens of each of the several species of dramatic productions which are peculiarly Spanish—there is no way in which we can convey so clear an idea of the forms and spirit of the Spanish stage in its highest maturity as by characterizing briefly but distinctly the several classes of Calderon's dramatic pieces. The principal classification of their plays on profane subjects recognized by the Spaniards themselves was that which distinguished *comedias heroicas*, *comedias de capa y espada*, and *comedias de figuron*. The first of these classes, the *heroic* plays, occupied much the same place in dramatic literature as the tales of chivalry did in narrative fiction: driven from prose composition by the Don Quixote, they seem to have taken refuge on the stage, where they were long welcomed by the public. The second class, named, from the costume of the time in which they were acted, plays of *the cloak and sword*, exhibited the Spanish manners of the day; but owing to the strong tincture of romance which those manners still retained, the were capable of being represented under an ideal aspect. 'This,' Schlegel remarks, 'could not have been possible had Calderon introduced us into the interior of domestic life, where want and habit generally reduce all things to every day narrowness. These pieces end, like the comedies of the antients, with marriages; but how different what precedes! . . . Calderon represents to us his principal characters of both sexes in the first ebullitions of youth, it is true; but the aim after which they strive, and in the prosecution of which everything else kicks the beam, is never confounded in their minds with any other good. Honour, love, and jealousy are uniformly the motives; the plot arises out of their daring but noble collision, and is not purposely instigated by knavish deception. . . . The feeling for honour is equally powerful in the female characters; it rules over love, which is allowed a place beside it, but not above it. The honour of the women, according to the manner of thinking exhibited in the dramas of Calderon, consists in loving only one man of unspotted honour, and loving him with perfect purity. Love requires inviolable secresy till a lawful union permits it to be publicly declared. This secresy secures it from the poisonous intermixture of vanity, which would boast of pretensions or conceded favours; it gives it the appearance of a vow, which, from its mystery, is the more sacredly observed. In this morality, it is true, cunning and dissimulation are allowed for the sake of love, and so far honour may be said to be infringed on; but the most delicate regards are nevertheless observed in the collision with other duties—as, for example, with those of friendship. The power of jealousy, always alive, and often breaking out in a dreadful manner —not, like that of eastern countries, a jealousy of possession, but of the slightest emotions of the heart and its least perceptible demonstrations, serves to ennoble love, as this feeling, whenever it is not altogether exclusive, sinks beneath itself. The perplexity to which the collision of all these mental motives gives rise frequently ends in nothing, and then the catastrophe is truly comic: sometimes, however, it takes a tragic turn; and then honour becomes a hostile destiny for him who cannot satisfy it without either annihilating his own happiness, or even becoming a criminal.' These pieces have commonly no other burlesque part than that of a merry servant, called by the Spanish writers the *gracioso*, who chiefly serves to parody the ideal motives from which his master acts, which he is often made to do in the most elegant and witty manner. He is seldom used as an efficient instrument in complicating the intrigue, in which we seem to admire the ingenuity of accident rather than of contrivance. The *comedias de figuron*, or plays of *character*, are distinguished from the class last described, chiefly by this—that the interest of the action, instead of being distributed over the personages of a double or triple intrigue, is centred in some one individual, in whom some particular vice or absurdity is broadly personified.

Some of Calderon's plays, historical or mythological, cannot strictly be ranked in any of the three foregoing species. The earlier periods of Spanish history he has often seized with the utmost truth; but he seems to have had too vehement a predilection for his own clime and nation to enter easily into the peculiarities of another. Classical antiquity, as well as the north of Europe, were altogether foreign to his conception; and thus, as Schlegel observes, the Greek mythology usually became in his hands a delightful tale, and the Roman history a majestic hyperbole. 'Another class of his pieces are entitled by Calderon himself *festal* dramas (*fiestas*). These were designed for representation at court on solemn occasions: although they require the theatrical pomp of frequent change of decoration and visible wonders, and though music is often introduced into them, yet we may call them *poetical* operas, that is, dramas which, by the mere splendour of poetry, achieve what in the actual opera can be attained only by the machinery, the music, and the dancing. Here the poet gives himself wholly up to the boldest flights of his fancy, and his creations hardly touch the earth.'

But it is in the class of *autos sacramentales*, or religious dramas, of which we must now speak, that the genius and spirit of Calderon are most richly and fully developed. As the religious ceremonies of Paganism had given birth to the Grecian theatre, so did those of Christianity give birth to the modern. The original principle of the dramatic spectacles, introduced or sanctioned by the Romish ecclesiastics, was that of exhibiting before the eyes of the faithful, on each of the great festivals of the church and commemoration days of the saints, a living representation of the passage of the New Testament or of legendary history to which the celebration in question referred. These performances, which, in all the rest of Europe went by the name of mysteries, were, in Spain, called from the beginning *divine plays* (*comedias divinas*) and *sacramental acts* (*autos sacramentales*). They were performed with great pomp, not only in the public squares and in processions, but also at the great theatres of the capital. This species of dramas, being performed on the most solemn festivals, under the patronage both of the ecclesiastical and the civil authorities, and in the presence of the whole people, were more profitable as well as more glorious to their authors than any other kind. Lope de Vega wrote some hundreds of these pieces; but Calderon, in this department as in others, so far excelled both his predecessors and his contemporaries, that letters patent were granted to him conferring the exclusive privilege of furnishing the *autos* for the use of the capital; a monopoly which he enjoyed for thirty-seven years. 'His mind,' to borrow the eloquent characterization of his able German translator, 'is most distinctly expressed in his treatment of religious subjects. He paints love with general features merely; he speaks its technical poetical language. But religion is his peculiar love, the heart of his heart. For religion alone he excites the most overpowering emotions, which penetrate into the innocent recesses of the soul. It would rather appear that he did not wish to enter with the same fervour into worldly events. However turbid they may be in themselves, yet, from the religious medium through which he views them, they appear to him perfectly bright. This fortunate man escaped from the wild labyrinth of doubt into the citadel of belief, from whence he viewed and portrayed the storms of the world with undisturbed tranquillity of soul: human life was to him no longer a dark riddle. Even his tears reflect the image of heaven, like dew-drops on a flower in the sun. His poetry, whatever its object may apparently be, is an incessant hymn of joy on the majesty of the creation: he celebrates the productions of nature and human art with an astonishment always joyful and always new, as if he saw them for the first time in an unworn festal splendour. It is the first awaking of Adam, combined with an eloquence and skill of expression, and a thorough acquaintance with the most mysterious relations of nature, such as high mental cultivation and mature contemplation can alone give. When he compares objects the most remote, the greatest and the smallest, stars and flowers, the sense of all his metaphors is the mutual attraction of created things to one another on account of their common origin; and, again, this delightful harmony and unity of the world is with him but a refulgence of the eternal love which embraces the universe.'

We have felt it the more necessary to endeavour to convey some just idea of the real spirit and execution of these dramas, because in recent times, in England especially, they have, through ignorance of the works themselves, and of the national spirit and circumstances out of which they arose, been confounded, under the designation of productions evincing much more zeal than taste, with the rude and barbarous compositions which the remains of the dramatic mysteries of the other European nations almost exclusively present to us. On the contrary, the more perfect spiritual plays of the old Spanish theatre will remain, through all changes of manners and opinions, highly valuable and interesting, as showing us how some of the noblest efforts of modern dramatic art were devoted in one country, as those of all the other arts have so generally been, to the service of the Christian faith.

It is remarkable, that during this most brilliant period of the Spanish stage, the council of Castile ventured to propose, as a condition of the re-opening of the theatres, which, on account of court mournings, had remained shut from 1644 to 1649, that the plays to be performed should be confined to subjects of good example taken from edifying lives and deaths, without any mixture of love; that consequently, nearly all those which had theretofore been acted should be prohibited, especially the works of Lope de Vega, which had been so prejudicial to good morals. But fortunately, the taste of the monarch, in accordance with that of the public, made him reject the proposal of his austere advisers

In the course of Calderon's protracted career arose Moreto, who, with less of the national fire of invention and richness of fancy, distinguished himself chiefly by giving a more perfect development to the 'comedias de figuron,' or plays of character. Such, for instance, are his pieces 'El Lindo Don Diego,' which might be called 'The Coxcomb,' and 'El Marques de Cigarral,' a Don Quixote of a certain sort, gone mad over the eternal reperusal of his family papers and reckoning up of his quarters of nobility. In this line Moreto may be regarded as one of the models of Molière, amongst whose pieces, indeed, there is one weak imitation of him. At the same period lived another dramatic poet whose living fame was not equal to his posthumous celebrity, yet who, by some extraordinary chance, has remained so unknown to other nations that the most eminent critics—Signorelli, Schlegel, Sismondi—have not so much as mentioned him: this was a monk of the order of Mercy, Fray Gabriel Tellez, who, under the assumed name of Tirso de Molina, gave to the stage a great number of pieces, which were afterwards collected and published by his nephew. Less ingenious than Calderon, and less delicate than Moreto, he does, however, excel every poet of his country in a certain mischievous gaiety. He pays little regard either to rule or probability, caring only to find room for the sallies of a laughing and caustic wit, a freedom of language which he carries even to licentiousness, and a boldness of thought which respects neither the powers of earth nor those of heaven. He spares nothing, but attacks whatever either offends or diverts him. There is but one writer to whom he can justly be compared, and to whom he bears a very striking resemblance, namely, the more recent French dramatist Beaumarchais. And as the latter writer was the original parent of Figaro, so it is a curious fact that Fray Gabriel was the first who brought upon the stage the famous story of 'Don Juan and the Statue;' availing himself of the legend invented by the Franciscan monks of Seville to account for the disappearance of the real 'Don Juan de Tenorio,' whom, in order to put a quiet end to his notorious excesses and impieties, the holy brethren had drawn into an ambush and slain.

The brilliant period of the Spanish theatre is comprised in the first half of the seventeenth century. The taste of the monarch, the court, and the nation, had thrown a multitude of literary men into that career, then the most honoured and the most lucrative. Thus, besides the eminent masters already mentioned, there were a host of dramatists of the second order, at the head of whom must be ranked Francisco de Rojàs, who had all the qualifications of Moreto, but exceeded him in his defects. Then follow Guillen de Castro, Ruis de Alarcon, La Hoz, Diamante, Mendoza, Belmonte, the brothers Figueroas (who wrote conjointly, like the French vaudevillists of the present day), Cancer, Enciso, Salazar, and Bances Candamo, each of whom, though establishing no school, produced at least some important composition.

The disasters that befel the Spanish monarchy in the latter years of the reign of Philip IV., together with a succession of court mournings which closed the theatres for a considerable time, gave the first blow to the dramatic art in Spain. In 1665, the death of that prince, who had been its most zealous protector, gave the signal for its rapid and thorough decline. His successor, the imbecile Charles II., was yet in his infancy; and the queen-regent signalized the commencement of her administration by a decree, dictated no doubt by her spiritual director the jesuit Nitard, and certainly unique in dramatic history: she commanded 'that all plays do cease until the king my son shall be old enough to be entertained by them.' Although this strange order could not be rigorously executed, yet it is plain how great an effect it must have produced at a time when literature could only thrive under the patronage of the great, and when the theatre could maintain itself against the reiterated attacks of the council of Castile only by the special protection of the monarch. But of the effect in question we find the most striking evidence in contrasting two remarkable facts. A memorial addressed to Philip IV. in 1632 by the comedian Cristoval Santiago Ortiz shows us that there were then in Spain upwards of forty companies of comedians (although the council would license no more than six); that these companies comprised about a thousand individuals; and that so many playhouses had been erected that there were very few cities, or even considerable towns, that had not at least one actually engaged. And yet, in 1679, at the marriage of Charles II. with a niece of Louis XIV., wherein all possible magnificence was displayed, no more than three companies could be got together to perform at court.

At this period of decay and neglect one writer alone endeavoured to support the tottering stage: Solis, the eloquent historian of the conquest of Mexico, likewise devoted to the service of the theatre his brilliant imagination, polished wit, and glowing style. He has left us several plays well worthy of the dramatic period which he survived, one of which especially, entitled 'Love à la Mode' (El Amor al Uso), has peculiar excellence.

With Solis may be said to have expired the Spanish theatre properly so called. The elevation of Philip V. to the throne of Spain having given prevalence to the French taste, and introduced, at court at least, the habits and manners of the court of Louis XIV., the Spaniards, after having been, as we shall shortly show, the dramatic precursors and teachers of the French, were content to become their humble translators and copyists. In the course of the eighteenth century, it is true, some attempts to re-erect a national drama were made successively by Zamora, Luzan, Canizares, and Jovellanos; but these honourable endeavours had but a transitory success; and to arrive at a work of originality—after, however, noticing as such the *sainetes* (small satirical pieces) of Ramon de la Cruz—we must come down to the commencement of the present century, to Moratin, the witty and elegant author of 'The Coffee-house,' 'The Baron,' 'The Maiden's Yes,' &c., and next, to Martinez de la Rosa, who wrote 'The Mother at the Ball and the Daughter at Home.'

The description which we have already given of the several kinds of dramatic composition in the days of Calderon may sufficiently show that in the old Spanish drama the classic tragedy, even less than the classic comedy, could find a broad and effective place. Yet, misled, it should seem, in a great degree by the word *comedia*, which in Spanish has always had as comprehensive a signification as the English term *play*, many of the most eminent continental critics, especially among the French, have alleged a total absence of tragedy in the Spanish theatre, and spoken of it as a singular and unaccountable phenomenon. So obstinately have such critics been prepossessed by the *classical* distinctions in which they have been trained up, that they can gravely make this astounding assertion, even while admitting that 'the tragic element predominates in a great number of the most celebrated pieces of the Spanish stage, and that the most popular subjects appear in general, to use the antique phrase, more appropriate to the buskin of Melpomene than to the sock of Thalia.' This very predominance of either element, as we have shown in the opening of this article, is the only ground for distinction between tragedy and comedy that exists in the essence of human nature and of dramatic art, or even that admits of any precise definition. According to this more rational mode of classification, the old Spanish theatre, by the very admission of the critics in question, is abundantly rich in tragedy. We must notice very briefly the few scattered specimens of dramatic writing under the *name* of tragedy that appear in the early Spanish literature.

Boscan, who first introduced into Spain the Italian style of versification, is said to have made a translation from one of the tragedies of Euripides, which has not been preserved; and in like manner, almost immediately after, about the year 1520, the learned Fernan Perez de Oliva, returning from the court of Leo X., where he had witnessed the performance of Trissino's 'Sophonisba,' wrote two other imitations of the Greek theatre, the 'Venganza de Agamemnon,' taken from the 'Electra' of Sophocles, and the 'Hecuba,' translated from Euripides. These tragedies, written in elegant prose, remained unknown beyond the universities: nor have we reason to suppose that they were acted even there. About 1570, however, Juan de Malara gave to the theatre of Seville several tragedies on scriptural subjects, as 'Absalom,' 'Saul,' &c.; and at Madrid, then recently chosen to be the capital of the kingdom, a monk named Geronimo Bermudez produced, under the name of Antonio de Silva, two tragedies which deserve particular mention They are founded on the remarkable history of Inez de Castro. The first of the two, entitled 'Nise Lastimosa,' and relating to the death of Inez, is imitated from a Portuguese play on the same subject by Antonio Ferreira: the second, entitled 'Nise Laureada,' exhibiting the revenge which the infante, become king, took upon the murderers of his wife, and the coronation of the corpse of Inez, it more original than the first, but inferior to it in plot and development. These two pieces, divided each into five acts, with intervening choral odes, may be regarded as the first *regular* tragedies that were written in Castilian *verse*. About the same time also, at Valencia, where the first theatre, built in 1526, was the property of an hospital, were played various dramas, still more remarkable, composed by Cristoval de Virues, whom we have already had occasion to mention, and by Andres Rey de Artieda. Virues, a military officer, was one of the leaders in that day of the great Spanish school which had gloried from the first in spurning the Aristotelian restrictions. His first production was 'La Gran Semiramis,' a subject handled at the same time in Italy by Muzio Manfredi. Virues however, instead of the five acts of the Greeks, divided his play into three *jornadas*, which, together, contain the whole life of Semiramis, the first act being laid at Bactria, the second at Nineveh, and the third at Babylon. He afterwards produced successively, and with the same disregard to the unities, the tragedies of 'Cruel Cassandra,' 'Atila Furioso,' 'Infeliz Marcela,' &c. That entitled 'Elisa Dido,' which he himself announced as written 'conforme al arte antiguo,' is in fact the only one wherein 'the rules' are at all respected. So little however does its plot resemble the famous episode of the Æneid, which Ludovico Dolce had lately brought upon the tragic stage of Italy, that he makes his heroine remain faithful to her first husband Sichæus, and kill herself that she may not marry Iarbas. The associate of Virues in this old war against the classic rules, Juan de la Cueva, after imitating the 'Ajax' of Sophocles, brought out at Seville two original tragedies; one, 'Las Siete Infantes de Lara,' founded on a popular tradition; the other taken from Roman history, and combining two tragic subjects, the death of Virginia and that of Appius Claudius. Cueva was the first who dramatised this subject, which, since then, has been so repeatedly brought upon the stage. Meanwhile, at the Madrid theatre, the tragedies of the friar Bermudez were succeeded by those of Lupercio de Argensola, to which Cervantes, ever more prompt to applaud his contemporaries than to criticise them, gives much higher praise than they can now be admitted to deserve. Of the noble pathos of his own 'Numancia' we have already spoken.

It is plain how much the romantic spirit predominates over the classical, even in these productions *professedly* tragic of the old Spanish stage. When, however, the accession of Philip V. had brought the Spanish theatre within the influence of Parisian taste, not only were the French tragic poets translated into the language of Spain, but some attempts were also made by the Spanish poets to imitate them. Of this number were the 'Virginia' and the 'Ataulfo' of Montiano.

Subsequently, under the enlightened ministry of the marquis of Aranda, this endeavour was resumed by Fernandez de Moratin, Cadalso, and Garcia de la Huerta; the first of whom produced 'Hormesinda,' the second 'Don Sancho Garcia,' and the third 'Raquel;' but these works, though valuable, especially the last, were not striking enough to naturalize a species of drama so novel in Spain. At the commencement of the present century, the like effort was made with better success by Don Nicasio Alvarez de Cienfuegos, ably supported by the talent of the celebrated actor Isidoro Mayquez, in some sort a pupil of Talma, not unworthy of his master, besides that he approached nearer to the wonderful versatility of Garrick, for he succeeded not only in the tragic department, but in every other, even down to simple buffoonery. After Cienfuegos, who left an 'Idomeneo,' a 'Pitaco,' and a 'Zoraida,' appeared two other tragic poets who are yet living. One of these, Quintana, is the author of a tragedy entitled 'Pelayo,' and founded on the history of that old champion of the forlorn cause of Spanish independence against the triumphant Arabians, a truly noble and pathetic piece, of which the Spaniards of the present day, forced like their ancestors to repel a foreign domination, used to repeat the most energetic passages in marching to battle. The other is Martinez de la Rosa, lately prime minister, whose first production of this class was likewise a patriotic piece, 'The Widow of Padilla,' founded on the memorable struggle of the municipal cities of Spain against the tyrannical aggressions of Charles V. This tragedy, composed during the siege of Cadiz by the French, was performed there on a stage erected for that express purpose. Its author has subsequently produced a 'Morayma,' somewhat after the manner of the 'Mérope' of Voltaire, and an 'Œdipus,' played recently at Madrid, wherein, says one of the most intelligent critics of Spanish literature (M. Louis Viardot), he has contrived to be original on a subject already treated by Sophocles, Seneca, Corneille, Voltaire, La Motte, and Dryden.

As regards the present theatrical vogue of the elder Spanish dramatists in their own country, we may remark that while Lope de Vega is almost wholly banished to the libraries, and while Calderon and Moreto seldom occupy the stage, Tirso de Molina, whom we have already characterized, is to be seen there more frequently than any other of the old dramatic writers. The late king, Ferdinand VII., so renowned for his delicate testimonies of devotion to the Virgin, used to enjoy most royally the *rich* jokes of this free-witted friar; and this declared predilection imposed silence on the susceptibility of certain agents of authority, which the friar's bold attacks upon the great were calculated to arouse. His comedy, entitled 'Don Gil of the Green Breeches' (Don Gil el de las Calzas Verdes) was Ferdinand's especial favourite; and accordingly the municipality of Madrid never failed to have this dainty served up to him on state occasions.

Although the performance of the *autos sacramentales* on the ordinary stage was suppressed in 1765, in the reign of Charles III., yet the seasons of Advent and Lent, and more especially the Holy Week, are still solemnized by the like representations in the great churches: a sort of stage, called *the monument*, is erected in the choir, upon which are played the acts of the Passion, wherein the numerous characters that successively figure in the piece still wear the costume of the middle ages as it must have been at the origin of these exhibitions,—san-benitos, black masks, high pointed caps, long skirts, belts, or rather breastplates, made of cords,—all the wardrobe, in short, of an *auto-da-fe* procession.

French Drama.

In France the *mysteries* appear to have had their immediate source in the pilgrimages so common in those days. Menestrier tells us (*Représentations en Musique Anciennes et Modernes*) that the pilgrims to the Holy Land, St. James of Galicia, Mont St. Michel in Normandy, and the various other places of pious resort in France and abroad, used to compose rude songs on their travels, wherein they introduced a recital of the life and death of Christ, or of the last judgment: in others they celebrated the miracles of saints, their martyrdom, and divers wonderful visions and apparitions. These pilgrims, going in companies, and taking their stand in the streets and public places, where they sang with their staves in their hands, and their hats and mantles covered with shells, and painted images of various colours, formed a kind of spectacle which pleased the public of that day, and at Paris excited the piety of some of the citizens to raise a fund for purchasing a proper place in which to erect a stage whereon these performances might be regularly exhibited on holidays, as well for the instruction of the people as for their entertainment. This appears to have been the origin of the society at Paris called the Brethren of the Passion. In 1402 Charles VI. authorised these exhibitions by letters patent: the Premonstratensian monks gave the use of a great hall of their convent, and a stage was constructed in it upon which the fraternity enacted scriptural pieces. The ecclesiastics crowded to these exhibitions; stages soon arose in every province; and the *mystères* were so much relished, that on holidays the hour of vespers was hastened, that the people might have more ample time to be present at the play. The brethren, to vary the attractions of the performance, added a sort of farcical interludes or afterpieces of a merely worldly character, the enacting of which however, careful of their own histrionic dignity, they delegated to a junior society called that of the *Enfans sans Soucis*. These latter pieces, in allusion to their burlesque and buffoon character, were denominated *sottises* or *soties*.

The stage upon which the mysteries were played consisted of several scaffoldings one above another: the most elevated of all represented heaven; that immediately beneath it, earth; a third, still lower, the palace of Herod, the house of Pilate, &c.; and hell, which was at the bottom and in front, was figured by the gaping mouth of a dragon, which opened and shut as the devils went in and out. On each side were seats rising in steps one above another, on which the actors rested when they were not upon the stage, a contrivance not very favourable to scenic illusion; and at the back was a recess, with curtains drawn across it, for the exhibition of such matters as were supposed to take place in the interior of a house.

Among the French, as elsewhere, the Passion was the primary, the most constant, and most solemn subject of these representations, the parts of Christ on the cross, Judas hanging himself, &c., being all played by real persons, sometimes at the actual peril of their lives. It seems to have been owing chiefly to the efforts of the early reformers to diffuse a knowledge of the Scriptures among the people that the Romish ecclesiastics throughout Europe, as one means of securing the fidelity of their flocks, proceeded studiously to extend the field of the religious representations so as to embrace the whole series of Old and New Testament history, or as much of that history as they deemed it prudent to disclose to the multitude. This zealous exertion on the part of the Catholic clergy was supported by all the authority of the Catholic princes. Thus we find that in 1541, under Francis I., the performance of a grand mystery of the Acts of the Apostles was proclaimed with great solemnity under the royal authority, and acted at Paris in the course of many successive days, before the nobility, clergy, and a great concourse of the people, in the Hôtel de Flandres. These plays, written in French rhyme by the brothers Greban, were printed in 2 vols., folio, black letter, under patent of the king to one Guillaume Alabat, of Bourges. The dramatis personæ are, God the Father, the Son, and the Holy Ghost; the Virgin and Joseph; archangels, angels, apostles, and disciples; Jewish priests, emperors, philosophers, magicians, Lucifer, Satan, Beelzebub, Belial, Cerberus, and a multitude of other celestial, terrestrial, and infernal personages, amounting altogether to nearly five hundred. The subjects of these plays are chiefly scriptural; but many of them are from apocryphal New Testament subjects, and the whole forms a strange medley of sacred and profane history. This grand performance was executed, not by any standing company, but by actors selected from the people at large after trial of the merits of the respective candidates. In the present instance, the proclamation notified 'that all should be, on the feast of St. Stephen, the first holiday in Christmas following, in the hall of the Passion, the accustomed place for rehearsals and repetitions of the mysteries played in the said city of Paris, which place, being well furnished with rich tapestry, chairs, and forms, is for the reception of all persons of honest and virtuous report, and of all qualities therein assisting, as also a great number of citizens, merchants, and others, as well clergy as laity, in the presence of the commissioners and judicial officers appointed and deputed to hear the speeches of each personage; and these are to make report, according to the merit of each, as in such case required, as to which have a gracious reception; and from day to day, every day so to continue to do until the perfection of the said mystery.'

Among the numerous legendary pieces, one of the most curious extant is 'The Mystery of the Knight who gives his Wife to the Devil,' (Le Mystère du Chevalier qui donne sa Femme au Diable; but the most universally popular of them all seems to have been that of the miraculous host, or consecrated wafer, tortured by a Jew at Paris, commonly called 'Le Mystère de la Sainte Hostie,' two several versions of which exist in black letter.

After the *mystères* and the *soties*, and during their continuance, came the *moralités* and the *farces*, of which the clerks of the Basoche were the inventors. These clerks were the young assistants of the procureurs, or solicitors, to whom Philippe le Bel granted the privilege of choosing from among themselves a chief, to be called their king, to have supreme jurisdiction over their body, and even to coin money for currency among the clerks. Francis I., in requital of the service rendered him by the king of the Basoche and 6000 of his clerks in marching against the revolters of Guienne, presented them, in 1547, with an extensive promenade ground, bordering on the Seine, which thence took the name of *Pré aux Clercs*. As early as the commencement of the fifteenth century, the king of the Basoche used every year, in July, to make a review of his clerks, divided into twelve bands under as many commanders: after the review, they went and offered their salutations to those gentlemen at the head of the legal profession who composed the parliament of Paris; and then they went and performed a morality or a farce. The brethren of the Passion having the exclusive privilege of acting mysteries, the clerks were driven to the invention of the moralities, which were purely allegorical pieces personifying the vices and virtues. The farces and the soties, on the other hand, took a satirical turn, the success of which soon carried the authors to licentious extremes. The public calamities and violent political dissensions of the reigns of Charles VI. and Charles VII. favoured this tendency: the two leading parties, the Armagnacs and the Burgundians, had each its poet, and insulted each other by turns upon the stage. When public order was restored, the royal authority availed itself of the fair pretext which these satirical excesses afforded to suppress this exclusively popular stage altogether: the clerks were forbidden to play either farce, sotie, or morality, on pain of flagellation and banishment. This suspension continued until the reign of a prince who was less afraid to hear the truth. 'The good king Louis XII.,' says the historian Bouchet, 'afflicted that in his time he could find nobody to tell him the truth, wherefore he could not know how his kingdom was governed, to the intent that the truth should find its way to him he gave liberty to the stage, and willed that upon it should be freely acted the abuses that were committed in his court and kingdom; thinking thereby to be acquainted with many things which it would otherwise be impossible for him to hear of.' He did indeed hear some things of a kind rather novel to royal ears, for the players represented him as mean and miserly. This good natured king, it is true, only laughed at them; but his peculiar relish for homely truths was not likely to predominate among his successors; and accordingly we find that this renovated satirical liberty of the clerks brought on them numerous persecutions, which, however, they seem to have braved at first with something like the daring of an Aristophanes.

The society of the *Enfans sans Soucis*, too, already mentioned, had been established under Charles VI., had been authorized by patent, and had suffered political oppression. Louis XII. took them likewise under his protection: and their most celebrated sotie, entitled 'The Abuse of the World' (L'Abus du Monde) is attributed to the historian Bouchet above quoted. Their farces have been more celebrated, especially that of 'Pathelin,' whose name has ever since been proverbial in France. The best writers of the beginning of the sixteenth century speak of it as a work enjoying the highest reputation; and in recent times it has been revived in the shape of a modern adaptation, by Brueïs and Palaprat. The characters are—Pathelin, a lawyer with little practice; Guillemet, his wife; Guillaume, a draper; Thibaut Aignelet, a shepherd; and the judge; and the humour of the plot consists chiefly in the droll expedient by which the lawyer, after using it to outwit his neighbour the draper, is outwitted by his client the shepherd. But the dialogue itself, written in octosyllabic rhyme, is full of humour; and from one passage it may be mentioned that Lafontaine has taken his charming fable, 'Le Renard et le Corbeau.' This piece, with all its levity, is very interesting, as one of the most truly original and national productions of the early French stage, and therefore as one of those which gave promise of something like that spontaneous and vigorous dramatic growth which was springing in one or two neighbouring countries. But the three several kinds of theatre which we have particularized were fated soon to sink under the repeated blows aimed at them by the government. This strong tendency, however, of the infant stage of France to freedom of political animadversion, and the early jealousy and arbitrary repression of theatrical liberty on the part of the French crown, should be clearly and constantly borne in mind, in order to understand and appreciate that very peculiar course which dramatic composition took in that country, and which the predominance of French taste made for so long a period ascendant in Europe. To this determined stifling by the government of the first germs of a truly national drama we ought to attribute the immediate and general success of the earliest French imitations of the antient theatre that were actually brought upon the stage. The national taste, the *romantic* tendencies of which had decidedly manifested themselves, was not suffered to develop itself freely. Theatrical enjoyment, since they first tasted it, has ever appeared a more imperious *want* of the French, and of the Parisians in particular, than of any other people, excepting perhaps the antient Athenians; and when, at the period in question, their rulers had violently crushed every other species of dramatic production, they eagerly welcomed those only forms of it which those rulers would vouchsafe to let them have.

Some French translations from Sophocles and Euripides already existed, but nobody had yet thought of adapting them to the stage; indeed they were little to the purpose either of the brethren of the Passion or the performers of the Basoche. A young gentleman, Etienne Jodelle, seigneur of Limodin, who had studied the antient dramatists both in their original works and in the Italian imitations of them, was the first to avail himself of the opportunity thus afforded, by bringing forward his 'Cléopatre Captive', a tragedy in five acts, with choruses after the manner of the Greeks. His friends got a stage erected in the Hôtel de Reims at Paris; two poets of note in that day, Remi Belleau and Jean de la Péruse, undertook the principal male parts; and Jodelle himself, trusting to his youth, his personal beauty, and histrionic talent, personated Cleopatra. Henry II. and his court, seeing plainly that while this dramatic innovation would gratify in some degree the craving appetite of the Parisian public for theatrical exhibitions, there was little danger of its contributing to develop those truly national feelings which it was now the confirmed policy of French administrations to discourage, warmly patronized this performance; and all Paris, delighted to have once more a theatre of some sort, followed the court's example. This piece is remarkable only as being the first of its class, and so commencing a new æra of French dramatic history. Jodelle was more successful in his comedy entitled 'L'Abbé Eugène,' wherein, still emulating the Italian imitations of the antients, though in the manners of his own age and country, he exhibits a libertine ecclesiastic intriguing with the wife of a simple man, and his chaplain acting the honourable part of go-between in the affair. There is much comic power and sprightliness in this play, to which succeeded his second tragedy of 'Didon,' the fate of which is not known.

From Jodelle down to Corneille, French dramatic art made little progress; but dramatic productions, in the same line of classic imitation, abounded, especially in tragedy, the heroes of which were constantly taken from Greek or Roman history, or at most from that of the Turks, who were first introduced upon the stage by Gabriel Bonnin. At this early period, indeed, of the French theatre, that singular dramatic prejudice seems to have firmly established itself, that the pomp of tragic style could not be well supported on the stage, except both costume and character were either Greek, Roman, or Mussulman. The Alexandrine verse, too, was almost invariably used; though once, and but once, was acted a prose tragedy of 'Sophonisba,' by St. Gelais. The versified comedies of the same period have nothing remarkable; but in 1562, the two brothers De la Taille began to accustom the French public to comedies in prose. Nicolas Filleul attempted unsuccessfully to naturalize pastoral poetry on the stage. All these writers had still to contend against the privileged possessors of the stage. There was not in all France a single company regularly trained for the new class of performances. Under Henry IV., the brethren of the Passion had obtained almost a revocation of the edict of 1548, which prohibited them from enacting religious subjects; but the public had now little relish for these rude exhibitions, so that the fraternity found themselves obliged to let their theatre to a more modern class of performers. The other dramatic societies endeavoured to adopt their antiquated pieces in some degree to the modern taste; and thus out of their old moralities they contrived to make pastoral pieces wherein the Church was a bride, and Christ the bridegroom. Robert Garnier rose in tragedy some little above his predecessors in elegance and dignity, and was so much celebrated in his own day as to have the pre-eminence of his tragic powers commemorated in one of the best sonnets of Ronsard. Though he usually drew abundantly from Sophocles, Euripides, and Seneca, he showed in some of his pieces more original vigour, as for instance in 'Les Juives,' taken from Jewish history. The prose comedy of intrigue (for the comedy of character had not yet appeared) continued to be cultivated with vigour and success by Pierre de l'Arivey, contemporary with Garnier. The Jesuit father Fronton attempted a tragedy on the grand national subject of 'Jeanne d'Arc,' but without success. At length, in 1600, two permanent theatres were erected at Paris, one of which was occupied by a company which took the title of *Troupe de la Comédie Françoise;* the other company established itself in the quarter of Paris called the Marais, with the consent of the brethren of the Passion, and thus the old stage of the middle ages was finally extinguished in the French metropolis. Still, however, as before, the theatre took its tone from the exclusive taste of the court; and from the commencement of the sixteenth century till the appearance of Corneille, scarcely anything was brought forward but either tragedy or that very harmless description of farce which, it was thought, might without much danger be conceded to the popular taste: this is the grand æra of the popularity of the well-known burlesque personages *Gros Guillaume*, *Tabarin*, and *Turlupin*, whose merry reign was protracted even into the age of Louis XIV.

Most of the tragedies of this period flowed from the exhaustless pen of Alexandre Hardy, a poet employed by the company which had succeeded to the privilege of the brethren of the Passion, and who wrote more than eight hundred dramatic pieces, of which forty remain. Possessed of very extensive reading, Hardy made some efforts to deviate from the beaten track of his predecessors: he ventured in some instances to compose what he called tragi-comedies, one of which is founded on a tale of Cervantes; but his genius was not equal to his boldness and facility. The dramatists who immediately preceded Corneille and Molière were Mairet and Tristan, the former of whom, like so many before and after him, tried and failed in the eternal subject of Sophonisba; while the latter failed yet more signally in the Jewish subject of Mariamne.

We come now to the age of Louis XIV., of which Cardinal Richelieu was the real creator in literature, as well as in politics. This great artificer of despotism, whose genius raised the French crown to a height and a solidity of irresponsible power, for the abuse of which it has dearly paid in later times, had the sagacity, which many powerful ministers have wanted, to perceive that, in order to consolidate his favourite political fabric the more, it was worth while to permanently organize the literary talent of the country in the service of the court. 'Leave us at least the republic of letters,' said Napoleon once to a poet who was showing him too much of the courtier: but Richelieu understood the matter differently; and arranged it so that his literary senate should ever remain as subservient as Napoleon's own political senate was under his imperial reign. The court, it is true, did not directly dictate to the cardinal's chosen forty in what quarters they should bestow their praise or censure; but things were so ordered that the men to whom the protectorship of letters was officially entrusted should always share more or less the tastes and opinions of the government: by the court it was that they were paid; under the eyes of the court they held their sittings; it was by court intrigue that a vacant chair was to be obtained; and every writer was ambitious of that honour.

Such was the predominant influence under which Corneille began his dramatic career. To enter the academy, he must please the court; and to please the court, he must defer to the literary dictation of the academy. Now, in dramatic composition, the academy not merely recommended adherence to the so-called rules of Aristotle, but prescribed their observance with the greatest rigidity. These same Aristotelian maxims were, indeed, in the present instance, little more than a pretext; but the far-sighted cardinal was well aware how admirably they were adapted to facilitate that strictness of surveillance, and that repression of everything like popular enthusiasm, to which his views required that this grand focus of public sympathies, the drama, should be subjected. There was, however, one serious obstacle to the complete establishment of his dramatic system, viz. the general estimation of the Spanish literature and the Spanish drama in particular, then as ascendant in Europe as those of France have been since. Familiarly cultivated and highly relished as the language and literature of Spain then were at Paris, any young dramatic writer of vigorous talents must have found himself, with all his anxiety to please the court, rather disagreeably circumstanced, between the academy and its classic code on the one hand, and the successful example of the most popular European dramatists on the other. Corneille produced six comedies and one tragedy after the antique models, before he ventured on any bolder attempt. Their great superiority in elegance and dignity of style over those of all his French predecessors, who in this respect had remained so far behind the Italians and the Spaniards, would alone have been sufficient to ensure their success. He next produced a comedy in the Spanish taste; and shortly after ventured to give a yet more striking evidence of his romantic tendencies in his tragedy of *Le Cid*.

This vigorous experiment brought the academic code and the public taste fairly into collision; the latter decided loudly for the author, and under any other political system might have effectually supported and encouraged him in his independent views of art. But the league of the academy with the court was too strong even for his masculine resolution; and in two of his best pieces, which next followed, 'The Horatii,' and 'Cinna,' he returned to the Roman tragedy. In comedy, however, Corneille still borrowed avowedly from the Spanish stage. In his tragedy of 'The Cid,' he had imitated two Spanish dramatists, Guillen de Castro and Diamante, who had both successively treated the same subject; and now, in his comedy of 'The Liar' (Le Menteur), he frankly and warmly acknowledged his obligations to a Spanish original, 'The Doubtful Truth' (La Verdad Sospechosa), of Don Juan Ruiz de Alarcon, which was long attributed by some to Lope de Vega, by others to Francisco de Rojas, and of which Corneille himself did not know the real author. When he afterwards produced the 'Sequel to the Liar' (La Suite du Menteur), he owned that he drew it also from a Spanish source; we find his original in Lope de Vega's 'Loving without knowing whom' (Amar sin saber á quien). Fontenelle himself, so careful of his uncle's fame, tells us, in speaking of another of his pieces, that it is taken almost entirely from the Spanish; 'for,' says he, 'at that time nearly all the plots were taken from the Spaniards, on account of their great superiority in those matters.' But Corneille's deep study of and sympathy with the Spanish dramatists appear also in the compositions more peculiarly his own; those chivalric manners, those lofty sentiments and swelling images, with which he was so familiarized, are discoverable throughout; his very Romans belong rather to the middle ages than to the old republic; and, indeed, are perhaps hardly so much Roman as they are Spanish. However, he kept himself in a feverish and constrained submission to the academy, for which he was at last appropriately rewarded with a seat among its members.

The rise of the French comedy of character, of which Molière is the great representative, is yet more clearly deducible from the Spanish source than that of their classic tragedy. The marked separation between tragedy and comedy was a fundamental article of the academic code. To that most numerous order of writers who are fitted to deal only with one of the two great classes of dramatic elements, the comic and the serious, such an injunction operates indeed rather as an encouragement than as a shackle or a clog; but when this prohibition of the mixed or truly romantic species falls upon a genius so bold and comprehensive as that of Corneille, it cripples the noblest of his powers, and shuts out from him the richest of his resources. A writer, however, having this depth and compass of genius, with that constant tendency to seriousness of purpose which ever attends them, finds it a less painful effort to abstain from the comic intermixture in tragedy than to exclude the passionate and the pathetic from comedy; and will thus, like Corneille, devote himself less to the latter than to the former. But Molière was born for the comic only, and could therefore indulge his dramatic tastes and propensities with comparatively little restraint. In his first pieces, written for a strolling company, he imitated the lively trickery and buffoonery of the Italian farces, a species of composition for which, throughout his career, he showed a strong inclination. Next, in 'L'Etourdi' and 'Le Dépit Amoureux' he imitated the Spanish comedy of intrigue. And how he was led, by Corneille's adaptation from the Spanish, to the comedy of character, wherein he was destined to establish his fame so solidly and so durably, he himself tells us in a letter to Boileau, recently quoted by Martinez de la Rosa. 'I am much indebted,' he says, 'to "Le Menteur." When it was first performed, I had already a wish to write, but was in doubt as to what it should be. My ideas were still confused, but this piece determined them. In short, but for the appearance of "Le Menteur," though I should no doubt have written comedies of intrigue, as "L'Etourdi" or "Le Dépit Amoureux," I should perhaps never have written "Le Misanthrope." Nor was it alone through the medium of Corneille that Molière, in his maturer compositions, received the influence of the Spanish stage: in various instances he borrowed directly from it, especially in his secondary pieces.

It is remarked by Schlegel, that when Molière in his farcical pieces did not lean on foreign invention, he still appropriated to himself the comic manner of other countries, especially that of the Italian buffoonery. 'He wished to introduce a sort of masked characters without masks, who should recur with the same name. They have never however been able to become properly domiciliated in France; because the flexible national character of the French, which imitates every mode that is prevalent for the time, is incompatible with that odd originality of exterior to which humorsome and singular individuals give themselves carelessly up in other nations, where all are not modelled by the social tone after the same manner. As the Sganarelles, Mascarilles, Scapins, and Crispins have been allowed to retain their uniform that everything like consistency may not be lost, they are now completely obsolete on the stage. The French taste is, generally speaking, very little inclined to the self-conscious, drolly exaggerating, and arbitrary comic; because these descriptions of the comic speak more to the fancy than to the understanding. We do not mean to censure this, nor to quarrel about the respective merits of the different species. The low estimation in which the former are held may perhaps contribute the more to the success of the comic of observation; and in fact the French comic writers have here displayed a great deal of refinement and ingenuity: herein consists the great merit of Molière, and it is certainly very distinguished.' The highest refinement and delicacy of the comic of observation, however, consists in this, that the characters disclose themselves unconsciously by traits which involuntarily escape from them; whereas long argumentative disquisitions between the several personages are frequent in all the most admired pieces of Molière, and nowhere more so than in 'Le Misanthrope,' which has always been cited by the French critics of the old school as the great model of French comedy; close by which they rank the 'Tartuffe,' 'Les Femmes Savantes,' and 'L'Ecole des Femmes' of the same author. Molière's greater comedies, in short, are too didactic, too expressly instructive; whereas the auditor should only be instructed covertly and incidentally. It should be observed that 'The Miser' of Molière ('L'Avare'), some scenes of which are taken from Plautus, is the earliest instance of a five-act French comedy written in prose.

The restrictions which cramped the genius of Corneille comfortably fitted that of Racine, and contributed to render him in every sense the favourite tragic poet of the court of Louis XIV. He seemed born to carry to the highest possible perfection what we must call, for want of a neater term that should be equally appropriate, the Frenchification of Greek tragedy. He managed with consummate art and most felicitous ease to flatter at once the dramatic taste and the moral temperament of the court. The very anomaly which his works presented, in giving to antique heroes the tone and the language of the French gallantry of his time, thus became one of their highest recommendations. Above all, his excellence in investing the expression of love, real or pretended, with conventional dignity and delicacy, was a merit invaluable in the eyes of Louis and his courtiers of both sexes. For tenderness and elegance of expression, Racine is indeed unrivalled among the French dramatists of the classic school. His high powers of this kind made him also one of the ablest appropriators and improvers of the eloquence of preceding writers in numberless scattered passages of his own productions. Among his pieces on Grecian subjects, 'Andromaque' is that in which he displays the most originality: in this tragedy, says Schlegel, 'he expressed the inward struggles and inconsistencies of passion with a truth and energy which had never before been heard on the French stage.' And respecting 'Phèdre,' the same critic, looking with no partial eye upon the masters of the French classic school, observes—'How much soever in this tragedy Racine may have borrowed from Euripides and Seneca, and how much soever he may have spoiled the former and not improved the latter, still it was a great step from the affected mannerism of his age to a more genuine tragic style. When we compare it with the 'Phèdre' of Pradon, which was so well received by his contemporaries, for no other reason than because no trace whatever of the antients was discernible in it, but every thing reduced to the scale of a fashionable miniature-portrait for a toilette, we must entertain the higher admiration for the writer who had so strong a feeling for the antient poets, had the courage to connect himself with them, and dared to display so much purity and unaffected simplicity in an age of which the prevailing taste was every way vitiated and unnatural.' Racine's 'Britannicus' is one of those among French classic tragedies which have the highest claims to historical accuracy and delicate discrimination of character, in the persons of Nero, Agrippina, Narcissus, and Burrhus. 'In "Athalie,"' says his German critic, 'he exhibited himself for the last time, before taking leave of poetry and the world, in his whole strength. It is not only his most finished work, but I have no hesitation in declaring it, of all the French tragedies, to be the one which, free from all mannerism, approaches nearest to the grand style of the Greeks. The chorus is fully in the sense of the antients, though introduced in a different manner for the sake of suiting our music and the different arrangement of our theatre. The scene has all the majesty of a public action: expectation, wonder, and keen agitation, succeed each other, and constantly rise with the progress of the drama: with a severe abstinence from everything extraneous, there is a display of the richest variety, sometimes of sweetness, but more frequently of majesty and grandeur. The inspiration of the prophet elevates the fancy to flights of more than usual boldness. The signification is that which a religious drama ought to have; on earth, the struggle between good and evil; in heaven, the wakeful eye of Providence darting down rays of decision from unapproachable glory. All is animated by one breath, by the pious inspiration of the poet; of the genuineness of which neither his life nor this work will allow us to entertain a doubt. This is the very thing in which so many pretended works of art of the French are deficient: the authors have not been inspired by a fervent love for their subject, but by the desire of external effect; hence the vanity of the artist everywhere breaks forth, and casts a damp over our feelings.'

In the history of French tragedy, it is little gratifying to pass from Racine to Richelieu's favourite, the Abbé D'Aubignac, who revenged himself for the failure of his tragedy of 'Zénobie' by censuring bitterly the works of Corneille. Racine himself found a similar adversary in Nicolas Pradon, who wrote a rival tragedy of 'Phèdre,' which Madame Deshoulières was not ashamed to extol above Racine's, and a 'Régulus,' which the praises of St. Evremond and Madame de Sévigné have not saved from oblivion. Lafosse profited somewhat better by Corneille's example in the dignity and intelligence which he threw into his otherwise feeble 'Manlius,' which Talma's acting recently made so popular. As for the tragedies of Duché, Campistron, the abbé Pellegrin, the abbé Longepierre, and others, suffice it to say, that they brought little fame to their authors, and no advancement to the art. Thomas Corneille ventured to write tragedy after his brother, and wrote it very 'correctly.' Crébillon was by far the most successful tragic writer that arose in the interval between Racine and Voltaire; but his reputation, rapidly acquired, resting on an unsound basis, declined almost as rapidly; ever striving rather to horrify than to affect, the unnatural exaggeration both of situation and character into which he was constantly betrayed was a defect too serious to be redeemed even by the great force and mastery of style which he displays.

This species of composition occupied no small proportion of the wonderful versatility of Voltaire; and although he was irresistibly led to press the tragic muse into the service of the unceasing warfare which he waged against superstition, fanaticism, and hypocrisy, and might even owe some portion of his theatrical success to that circumstance, yet he has earned, in universal estimation, a place beside Corneille and Racine as a dramatic artist. The same independence of genius and spirit which made him rebel against other conventionalisms of graver import, prompted him to break through some of the more irksome part of the restrictions imposed by the established dramatic system. He insisted on treating subjects with more historical truth, and raised once more to the dignity of the tragic stage the chivalrous and Christian characters of modern Europe, which, ever since 'The Cid' of Corneille, had been altogether excluded from it. Thus his Lusignan and Nerestan, in 'Zaïre,' are among his most true, affecting, and noble creations; and the plot of his 'Tancrède' is founded on as pure motives of honour and love without any ignoble intermixture, as entirely consecrated to the exhibition of chivalrous sentiments, as that of 'Le Cid' itself. In 'Alzire,' Voltaire went still farther, treating a subject in modern history never before touched by his countrymen; and as in the pieces already mentioned he had contrasted the chivalric ideas and motives with the Saracenic, so here, with great historical truth and noble pathos, he has ventured to exhibit the old Spaniards in opposition to the Peruvians. 'It is singular enough,' remarks Schlegel, 'that Voltaire, in his restless search after tragical materials, has actually completed the circumnavigation of the globe; for, as in 'Alzire' he exhibits the American tribes of the other hemisphere, in his 'Dschingis Kan,' he brings Chinese upon the stage from the farthest extremity of ours, who, from the faithful observance of their costume, have the appearance of comic or grotesque figures.' 'As the French,' observes our German critic in another place, 'are in general better acquainted with the Romans than with the Greeks, we might expect the Roman pieces of Voltaire to be more consistent, in a political point of view, with historical truth, than his Greek pieces are with the symbolical nature of mythology. This, however, is the case only in 'Brutus,' the earliest of them, and the only one which can be said to be sensibly planned. Voltaire sketched this tragedy in England; he had learned from "Julius Cæsar" the effect which the publicity of republican transactions is capable of producing on the stage, and so endeavoured to hold in some degree a middle course between Corneille and Shakspeare;' of the latter of whom, we may add, he acquired, or at least evinced, very little in the way of due appreciation. On the whole, however, though Corneille is deemed to have expressed heroic sentiments with greater sublimity, and Racine the natural emotions with greater sweetness, it is admitted that Voltaire introduced moral motives into the drama with greater effect, and displays a more intimate acquaintance with the original relations of the mind.

Only the first and the last of these three great masters of the French tragic stage may be said to have been fruitful in this class of productions. Racine, however, has this advantage, that, excepting his first youthful attempts, the whole of his pieces have kept possession of the stage and of the public favour, while many of Corneille's and Voltaire's which pleased at first are not now even so much as read, so that it has become common to publish selections from their dramatic works under the title of *Chefs-d'œuvre*.

Voltaire seems to have come too late, even with his moderate attempts at reformation of the dramatic system. The prejudice which gave such disproportionate importance to the observance of external rules and proprieties was already immovably established; nor was it until after the great political change which took place towards the close of the last century that any considerable effort was again made to break through the academic limitations. We shall therefore pass briefly over the half century of French dramatic history which immediately followed the age of Louis XIV., notwithstanding that, during that period, upwards of fifty authors, of more or less celebrity, wrote for the higher departments of the stage, of whose pieces the greater part were actually performed, many of them with high temporary and some few with permanent success. In tragedy we shall mention nothing more than the names, for the most part now obscure, of Lagrange, Chancel, Lamotte, Piron, Lanoue, Guimond de Latouche, Châteaubrun, Saurin, and Debelloy.

La Harpe, whose critical labours had so extensively injurious an influence throughout Europe in enforcing the classic system in all its rigidity, contributed nothing to recommend it by his own tragic compositions, which, while they are among the most correct in style, are among the most frigid in sentiment and effect, although, indeed, he has the merit of having presented, in his 'Philoctète,' the most exact imitation of a Greek tragedy that France has produced. On the other hand, Marie Joseph Chénier, who, flourishing in the early days of the Revolution, wrote, like the tragic poets of Greece, in the midst of free men, and with like ardour stimulated them to the love of liberty, made nearer approaches than any of his predecessors to the tragic strength and fervid diction of Voltaire. His 'Charles the Ninth, or the School for Kings' (Ecole des Rois), from which the people, too, might draw an important lesson, was that among his pieces which produced the greatest excitement in the public mind. So far, however, from studiously blackoning the character of the young king, he casts chiefly upon his mother-in-law and the cardinal of Lorraine the odium of the St. Bartholomew massacre, the horrors of which he depicts with unsparing energy. In his 'Tibère' he no less forcibly exhibits the interior of a hypocritical tyrant, as he does that of a fanatical one in his 'Philippe II.,' in some parts of which he has happily, but not servilely, imitated Schiller. It was in his 'Fénélon,' too, wherein he paints the miseries of the cloister, and shows Fénélon's angelic piety in admirable contrast with the fanatical passions which possess the other characters, that the young Talma, whose histrionic powers Chénier had already divined, began to make himself known to the public. Ducis, possessing brilliant powers of poetic execution, portrayed the Arabian manners, in his tragedy of 'Albufar,' with great warmth of imagination and originality of style; but his highest claim to dramatic celebrity rests upon the endeavour, which he made with considerable success, to bring his countrymen acquainted with the masterpieces of Shakspeare. Having high qualifications for this task, it is to be regretted that he felt himself bound to cramp and maim his adaptations by reducing them within the French dramatic limitations, when, by copying his English original more closely, he might have made himself a creator in French literature: still his work was most praiseworthy and important, as the first able and cordial attempt to give the French public some remote idea at least of the real merits of that transcendent genius whom Voltaire, though he made some efforts to appreciate, had remained so far from understanding as to call him deliberately 'a drunken savage.' The name of M. Arnault appears already in the dramatic annals of that period. His first tragedies, 'Marius à Minturnes,' 'Lucrèce,' and 'Cincinnatus,' with their energetic simplicity, are in spirit and design truly antique. Gabriel Legouvé's 'Death of Abel' (Mort d'Abel) was a hazardous but successful attempt to make an antediluvian subject acceptable on a modern stage, to which he had been encouraged by the popularity which Gessner and his poetry then enjoyed. The same author ventured to exhibit, not unsuccessfully, in 'Epicharis et Néron,' the latter days of Nero, the opening of whose career is shown in one of the masterpieces of Racine. 'Les Templiers' of M. Raynouard, founded on the destruction of the order of Knights Templars in the reign of Philippe le Bel, is much more remarkable for art and correctness of structure and execution than for poetic vitality; but these merits, added to the powerful interest of its national subject, made it highly successful.

Some of the comedies of Boursault, a younger contemporary of Molière, have kept possession of the stage: they are all of the secondary description which the French call *pièces à tiroir*, of which Molière himself, in his 'Fâcheux,' gave the first example. This kind, in the accidental nature of the scenes, which are strung together on one common occasion, bear a resemblance to the *mimi* of the antients: they are particularly favourable for the display of the mimetic art in the more limited signification of the term, as it is one and the same player that re-appears throughout in a fresh character and a different disguise. The want of dramatic movement however in such productions requires they should be short, whereas Boursault's pieces, though otherwise possessing considerable merit, are drawn out to the wearisome length of five acts.

After Molière's death, a considerable time elapsed before the appearance of Regnard, to whom the second place among the French comic writers has usually been assigned. He divided his labours between the Italian theatre, which still flourished under Gherardi, and for which he sketched the French scenes, and the composition of regular comedy in verse. His earliest play, 'The Gambler' (Le Joueur), is the most esteemed: it is a picture after nature, drawn strongly, but without exaggeration, from his intimate acquaintance with the subject resulting from his personal experience. His 'Absent Man' (Le Distrait), running exclusively upon the exhibition of that characteristic defect, is necessarily tedious: the author has here done little more than dramatize a series of anecdotes which La Bruyère had assembled under the name of a particular character. His 'Légataire Universel,' though exhibiting more comic power, fails through a deficiency of moral feeling. La Harpe however declares it to be a masterpiece of comic pleasantry; whereupon Schlegel remarks: 'It is in fact such a subject for pleasantry as would move a stone to pity; as enlivening as the grin of a death's head. What a subject for mirth!—a feeble old man in the jaws of death, who is teazed by young profligates for his property, and has a false will imposed on him while lying insensible, as is believed, on his death-bed.'

A contemporary of Regnard, the actor Legrand, was one of the first comic poets of his nation who acquired celebrity in versified afterpieces, a kind in which the French have since produced many elegant trifles. His posthumous fame however has been far inferior to that of Regnard; although there is one piece of his, 'Le Roi de Cocagne,' a sprightly farce in the wonderful style, overflowing with a quality then rarely found in the French drama, a native and fanciful wit, animated by the liveliest mirth, which sports about all sorts of subjects in the most frolicsome yet harmless manner. But the French critics of the old school have generally been indifferent or unjust towards any impulse of genuine fancy: confounding, it should seem, the levity of jocularity with that of mere shallowness, which has been so much complained of in their countrymen.

The eighteenth century produced a number of comic writers in France of the second and third rank, but no genius capable of advancing that department of the dramatic art a step farther, and thus the belief in the unapproachable excellence of Molière became yet more firmly fixed. 'Want of easy progress,' observes Schlegel, 'and the use of lengthened disquisitions in stationary dialogue, have characterized more or less every writer since the time of Molière, on whose regular pieces the conventional rules applied to tragedy have had an indisputable influence. French comedy in verse has its tirades as well as tragedy; which circumstance contributed to introduce into it a certain degree of stiff etiquette. The comedy of other nations has generally descended, from motives which we can be at no loss to understand, into the circle of the inferior classes: but the range of the French comedy is nearly confined to the upper classes of society. Here also we trace the influence of the court as the central point of the whole national vanity. Those spectators who in reality had no access to the great world, were flattered by having marquises and chevaliers brought before them on the stage; and the poet himself, while satirising the fashionable follies, endeavoured to snatch something of that privileged tone which was esteemed so enviable. Society rubs off the salient angles of character; its peculiar entertainment consists in detecting the ridiculous; and hence we acquire the faculty of being on our guard against the observations of others. Thus it is that the natural, cordial, and jovial comic of the inferior classes is laid aside, and another description, the fruit of polished society, and characterized by the insipidity of such an aimless way of living, comes to be substituted in its place. The object of these comedies is no longer life, but society; that perpetual negotiation between conflicting vanities which never ends in a sincere treaty of peace: the embroidered dress, the hat under the arm, and the sword by the side, essentially belong to them; and the whole of the characterization is limited to the folly of the men and the coquetry of the women. The insipid uniformity of these pictures was unfortunately too often seasoned by the corruption of moral principles which, especially after the age of Louis XIV. till the middle of the century, under the Regency and Louis XV., it became the fashion openly to avow. In this period the favourite of the women, the *homme à bonnes fortunes*, who in a tone of satiety boasts of the multitude of his conquests, too easily achieved, was not a character invented by the comic writers, but an accurate portrait from real life, as is proved by many memoirs of the last century, even down to those of a Besenval. We are disgusted at the unrivalled sensuality of the love intrigues of the Grecian comedy; but the Greeks would have thought the intrigues with married women in the French comedy, entered into merely from giddy vanity, much more disgusting. Limits have been fixed by nature herself to sensual excess; but where vanity assumes the part of a sensuality already deadened and enervated, it gives birth to the most hollow corruption. If, in the constant ridicule of marriage by the petit-maitres, and in their moral scepticism, especially with regard to women, the poets merely intended to censure a prevailing depravity, the picture is not therefore the less dangerous. The great or fashionable world, which in point of numbers is the small, but which considers itself as alone of any importance, can hardly be improved by it; and the example is but too seductive for the other classes, from the brilliancy with which the characters are surrounded. But in so far as comedy is concerned, this deadening corruption is by no means entertaining; and in many pieces in which fools of quality give the tone, as in the 'Chevalier à la Mode' of Dancourt for instance, the picture of complete moral dissoluteness, which, though true, is both unpoetical and unnatural, is not only wearisome in the extreme, but most decidedly disgusting.

'From the number of writers to whom this charge principally attaches, Destouches and Marivaux, fertile, or at least diligent, comic poets, the former in verse, the latter in prose, deserve to be excepted. They acquired considerable distinction among their contemporaries in the first half of the eighteenth century, but few of their works survived either of them on the stage.

'Two other separate works are named as masterpieces in regular comedy in verse, belonging to two writers who perhaps have here taken more pains, but in other poetical departments have given freer scope to their natural talent—the "Métromanie" of Piron, and the "Méchant" of Gresset. The 'Métromanie' is not without humorous inspiration: in the young man possessed by a rage for versifying, Piron meant in some degree to portray himself; but as we always go tenderly to work in ridiculing ourselves, so, together with the amiable weakness in question, he exhibits in his hero talents, magnanimity, and good-heartedness· but this same tender regard is not peculiarly conducive to comic strength. The "Méchant" is one of those gloomy comedies which might be rapturously hailed by a Timon as serving to confirm him in his aversion to human society, but on social and cheerful minds can only be productive of the most painful effects. Yet, according to the decision of the French critics, these three comedies, "The Vainglorious Man" (Le Glorieux) of Destouches, "La Métromanie" of Piron, and "Le Méchant" of Gresset, are all that the eighteenth century has to oppose to Molière. To Diderot's attempts at dramatic innovation, as they were founded on false views of the objects and conditions of art in general, we shall do no more than allude. And of Beaumarchais, the celebrated of 'Le Barbier de Seville' and 'Les Noces de Figaro,' it may be said, that, under the last days of the monarchy, he assailed the corrupt society of his time with a wit no less caustic, sportive, and subtle, in his dramatic pieces, than Voltaire had employed against it in his lighter tales and essays.

In the overthrow of the *ancien régime* in politics fell the main support of the old dramatic code; yet it is remarkable, though perhaps not wonderful, that many of the warmest and firmest opponents of the former, both then and since, have clung with extreme tenacity to the latter; so strong and so binding is the force of habit, especially of literary habit, so long as the analytic powers have not been brought to bear directly and expressly upon the subject in question. Hence the revolution in French art and literature has followed but tardily the political revolution; and its first promoters have had to contend against the most formidable obstacles. However, they presented themselves early in the field. The stormy days of the Convention, and the saturnalian period of the Directory which followed them, did indeed afford little leisure or encouragement for the cultivation of the liberal arts; but no sooner were the danger and the fear of anarchy removed by the firm and vigorous administration of the Consulate, than the new literary and dramatic ideas began to develop themselves, and, in consequence, a violent war to be waged between the *classicistes* of the old school and the *romanticistes* of the new.

Among the earliest, ablest, and steadiest cultivators of the French romantic drama, the first place seems due to M. Népomucène Lemercier. In his tragedy of 'Agamemnon,' the most perfect work of the kind that had yet appeared since Racine and Voltaire, he strove, with signal success, to combine with felicity of plot and purity of style, more original and striking attractions. He penetrated far beneath the costume and the forms of antiquity, to its inmost soul and spirit: to the numerous personages, so different in their characters and their interests, whom he grouped with admirable skill, he lent their respective habits, manners, and language, with such clear and just discrimination, as to create a class of dramatic beauties, which, at that day, took the French public by surprise, while the consummate art with which they were introduced won their admiration for that which otherwise they would have regarded merely as an audacious innovation. When the first shocks of the Revolution had subsided, and, as we have already observed, literature and art once more found room to breathe, M. Lemercier made a yet bolder step in his devoted cultivation of the *drame*, as the new species was distinctively denominated by its advocates, who characterized it as a simple adherence to the higher spirit of art, while its opponents stigmatized it as a forced and incongruous mixture of tragedy and comedy. In his drama of 'Pinto,' he ventured to unfold at once the whole romantic system; it exhibits the freest intermixture of humorous scenes with grave situations, in a most lively and varied picture of the popular emotions and the protracted anxiety of a band of conspirators, with all the vacillations, the inquietudes, the reverses, and the bursts of enthusiasm, attendant on similar attempts at political change.

We cannot better convey a notion of the course of French dramatic art from that time down to the years which immediately preceded the revolution of 1830, and of the manner in which that course was affected by the remarkable variations of political circumstances, than in the words of M. Lemercier himself, writing under the government of the Restoration, about the year 1825. (*Revue Européenne*, No. 5.) 'In former time,' says he, 'urged by that want in the public mind which made it seek to quit the académie routine, I strove to create, under the name of *Pinto*, a sort of *historic play*, wherein the reverse side of the court decorations should be presented to the audience; where the great and the people should speak, each in their genuine language, and show their respective absurdities in contrast. The art was gradually advancing, when its march was again embarrassed by the complication of public affairs. A fatally personal ambition erected the imperial government. Truth gave it umbrage, and therefore silence was to be imposed on her interpreters. All progress was stopped; all poetic reputation excited suspicion in a threefold police: we stood aside, and held our peace during the concerts of constrained applause. The muses are irreconcilable with tyranny: the forced silence of the former has always attested the presence of the latter; but their patience ever finds an opportunity to stigmatize this disgrace. After so many checks and vicissitudes, the obstacles accumulated by thirty years of civil discord are now united against the free progress of art, with shackles imposed by a mistaken prudence. The opposing parties, the coteries, proscribe the noblest recollections of antiquity through dread of the republican spirit: the church, whose history is so closely mingled in all modern annals, forbids the delineation even of her virtues, lest it should lead to that of her crimes. She proscribes her own sacerdotal costume, which Wolsey wears upon the English stage, and the grand-inquisitor of Madrid upon that of Vienna: she shrinks from beholding her sacred habit, not only on the cardinal of Lorraine, but even on the venerable Fénélon. Not more uncompromising was the rigidity with which Robespierre rejected the purple of royalty and the costume of count or marquis. A censorship, sprung up under the Empire, is now exercised through agents more numerous and more secretly inquisitorial: with such a censorship nothing can be portrayed, nothing can be thought; we must not even dare to remember anything. Such few sparks of the sacred fire as yet escape at rare intervals from a vessel so carefully covered up, so thoroughly smothered, go and die out in some party committee or some *bureau de surveillance*. Not that there is any reason to believe that dramatic literature is dead in France; but it is languishing, imprisoned, and has no refuge in most of the other countries of Europe, where the same causes oppose to it the same barriers as amongst ourselves. However, as the people must have spectacle, and as the appearance is to be given them when the reality is taken away, the idle are left in possession, not only of academies and censured journals, but of theatres—laborious manufactories wherein each individual associating himself with the mass, contributes the full amount of his most insignificant ideas, in order that the police may tolerate them, and so not prevent him from gaining his livelihood or enriching the theatrical storehouse. Hence all this painting of little vices, little oddities, little people, little commonplace minds; and all these nothings amuse, while they take its money, a nation flattered by the little compliments which form the customary burden of its theatrical *éphémérides*. And thus, by the voice of these *musettes*, singing with permission and according to orders, has it been consoled for the loss of its noblest pleasures, and diverted from its pursuit of glory and liberty by the distractions administered to its levity. Too long has the blindness of parties converted our great theatres into so many fields for the trial of their political strength—so many arenas opened to the frantic impulses of allusion: the lapse of thirty years has not deadened this scandalous strife; and during all this time the censorship, vainly occupied in striving to defeat these malicious contrivances, has sometimes suppressed the most salutary productions, and sometimes inserted into them whole passages favourable to the reigning systems. but the public revenge themselves by rejecting the applications which self-interest has suggested, at the same time that they eagerly lay hold on those which punish this wretched exercise of a power that cannot wisely suppress anything but positive abuses. What, then, can any talent accomplish under chains at once so galling and so depressing? It is cheated of the substance, and has nothing left it but the superficial graces of versification.'

The revolution of 1830 was a victory won for liberty in art as well as in politics. Since then, the higher departments of the French drama, both as to writing and acting, have been in full activity. Among the advocates and emulators of the Shakspearian *drame*, Victor Hugo has hitherto shown himself the foremost, the boldest, and the ablest. In tragedy in the more limited sense, though still of the romantic school, Alexandre Dumas and Alfred de Vigny are the most distinguished. It is the higher comedy that seems at present to be the least flourishing. Meanwhile, the classic reputation of Molière preserves his comedies on the stage, although in tone and manners they are altogether obsolete

The serious or ideal French opera dates from the time of Louis XIV. Cardinal Mazarin, himself an Italian, had introduced into France the taste for the Italian opera. Louis too was desirous of rivalling or surpassing foreign nations in the external magnificence of the drama—in decoration, machinery, music, and dancing; these were to be used on festival occasions at court, and accordingly Molière was employed to write gay operas, and Quinault grave ones, for the music of Lulli. As Quinault is the only great poetical name in the history of the higher French opera, we refer to his article [Quinault] for what we have further to say of that particular species. The *operette*, or comic opera, has been much more successfully cultivated by modern French writers, owing, in a great degree, to the substitution, in this kind, of ordinary dialogue in lieu of recitative, so unfavourable to dramatic animation. The *vaudeville*, in which the lighter dramatic writers of France have of late been so wonderfully prolific, and which so peculiarly harmonizes with the tone of good-natured gaiety in the more popular classes of that country, is but a variety of the comic opera; its essential distinction being, that it dispenses with musical composition, as the songs are set to well-known popular airs.

It is a fact worthy of attention, that the histrionic art, especially in tragedy and the higher comedy, has long been carried in France to very high perfection. Schlegel himself admits, that in external dignity, quickness, correctness of memory, and in a wonderful degree of propriety and elegance in the delivery of verse, the best French actors can hardly be surpassed.

On the whole, we must observe, there is no cause to apprehend any permanent decay of dramatic art in France. The most powerful and most salutary external stimulus that the artist can receive, more especially the dramatist, is not the merely material and pecuniary support of the public for whom he labours, but an enlightened interest and sympathy on the part of that public for his art itself; and the French people, with a livelier general susceptibility of this nature than some of their neighbours, have ever been peculiarly alive to the attractions of the stage. When, therefore, we consider the important advances which the liberated mind of France has already made in philosophy, in poetry, and especially in history; when, also, we consider that the French theatre has not been operated on by circumstances like those which in England, as we shall see, have so long created purely physical yet insurmountable obstacles to vigorous dramatic cultivation; we may fairly conclude, that the modern stage of France is destined to reach far higher and more varied excellence than even its noblest geniuses could attain under the despotic restrictions of the old dramatic system. Nor can we help remarking, that in the mean time the English critic is bound to show indulgence rather than severity to the very errors and extravagancies of a rising school which so cordially and so explicitly sets up Shakspeare, if not as the god of its idolatry, yet certainly as the object of its highest, most admiring, and most affectionate reverence, as well as its most zealous emulation.

German Drama.

The earliest mention of the performance of Mysteries in Germany appears in the 'Eulen-spiegel,' which professes to be the history of a celebrated buffoon of that name, who is stated to have lived about the middle of the fourteenth century, although the book itself is not older than the beginning of the fifteenth. We there find, amongst other elegant matters, 'How Eulen-spiegel made a play in the Easter fair, wherein the priest and his maid-servant fought with the boors.' The oldest extant German drama was written about the middle of the fifteenth century, by one Hans Rosenpluet, a native of Nuremberg. He was succeeded by two fertile writers born in the same imperial city, Hans Sachs and Ayrer. Among the works of Hans Sachs we find a great number of tragedies, comedies, spiritual and temporal histories, where the prologue and epilogue are always spoken by the herald, besides merry carnival plays. All these pieces, it appears, were acted, not by players, but by respectable citizens, as an allowable relaxation, without any theatrical apparatus. The carnival plays are rather coarse, but often extremely droll, running indeed into the wildest farce, and overleaping all the bounds of reality. 'The composition,' says Schlegel, 'is respectable, and does not contain many circumlocutions: all the characters, from God the Father downwards, state at once in plain terms what they have at heart, and why they make their appearance; like those figures in old pictures, who have labels put in their mouths to assist the defective expression of the attitudes.' Allegorical personages frequently appear; and the form approaches most on the whole to what were elsewhere called Moralities.

In the first half of the seventeenth century, **Opiz**, regarded as the founder of the modern forms of German poetry, translated several tragedies from the antients into verse, and composed operatic pastorals after the Italian manner; but it is not known whether he wrote anything expressly for the stage. Next came Andreas Gryphius, considered as the first dramatic writer of Germany. Among his imitations and translations from various modern languages, are, a tragedy from the Flemish of Vondel, and a farce called 'Peter Squenz' (Peter Quince), which is an extension of the burlesque tragedy of Pyramus and Thisbe in Shakspeare's 'Midsummer Night's Dream.' The latter was then almost unknown beyond his own island: the learned Morhof, who wrote in the last half of the seventeenth century, confesses that he had never seen Shakspeare's works, though he was well acquainted with Ben Jonson. Even so late as the middle of last century, a German writer of some merit could institute a comparison between Gryphius and Shakspeare; though assuredly no further resemblance is traceable than this, that Gryphius, as well as Shakspeare, was fond of calling up the spirits of the departed. He seems rather to have had before his eyes the Flemish writer Vondel, whom his countrymen still call the great Vondel, while Gryphius himself has been consigned to oblivion. The plays of Gryphius are written after the French model in Alexandrines; the scene sometimes changes; and the interludes, partly musical, partly allegorical, somewhat resemble the old English masks; the author however shows little theatrical skill; nor is it even known that his pieces were actually performed. The tragedies of Lohenstein, who wrote at the same time, are of such immeasurable length as clearly to have set all representation at defiance.

'The pitiful condition of the theatre in Germany at the end of the seventeenth and during the first third part of the eighteenth century,' says Schlegel, 'wherever there was any other stage than that of puppet-shows and mountebanks, exactly corresponded to that of the other parts of our literature. We have a standard for this wretchedness when we consider that Gottsched could pass for the restorer of our literature—Gottsched, whose writings resemble a watery beverage, such as was then usually recommended to patients in a state of convalescence, from a notion that they could bear nothing stronger, by which means their stomachs become still more enfeebled. Gottsched, among his other labours, composed a great deal for the theatre Connected with a certain Madame Neuber, who was at the head of a company of players in Leipzig, he discarded Punch (*Hanswurst*), and they buried him solemnly with great triumph. I am willing to believe that the parts of Punch, of which we may even yet form a judgment from puppet-shows, were not always ingeniously filled up extemporarily; still Punch had undoubtedly more sense in his little finger than Gottsched had in his whole body. Punch, as an allegorical personage, is immortal; and however strong the belief of his burial may be, he still pops unexpectedly upon us, in some grave office-bearer or other, almost every day.

'Gottsched and his school now inundated the German theatre, which was thenceforward to be regular by dint of insipid and diffuse translations from the French. Heads of a better description began to labour for the stage; but instead of producing really original works, they brought forth only wretched imitations; and the reputation of the French theatre was so great, that the most contemptible mannerism was as eagerly caught hold of as the fruits of a better taste. Thus, for instance, Gellert still composed pastoral plays after bad French models, wherein shepherds and shepherdesses, with rose-red and apple-green ribands, uttered all manner of insipid compliments to one another. Besides the French comedies, those translated from the Danish of Holberg were acted with great applause. This writer certainly has great merit. His pictures of manners possess great local truth; his exhibitions of depravity, folly, and stupidity, rest on an extremely good foundation; in strength of comic motives and situations he is not deficient; he is only not very inventive in his plots; the execution runs too much out into breadth. The Danes highly relish the delicacy of his jokes in their own language, but the vulgarity of his tone is revolting to our present taste; yet in the low sphere in which he moves, and in which there are incessant storms of cudgellings, it may be natural enough. Attempts have lately been made to revive him, but seldom with much success. As his chief merit consists in his characterization, which is certainly somewhat caricatured, he requires good comic actors to appear to any advantage. A few of the plays of that time, in the manners of our country, by Gellert and Elias Schlegel, are not without merit; only they have this error, that into their pictures of folly and stupidity the same wearisomeness has crept which accompanies them in real life. In tragedies, properly so called, after French models, the first who were in any degree successful were Elias Schlegel and afterwards Kronegk and Weisse. I know not whether their labours, if translated into good French verse, would appear as frigid to us as they do in German. It is insufferable to us to read verses of an ell long, in which the style seldom rises above watery prose; truly poetical expression was first created in Germany at a subsequent period. The Alexandrine, which in no language can be a good metre, is doubly stiff and heavy in ours.' Thus, bad translations of French plays, with pieces from Holberg, and afterwards from Goldoni, and with some feeble German imitations devoid of any peculiar spirit, may be said to have constituted the repertory of the German stage, until Lessing appeared to commence the work of redeeming it from its long-continued mediocrity.

The sceptical and analytic spirit of Lessing was, however, more successful in reforming the theory than improving the practice of the German drama. His first original play, 'Miss Sara Sampson,' is a familiar tragedy of the lacrymose kind, in which he seems to have had before him as a model 'The London Merchant' of Lillo, better known in England under the name of 'George Barnwell.' But in 1767, his connexion with a company of comedians at Hamburg, and a periodical paper devoted to theatrical criticism which he conducted, gave him occasion to enter more deeply into the consideration of dramatic art. The boldness and acuteness with which, through this medium, he attacked the prevalent French taste in tragedy were so successful that in a short time not only the translations of French tragedies, but the German tragedies modelled after them, disappeared from the stage. He was the first who spoke warmly of Shakspeare, and paved the way for his appearance in Germany. But his faith in Aristotle, and the influence which Diderot's writings had exercised over him, produced a singular mixture in his theory of the drama. Unacquainted with the rights and the necessary conditions of poetical imitation, he desired to have in dialogue everything else a naked copy of nature. His attack on the Alexandrine measure was just; but the best critics of his country regret that he succeeded so far in his efforts to abolish all versification: hereby, say they, he opened greater facilities to that insipid affectation of nature in which so many of their later dramatic writers have indulged.

Owing to these prosaic views of art, Lessing, in the few dramatic works which he produced with great labour, and in which he proceeded for the most part on the classical principle of separating the comic and the tragic species, was much more effective in the former kind than in the latter. 'Minna von Barnhelm,' although it owed much of its extraordinary success to the allusions which it contained to the memorable circumstances of the seven years' war, is a genuine comedy of the more refined description, the whole social tone of which is peculiarly German, while its comic secondary characters are drawn with great humour. But in 'Emilia Galotti,' which exhibits the story of Virginia, transferred, by change of names and places, to modern Italy, the author has introduced the cool and prying observation of the comic writer into the province of tragedy, and the passions are acutely characterised rather than eloquently expressed. 'It is singular enough,' remarks Schlegel, 'that of all the dramatic works of Lessing, the last, "Nathan the Wise" (Nathan der Weise), which he wrote merely with a view,' as he says, 'to laugh at theologians, when his zeal for the improvement of the German theatre had pretty much cooled, should yet be the most conformable to the genuine principles of art. A remarkable tale of Boccaccio is wrought up with a number of inventions which are wonderful, yet not improbable, when we consider the circumstances of the times; the fictitious persons are grouped round a celebrated historical character, the great Saladin, who is drawn with historic truth; the crusades in the back ground, the scene at Jerusalem, the meeting of persons of various nations and religions on this oriental soil,—all this gives to the work a romantic air; while the thoughts, foreign to the age in question, which the poet has allowed himself to intersperse for the sake of his philosophical views, form a contrast somewhat hazardous indeed, but yet exceedingly attractive. The form is more free and comprehensive than in the other pieces of Lessing; it is nearly that of a drama of Shakspeare.' Here, too, the author returns to the use of versification; not, indeed, to the Alexandrine, but to the unrhymed Iambic, answering to the English blank verse. 'That Lessing,' adds Schlegel, 'although possessing so independent a mind, still allowed himself in his dramatic practice to be in some measure overcome by the general inclination of his age, I infer from this, that the number of imitations of "Nathan" were very few in comparison with those of "Emilia Galotti."'

As the leading object of Goethe seems to have been to give his genius the fullest possible expression in his works, so he was indifferent as to the form, though generally preferring the dramatic. He was at the same time a warm friend to the theatre, and sometimes laboured to comply with its wants as determined by custom and the taste of the day; as, for instance, in 'Clavigo,' where he produced a familiar tragedy in the manner of Lessing, and in 'Stella,' where he took nearly the same liberty with the old German story of Count Von Gleichen as Lessing did with that of Virginia. 'At an after period,' says Schlegel, 'he endeavoured to effect a reconciliation between his views of art and the common dramatic forms, even the subordinate, nearly all of which he ran through with single attempts. In his "Iphigenia" he expressed the spirit of the antique tragedy according to his conceptions of it, especially as to repose, perspicuity, and ideality. With the same simplicity, flexibility, and noble elegance, he composed his "Tasso," in which he applied an historical anecdote to mark the general signification of the contrast between a court life and a poetical one. His "Egmont," again, is a romantic and historic drama, the style of which steers a middle course between his first manner in "Götz von Berlichingen" and the form of Shakspeare. "Erwin und Elmire," and "Claudine von Villabella," may be called ideal operettes, breathed out so lightly and airily, that, with musical accompaniment and representation, they do but run the risk of becoming heavy and prosaic: in these pieces the noble and sustained style of the dialogue of his "Tasso" is varied by the tenderest songs. "Jery und Bätely" is a charming natural picture of Swiss manners, in the spirit and form of the best French operettes; while "Scherz List und Rache" is a true *opera buffa*, full of Italian *lazzi*. "Die Mitschuldigen" is a rhymed comedy, in the manner of common life, according to the French rules. "The Triumph of Sentimentality" ('Der Triumph der Empfindsamkeit') is a highly ingenious satire of Goethe's own imitators, inclining to the arbitrary comic and the fancifully symbolical of Aristophanes, but a modest Aristophanes in good company and at court. At a much earlier period Goethe had, in some of his merry tales and carnival plays, completely appropriated to himself the manner of our honest Hans Sachs.' Of the 'Faust,' which must be regarded as Goethe's peculiar creation, though forming so grand and remarkable a feature in the poetical literature of modern Europe, there is little to be said in immediate relation to the drama. It is well observed by Schlegel, that to exhibit that boundless and labyrinthian production on the stage, we should be possessed of Faustus's own magic staff and his formulæ of conjuration. Yet much is to be learned from it both as to plan and execution. In a prologue the poet declares why he could not accommodate himself to the demands of a mixed multitude of spectators, and so writes, as it were, a farewell epistle to the theatre.

Meanwhile, shortly after the first appearance of Goethe, a very vigorous effort had been made to bring Shakspeare upon the German stage; and Schlegel is of opinion that, in some of his most celebrated characters, tragic and comic, Schröder perhaps attained the same perfection which had been almost idolized in Garrick. The plays however had the disadvantage of appearing in cumbersome prose translations, and often in mere abstracts, with disfiguring alterations: the separate characters and situations had been to a certain degree hit, but by no means the sense of his composition.

Under these circumstances appeared Schiller, endowed with the qualities requisite for producing a strong effect on the multitude as well as on minds of higher cultivation. Though his genius was daring in the highest degree, yet in the works of his youth he was influenced by the models of Lessing, by the earlier productions of Goethe, and by Shakspeare, so far as he could understand him without an acquaintance with the original. 'The Robbers' ('Die Raüber'), wild and horrible as it is, had, as is well known, so powerful an effect as absolutely to turn the heads of some youthful enthusiasts. Notwithstanding the signal success of this and his other first attempts, Schiller became sensible of the discipline which his genius required, and threw himself, with all the natural vehemence of his character, into the task of self-cultivation. The first result was his 'Don Carlos,' wherein, with great depth of characterization and great pathetic power, the plot is so intricately complicated, and the characters philosophize so much, as to swell the work to a size incompatible with due theatrical representation. After the course of sound historical and philosophical study by which the poet next enriched his mind and enlightened his views of art, he applied himself wholly to historical tragedy, and endeavoured, by divesting himself of his individuality, to rise to purely *objective* exhibitions. In 'Wallenstein' he strove to adhere so conscientiously to historical truth, that his materials, though embracing no great historical extent, swelled out into two plays and a rather didactic prologue: in the forms he closely followed Shakspeare, but endeavoured to confine the changes of place and time within narrower limits, and to maintain what he conceived to be a more sustained tragical dignity. 'Maria Stuart' is executed with more perfect artistical skill. In 'The Maid of Orleans' the plot is looser and less faithful to history; but its dazzling effect and rich ornaments of language gained it distinguished and deserved success upon the stage. 'The Bride of Messina' is an attempt, apparently neither judicious nor successful, to produce a tragedy romantic in substance, but antique in form. The last of Schiller's productions, 'Wilhelm Tell,' is considered by Schlegel as his best. 'Here he has wholly returned to the poetry of history: the manner in which he has handled his subject is true, and cordial, and, when we consider Schiller's ignorance of Swiss nature and manners, wonderful in point of local truth. It is true he had here a noble source to draw from, in the speaking pictures of the immortal John Müller. Within view of Tell's chapel, on the banks of the lake of Lucerne, in the open air, with the Alps for a background, this picture of heart-elevating old German manners, piety, and true heroism, might have merited performance as a solemnization of Swiss freedom five centuries after its foundation. How much farther Schiller might have carried the advancement of the German drama it is difficult to estimate, as he now devoted himself exclusively to the theatre, attained with every fresh work a higher mastery in his art, and was carried off by an untimely death in the full maturity of his mind.

The appearance of great original minds in Germany has always been followed by crowds of imitators. Thus an early production of Goethe's, 'Götz von Berlichingen,' wherein he exhibits, in a bold and vivid way, the manners of the latter part of the middle ages, produced a whole inundation of *chivalrous plays*, in which, says Schlegel, 'there was nothing historical but the names and other historical circumstances; nothing chivalrous but the helmets, bucklers, and swords, nor anything of old German honesty but the supposed rudeness: the sentiments were as modern as they were vulgar: from chivalry pieces they became real *cavalry* pieces, which certainly deserve to be acted by horses rather than by men.' The next place in the public favour has been held by the *family picture*, and the *affecting* or *sentimental drama*, two secondary species which Lessing, Goethe, and Schiller themselves cannot be acquitted of having encouraged, the former by precept, the two latter by the example of their earliest compositions. In these kinds (in the latter of which Kotzebue was so prolific, and for a while so popular), the essence of dramatic poetry being mistaken, a pretended moral aim is laid down; the morality appearing however in the one class of pieces under the confined shape of economy, in the other under that of sensibility; and the dramatic fruits have been correspondent to the unsoundness of such principles.

'The poetical as well as moral decline of the taste of the time,' observes Schlegel, in conclusion, 'has been attended by this consequence, that the writers who are the greatest favourites on the stage seek only for a momentary applause, regardless of the opinion of good judges and of true esteem; those, however, who, with higher aims, have both these objects before them, cannot prevail upon themselves to comply with the demands of the multitude, and when they do compose dramatically are wholly regardless of the stage: hence they remain deficient in the theatrical portion of the art, which can be attained in perfection only by practice and experience. The repository of our stage exhibits therefore in its miserable wealth a motley assemblage of chivalrous pieces, family pictures, and sentimental dramas, occasionally, though seldom, varied by works in a grander and more cultivated style, of Shakspeare and Schiller. In this state of things, translations and imitations of foreign novelties, especially of the French afterpieces and operettes, are indispensable. Owing to the worthlessness of the individual works, the fleeting charm of novelty is alone sought for in theatrical entertainment, to the great injury of the histrionic art, as a great number of insignificant parts must be got by rote in the most hurried manner, to be immediately forgotten.'

English Drama.

The period in which we find the earliest traces of the general introduction of dramatic exhibitions by the clergy throughout the spiritual empire of Rome, being that in which, under the regime of the Norman conquest, the old French language and literature had full predominance in England, and a very large proportion of its clergy were of Gallic extraction, French was necessarily the original language of our religious drama; and the first pieces that it possessed were either borrowed directly from continental writers, or were composed by the Anglo-Norman clerks in the Gallic idiom. None of the dramatic manuscripts in that language, which must have been used in England for two or three centuries after the conquest, have descended to us; but in addition to the most sufficient historical evidence of the fact, some of the miracle plays that remain in English contain the plainest internal evidence of their having been closely translated from a French original. It was not until the 36th of Edward III. that the pleadings in any of the courts of law were allowed to be made in English. At the commencement of Edward's reign (as observed by Tyrwhitt in the essay on the language and versification of Chaucer, prefixed to his excellent edition of the 'Canterbury Tales') the French and English languages subsisted together throughout the kingdom; the higher orders, both clergy and laity, speaking almost universally French; while the lower retained the use of their native tongue, but also frequently added to it some knowledge of the other. Ralph Higden himself, the reputed author of the Chester miracle-plays as they now appear in English, bears a remarkable testimony (in his *Polycronicon*, B. I., c. lix.) to the manner in which the English language was impaired by the children in general being still obliged at school to construe their lessons, &c. in French, by the children of the gentry being taught to speak French from then cradle, and by the anxiety of the commoners to talk French that they might be the more highly thought of.

We find religious dramas to have been regularly established performances in London as early as 1180. William Fitzstephen, in the introduction to his Life of his friend and patron, archbishop Becket, written between 1170 and 1182, tells us that London, in lieu of the theatrical spectacles and stage plays of the Romans, to which he has just before alluded, had then a holier description of plays, in the representations of the miracles worked by holy confessors, or of the sufferings wherein the martyrs had displayed their constancy.[*] However, from Mathew Paris (*Vitæ Abbatum*) and from Bulæus (*Historia Universitatis Parisiensis*) we learn that the miracle-play of 'St. Katherine' had been exhibited at Dunstable before the year 1119. According to the latter authority this play of 'St. Katherine' was not then by any means a novelty; and from a passage in the 'Annales Burtonenses,' or 'Annals of Burton Abbey,' we may infer that in the middle of the 13th century itinerant actors were well known in England.

The oldest extant specimen of a miracle-play in English is among the Harleian MSS. in the British Museum: it probably formed one of a series, and is certainly as ancient as the earlier part of the reign of Edward III.; it is founded on the 16th chapter of the apocryphal gospel of 'Nicodemus,' and relates to the descent of Christ into hell, to liberate from thence Adam, Eve, John the Baptist, and the prophets. Besides this and a few other single pieces, and a set of three plays founded on that part of the 'Acts of the Apostles' which relates to the conversion of St. Paul, there exist in this country three series of miracle-plays which go through the principal incidents of the Old and New Testaments. These are:—1. The Towneley collection, supposed to have belonged to Widkirk Abbey, the MS. of which appears to have been written about the reign of Henry VI. 2. A volume called the 'Ludus Coventriæ,' consisting of plays said to have been represented at Coventry at the festival of Corpus Christi, the MS. of which is at least as old as the reign of Henry VII. 3. The Chester Whitsun plays, of which there are two MSS. in the British Museum, one dated in 1600, the other in 1607. Several specimens of Cornish miracle-plays are extant, which differ from the English in no material characteristic but that of language.

The best idea that we can give of the groundwork of these plays is by specifying the subjects of that one of the series above mentioned which is the most numerous. This is, the Coventry series, comprising 42 plays, viz.:—1. 'The Creation.' 2. 'The Fall of Man.' 3. 'The Death of Abel.' 4. 'Noah's Flood.' 5. 'Abraham's Sacrifice.' 6. 'Moses and the Two Tables.' 7. 'The Genealogy of Christ.' 8. 'Anna's Pregnancy.' 9. 'Mary in the Temple.' 10. 'Mary's Betrothment.' 11. 'The Salutation and Conception.' 12. 'Joseph's Return.' 13. 'The Visit to Elizabeth.' 14. 'The Trial of Joseph and Mary.' 15. 'The Birth of Christ.' 16. 'The Shepherds' Offering.' 17. (Wanting in the MS.) 18. 'Adoration of the Magi.' 19. 'The Purification.' 20. 'Slaughter of the Innocents.' 21. 'Christ disputing in the Temple.' 22. 'The Baptism of Christ.' 23. 'The Temptation.' 24. 'The Woman taken in Adultery.' 25. 'Lazarus.' 26. 'Council of the Jews.' 27. 'Mary Magdalen.' 28. 'Christ Betrayed.' 29. 'Herod.' 30. 'The Trial of Christ.' 31. 'Pilate's Wife's Dream.' 32. 'The Crucifixion.' 33. 'Christ's Descent into Hell.' 34. 'Sealing of the Tomb.' 35. 'The Resurrection.' 36. 'The Three Marys.' 37. 'Christ appearing to Mary Magdalen.' 38. 'The Pilgrim of Emaus.' 39. 'The Ascension.' 40. 'Descent of the Holy Ghost.' 41. 'The Assumption of the Virgin.' 42. 'Doomsday.'

There is abundant evidence that the Romish ecclesiastics, in their first introduction of this kind of representations, especially that part of them relating to the birth, passion, and resurrection of Christ, had the perfectly serious intention of strengthening the faith of the multitude in the fundamental doctrines of their church; and it seems the less extraordinary that they should have resorted to this expedient, when we reflect that before the invention of printing, books had no existence for the people at large. But it is no less certain that the repetition of these exhibitions rapidly worked upon the popular mind an effect which, it is likely, the priestly dramatists themselves had not contemplated in the first instance: it developed the universally latent passion in the breast of social man for spectacle in general, and for dramatic spectacle especially, *for its own sake*. Here, again, was the strongest encouragement of all for the clergy to persevere in their dramatic efforts. Finding the lively pleasure which the people took in this mode of receiving religious instruction, they were attempted to add, according to their barbarous ability, embellishment after embellishment to the simple copies which they had originally presented of the most remarkable passages of Scripture story, until the profane exhibition itself, 'the miracle *play*,' and not the sacred subject of it, became the sole object of interest to the people who composed the audience at these representations, as, also, it certainly became the primary object of the greater part of the ecclesiastics who took part in getting them up. These two facts are shown with the utmost clearness by the collective testimony of all the contemporary writers who have thrown a general light upon the manners of the later middle ages.

These considerations will sufficiently account for one remarkable contrast, amongst others, which the early drama of modern Europe presents to the early Greek drama, though both flowed directly from a religious source; that while in the latter a groundwork drawn from human history was adorned and elevated by mythological intermixtures; in the middle-age drama, on the contrary, the basis or substratum was religious, but soon became so much overlaid with allusions to actual life, and with sketches of manners, and even of character, drawn from the actual society, as to leave scarcely a trace of that solemnity which must in the beginning have been intended to characterize the performance. The proclamation of the Chester plays, which was read over in various parts of the city on St. George's day, before the commencement of the performances, expressly excuses the introduction of 'some things not warranted by any writ,' on the ground that it was done 'to make sport' and to 'glad the hearers.'

The dialogue in these productions was, for the most part, extremely rude and inartificial; and as to plot, they cannot properly be said to have had any. It is not until the middle of the sixteenth century that we arrive at a scriptural play having anything approaching to a regularly constructed dramatic action. In this respect the series of plays which we have been considering should rather be described as a series of shows or pageants exhibited in succession, but without any artificial connection. Each of these detached divisions of the representation was indeed commonly called a 'pageant;' and each succeeding play or pageant of the series was supported by a new set of performers. Thus, to get up one of these extensive sets of plays, it was necessary to provide and to prepare a large number of actors; and here we see one manifest reason why this longer class of performances was almost wholly confined, in England as well as on the continent, to the larger cities.

The seasons for exhibiting the grand scriptural plays were chiefly the Christmas and the Whitsun holidays. The getting up and acting of these in the great cities early devolved upon the trading companies, each guild undertaking a portion of the performance and sustaining a share of the expense. The authentic information regarding the exhibition of the Corpus Christi plays at Coventry extends from the year 1416 to 1591, during the whole of which period there is no indication that the clergy in any way co-operated. The Chester records likewise establish that the whole management of these representations there was in the hands of laymen. From Stow's Chronicle we learn that in London this class of performances was undertaken by the parish clerks (who were incorporated by Henry III.) as early as 1409; and it is remarkable that no instance is to be found of the trading companies of London having been, at any date, so engaged. The pieces were acted on temporary erections of timber, called scaffolds or stages; and it appears that in some instances they were placed upon wheels, in order that they might be removed from one part to another of a large town, and so the plays might be repeated successively in various quarters. Some of the Chester pieces required the employment of two, and even of three scaffolds, besides other contrivances: the street also must have been used, as several of the characters enter and go out on horseback. The same remark is applicable both to the Widkirk and the Coventry plays. In the latter indeed 'the place' and 'the mid place' are mentioned as the scene of part of the action; and it is evident from some of the stage directions, that two, three, and even four scaffolds, were erected round a centre, the performers proceeding, as occasion required, from one stage to another across 'the mid place.' It may be observed, too, that in one of the Widkirk plays Cain is exhibited at plough with a team of horses; and that in another it is absolutely necessary that something like the interior of a cottage should be represented, with a peasant's wife in bed, who pretends to have been just delivered of a child, which lies beside her in a cradle.

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[*] The reader may like to see this very remarkable passage as it stands in the original text; the words are these: 'Lundonia pro spectaculis theatralibus, pro ludis scenicis, ludos habet sanctiores, representationes miraculorum quæ sancti confessores operati sunt, seu representationes passionum quibus claruit constantia martyrum.'

These exhibitions however of long successions of Scripture pageants form a kind of exception to the general footing of the drama in those ages. The dramas which still most generally prevailed were those which proceeded originally from two distinct though kindred sources, which may be thus described. The first was the desire to impress the minds of the people in a vivid manner with those fundamental points of Scripture history which the greater festivals of the Christian church were established to celebrate, by exhibiting before them, especially during the seasons of Christmas and Easter, a living representation of the subject of celebration at that particular time. The second was the desire to strengthen and maintain the people's devotion to the patron saint of the church of their particular locality, by exhibiting on his feast-day a lively representation of his most remarkable actions or sufferings. To these two classes of performances the ecclesiastical establishments, not only of the cathedrals and monasteries, but of a great many parochial churches, were quite equal; and accordingly they continued to be generally prevalent in England until the commencement of the Reformation, and did not entirely cease until its complete establishment. From first to last, the clergy were not only the authors of the pieces exhibited within the churches, but were also, without any liability to ecclesiastical censure, the actors in or managers of the representations. But they did not long confine the exercise of their histrionic powers either to the consecrated subjects or within the consecrated walls. They soon partook of the dramatic passion which they had indirectly awakened, and came to like both plays and playing for their own sake. In Burnet's History of the Reformation we find that, so late as 1542, bishop Bonner had occasion to issue a proclamation to the clergy of his diocese, prohibiting 'all manner of common plays, games, or interludes, to be played, set forth, or delivered, within their churches and chapels.' And from the following passage of a tract printed in 1572 it appears that even then interludes were occasionally played in churches: the author is describing how the clergy neglect their duties: 'He againe posteth it (the service) over as fast as he can gallop; for either he hath two places to serve, or else there are some games to be played in the afternoon, as lying for the whetstone, heathenishe dauncing for the ring, a beare or a bull to be bayted, or else jack-an-apes to ride on horseback, or an enterlude to be played; and if no place else can be gotten, it must be doone in the church.' In proof also, that in the early part of the same century ecclesiastics still exhibited themselves as common players, we see, among many other evidences, that in 1519 Cardinal Wolsey found it necessary to insert an express injunction against this practice in the regulations of the Canons Regular of St. Austin.[*]

Miracle plays were acted very constantly at Chester until 1577, at Coventry until 1591, at York until late in the sixteenth century, at Newcastle until 1598, at Lancaster, Preston, and last of all at Kendal, in the beginning of the reign of James I. Although, in the beginning, these plays only dramatised certain scriptural events by the characters historically concerned, yet abstract impersonations found their way into them by degrees. This was perhaps done to introduce some variety into the constant repetition of the same sets of *dramatis personæ*. Among the first innovations of this kind were the representatives of Truth, Justice, Peace, and Mercy, in the 'Parliament of Heaven,' which forms part of the eleventh play or pageant of the *Ludus Coventriæ*. Death, in the same series, was a subsequent addition; and the Mother of Death, a still later enrichment; until at length such characters as 'Renfin' and 'Lyon' were employed, having more of individuality, but still personifying the passions supposed to have actuated the Jews against Christ. As such characters became more numerous, they interfered in a certain degree with the progress of the action; in some pieces the scriptural characters fell quite into the back-ground; and thus, in course of time, what seems to have been at first designed as a sort of poetical embellishment to an historical drama became a new species of drama unconnected with history. This was called a 'moral' or 'moral-play,' the object being to enforce and illustrate some ethical precept; for it must be observed, that the term 'morality,' as applied to a dramatic production, is, like 'mystery,' of comparatively recent introduction into our language. Some manuscript productions of this class have been lately discovered, which show that moral-plays were in a state of considerable advancement early in the reign of Henry VI. They seem to have reached their highest perfection under Henry VII., although they afterwards exhibited a greater degree of ingenious complication. In the reigns of Henry VII. and VIII., a company of actors usually consisted of only four or five individuals; but by doubling some of the parts, they were able to perform the greater number of the dramatic entertainments then in fashion.

Besides allegorical personages, there are two standing characters very prominent in moral-plays, the Devil and the Vice. The Devil was no doubt introduced into moral-plays from the old miracle-plays, where he had figured so amusingly that his presence was indispensable in the new species of drama; and accordingly we find him acting as leader of the Seven Deadly Sins in one of the most antient moral-plays that have been preserved. He was made as hideous as possible by the mask and dress which he wore; and from various sources we learn that his exterior was shaggy and hairy, so that in one piece he is mistaken by one of the characters for 'a dancing bear.' His 'bottle nose' and 'evil face' are repeatedly mentioned; and that he was not without a tail is evident from the circumstance that in one place the Vice asks him for a piece of it to make a fly-flap His ordinary exclamation on entering was 'Ho, ho, ho!' and on all occasions he was given to roaring and crying out, especially when, for the amusement of the audience, he was provoked to it by castigation at the hands of the Vice, by whom he was generally, though not invariably, accompanied. As for the Vice himself, his name appears to have been derived from the predominant nature of his character, as amidst all his varieties of form, he is constantly represented as most wicked in design. As the Devil now and then appeared without the Vice, so the Vice appeared sometimes without the Devil. Malone tells us, that 'the principal employment of the Vice was to belabour the Devil;' but, though frequently so engaged, he had also higher functions. He was never introduced into the miracle-plays until after the reign of Mary; but in 'The Life and Repentance of Mary Magdalen,' which appeared in 1567, we find him performing the part of her lover, before her conversion, under the name of Infidelity; in which character he assumes various disguises, and successfully recommends to her 'not to make two hells instead of one,' but to live merrily in this world, since she is sure to be damned in the next. In 'King Darius,' dated 1565, he likewise acted a prominent part, under the name of Iniquity, by his own mischievous impulses, without any prompting from the representative of the principle of evil. Such was the general style of the Vice; and as Iniquity we find him spoken of by Shakspeare and Ben Jonson. Sometimes, however, the Vice and Iniquity seem to have been two distinct personages; and the former was not unfrequently called by the name of some particular vice. In the moral-plays, as in the miracle-plays before them, the comic ingredients were made to predominate more and more over the serious; and the Vice became a standing vehicle of grosser and more thorough buffoonery than the Devil himself. Thus it was that he came to be so completely confounded with the character of the domestic fool, as to be very commonly dressed in the fool's parti-coloured habit, wearing his dagger of lath. It appears to have been a very common termination of the adventures of the Vice for him to be carried off to hell on the Devil's back. In 'King Darius,' he runs thither of his own accord, to escape from Constancy, Equity, and Charity. It seems, also, that he was in the habit of riding and beating the Devil at other times than when he was thus forcibly carried off to punishment.

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[*] The original MS. is in the British Museum, Cotton MS. Vesp. F. ix. It is printed in Wilkins's Concilia, iii. 687.

The mechanical contrivances used for the representation of moral-plays differed in no material point from those employed in the religious exhibitions which they gradually superseded; except that, in general, there seems to have been only one scaffold or stage, which was erected either in a street or on a green adjoining a town or village, sometimes in the public hall of a city or borough, and sometimes in a great private mansion.

One of the most curious of the later moral-plays was written in defence of dramatic exhibitions in general, in answer to a tract against them by Stephen Gosson, called 'The School of Abuse,' and published in 1579. This piece, entitled 'The Play of Plays,' was acted at a theatre in Shoreditch about 1580. A considerable portion remains of a still more remarkable production of this class, which must here be noticed as being the only one that we can trace as having had an object openly and entirely political: it seems to have been designed to illustrate and enforce the right rules of government for the good of a nation at large, and there is reason to suppose that it was suppressed immediately after its first performance. The portion preserved, about one-third of the whole, is in the Duke of Devonshire's collection, and consists of twelve closely-printed quarto pages, apparently of the date of 1566. From this fragment we gather that among the characters of the play were the following:—Albion, personified as a knight; Justice; Injury, who seems to have been the Vice of the piece; Division, and his two ministers Double-Device and Old-Debate; Temporalty and Spiritualty; Principality and Commonalty; Sovereignty, Peace, and Plenty. In the commencement of it, Injury, under the assumed name of Manhood, ingratiates himself with Justice and Albion, and endeavours to persuade the latter, amongst other things, that salutary acts of parliament are not enforced as they ought to be, but allowed to sleep, because they touch the lords spiritual and temporal, so that, although passed to benefit merchants and the commonalty, the great declare them only 'fit to wipe a pan.' In like manner, Division sends his agents to sow dissension, on the one hand, between the lords spiritual and the lords temporal, on the other between Principality (personifying the sovereign authority) and the Commons. But, although there is every appearance that the author made his play terminate in the defeat of the scheme of Injury and Division, and the happy union of Albion and Plenty, yet it is manifest that the Vice of the play was here made use of to cover some serious strokes of satire and reprobation against the political abuses of the time, involving the most important principles of constitutional government, and rendering this unique and mutilated piece a very interesting feature of our old dramatic literature, and an illustration of the various uses to which the stage was turned while no periodical press yet existed.

The moral-plays now extant are classed by Mr. Payne Collier (*Annals of the Stage*, &c.) in the following divisions:—1. The curious manuscript specimens formerly in the collection of Dr. Cox Macro, and now in that of Hudson Gurney, Esq., which are much more antient than any others yet discovered. 2. Printed moral-plays, the lesson enforced by which relates to the vices and regeneration of mankind at large. 3. Such as convey instructions for human conduct of a more varied character. 4. Pieces belonging to the class of moral-plays, but making approaches to the representation of real life and manners.

The performance of moral-plays was not wholly discontinued until the end of Elizabeth's reign; and one of the last dramatic representations that she witnessed was a piece of this kind, 'The Contention between Liberality and Prodigality,' played before her in the 43rd year of her reign. Attempts had however been very early made to invest even symbolical representatives with metaphysical as well as physical peculiarities, and attract for them a personal interest; and thus it was that even in the allegorical species, the nature of which would seem to have least admitted of such modification, advances more and more decided were successively made towards individuality of character, and consequently towards the representation of actual life. Hence nearly all the later moral-plays exhibit a strange mixture of individual characters with allegorical impersonations, which, however, with all its violent incongruity, was a necessary step in the progress towards the modern drama, the drama of human passions and manners.

The first English dramatic productions in which it was attempted to exhibit sketches from actual life without any scriptural, saintly, or allegorical intermixture, belong to that class to which the denomination of *interludes*, though it has had a more general application, most properly and distinctively belongs. These pieces being, as their name imports, expressly designed for performance during the intervals of convivial entertainment, the first condition of their structure was that the limits should be brief and the characters few. The historical play of 'Sir Thomas More,' written towards the close of the reign of Elizabeth, and extant among the Harleian MSS., shows very exactly the time, form, and manner of such representations. Sir Thomas More there gives a splendid supper to the lord mayor of London, the aldermen, their wives, &c.; and four men players and a boy (the latter taking, no doubt, the female parts) having heard of the intended banquet, tender their services in order to vary the amusements. Sir Thomas declares that it 'will be excellent to have a play before the banquet,' and asks the actors what pieces they can perform. In answer, they run over the titles of six different pieces, out of which Sir Thomas chooses the one entitled 'The Marriage of Wit and Wisdom.' Its representation accordingly commences, as a play within a play, and is continued until there occurs an accidental interruption. The piece selected by Sir Thomas More on this occasion was evidently of the class of 'morals,' and so do all the pieces acted by way of interlude appear to have been until the reign of Henry VIII.; so much was this the case, that the very terms 'moral' and 'interlude' came to be generally confounded. John Heywood, a musician of Henry's household, set the first example of composing interludes quite independently of allegorical materials.

Among the pieces of Heywood's that have come down to us, the three which alone can strictly be termed *comic* are directed against the vices of the clergy, and more especially of the holy mendicants who swarmed over the land under the names of friars and pardoners. They have much of the genuine humour as well as broad satire of Chaucer's comic pictures wherein the same characters so prominently figure; and indeed it should here be borne in mind that, in the same spirit which favoured the production of these satirical interludes, Henry, when his thoughts had begun to tend towards ecclesiastical reform, patronized the first printed edition of 'The Canterbury Tales.' In the earliest of the pieces in question, 'A mery play betwene the pardoner and the frere, the curate and neybour Pratte,' Leo X., whose remarkable indulgence to similar compositions we have already had occasion to mention, is spoken of as still living. A pardoner and a friar have each obtained leave of the curate to use his church; the former to exhibit his relics (among which he shows 'the great toe of the Holy Trinity'), the latter to deliver a sermon, their common object being the raising of money. The friar arrives first, and is about to commence his discourse, when the pardoner comes in and disturbs him; each desires to be heard; and after many vain attempts by force of lungs, they proceed to kick and cuff each other unmercifully. The curate, called by the disturbance in his church, endeavours, without avail, to part the combatants; he therefore calls in neighbour Pratt to his aid; and while the curate seizes the friar, Pratt undertakes to deal with the pardoner, in order that they may set them in the stocks. Both friar and pardoner, however, prove too strong for their assailants, and the latter, after receiving a sound drubbing, are glad to allow the former quietly to depart. In the course of the piece, the friar, pardoner, and curate deal out the most furious oaths, and neighbour Pratt is the only decently-spoken man of the party. In 'The Four P's' (that is, the Palmer, the Pardoner, the Poticary, and the Pedlar), the question at issue among them is, which shall tell the greatest lie. And in the 'mery play between Johan the husbande, Tyb his wife, and syr Johan the preest,' the nature of the plot will easily be divined, especially by such as are acquainted with Chaucer's comic tales. Heywood's play of 'The Weather' was written to illustrate a point of natural philosophy, and vindicate Providence in its distribution of the seasons. Perhaps, too, he should be regarded as the inventor of another species of composition, dramatic in so far as that it was conducted in dialogue and recited in public, but without plot, being merely a discussion in verse, between two or more characters, of some particular topic or opinion. This sort of production being little calculated for popularity, it is not surprising that but one specimen of it by him has descended to us, and that in manuscript. The point debated in this colloquy, which would occupy about three quarters of an hour in the delivery, is whether a fool or a wise man be the happier; and though the conclusion eventually come to is in favour of the latter, it is remarkable that Will Somer, the fool of Henry VIII., is often mentioned in the course of the dialogue as illustrating the advantage of being without understanding and education.

The only extant English interlude from real life in which the tragic element predominates, was designed, its title tells us, to show 'as well the beauty and good properties of women, as their vices and evil conditions,' contrasting the character of the heroine Melibea with that of Celestina, a sort of compound of procuress and sorceress, who is hired by Melibea's lover to corrupt her, in which, after using extreme art, she succeeds; and the piece ends with exhibiting the bitter grief and repentance of the heroine. It is founded on the famous Spanish 'Celestina,' which we have already described as a long dramatic dialogue rather than a drama; but though the English piece has some vigour, it altogether wants those subtle graces which gave so wide a popularity to its foreign prototype.

It must here be observed, that in the literature of the later middle ages the term 'tragedy' was used to denote any serious narrative in verse. In his treatise *Della Volgare Eloquenza*, Dante speaks of it as denoting elevation of style ('per tragediam superiorem stilum induimus'); and he modestly names his own great poem *comedia*, while, in its 21st canto, he terms Virgil's Æneid, in his admiration, *una tragedia*. Bojardo, at a later date, calls his romantic poem a 'comedy,' comparing it with Homer's 'tragedy,' the Iliad. To the like effect is Chaucer's definition of tragedy in 'The Monke's Tale;' and consistently with it Lydgate calls his 'Fall of Princes' a series of 'tragedies.' Churchyard wrote several elegies which he terms tragedies; and Markham, so late as 1595, published 'the tragedy of Sir Richard Greenville,' an heroic poem in octave stanzas. Bishop Bale was the first to apply the denominations 'tragedy' and 'comedy' to dramatic productions in English: he calls 'God's Promises,' one of his own printed religious plays, a tragedy; and a series of plays from the life of Christ, one of which, 'The Temptation,' is also extant in print, he terms comedies. None of those however differs in any essential respect from the previous miracle-plays: they were all printed abroad in 1538; and it is to be remarked of them that they contain the first extant attempts to promote the Reformation by means of the stage. Besides religious plays of the beginning of Elizabeth's reign connected in subject and acted in succession, several dramas were written and printed at the same period upon separate stories and incidents in the Bible, complete in themselves, and apparently performed without reference to any other pieces that might precede or follow them. One of the most remarkable of these is 'The Life and Repentance of Mary Magdalen,' already mentioned, printed in 1567, and apparently written after the Reformation was completed.

'A newe, mery, and wittie comedie or enterlude, treating upon the historie of Jacob and Esau' (apparently written about 1557, but not printed till 1568), though its subject is scriptural, makes nearer advances to the structure and general character of a modern play than any piece that preceded it. In addition to the scriptural characters, it has, of the author's invention, Ragau, servant to Esau; Mido, a boy who leads blind Isaac: Hanon and Zethar, two of Isaac's neighbours; Abra, a girl who assists Rebecca; and Debora, an old nurse. Here indeed we have a five-act play, with a plot regularly constructed, characters discriminated and contrasted, and a versification, for that period, vigorous and flowing, while the comic portions of the piece have humour independent of coarseness.

The general tenor of the last-mentioned play is tragic, or at least decidedly serious. In the earliest piece of equal dimensions and regularity of structure that can properly be termed a comedy we have also the first avowed dramatic imitation, in English, of the antients. This is 'Ralph Roister Doister,' which was certainly in being as early as 1551, and probably written as early as the reign of Henry VIII. The former existence of such a piece had long been known, when in 1818 a printed copy was discovered, of which a limited reprint has been made. The author was Nicholas Udall, who died after 1564, having been master, first of Eton and afterwards of Westminster School. Warton (*Hist. Eng. Poet.* iii., 213) quotes from the antient Consuetudinary of Eton School a passage importing that yearly, about St. Andrew's day, November 30, the master was accustomed to select, according to his own discretion, such Latin plays as were best and fittest to be acted by the boys in the following Christmas holidays, with scenic decorations, before a public audience; and that sometimes also he ordered the performance of plays in English, provided that he found any with sufficient grace and wit. The author of the piece in question calls it, in his prologue of four seven-line stanzas, a 'comedie or enterlude;' the latter, as we have already intimated, being at that date the ordinary appellation for a dramatic production in general; so that, in employing also the less usual term 'comedy,' Udall seems to claim to have his play regarded as of more *regular* and *classical* construction, making at the same time express reference to the works of Plautus and Terence, as precedents which he had endeavoured to imitate. The scene of this comedy is laid in London; and it is in a great degree a representation of the manners and notions of the middle classes of the metropolis at that period. It is divided into acts and scenes, has nine male and four female characters, and the performance must have occupied two hours and a half, while few of the moral-plays would require more than an hour, for of those which were in two parts each part was exhibited on a separate day. The plot is amusing and well constructed, with an agreeable intermixture of serious and humorous dialogue, and a variety of character to which no other English play of a similar date can make any pretension. Another comedy, of the like dimensions and general structure, has lately been discovered in manuscript. It is entitled 'Misogonus;' and the author was apparently one Thomas Rychardes. The scene is laid in Italy, and the piece was probably founded on some Italian tale or play; it represents however the manners of England, and has many allusions to the circumstances of the day: although the plot is simple, there is much variety of situation and character; and it is worthy of remark that, under the name of *Cacurgus*, the qualities and functions of that important personage, the domestic fool, are more distinctly as well as amusingly exhibited than in almost any other of our old plays. This piece is ascertained to have been composed about 1560. It is certain that the former of these two comedies, and extremely probable that the latter, preceded the production of 'Gammer Gurton's Needle,' which all our literary and dramatic antiquaries before Mr. Collier have spoken of as the earliest English comedy, though, when it was acted at Christ's College, Cambridge, in 1566, its author, Still, afterwards bishop of Bath and Wells, was only in his twenty-third year. In merit it is far inferior to the pieces just mentioned; 'the writer,' as Warton observes, 'has a degree of jocularity which sometimes rises above buffoonery, but is often disgraced by lowness of incident.' The dialogue too is for the most part in the broadest provincial dialect, not in any respect exhibiting a specimen of the ordinary language of the time. This however appears to be the first existing English play that was acted at either university; and it is a singular coincidence that its author should have been the very same person who, many years after, when become vice-chancellor of Cambridge, was called upon to remonstrate with Queen Elizabeth's ministers against the having an English play performed before her at that university, as unbefitting its learning, dignity, and character.

The earliest extant piece in English that can now with any propriety be termed a tragedy, was written by Thomas Sackville (afterwards Lord Buckhurst and Earl of Dorset) and Thomas Norton, a barrister; and was acted before the queen at Whitehall, on the 18th of January, 1561. In the first and third printed editions it is called 'The Tragedy of Gorboduc,' from the name of a supposed antient British king; but in the second it is entitled, more correctly, 'The Tragedy of Ferrex and Porrex,' from those of his two sons, who contend for sole possession of his kingdom after he has divided it between them. A dumb show precedes each of the five acts, prefiguring what is to occur:[*] the first four acts are closed by choruses in rhyme, and the fifth by a didactic speech of nearly two hundred lines. Sir Philip Sidney, who, in his 'Apology of Poetry' (written about 1583) maintains the fitness of observing the antique unities, though complaining that those of time and place are neglected in 'Ferrex and Porrex,' admits that it is 'full of stately speeches and well-sounding phrases, climbing to the height of Seneca his stile, and full of notable morality, which it doth most delightfully teach.' It is not indeed surprising that this first attempt to imitate or emulate the regular or classic tragedy should have been highly extolled at the time, especially by those who inculcated by formal precept a general imitation of the antique models; but certain it is, that, both as to incident and dialogue, the piece is laboriously heavy; the speeches are of most tedious length, and the thoughts and sentiments very trite and commonplace. It is however worthy of especial notice, that this was the first play in the English language the dialogue of which was written in blank verse. This, again, in all probability was owing to the earnest endeavour which the authors were making to follow the method of the antients. This tragedy was followed almost immediately by 'Julius Cæsar,' the earliest instance on record in which events from the Roman history were dramatised in English, although the precise nature of this performance, of which we have nothing but the mention in an old MS. chronicle, cannot be ascertained. It is doubtful, however, whether both these pieces were not preceded by a tragedy founded on Luigi da Porto's famous tale of 'Romeo and Juliet.' From about this date until shortly after 1570, the dramatic field seems to have been pretty equally divided between the later moral-plays and the earlier attempts in tragedy, comedy, and history. In some pieces of this date and a little later, as already shown, endeavours were made to reconcile or combine the two kinds of composition; but afterwards the morals generally gave way to the more popular and intelligible species of performance. We find precedence given to the latter in the license to James Burbage and others in 1574, in its mention of 'comedies, tragedies, interludes, and stage-plays;' and in the act of common council of the following year against theatrical performances in the city they are designated as 'interludes, tragedies, comedies, and shows.'

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[*] It should be remarked that in our oldest tragedies these dumb shows were not always typical of the ensuing incidents: they sometimes served to introduce compendiously such circumstances as could not be conveniently included in the actual performance, and sometimes they supplied deficiencies, or covered the want of business on the scene.

Still the terms tragedy and comedy, in general acceptation, remained far from the strictness of signification attached to them by the professed inculcators, by example or precept, of the imitation of the antients. It is observable, however, that comedy was from the beginning used in a more comprehensive sense than tragedy, being in fact very often employed as synonymous with the general designation of play. It is plain, even from the instances we have already cited, that, for a long period, any play might without impropriety be termed a comedy, though none but a serious piece was ever called a tragedy. Hence it was, that, as late as 1578, Thomas Lupton called his moral-play of 'All for Money' both a comedy and a tragedy; and hence it is, that Shakspeare makes Hamlet, after he has had the tragedy exhibited before the king and queen, exclaim,

> 'For if the king like not the comedy,' &c.

Not only, however, was the tragic element, as we here see, by no means excluded from what was at that time understood as comedy; but the comic, as we find, both from examining the productions of the time, and from the testimony of the contemporary critics, was employed without reserve in tragedy. Thus Sir Philip Sidney, the most distinguished at that day among the English champions of the classic school, in his 'Apology of Poetry,' written, as already mentioned, about 1583, after inveighing severely against the total disregard, by the English dramatists, of the unities of time and place, felt himself called upon to add:—'But besides these gross absurdities, how all their plays be neither right tragedies nor right comedies, mingling kings and clowns, not because the matter so carrieth it, but thrust in the clown by head and shoulders, to play a part in majestical matters with neither decency nor discretion; so as neither the admiration and commiseration, nor right sportfulness, is by their mongrel tragi-comedy obtained.'

Small as is the value now-a-days of this critical opinion of Sidney's, it affords an interesting and conclusive testimony as to the essentially romantic character of the rising drama, which we thus find it to have thoroughly, and, as the classic advocates deemed, incorrigibly, assumed at least ten years before Shakspeare, who by some has been supposed to have impressed that character upon it, became an original writer for the stage. The vast variety of matters embraced by the dramatists of that day, and of sources from which they drew, is perfectly expressed in the prologue to the 'Royal King and Loyal Subject,' one of the earlier productions of Thomas Heywood, who became a writer for the stage some years before the death of Elizabeth.

Sidney says nothing of the performance of miracle plays in his time; but we know from many other authorities, that while the romantic drama was thus establishing itself, and moral-plays were still frequently exhibited, pieces founded on Scripture history continued to be represented. The latter, however, already confined chiefly to country places, soon ceased altogether; nor have we any specimen of what can strictly be termed a moral-play subsequent to the death of Elizabeth.

We have now traced the progress of the English stage from its ecclesiastical and religious origin until it became almost exclusively a mirror of actual life, and attained all those dramatic and theatrical forms which most prominently characterized the later and fuller maturity of our elder modern drama. It was in the same year, 1583, wherein Sidney wrote his 'Apology,' that Elizabeth first allowed a public company to act under her name and authority. As the dramatic writers who flourished in the brief interval between this period and that of the fullest development of Shakspeare's genius, with one exception, did nothing importantly to alter or improve dramatic art, it is needless to enlarge upon the various kinds and degrees of merit which made a number of them, as Kyd, Lodge, Greene, Lyly, Peele, Nash, Chettle, Munday, Wilson, &c., highly popular and celebrated in their own time. Immediate predecessors of Shakspeare, they have long been lost, necessarily and deservedly, 'in the near effulgence of his blaze.' The single exception that we are called upon to make is in favour of Christopher Marlow, of whom we must observe, not only that his works exhibit greater vigour both of conception and of language than belongs to any of his contemporaries, but also that he was the first who established the use of blank verse upon the *public* stage, in lieu of that exclusive rhyming which possessed it before he wrote.

The collection of Shakspeare's plays, as commonly printed, affords the grandest and most instructive study possible of the progress of the romantic drama from the crudeness of its early state to the blended richness of its full maturity. In this view, even those pieces in that collection in the composition of which Shakspeare is known to have had little or no concern, become extremely interesting. Such plays as the 'First Part of Henry VI.,' 'Pericles of Tyre,' and 'Titus Andronicus,' for instance, if not highly favourable, are not unfair specimens of the state of the art when Shakspeare was first introduced to its acquaintance: the 'Second' and 'Third Part of Henry VI.,' 'King John,' &c., show us in progressive gradation the rapid development of his wonderful power of infusing a spirit of life into a production which came into his hands a piece of cold, heavy, mechanical, and often incongruous composition. In the 'Two Gentlemen of Verona,' &c. we have the first free spontaneous flowings from his own peculiar and delightful spring of dramatic poesy, 'unmixed with baser matter;' and then, proceeding onward, still rising as we proceed, we pass through those greater historical compositions, whether from English or Roman history, which display so deep an insight into national as well as individual character, and into the personal springs of political transactions; then through those pieces founded on romantic story, as 'Romeo and Juliet,' 'Othello,' &c., fraught with all the depth, the wildness, and the richness of vehement passion; until we reach the grandest and most profound of his dramatic creations, where, in boundless diversity, the beauties and the deformities, the glory and the emptiness, of human existence, are unfolded in the tender light of a compassionate sympathy, as in 'The Tempest,' or disclosed with more awful depth and unsparing though beautiful rigour in 'Macbeth,' in 'Lear,' in 'Timon of Athens,' or in 'Hamlet.'

Indeed, as the compositions of Shakspeare form the most elevated region of dramatic poetry in that age, so the play of 'Hamlet' may, we think, be taken as the highest summit of that region. It seems to present the finest example of the depth, sublimity, refinement, and variety of which the romantic drama is capable; and it is the most abundantly marked with those peculiar characteristics which sprang from the union, in the person of its author, of such wonderful dramatic powers with such familiar and thorough experience of theatrical management. Thus, besides its exalted interest in a poetical view, it is singularly valuable as an historical study of dramatic and histrionic art. Here Shakspeare exhibits to us even the relation in which the lord chamberlain stood to the players; and from the pedantic enumeration which Polonius's loquacity gives us of the various kinds of pieces which the actors whom Hamlet engages could perform, we gather what was then the established mode of classifying dramatic productions. 'The best actors in the world,' says Polonius, 'either for tragedy, comedy, history, pastoral, pastoral-comical, historical-pastoral, tragical-historical, tragical-comical, scene individable, or poem unlimited.' The latter part of this nomenclature, indeed, seems chiefly the offspring of the chamberlain's own pedantic and talkative affectation: it is to the three leading distinctions of tragedy, comedy, and history, that we should principally attend.

Of Shakspeare's younger contemporaries and competitors few have transmitted a living memorial of their works to posterity: the principal are Ben Jonson, Beaumont and Fletcher, and Massinger. Jonson demands our more particular notice as the chief advocate and practiser, among the old English dramatists, of the imitation of the antients—as standing indeed almost alone among them in that respect, and so earning Milton's well-known characterization in 'L'Allegro' of 'Jonson's learned sock.' Totally different as Jonson was from Shakspeare, both in his views of dramatic art and in his poetical constitution, he yet found a ready encourager in the latter, who was so far superior to all petty jealousy and rivalry. It was by Shakspeare's intervention that Jonson's first piece was brought upon the stage; a second even received touches from his hand; and in both he undertook the performance of a principal character. We have two tragical attempts of Jonson, and a number of comedies and masks. He could have risen to the dignity of the tragic tone, but had no turn for the pathetic. It is curious to observe how much, while he was constantly preaching up the imitation of the antients, his two tragedies differ both in substance and form from the antique models: we see here the irresistible influence which the prevailing tone of an age and the course already pursued in an art must exercise upon even the most independent minds. In the historical extent given by Jonson to his 'Sejanus' and his 'Cataline,' unity of time and place were altogether out of the question; and both pieces are crowded with a number of secondary personages. In 'Cataline,' indeed, the prologue is spoken by the spirit of Sylla, and much resembles that of Tantalus in the 'Atreus and Thyestes' of Seneca; while to the end of each act a moralizing chorus is appended, but not duly introduced or connected with the whole. This is all the resemblance to the antients; in other respects the form of Shakspeare's historical dramas is adhered to, but without their romantic charm. 'Cataline' and 'Sejanus' are in fact solid dramatic studies after Sallust and Cicero, and after Tacitus, Suetonius, Juvenal, &c.; but their author had not learned from Shakspeare the art of remaining true to history and yet satisfying the demands of poetry. Jonson was a strong advocate for *the purity of the species*, that is, for the alleged classical circumscription of tragedy and comedy; yet he had little talent for comedy in the antique spirit, and accordingly the later Roman satirists were his models rather than the comic writers. Fancy was less powerful in him than the spirit of observation, and hence in plot and incident he is often defective. He possessed a methodical head, and accordingly, when he had conceived a character in its leading idea, he followed out that idea with a strictness which excluded whatever might merely serve to give individual animation. He generally seized with accuracy the manners of his own age and country; but he attached himself so much to external peculiarities, then called *humours*, that a great part of his comic delineations soon became obsolete: his Captain Bobadil, however, in 'Every Man in his Humour,' forms an exception to this remark; and though less original and entertaining than Falstaff's comrade, Pistol, he is nevertheless a model in his way, and has been imitated by subsequent writers. In the *masks* of that day there seems to have been something congenial to the learned and rather frigid spirit of Jonson, and he was more distinguished in their composition than any other writer of the period: these were allegorical occasional pieces, usually designed for court festivals, decorated with machinery, masked dresses, dancing, and singing. This secondary dramatic species nearly expired with Jonson: the only subsequent production in this way of any celebrity is the *Comus* of Milton.

It is no mean honour to Beaumont and Fletcher, that after Shakspeare, who stands alone in all dramatic history, they are entitled to the highest place among the romantic dramatists of England. They seem indeed to have had almost every dramatic quality short of that marvellously unerring instinct which Shakspeare possessed, and which appears to be vouchsafed to few. They began their career in Shakspeare's lifetime; Beaumont indeed died before him, and Fletcher survived him only nine or ten years. They followed his example in the whole form of their plays, regardless of the different principles of Ben Jonson and the imitation of the antients. Like him, they drew from tales and romances; they mingled burlesque with pathetic scenes, and endeavoured, by the concatenation of the incidents, to give an impression of the extraordinary and the wonderful. Shakspeare's own fame was in some degree eclipsed by them in the generation which immediately succeeded him; and in the time of Charles the Second they possessed a still greater proportion of popularity. 'Beaumont and Fletcher,' remarks Schlegel, 'were in fact men of the most distinguished talents: they hardly wanted any thing but a more profound seriousness of mind, and that sagacity in art which observes a due measure in every thing, to deserve a place beside the greatest dramatic poets of all nations. They possessed an uncommon fecundity and flexibility, and a felicitous ease, which however too often degenerated into levity. Poetry with them was not an inward devotion of the feelings and imagination, but a means to obtain brilliant results. Their first object was *effect*, which the great artist can hardly fail of attaining if he is determined above all things to satisfy *himself*. They were not players, like most of their predecessors, but they lived in the neighbourhood of the theatre, were in constant intercourse with it, and so had a perfect understanding of theatrical matters. They were also thoroughly acquainted with their contemporaries; but they found it more convenient to lower themselves to the public than to follow, in this particular, the example of Shakspeare, who elevated the public to himself. They are least successful in their tragic attempts, because their feeling is not sufficiently drawn from the depths of human nature, and because they bestowed too little attention on the general consideration of human destinies: they succeed much better in comedy, and in those serious and pathetic pictures which occupy a middle place between comedy and tragedy. The morality of these writers is ambiguous. Not that they failed to contrast in strong colours magnanimity and goodness with baseness and wickedness, or did not usually conclude with the disgrace and punishment of the latter; but they often exhibit an ostentatious generosity in lieu of duty and justice. Every thing good and excellent arises in their pictures more from transient ebullition than from fixed principle; they seem to place the virtues in the blood; and impulses of a merely selfish and instinct-like nature hold up their heads quite close to them as if they were of kindred origin. There is an incurably vulgar side of human nature which the poet should never approach but with a certain bashfulness when he cannot avoid letting it be perceived; but instead of this, Beaumont and Fletcher throw no veil whatever over nature: they express every thing bluntly in words; they make the spectator the unwilling confidant of all that more noble minds endeavour even to hide from themselves. The indecencies in which these poets allowed themselves to indulge exceed all conception: the licentiousness of the language is the least evil; many scenes, nay, even whole plots, are so contrived, that the very idea of them, not to mention the sight, is a gross insult to modesty. Their pieces had this convenience for performance in their time, that such great actors were not necessary to fill the principal characters as in Shakspeare's plays. To bring them on the stage in our days, it would be necessary to recast the greater part of them: with some of them we might succeed by omitting, moderating, and purifying various passages.'[*]

Massinger, Shirley, Ford, and such other of the younger contemporaries of Shakspeare as we have not yet mentioned, have no characteristics sufficiently distinctive to admit of their being particularized in this general survey. There was then a grand school of dramatic art in England, of which Shakspeare was the real, though too frequently unacknowledged, head; for Ben Jonson had scarcely a successor. One effect of mannerism in art is, to efface the marks of individual originality, and make the productions of various artists resemble each other; and from this mannerism no dramatic poet of that age who succeeded Shakspeare is altogether free. Nevertheless, in a general view of dramatic art, this first period of the English theatre is far the most important: it can hardly be doubted that some even of the secondary writers of that time are more instructive for theory and more remarkable in practice than the most celebrated of all the succeeding times.

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[*] This assertion has been verified in a very recent instance by the successful production, at the Haymarket Theatre, of 'The Bridal,' a recasting of 'The Maid's Tragedy' of Beaumont and Fletcher. Their 'Rule a Wife and have a Wife' has kept the stage by similar means. It has also been brought upon the German stage, having been re-written by Schröder under the title of 'Still Waters are Deep' (*Stille Wasser sind Tief*), and, when well acted, has always as Schlegel informs us, been extremely well received.

Such was the general condition of the stage during the reign of Charles I. down to the year 1642, when the invectives of the puritans, who had long murmured against the theatre, and at last thundered loudly against it, were changed into prohibitory law; and in 1648 not only to act plays, but even to witness them, was made a penal offence. Nearly all the players now took arms on that side the interests of which seemed identified with the existence of their own profession. Many of them perished in the field; and after the final close of the war, one company of actors only was formed out of the remains of all the former ones, and occasionally, with great circumspection, performed at private mansions in the vicinity of London.

Davenant as manager, and Betterton as actor, form a slender link of connection between the old stage and that of the Restoration. Charles II. being considered, in his relation to the theatre, as a sort of restoring and tutelar deity, its character was now formed in absolute deference to the half foreign and wholly vicious taste of himself and his courtiers. Under these auspices, Davenant introduced the Italian system of decoration, the *costume* as then understood, the opera music, and the use of the orchestra in general. A still more important innovation in theatrical arrangements was, the permanent adoption of the practice, against which the puritans had directed the most violent of their anti-dramatic fury, but which had long been established in Italy, Spain, and France, of having the female parts personated by women instead of boys. At the same time, Betterton was sent over to Paris expressly to take a view of the French stage, in order to such other modifications of the English as the inspection might suggest. The result of this great neglect of the old dramatic and theatrical system of England, and assiduous study of that of France, was, for a long period, an almost entire denationalization, both in form and spirit, of the current dramatic literature. Davenant himself, who had resided very much at Paris, seems to have acquired this exotic taste long before the Restoration, as it is fully exhibited, amongst others of his productions, in his operatic piece, 'The Siege of Rhodes,' performed as early as 1656. Hence, in the theatrical restoration which accompanied the political, he set himself cordially to work, by altering old pieces, and writing new plays, operas, prologues, &c., to contribute towards the furnishing of that new theatrical repertory which the new dramatic system required. Of all his works, however, nothing has escaped a merited oblivion.

It was left for the industry and fertility of Dryden to give the new theatre a thorough establishment according to the new ideas, a task to which he applied himself with all possible diligence both by example and precept. The numerous essays on dramatic art which accompanied the publication of his several pieces, together with the larger treatise which he put forth separately, exhibit in a remarkable manner the anarchy which then prevailed in the notions of that art which then pervaded the public mind. The court indeed, whose taste it was now the leading object of the dramatic writers to seize and to follow, had no real knowledge of the fine arts; it merely favoured them, like other foreign fashions and inventions of luxury. Hence the drama of the day became a strange compound of the extreme license of the later writers of the earlier English school with the conventional stiffness and formality of the French, but without any of the natural and vigorous spirit which had animated either of those models. Dryden's fatal facility of rhyming, as in this case it may well be termed, materially aided him in effecting this incongruous combination, to which the absence in him of the highest poetic spirit likewise essentially conduced. It may be observed of his plays in general, that the plots are grossly improbable, and the incidents thrown out at random, while the most marvellous theatrical strokes drop, as it were, incessantly from the clouds. Scarcely a spark of nature is to be found in any of his characters: passions, criminal and magnanimous, flow with indifferent levity from their lips without ever having dwelt in the heart: their chief delight seems to be in heroical boasting. The tone of expression is by turns flat and madly bombastic: the author's wit is displayed in far-fetched sophisms, and his imagination in long-spun similes awkwardly introduced. The Duke of Buckingham, who, amongst other vigorous though wayward and generally misapplied talents, possessed high powers of ridicule, undertook to satirize these faults and absurdities of Dryden and his school, in his comedy of 'The Rehearsal,' wherein, although the structure of the piece itself might have been more artificial and diversified, the separate parodies are very ingenious and effective.

But the best-aimed satire, though it might correct in some degree, could not regenerate the stage. This could have been done only by the arising of some greater and more genuine dramatic genius, or at least by the successful appearance of some very great actor, capable of entering fully into the spirit of the elder drama. 'The Rehearsal' might indeed contribute to produce that nearer approach to nature which, among the compositions of Dryden's younger contemporaries, has preserved upon the stage one tragedy of Lee's and two of Otway's, while not one of Dryden's pieces has maintained its theatrical existence; but the essential constitution of the acting drama remained as before. The mixed romantic species being entirely laid aside, all was either tragedy or comedy. Dryden wrote comedies as well as tragedies; but as, with all his command of language and flow of rhyme, he did not possess in any perfection either the greatest dramatic or the highest poetical qualities, his dramatic writings, in this kind as well as in the other, have fallen, if not into absolute oblivion, at least into entire neglect. Shadwell's seventeen comedies, though he affected to imitate Ben Jonson in exhibiting humorous and eccentric peculiarities of character, are deservedly forgotten. Wycherley, so much in favour both with Buckingham and King Charles, and afterwards with King James, had much more genuine pretensions to the higher and more vigorous order of comic power, notwithstanding that his greatest performance, 'The Plain-dealer,' is a sort of counterpart of Molière's 'Misanthrope;' his next best piece, 'The Country Wife,' has been retained upon the stage, by means of adaptation and purification, under the title of 'The Country Girl.' Although the 'Sir Fopling Flutter' of Etherege is not yet forgotten, still Congreve deserves to be considered as the true father of 'genteel comedy' on the English stage, and was long regarded as the great model for imitation in that department, to which distinction he was much less entitled by any lively and humorous delineation of natural character than by a perpetual reciprocation of wit in his dialogue, together with originality of plot, and novel combinations of factitious manners: he drew little from common life; but his portraits of sharpers and coquettes—of men without principle and women without delicacy—are but too faithful representations of the fine gentlemen and ladies of his day. His 'Love for Love' is the only one of his pieces the licentiousness of which it has been found possible to prune sufficiently for performance in later years.

Of the poetic spirit and the moral tone of English comedy during the period we have just reviewed, we shall state our opinion in the words of Schlegel, because we think it useful to show to the English reader in what light that particular portion of our dramatic literature is justly received and represented by so able a continental critic:—'The greatest merit of the English comic poets of this period consists in the drawing of character; yet, though many of them have shown much talent in this way, I cannot ascribe to any of them a peculiar genius for character. Even in this department the older poets (not only Shakspeare, for that may well be supposed, but even Fletcher and Jonson) are superior to them. The moderns seldom possess the faculty of seizing the most hidden and involuntary emotions, and giving them comic expression; they generally draw merely the natural or assumed surface of men. The same circumstance that was attended with so prejudicial an effect in France after Molière's time came here also into play. The comic muse, instead of becoming familiar with the way of living of the middle and lower ranks, her proper sphere assumed an air of distinction; she squeezed herself into courts, and endeavoured to snatch a resemblance of the *beau monde*. It was now no longer an English national, but a London comedy. The whole nearly turns on fashionable love-suits and fashionable raillery; the love affairs are either disgusting or insipid, and the raillery is always puerile and devoid of humour. These comic writers may have accurately hit the tone of their time: in this they did their duty; but they have reared a lamentable memorial of their age. In few periods has taste in the fine arts been at so low an ebb as towards the close of the seventeenth century and during the first half of the eighteenth. The political machine held its course; wars, negotiations, and changes of states, give to that age a certain historic splendour; but the comic poets and the portrait-painters have revealed to us the secret of its pitifulness, the latter in their copies of the dresses, the former in their imitations of the social tone. I am convinced that if we could listen to the conversation of the *beau monde* of that day in the present, we should find it as pettily affected and full of tasteless pretension as the hoops, the towering head-dresses, and high-heeled shoes of the women, and the huge perruques, cravats, wide sleeves, and ribbon-knots of the men. The last, and not the least, defect of the English comedies is their indecency. I may sum up the whole in one word by saying, that after all that we know of the licentiousness of manners under Charles II., we still are lost in astonishment at the audacious ribaldry of Wycherley and Congreve. Not merely is decency most grossly violated in single speeches, and frequently in the whole plot; but in the character of the rake, the fashionable débauchée, a moral scepticism is directly preached, and marriage is the constant subject of ridicule. Beaumont and Fletcher portrayed a vigorous though irregular nature; but nothing can be more repulsive than rude depravity coupled with claims to higher refinement.'

The continuance, and even increase, of this moral depravation of the drama produced at length, in 1698, a severe castigation from the pen of the sturdy nonjuror, Jeremy Collier, under the title of 'A short View of the Immorality and Profaneness of the English Stage, together with the Sense of Antiquity on this Argument.' In this work, its author, armed with sufficient learning and sarcastic wit, attacked all the living dramatists from Dryden to D'Urfey; and although some of them, including Congreve, less candid on this occasion than Dryden himself, set up a petulant and sophistical defence, yet this publication of Collier's had a permanent effect on the stage as well as on the public mind. This effect, however, was operated only by degrees. Vanburgh followed in the line of Congreve, and, in spite of Collier's animadversions, did so with little more regard either to morality or decorum, though mingling more humour with his wit. This unbounded license has long banished from the stage his ablest production, 'The Confederacy,' while 'The Provoked Wife' and 'The Provoked Husband,' inferior in comic power, have survived by virtue of their greater decency. His contemporary, Farquhar, though displaying sufficient libertinism of language and sentiment, did not carry them to so gross an excess. A perfect gentlemanly ease of manner, lively spontaneity of wit, natural though not strongly drawn character, and a felicitous, uninvolved construction of plot, are his peculiar characteristics, and have preserved 'The Beaux' Stratagem' and two other of his pieces in public favour to the present time. His 'Sir Harry Wildair,' too, was the legitimate successor of the 'Sir Fopling Flutter' of the preceding generation; but in the true dramatic qualities Farquhar excels Etherege beyond all comparison. The Restoration period of English theatrical history had not only brought female performers for the first time before the public, but female dramatists also. The numerous comedies of Mrs. Behn, who wrote under Charles II., are remarkable only for the full share which they possess of the licentiousness of her time; nor need we remark upon two tragedies and a comedy, acted with some success, from the pen of Mrs. Manley, better known as a romantic memoir writer. But in Mrs. Centlivre, a prolific writer of comedy, exactly contemporary with Farquhar, we find more genuine dramatic talent, yet exhibited much more in a lively bustle of intrigue than in forcible delineation of character, although *Marplot*, in her 'Busy Body,' is still proverbial as a comic portrait, and some others of her plays, as 'The Wonder,' 'A Bold Stroke for a Wife,' &c., remain as well-known stock pieces. Just at the same period, also, Steele, among the other various exertions of his pen, wrote for the stage in a kindred spirit with Farquhar, but with inferior dramatic skill; and Cibber produced his best comedies, 'The Careless Husband' and 'The Nonjuror' (a sort of adaptation of the 'Tartuffe' of Molière), the very great success of which at that time was owing partly to its flattering the sentiments of the friends of the Hanoverian succession, and which, under an altered form and another title, 'The Hypocrite,' is still a favourite on the stage. Fielding, the novelist, commenced his literary career as a writer of comedy: he chiefly demands notice in dramatic history as one of the principal of those writers for the stage who afforded Sir Robert Walpole a pretext for obtaining the act to limit the number of theatres, and subject dramatic performances to the lord chamberlain's license. In a very similar predicament was Gay, after the appearance, in 1727, of his 'Beggars' Opera.' Its professed object was, by way of burlesque, to ridicule the Italian Opera, which had been established and maintained at great expense, and was thought by many to be rising in hurtful rivalry with the national drama. But amidst the general satire on political and fashionable selfishness and depravity which this composition implied, the persons then in power took so much of it to themselves, that while 'The Beggars' Opera' had the unprecedented run of sixty-three successive nights, and transformed the actress who represented the heroine into a duchess, the lord chamberlain refused to license for performance a second part of it entitled 'Polly.' This celebrated production, however, though still a standing favourite with the public, is now chiefly remarkable in dramatic history as the prototype (unwittingly, it seems, on its author's part) of a new species of dramatic composition upon the British stage, since known as 'the English opera.'

We must now revert for a moment to the history of modern English tragedy. After the example of Lee and Otway, Southern and Rowe endeavoured to return to a more natural tragic tone and style than those which Dryden had so long practised and inculcated. Southern even ventured to attempt the Shakspearian combination of the humorous and the ludicrous with the tragic, but was so deficient in that high mastery of the art which is necessary to accomplish this with success, that in his 'Oroonoko,' which, with another of his tragedies, under the altered title of 'Isabella, or the Fatal Marriage,' has kept the stage, the comic portions, being merely inserted or stuck on rather than interwoven or blended, have been simply dropped in performance, without being at all missed by the audience. Rowe was an honest admirer of Shakspeare, and in his 'Jane Shore' has even directly borrowed the part of Gloster from 'Richard the Third.' Without boldness and vigour, he possessed sweetness and feeling; he could excite the softer emotions; and hence, in his 'Fair Penitent' (a feeble remodelling, it must be observed, of Massinger's 'Fatal Dowry'), in 'Jane Shore,' and in 'Lady Jane Grey,' he has successfully chosen the weaknesses of heroines for his subject. Addison's 'Cato,' notwithstanding the great temporary celebrity and popularity which party rivalry conferred upon it, merits no attention in the history of dramatic art, except as having been the first, and, it should seem, the model, of a series of the most frigid productions in imitation of the French classic school, by Young, Johnson, Thomson, Glover, &c., that are to be found in our literary history. With some small poetic, they have no dramatic pretensions; yet the very excess of their formality and frigidity perhaps contributed to that decisive reaction of the public mind in favour of the elder dramatic school, which took place in the middle of the last century, and which now demands our attention.

Garrick's restoration of Shakspeare to his rightful supremacy over the English theatre has entailed upon his countrymen a permanent debt of gratitude which is yet more glorious to the memory of that great performer than the idolatrous admiration of his contemporaries for his unrivalled histrionic powers. It was nothing less than the removal of one great mark, worn for eighty years before, of national degradation, morally and intellectually. Here, too, we have a signal instance of the great degree in which the dignity and prosperity of a national theatre at any given period may depend on the taste and genius of a single actor, especially when that actor becomes a leading manager also. In the instance in question this was more peculiarly and necessarily the case. When the condition of the English stage for three generations before is considered, it is quite evident that no person but an actor of very high genius could achieve the theatrical resuscitation of the greatest of all dramatic poets. Had any such actor existed at the restoration of Charles II., he might probably have done much to prevent the wretched denationalization of the theatre which was so much favoured by that king's exotic and vitiated taste. But it was one of the vital and lasting injuries inflicted on the theatrical system by the puritanical suppression, that the old line of actors which had risen and flourished along with the great and vigorous dramatic school of the age of Elizabeth and James, and had intimately imbibed its healthy natural tone, had grown with its growth, and strengthened with its strength,' was violently and fatally interrupted: a new race of actors had to arise, who, not having, like their predecessors of the former period, the example and the awe of the great histrionic models of the old school before them, found it a much easier task to strut and rant in the delivery of unnatural bombast than to sound the depths and reach the delicacies of nature's favourite poet. And thus an additional facility was opened for the introduction and perpetuation upon the stage of the factitious taste of Dryden and his followers.

It was left for one qualified to be the great actor of nature to lead forth the sublime poet of nature from his long theatrical obscurity. The clear, deep, quick, and varied truth which appeared in Garrick's interpretation of Shakspeare's leading characters, after all the cold, leaden, formal declamation under which even the best-esteemed performers had so long been accustomed to smother their spirit, was nothing less than a revelation to the play-going public of that day. The effect was electrical. Not only the leading dramatic taste, but the highest standard of acting, was raised at once to its antient elevation; nor has either of them, amidst all the minor vicissitudes of our theatrical history, ever since descended below it.

Of the genius and efforts of our dramatic writers during this latter æra it is not possible to speak so highly. It is perhaps too much to look once in a century, or even in several centuries, for a writer like Shakspeare, possessing such universal mastery over all human emotions as to be able to blend them in such endless variety as to move at will, in whatever order, in whatever alternation or juxtaposition that he pleases, our laughter and our tears. We know that there are myriads who can enjoy the tragic or the comic, more especially the latter, for one who can thoroughly relish both; and that yet smaller is the proportion among those who can relish both, of those who can excel in producing both. Yet it might not have been unreasonable to have expected among our later dramatic productions a greater number approaching the perfection of those models which other countries have produced within those narrower limits of tragedy and comedy which, as we have seen, were established as part of their dramatic system.

Garrick himself, having made no great attempt in dramatic composition, exposed himself to no considerable failure: one or two of his small afterpieces have kept possession of the stage; but his labour of this kind most worthy of mention is probably the share which he took in the composition of one of Colman's best comedies, 'The Clandestine Marriage.' Cumberland's comic powers were respectable; but in his most successful pieces, 'The West Indian,' brought out by Garrick in 1771, and 'The Wheel of Fortune,' to which John Kemble's masterly personation of the principal character gave so decided a popularity, he scarcely rises above mediocrity. Horace Walpole's tragedy, 'The Mysterious Mother,' though its subject necessarily excluded it from representation, set the first example of a vigorous attempt to return to a natural and healthy tragic tone and style. As for the 'Douglas' of Home, it has no such qualities to recommend it, but acquired and has retained the public favour chiefly by dint of one truly and deeply pathetic situation wherein the strongest domestic affections are profoundly and permanently interested. Sheridan gave new life and spirit to 'genteel comedy,' in which department he remains at the head of the writers of the present æra. Though perhaps his pieces are less perfectly finished than those of Congreve, already characterized as the chief of this class of dramatists in the preceding period, and although, especially in 'The School for Scandal,' he is subject to the same imputation as his predecessor, of being too indiscriminately lavish of epigrammatic wit, yet he has more truly comic wit, more force of genuine humour, than Congreve, as is more particularly felt in his play of 'The Rivals,' and should therefore, we conceive, be ranked above him as regards the more essential qualities of comedy. The dramatic merits of Goldsmith were of a totally different cast: a certain eccentric drollery of character and whimsical extravagance of plot are the distinctive characteristics of his two comedies, one of which, though by no means among the most excellent productions of his pen, has kept an honourable place in the public favour. Of the elder Colman's pieces, two, 'The Jealous Wife' and 'The Clandestine Marriage,' are still deservedly esteemed; and the latter in particular is frequently acted: they combine much elegance of composition with considerable comic power. Nor among the comic dramatists of the latter half of the last century must we forget to mention the once celebrated Samuel Foote, who has been more commonly than appropriately called the English Aristophanes, seeing that such a designation conveys much too high a compliment to Foote, and a very indifferent one to the great master of the elder Grecian comedy. So little had Foote's pieces of that burlesque ideality which constituted the essential character of the latter, that his exercise of the *vis comica* reduced itself almost exclusively to a contemporary personal satire, amounting to little more than a refined species of mimicry, which, from the merest mercenary motives, he directed quite as readily against the most innocent peculiarities of living individuals as against the most injurious vices or follies. Hence it is, that of the many farces which he wrote, chiefly to exhibit in them his own powers of satirical mimicry as an actor, not more than one survives upon the stage.

It was towards the close of the century that the sentimental comedy of the German school of Kotzebue, with little but its novelty to recommend it, acquired a footing in England. In this kind, among the direct adaptations from the German, 'The Stranger' has had the most general success, and is the most perfect representative of the species. Among the native efforts in the same line, Holcroft's 'Road to Ruin,' still popular, is one of the most meritorious. The same writer has the credit also of having first introduced on the English stage the melo-drama, which has since filled so large a place upon it. Mrs. Inchbald, among many pleasing original pieces in the lighter comedy, has likewise given us an adaptation from Kotzebue. M. G. Lewis, in his tragedies, as in his romances, drew from a very different German source, in his taste, we might almost say his rage, for the marvellous and the terrific. A kindred spirit is displayed in the late Charles Maturin's tragedy of 'Bertram,' to which Kean's acting gave high success. As regards Lord Byron's tragedies, we have only to remind the reader that as their author never designed them for representation, he is by no means chargeable with their dramatic failure.

We abstain from individual criticism of living English contemporaries. As regards modern efforts in the Shakspearian drama, the flight in this case is so lofty and so bold, that even to attempt it may be said to require almost as vigorous and as rare a genius as to succeed. But on the ground next in elevation, that of tragedy in the mere limited sense, aspirants, if not very numerous, are yet, from time to time, presenting themselves: however, we have not yet anything that approaches in natural vigour or in poetic richness, either to the masterpieces of Schiller, or even to the most successful efforts of the new romantic school of France. In the higher comedy the experiments are yet more rare. Decency has long been thoroughly established in this department; but since Sheridan's time, we look in vain either for the raciness of humour, the brilliancy of wit, or the happiness of invention which seasoned the licentiousness of our earlier comic writers. Of the occasional pieces written to show off the talent of particular actors, the numerous adaptations of French farces and vaudevilles, and the many trifles that are continually coming forth into an ephemeral popularity in the form of comic opera or burletta, we shall merely remark that, with much that is lively and amusing, they have little that indicates either vigour or originality of dramatic talent.

The late and continued decline of dramatic art in England, which it is common to speak of as if it were tending to the utter abasement of that art, if not to its total extinction, seems to demand that we should point out distinctly the leading considerations relative to this subject. It is true that since the age of Elizabeth, for instance, the spread of printing and of reading, and above all, the rise and progress of novel and romance writing since the middle of the last century, have reduced the theatre to the occupation of a much smaller relative space among the sources of public amusement. Novel and romance reading, in particular, has become its most immediate and powerful rival, as approaching nearest to it in the nature and vividness of the stimulus afforded to the feelings and imagination, and as having the convenient capability of administering that excitement in all times and all places. Nevertheless, theatrical representations, besides those more general attractions which they may be said to share with some branches of reading, have their peculiar charms, for which no absolute equivalent is elsewhere to be found, and which therefore seem to place their perpetuity beyond all reasonable doubt. Besides that the perfect performance of a drama of the first order supplies the noblest enjoyment that art can offer to the mind through the medium of the senses, the pleasure which an audience derives from even an inferior dramatic production on the stage, is so much more vivid and immediate than reading can supply, as to free the former from all danger of being superseded by the latter. Nor are we inclined to lay much stress upon the favour extended by the more peculiarly aristocratic classes to the Italian opera, as a circumstance having any fatal or very injurious tendency as regards the national drama. The entire subordination in this foreign entertainment of every truly dramatic feature to musical effect (not to mention the unintelligibility of the language to most English ears), quite excludes it from the sphere of dramatic rivalry. Mere fashion apart, and as far as real pleasure is concerned, it is music and dancing, not acting, that people go expressly to enjoy at the Italian opera.

A much more evident, if not indeed an all-sufficient cause of the decline in question, is to be found in one remarkable result, which we must briefly state, of the monopoly of the higher dramatic performances possessed by the patentees of the two great winter theatres of the metropolis. The interpretation which for so long a period has been given to this privilege, of being not merely permissive, but exclusive, led at length to an enormous enlargement of the houses, with a view to obviate complaint as to want of accommodation for the increased and increasing metropolitan population. Now, it is plain that nature in fixing the average powers of vision and of hearing, has appointed certain limits beyond which the most scientifically constructed theatre for the performance of the regular drama cannot be conveniently nor even safely extended: yet this most important consideration has been altogether overlooked or neglected in the instances before us; and the inevitable and merited consequence has followed, in the desertion of the *great* houses, and of those higher and more genuine dramatic performances which they at once monopolized and marred by their very magnitude. 'The falling off in the attendance of the public was gradual, though somewhat fluctuating. There was a large play-going audience who could not readily give up their amusements at the theatre—persons to whom this kind of entertainment had become almost a necessary of life, which they relinquished very slowly and with great reluctance, even when they could no longer see and hear as they wished to see and hear. Some did, however, give up their enjoyments; some died; some fell off from other causes, and their places were not supplied by others; many found new modes of being entertained; and thus the play-going audience was gradually reduced, and the theatres were abandoned and forgotten by a very large portion of those who, under other circumstances, would have supported them.'[*] Hence, at Covent-Garden theatre, for example, during the twelve seasons from its rebuilding in 1809 to the year 1821, as shown from the accounts of the theatre, by the manager himself, the whole receipts of the house, including the performance of pantomimes, for which indeed its enormous magnitude was better adapted, was unequal to the current expenses of 'the legitimate drama' alone. Yet during that period the company was remarkably strong in excellent performers. Captain Forbes, in his evidence before the House of Commons' Committee on Dramatic Literature, in 1832, named the principal ones thus: 'John Kemble, Charles Kemble, Cooke, Lewis, Incledon, Munden, Fawcett, Young, Jones, Blanchard, Emery, Liston; Mrs. Siddons, Mrs. Dickens, Mrs. C. Kemble, Mrs. H. Johnstone, Mrs. Gibbs, and Mrs. Davenport.' Nor was this an expensive company made up for the new house; for all, or nearly all, of the performers thus enumerated had belonged to the old one. It should be further observed, that in this same period the income of the theatre declined, on an average of the last six seasons as compared with the first six, at the rate of nearly 21,000*l.* a year. The ten following seasons, however, when the theatre was held by Messrs. Kemble, Willett, and Forbes, present a much more deplorable account. Captain Forbes himself, in the evidence already quoted, states the loss at 20,000*l.* per annum. It also appears, from the statements of the interested parties themselves, that during the first twelve seasons the house was not, on an average, much more than half filled with spectators; and that during the last three of the seasons alluded to by Captain Forbes it was considerably less than half filled. The case of Drury-Lane theatre is so exactly parallel to that of Covent-Garden, as to require no separate illustration.

That the relish of the public for theatrical representations in general, if diminished at all, has not declined in a degree at all proportionate to the decay in the prosperity of the larger establishments, is manifest from one fact, of which the proprietors themselves complain—the extraordinary success of some of the minor theatres during the same period, which had risen, it would seem, in much the same proportion as the attendance at the great houses has fallen off,—showing, what indeed is plain enough without such demonstration, that people will more willingly attend even an inferior dramatic representation which they can see and hear perfectly, than a superior one which they cannot so hear and see.

The remedy for this preposterous state of things lies with the legislature, by opening a free theatrical competition which shall lead to the erection of houses for the regular drama, capable of holding little more than half the number of spectators necessary to fill houses so large as those of Covent-Garden and Drury-Lane. A bill to permit the erection of other playhouses was, indeed, recently passed by the House of Commons, but was rejected by the Lords, owing in this case, we must suppose, to indolence or indifference in the hereditary House, rather than to hostility. This is, however, a question upon which the best interests of dramatic art, the care of the nation for its noblest scenic enjoyments, and a just regard for its character as to general cultivation in the eyes of the civilized world, should cause the public opinion to be expressed loudly, distinctly, and unceasingly, until the legislature does apply the remedy in its power.

Under these circumstances, the higher walks of dramatic composition could expect and have indeed received but little encouragement from the directors of the privileged theatres. Their first solicitude has necessarily been to fill the treasuries of their respective establishments; and this they have long been striving, though vainly, to effect by the production of all manner of dazzling and stunning spectacles, with performers two-footed and four-footed, which should at least possess, as they seem to have thought, the requisites of being *visible* and *audible*. But the few concluding suggestions which we proceed to make are offered in the firm conviction that the present injurious and degrading theatrical system 'as by law established' is too monstrous in itself and too insulting to the national taste and reason to be much longer maintained; so that any dramatist who is capable of deserving, may rely upon shortly obtaining, the most effective medium for communicating his creations to the minds of his countrymen.

One leading error, then, which still besets the practice of dramatic composition is directly derived from the grandest and most glorious event in the intellectual history of modern times, the revival of art and letters in the fifteenth and sixteenth centuries. We may well excuse many of the greatest minds of that period if, in the ardour with which they applied themselves to the wondrous and long-hidden stores of physical and intellectual beauty which had suddenly opened upon them, their first irresistible impulse was to emulate the external graces of the antique models by close and devoted imitation—if often they mistook the form for the essence, or at least confounded them together. But it is not easy to extend the like indulgence to the artist of the present age. Let him, indeed, study the antients; but let him study them to the *bottom*. 'These time-bettering' days demand that he should be able not only to raise his view above the maxims of Horace and Aristotle to that of the works from the consideration of which those maxims were formed—not only to see distinctly how antient criticism was merely a product of antient art—but also to perceive how that art itself had grown out of, and drew its vital energies from, the peculiar spirit of the artist's age and country. Thus it is that in order to give vitality to any modern imitation of the Grecian tragedy for instance, the Greek mythology itself must first be established in the belief of the auditory. Until the poet can first accomplish this, the noblest grace of conception, the highest beauty of language cannot render his work a living and breathing creation.

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[*] See an accurate and able exposition of the operation of the theatrical monopoly upon the interests of the proprietors and lessees themselves, in the Monthly Magazine, of March, 1834.

The fundamental contrast between the religious principles of the antients and those of the moderns is found, on attentive examination, to be the leading source of the essential difference between the spirit of antient and that of modern art, especially of dramatic art. The more directly and exclusively any species of human composition is addressed to the feelings and imagination of a people, the more it must necessarily be influenced by the predominant character of that people's religious system, which, of all things whatever, has upon those feelings and that imagination the most uniform and the deepest operation. Now, among the primary characteristics of the Grecian system, those which especially demand our attention in relation to the present subject are these two—the absolute overruling power of fate, to which we have already had occasion to allude, and the absence of any clear notion or anticipation of a desirable future state. Were it more immediately to the present purpose, we might here show how thoroughly these two leading principles pervaded the philosophy as well as the poetry of the Greeks—how Stoicism, which we may call the art of endurance, was but a matured fruit of the former conviction, as Epicureanism, the economy of enjoyment, was of the latter—and that it is pretty clear that the most intelligent individuals of either profession united in their conduct these two great branches of practical wisdom. But Christianity reversed this order of ideas. It substituted for the impassive omnipotence of *fate* an almighty *will*, thus making passive fortitude give place to hope and fear; and further, to give to these two grand springs of imagination and enthusiasm, as well as action, the highest exaltation and most unlimited scope, many of those who expounded the Christian doctrines made the happiness of this life an object of contempt rather than of solicitude, representing its very miseries as conducive to the attainment of everlasting bliss. It was a necessary result of the exclusive rigour with which these notions were so long inculcated that the sciences which illumine life and the arts which refine it rapidly expired. Both knowledge and taste might well cease to be cultivated, when their very neglect was held up to mankind in the light in which so many fanatics have represented it, as one means of securing eternal happiness.

And when the strictness with which these principles were interpreted for so many ages began to relax, and men began to think that some effort to ameliorate their worldly state was not inconsistent with the profession or practice of Christianity, the boundless dominion of hope and fear still gave that predominant hue to their imaginations and their passions which they have ever since retained. The fierceness of fanaticism has indeed subsided, but the firmness of philosophy has not succeeded it.

Vain, then, is the attempt to exhibit on a modern stage 'the unconquerable will' of a Grecian tragic hero. The antique spirit animated the Grecian spectator as well as the Grecian poet. But the modern poet has a *romantic* audience, and cannot have any other—an audience that sympathises not with the triumph of will over passion, but with that of passion over will. Well did Shakspeare know this when achieving his grandest tragic successes in Lear, Macbeth, Othello, &c., wherein we see, not the triumph of the hero over fortune and over passion, but that of malignant fortune and conflicting passions over the hero.

In short, an intimate acquaintance with the pervading spirit of that public of his own time from whom his audience must be supplied, is the primary condition of all successful dramatic writing. It is indeed necessarily included in the perfect possession of that highest dramatic faculty which is essential to form a dramatist of the first order; for he must know, or have the sagacity to discover, the habits, mental as well as physical, of all classes and degrees of men, whether the distinctions be marked by difference of race, of country, of rank, of profession, or occupation. He should have a nice perception of the moral distinction between the characters of either sex, and of the modifications which age produces in that of each individual. In fine, he should possess that pervading insight into all the elements of character and all their combinations—that Shakspearian instinct—which can feel, not only *for*, but *with*, every variety of human nature and human condition.

Supposing that a writer could now arise, possessing the natural powers of a Shakspeare,—what are the principles by which he should be guided in cultivating those powers so as to give them the greatest effectiveness in the present day? We should answer,—Study, on the one hand, living man and his history; on the other hand, study Shakspeare; but study him on a juster and more liberal principle than has hitherto been followed; study him, above all things, to find how *he* studied human nature and human life;—to discover which thoroughly, his *age*, as well as himself, must be diligently and patiently examined; for the true use of Shakspeare to the artist of the present day is, by viewing his works in relation to his time, to divine, if possible, how Shakspeare would have written for an audience of the nineteenth century. We have neither the space nor the presumption to indicate how he would have done this; only we assert with the fullest confidence that such, and such only, is the mode of studying him calculated to aid the progress and elevate the standard of contemporary dramatic art. This observation, it will be seen, applies more especially to his selection and construction of character and plot, and to the general tone of manners. As regards the amazing force, delicacy, variety, and flexibility of his expression, it is plain that they are much less liable to be studied in an erroneous sense. Happy the writer that should succeed in transfusing their essence into his own diction!

But if a dramatic artist have not this all-comprehensive faculty, which seems given to few, it is, in the next place, important that he should be aware of his deficiency, and should perceive distinctly the nature and limits of the field which his powers really do embrace. Next, in short, to well understanding his public, the dramatist should, if possible, correctly appreciate himself; then, at least, if he do not reach greatness in performance, he will escape absurdity in failure.

Among those orders of dramatic power that fall short of that highest capability which we have endeavoured to characterize, the infinitely numerous and various degrees of deficiency are for the most part assignable to two principal causes: first, to the absence of a lively and delicate sensibility, in some individuals to the serious, in others to the comic, elements of character and plot; secondly, to a limited acquaintance with the diversities of human character and fortune in general. The former deficiency seems in all ages to have been scarcely less prevalent than the latter; and among the early Greeks, as well as among the modern Europeans, was a most influential cause of the two grand dramatic circumscriptions of tragedy and comedy. It is also the defect which it is of the first and most urgent importance that the writer in whom it exists should be thoroughly aware of; since, of all failures in dramatic productions, the exhibition of false wit, and, above all, of false pathos, is the most disastrous. The next great danger to be shunned by the dramatist is that of attempting the delineation of a character, with the features of which, individual, professional, national, &c., he is not completely and accurately acquainted. The judicious selection or contrivance of a plot, which shall be neither languid on the one hand nor improbable on the other, neither too bare of incident nor too crowded with it, and at the same time shall have, if possible, some feature of decided novelty, is next to be attended to. The character and incident of any meditated piece being once clearly determined in the author's mind, the dialogue (supposing him to have the requisite command of diction) will then be a natural, and, as it were, spontaneous result of the series of circumstances under which his personages are brought into contact; and if the latter be really conceived with truth and distinctness, it may indeed be more or less flexible and harmonious, according as the author's mastery of expression is more or less complete, but it cannot fail to be varied and interesting.

Such are the conditions fundamentally requisite for succeeding in any department of dramatic composition. The next class of qualifications arises from an exact and thorough knowledge of the restrictions imposed upon the writer, both as to the literary extent of his composition and the mode of handling his subject, by the very nature of theatrical representation in general. In this respect, it is unquestionable that the peculiar fortune of Shakspeare in being so long a manager as well as a dramatist, contributed materially to that remarkable *theatrical* fitness and completeness of effect which are found in all his mature productions.

And finally, to pass for a moment from the business of dramatic writing to that of acting, let us observe that the theatrical manager, simply as such, ought, no less than the dramatic writer, to be a genuine artist, though in an inferior walk. If true taste and knowledge be wanting in the manager, the best efforts of the dramatist's genius will be marred on the one hand; and on the other, histrionic excellence will neither be brought forward, cultivated, nor encouraged.

ENGRAVING, the art of executing designs by incision upon plates of copper, steel, or other substance, for the purpose of obtaining therefrom impressions or prints upon paper. Although, in this sense of the term, the art is only coeval with that of printing, it has been practised with a more limited object from the earliest periods on record, in a similar manner and with similar instruments to those used at the present time. That an art so abundantly capable of diffusing all kinds of knowledge should have been extensively practised from the most remote antiquity without its applicability to printing having been discovered, is so curious a subject of reflection, that it would be improper to omit giving in this place a slight sketch of its early history.

On referring to sacred history we find in the writings of Moses rather detailed accounts of the character of the engraved works executed in his time, and of the substances whereon they were wrought; nor are we left in ignorance even of the names of the practising artists among the Israelites. Thus from the book of Exodus we learn that when Moses had liberated the Jews from Egyptian bondage, he was commanded to 'make a plate of pure gold, and grave upon it, like the engravings of a signet, holiness to the Lord.' He was also commanded 'to take two onyx stones, and grave on them the names of the children of Israel according to their birth, with the work of an engraver on stone, like the engravings of a signet.' Both these passages distinctly imply the practice of gem and seal engraving, and also of engraving on metal plates, a knowledge of which, among other arts, was, without doubt, acquired by the Israelites during their captivity in Egypt; and specimens of the art as practised in that nation, perhaps at as early a period as that now under notice, still exist. In the book of Exodus also honourable mention is made of one Bezaleel, who appears to have united the callings of the engraver, the jeweller, and the lapidary; and it is said 'that he was filled with wisdom of heart to work all manner of work with the graver, as well as to devise cunning works; to work in gold, and in silver, and in brass, and in cutting of stones to set them.' 'And it was put into his heart that both he and Aholiab might teach them that were filled with wisdom to work all manner of work of the engraver.' These few are selected from numerous other passages in Scripture as sufficiently attesting the practice of several branches of engraving at this early period: from the same source indeed we learn that some of them, as, for example, the engraving of signets, was practised at a time anterior to that of Moses.

From Herodotus (v. 49) we learn that one of the earliest uses to which engraving was applied among the Greeks was the delineation of maps on metal plates. He says that 'Aristagoras appeared before the king of Sparta with a tablet of brass in his hand, on which was inscribed every part of the habitable world, the seas, and the rivers; and to this he pointed as he spoke of the several countries between the Ionian Sea and Susa.' The date of this event was 500 B.C.

The hieroglyphics and other remains of Egyptian engraving are among the most antient relics now extant, and our own British Museum is particularly rich in specimens of them. Some of these are engraved on metal, and have been chiefly found in the chests or coffins of mummies. Mr. Strutt, in his Dictionary of Engravers, describes one of them very minutely. These engravings of hieroglyphics on metal, as well as those on the antient sarcophagi, are evidently executed with similar instruments to those now in use; some of the lines narrowing downwards have clearly been cut with the lozenge-shaped graver now chiefly used; but other lines being of the same width through their whole depth, must have been produced with that species of graver called a scooper, still used for effecting broad incisions.

There is, it must be confessed, some difficulty in determining of what substance the instruments were made with which they engraved on porphyry and jasper, no mode of tempering steel being now known by which it can be rendered sufficiently hard, and at the same time tough enough, to penetrate those substances. Mr. Landseer is of opinion nevertheless that the incisions were produced by patient perseverance with steel gravers impelled by blows with a mallet, and that the work was afterwards rendered smooth by friction with some hard substance pulverized (such as the powder of the corundum stone) and applied with lead.

But it is believed that some of the relics of Etruscan art in the British Museum are of as high antiquity as any existing specimens of engraving. Mr. Strutt gives a description of two of these, the one a parazonium or dagger sheath, on which is represented a story from Homer; the other is supposed to be a patera or instrument used by the priests in their sacrificial ceremonies. This latter is rather a specimen of sculpture than engraving, being embossed in high relief; but portions of the drapery and hair on the figures are evidently executed with the graver. Mr. Strutt is of opinion that the subject is the combat between Hercules and Hippolyte, the queen of the Amazons, 'whose girdle he was enjoined by Eurystheus to unloose and take from her.' Others have supposed that it represents Minerva leaning on the head of Hercules and urging him forward in the paths of glory. It is apparently of brass, seven inches in diameter and about half an inch thick, and is declared by Mons. D'Hancarville to be, 'without contradiction, the richest and most remarkable remnant of antiquity, and of all the Etruscan bronzes the best executed and most happily preserved.' The circumstance of the inscription running from the right hand towards the left furnishes additional testimony of its great antiquity. The dagger-sheath is thus described by Strutt:—'It is more than three inches and three quarters wide at the top, and decreases gradually to an inch and a quarter at the bottom. Its present length is eight inches and a half. The story engraved upon it appears to be taken from Homer. The trophy at the bottom is symbolical of war. Above the trophy two warriors are delineated with a woman, who seems to accompany them with great reluctance; which I conceive may represent Paris, with his accomplice, conducting Helen to the ship, in order to make their escape to Troy; and at the top, the messenger, a servant of Menelaus, is relating to his lord the ungrateful behaviour of his Trojan guest. The figures are exceedingly rude, and seem to indicate the very infancy of the art of engraving, for they are executed with the graver only upon a flat surface, and need only to be filled with ink and run through a printing-press (provided the plate could bear the operation) to produce a fair and perfect impression. The print so produced, says Mons. D'Hancarville, would certainly be the most antient of all that are preserved in the collections of the curious, and demonstrate to us how near the antients approached to this admirable art, which in the present day forms so considerable a branch of commerce. We may indeed say, that they did discover it, for it is evident from the valuable relic before us that they only wanted the idea of multiplying representations of the same engraving. After having conquered every principal difficulty, a stop was put to their progress by an obstacle which, in appearance, a child might have surmounted.' Prints which indeed we have ourselves seen, taken with ink from Etruscan specula, of which there are several in the Museum, sufficiently prove the capacity of these early engravings to deliver impressions.

But while the world was so slow to discover a mode of taking impressions from engraved works, on substances offering natural facilities for such an object, the art of impressing more obdurate substances appears to have been understood and practised at a very early period in most parts of the civilized globe. This is evidenced in the practice of numismatic engraving, or the art of sinking dies, from which coins are impressed, which is of very antient although uncertain origin. The mode of impressing the metal was by the stroke of a hammer, the die or engraving being cut on a sort of punch; and it is remarkable that the operation of coining is performed in the same manner at the present time, in such parts of the globe as are backward in improvement. The first Greek coins were struck, according to some authors, at Ægina, by Pheidon, king of Argos, about eight centuries before the Christian æra. But this is a much less remote antiquity than what is ascribed to other antient coins. Mr. Landseer describes a gold coin in the collection belonging to the East India Company, to which the Hindoos ascribed an antiquity of 4000 years, and paid it superstitious homage. It is understood to have been dug up near the royal palace of Mysore, and was found among the treasures of Tippoo Sultan. In Rome, a mint every way commensurate with the greatness of the empire was established in the reign of the emperor Augustus. The extravagant fondness of the Roman matrons for engraved gems was satirised by Juvenal, and gave rise to the remark of Pliny, that they 'loaded their fingers with princely fortunes.' This profusion gradually extended itself to the wearing apparel of both sexes; and among the opulent classes almost every article of use or dress glittered with engraved gems.

In the peninsula of India, also, the art of engraving on plates of copper appears to have been practised long before the Christian æra. It would appear that it was there customary to ratify grants of land by deeds of transfer actually engraven on plates of copper, as we now write them on skins of parchment. A copy of one of these very interesting relics is given with an English translation by Mr. Wilkins, in the first volume of the Asiatic Researches, page 123. It is in the Sanscrit language, and bears date twenty years before the birth of Christ.

The engraving of signets, although considered by many to be rather a mode of sculpture than of engraving, is sufficiently allied to it to claim a slight notice in this place; the more so, as being of higher antiquity even than die-sinking. Mention is made of the use of signets in the sacred writings as early as the time of the patriarchs. They were then probably engraved on metal, and appear to have been used at this time, and at all subsequent periods, as instruments of ratification. When through the dark ages the knowledge of the Roman sealing substance was lost, recourse was had to lead, as a substitute for wax, to receive the impressions. The emperor Charlemagne wore his signet in the pummel of his sword; and it was in allusion to this as an instrument of ratification that he was accustomed to say, 'With the point I will maintain that which I have engaged with the hilt.'

The state of engraving in our own country previous to the Conquest must not be entirely overlooked. Our knowledge of it is principally derived from such ornaments of dress as buckles, clasps, rings, and military accoutrements, sometimes found in antient tumuli. These frequently bear the marks of the graver: but if other proofs were wanting their coins would sufficiently attest their knowledge of the art; for although exceedingly rude, they are evidently impressed from engravings cut upon iron or steel. 'Under the protection of that good and excellent monarch Alfred the Great (says Strutt), the arts began to manifest themselves in a superior degree, notwithstanding the load of intestine troubles which destroyed the nation.' The works of the Anglo-Saxon goldsmiths, who were the principal engravers of that day, were held in the highest estimation; and there is yet preserved in the museum at Oxford a very valuable jewel made by command of Alfred, and which was indeed one of the few treasures which he took with him when he retreated to the Isle of Athelney, where it was found. It is of gold, richly adorned with a kind of filligree work, in the midst of which is the half figure of a man, supposed to be St. Cuthbert. The back of this jewel is ornamented with foliage, and is pronounced to be very skilfully engraved, on the authority of Mr. Strutt, who has given a faithful representation of it in the second volume of the Chronicles of England.

'Soon after the Conquest,' (according to the authority just quoted, but we ourselves have never met with a specimen of earlier date than A.D. 1284,) 'a new species of engraving was introduced into England, much more perfect in itself than any which had preceded it, and in every respect distinct from the work of the carver or chaser.' The author alludes to the engraving of the sepulchral brass-plates, so frequently found in our churches upon the tombstones. Their economy, as compared with the carved images which preceded their introduction, probably brought them into such general use that very few churches in this country are without them. They are executed entirely with the graver, and in precisely the same manner that a copperplate is now engraved that is intended to be printed from; but as they were commonly exposed to the feet of the congregation, the strokes were cut deep, that they might endure the longer, and consequently very neat workmanship is not to be expected. Some of them, however, bear evidence of considerable ability in the workmen by whom they were executed; but who these workmen were is quite unknown. It has been conjectured even, that they were not produced in England at all, but executed by foreigners, who took British produce in exchange for their labours. However this may be, certainly no churches more abound with them than those of this country; but we have never met with more than one, even with a *monogram*, and that is insufficient to lead to a knowledge of the artist, who was not improbably, in this and in most other cases, an ecclesiastic.

We now approach the period when the invention of *printing* gave to engraving a new direction, and produced an effect on the civilization of the world as astonishing as it is incalculable. The chief obstacle to printing had already been removed by the manufacture of paper from linen rags, which had become generally known in Europe at the latter end of the fourteenth century. It must be remembered, as giving additional interest to this subject, that it is to a certain class of engravers that we are immediately indebted for the first printed books, which were actually impressed from engraved wooden tablets—a method which was afterwards improved by substituting movable metal types; and thus the arts of engraving and printing, at the same time that they constitute the sole means by which all kinds of knowledge may be extensively diffused, have placed it within the power of us all to possess the best thoughts of the best men in literature, science, and art.

The first prints, as we have already intimated, were obtained from engraved wood blocks. This might naturally be expected, because the process of printing from such works is so simple and obvious, not requiring even a press, that persons of reflection are astonished, not that printing was invented so soon, but that it had not been discovered sooner. To obtain impressions from the incised hollows of an engraved metal plate, on the contrary, is a much less obvious process, requiring the aid of a somewhat complicated machine, called a rolling-press. We need not wonder, therefore, that its discovery should have been later; and, indeed, the two processes are so very different, that when one was discovered it did not lead necessarily to the other.

The earliest print with a date attached to it is one known as the St. Christopher, which is from a wood block, and dated 1423; but no impression from an engraved *plate* has been found with a date anterior to 1461. The art of engraving on metal plates for taking impressions on paper was, according to Vasari, first practised by Maso or Thomaso Finneguerra, a Florentine goldsmith, about the year 1460; and although many writers have advocated the claims of Germany to the honour of the invention, it seems now to be conceded by nearly universal consent to Italy. The arguments of the Abate Luigi Lanzi, in his work on the history of painting in Italy, appear to us to be quite conclusive in confirmation of Vasari's opinion. However this may be, there has never existed a doubt that the art had its origin in the workshops of the goldsmiths about the middle of the fifteenth century. Many of these goldsmiths were *niellatori*, or workers in *niello*—a mode of ornamental engraving usually performed on silver plates—the design engraved on which was afterwards filled in with a black composition, said to have been composed of silver and lead, which from its dark colour was called by the antients nigellum, a word curtailed by the Italians into niello. This being incorporated with the silver, that is, run into the engraved lines, produced the effect of shadow, and had very much the appearance of a print. 'These nielli,' says Lanzi, 'were used as silver ornaments to articles of furniture, sacred vessels, such as holy cups and vases, to missals and other devotional books, and to reliquaries; as well as to profane purposes, as adorning the hilts of swords, table utensils, and many kinds of female ornaments.' Now Maso Finneguerra was a worker in niello, and, according to Vasari, his discovery of the art of printing from engraved plates was the result of accident. It was usual with the artists who worked in this style to rub a mixture of charcoal and oil into the design engraved on the silver plate, that they might ascertain what would be the effect of the work previous to inlaying with the nigellum or mixture of silver and lead. It is said that on one occasion Finneguerra, having rubbed in the charcoal and oil, by way of thus proving his work, accidentally let fall upon it some melted sulphur, which upon removal brought with it the ink out of the hollows, and exhibited the exact impression of his work. It occurred to him to try if the same result would follow on a piece of moistened paper if laid over the design thus filled with ink, and pressed by a roller. The experiment succeeded; and the consequence was the gradual improvement of the new art both in his hands and those of Baccio Baldini, Sandro Botticelli, Antonio Pollajuoli, and Andrea Mantegna, to whom he communicated the process. Other accounts, however, make the discovery of chalcography much less the result of accident. According to these, Finneguerra, as well as other workers in niello of his time, were in the habit of proving their works by means of *sulphur casts* previous to the ultimate inlaying. For this purpose the engraved plate was pressed with earth or clay, upon the top of which some melted sulphur was then thrown, which on removal presented a fac-simile of the work on silver; into the lines of this sulphur cast something black was then rubbed, and the artist was thus enabled to form a correct opinion of the progress and perfection of his work. These facts are now placed beyond all doubt by the discovery of some sulphur casts from the nielli of Finneguerra, although there is no fully-authenticated impression upon paper from any plate engraved by him. Thus it would appear that the workers in niello were long advancing on the verge of this invention. Engraving was henceforth to constitute a distinct and honourable profession, or to have those energies further developed by the greatest masters of design which had hitherto only manifested a feeble existence in the workshop of the goldsmith.

Our limits will not allow us to dwell on the merits or performances of those early masters, contemporaries of Finneguerra, to whose exertions we are nevertheless much indebted for the rapid approaches of the art towards excellence. Of these Baldini, Botticelli, and Andrea Mantegna, have already been named among the Italians; and while we disallow the claims of the Germans to the discovery of copperplate engraving, we willingly admit that it was very early and very greatly improved in that country by Martin Schoen, Israel Van Mecheln, Leydenwurf, and Wolgemut. This is not surprising when we reflect that wood engraving had been first practised there, forty years earlier, and consequently that they had anticipated the Italians in a knowledge of printing-ink and the press; nay, it is remarkable that the first *book* printed at *Rome* (an edition of Ptolemy's Geography) was also illustrated by the first *plate engravings*, twenty-seven in number, which were maps, and were executed there by two Germans, Sweynheym and Buckink; the latter completing what the former left unfinished at his death. This work is dated 1478, but was commenced in 1472.

One of the first books illustrated with designs on engraved plates was indeed the production of Italian artists; this was an edition of Dante's 'Inferno,' published at Florence in 1481, and embellished with engravings by Baccio Baldini, after the designs of Botticelli. It is worthy of remark that these plates were not printed on the same paper as the letter-press, but blank spaces were left at the head of each canto, over which the prints were pasted. As we believe the greatest number of embellishments ever found in a copy of this work does not exceed nineteen, it is to be presumed that the intended series of illustrations was never completed. Omitting farther notice of those early masters who flourished at the end of the fifteenth, we shall pass on to the sixteenth century, at the commencement of which the art was carried to a very high degree of excellence; in Italy by Marc Antonio Raimondi, and simultaneously by Albert Dürer in Germany, and Lucas Van Leyden in Holland: a constellation of talent, the appearance of which marks the most memorable epoch in the history of engraving.

Marc Antonio, like so many of his predecessors, was originally a worker in niello, in which art he was instructed by Francesco Francia, and acquired considerable skill; but quitting it for engraving on metal, he at first copied some of the works of his master, and afterwards imitated those of Andrea Mantegna and Albert Dürer. He finally perfected himself in design under Raphael d'Urbino, who appreciated his talents so highly as to lend him every assistance; he even permitted his own grinder of colours to manage the press for him, that he might devote his time wholly to the more intellectual parts of the art.

The great merit of Marc Antonio lay in the correctness and beauty of his outline: so great is his excellence in this respect, that it is believed that Raphael himself assisted him with his own hand on the copper. The character of his heads is admirably preserved, and the extremities marked with the truest precision· but his lights are not enriched with that variety of fainter tones which indicate local colour, nor do his prints possess the harmony arising from the chiaroscuro or the beauty of reflex light. The consequence is somewhat of monotony in his darks and baldness in his lights, which produce an appearance of hardness; but the rude state in which he found engraving must be remembered in forming an estimate of his merits, nor should it be forgotten that the then recent disinterment of the great works of antique sculpture and the fame of Raphael and of Michel Angelo rendered *form* and *character* the great objects of pursuit, as they were indeed at that time, from these causes, thought to be the only ones worthy of consideration.

Thus happily favoured with the patronage, instruction, and friendship of the 'divine Raphael,' he devoted himself almost exclusively to engraving after his matchless productions; and although, as we have seen, his prints want so many of the blandishments and conventionalities of more modern art, and are more deficient in these respects even than his contemporaries of the school of Germany and Holland, yet such was the truth and purity of his outline, that it is doubtful if the works of Raphael have ever since been rendered with so much justice to their author. M. Antonio died about 1527. Our space will not allow even a list of the engravers and painters who engraved or etched (a mode of engraving hereafter to be described) who flourished in Italy during the two centuries which succeeded the death of Marc Antonio: the principal of these however were Agostino de Musis, Marc de Ravenna, Caraglio, Giulio Bonasoni, and Enea Vico, all pupils of Marc Antonio; Georgio Ghisi of Mantua and his relatives Diana and Adam Ghisi, Cornelius Cort, &c. &c. But although by these and others the executive part of the art was continually though slowly improved, their powers in design or drawing, (in which the chief excellence of the school at all times consisted) declined, at least as fast as they advanced in mechanical skill, until at length in the 18th century the intellectual and mechanical excellencies of the art were united in the works of Jacomo Frey; and from that time the credit of engraving in Italy has been well maintained by succeeding artists. The names of the principal painters who have practised engraving in Italy are Agostino Carracci, Stephano della Bella, Spagnoletto, Guercino, Salvator Rosa, Claude Lorraine, Swaneveldt, Canaletti, Piranesi, &c. &c.

In Germany engraving made more rapid strides towards excellence, in the mechanical parts of it; and at the commencement of the 16th century appeared Albert Dürer, a man whose universality of talent extended the boundaries of every department of art, and carried all to a degree of perfection previously unknown in that country. The defects of Albert Dürer, who was a painter as well as an engraver, were the defects of the school to which he belonged; the dry and Gothic taste of which is equally observable in their paintings and engravings. But in all that relates to the executive part of the art of engraving the works of Albert Dürer deserve the highest praise. The Italian artists having the finest specimens of antique sculpture constantly before their eyes, appear to have been very early impressed by them with a sense of the beauty of flowing lines; and perhaps nothing is so well calculated to convince us of the advantages to be derived from the study of the antique sculptures as a comparison of the works of German and Italian artists. The draperies, for instance, in the German works, are represented by abrupt rectangular forms, and have been well described as *snapt*, rather than *folded;* resembling the appearance of crumpled-up paper more than drapery. The pains which they evidently bestowed upon their works forbid us to ascribe that to want of attention which was certainly the result of a vitiated taste in design.

Albert Dürer had great command of the graver, and carried his plates to a much higher degree of finish than his Italian contemporaries, as his print of 'St. Jerome in the Room,' as it is called, the execution of which has scarcely ever been exceeded, will sufficiently attest. To his other honours we have little hesitation in adding that of being the inventor of etching by corrosion, an art which has contributed most powerfully to the perfection of engraving. We are aware that the discovery of etching has been by some attributed to Michael Wolgemut, the master of A. Dürer, but we never heard of any etching from his hand having been seen; nor do we know of any etching by any other hand which bears date so early as the celebrated Cannon landscape, by Dürer, which is 1518; while from his own hand we have two others still earlier, viz. Christ praying on the Mount, 1515; and the Rape of Proserpine, 1516. All these were evidently performed in the very infancy of the art, before the discovery of stopping out, as it is called, an expression which will be intelligible to the reader on a reference to our account of the process of etching. On examining the etchings of Albert Dürer, we see that they have all been corroded at one biting in; which sufficiently explains their monotonous appearance, and proves that stopping out was not understood, or it would have been had recourse to, as its advantages could not have been overlooked. It is most probable that the defective and monotonous tone occasioned by the want of this knowledge is the reason that so few corroded etchings were executed by Albert Dürer, who must have been otherwise fascinated by the facilities which this mode of engraving offered; as it is, his corroded etchings are much inferior to his other works, both on copper and wood.

The principal German engravers, after Albert Dürer, are his pupil, Henry Aldegraver, together with Bartholomew and Hans Sebald Beham, Albert Altdorfer, James Bink, George Penz, Virgil Solis, &c. &c. But the history of pure German art is very short, for most of these German engravers travelled to Italy for improvement, attracted by the fame of Marc Antonio; several of them are indeed his reputed disciples; and the consequence is, that the two schools may be said to have immediately, in some measure, blended; as under the influence of Italian taste the peculiar characteristics of German art in a great measure disappeared. From the small size of most of the works produced by these German engravers, they are generally distinguished as the 'little masters,' although many large plates were executed by them.

Lucas Jacobs, best known by the name of Lucas Van Leyden, was the father of the Dutch and Flemish schools, and the contemporary and friend of Albert Dürer, whose defects he fully possessed, while he fell short of his excellencies. The same vulgarity of form, and general want of grace and propriety of design, which has been noticed in the German school, is equally observable in the works of Lucas Van Leyden; while they are deficient in the spirit and firmness which characterize the works of Dürer. But notwithstanding these drawbacks he was a man of great abilities. After Lucas Van Leyden the art was maintained in the Low Countries by the Wierinxes, the Sadelers, whose works are multifarious, and embrace every class of subject; the elder and younger Jode, Cornelius, Theodore, and Philip Galle, and Abraham and Cornelius Bloemart. The latter, perhaps less actuated by the commercial spirit in which the art was at this time practised, attempted improvements with success; and by working delicate tints on the lights, which had hitherto been left only as so many white spots, he brought his works to a degree of finish and harmony not previously attained. This artist studied and indeed died at Rome, whither also Goltzius travelled for improvement, who imparted a boldness to engraving which forms a striking contrast to the neat stiff manner of his predecessors. Goltzius was a man of great abilities, and drew the human figure admirably; but in endeavouring to avoid the dry Gothic taste of his countrymen, he went into the opposite extreme, and aiming at the sublime of Michael Angelo, took the one step beyond, and occasionally fell into the ridiculous. The same observations will apply to the works of Sprangher; and these faults were exaggerated and carried to the extreme of bombast by the disciple of Goltzius, Müller; but the freedom with which he handled the graver is truly surprising. To these succeeded Lucas Killian, Matham and Saenredam; and at the commencement of the seventeenth century the two Bolswerts, who had formed their style on that of Goltzius, improved themselves under the instruction of Rubens.

Etching, at this period, was practised by many of the painters in the Low Countries with great success; and we need scarcely say, that it is principally to this process that we are indebted for those treasures of art, the engraved works of Rembrandt: not that in his finished works he confined himself to etching; he also called in the assistance of the graver and the dry point. His etchings being very numerous, are of unequal merit; and many, the subjects of which are of a sacred or dignified nature, are debased by the vulgarity of the characters introduced: but notwithstanding these and other defects, his best works are greatly and deservedly prized, for they are inimitably fine, and possess the excellencies of the best paintings, even by his own hand, in a degree not equalled by the works of any other engraver. To mention the artists of this school from whose hands we have etchings would be to name nearly all the most eminent painters belonging to it. Berghem, Cuyp, Karel du Jardin, Paul Potter, Ruysdael, Ostade, Waterloo, Adrian Van de Veldt, with many others, have all enriched the portfolio of the collector with works of great taste and skill. Among the more professedly engravers not already noticed we must mention Count Goudt as possessing extraordinary skill, although he cultivated the art less as a profession than for pleasure. The family of the Visschers produced many and excellent works, from the pictures of various masters; and Cornelius Visscher stands particularly distinguished for the accuracy of his drawing and the fidelity with which he has rendered the character of the pictures after which he engraved.

In France engraving has been practised with pre-eminent success in the departments of history and portraiture. The celebrity of the school dates from the time of Louis XIV.; for although several engravers had appeared before that time, it was only under the fostering influence of that monarch, assisted by the fine taste of Colbert, his minister, that a school arose surpassing in excellence any which had preceded it. The family of the Audrans produced six eminent engravers, but of these the most distinguished was Gerard Audran. He was an admirable draftsman himself; but the great excellence of his works in other respects was enhanced by the absence of all *manner*, except such as belonged to the painter after whom he engraved. He was the first engraver who successfully united, to any extent, the use of the graver and the etching point, and by thus availing himself of the facilities arising from the use of the aquafortis, produced numerous works of great excellence and some of prodigious size, among which we may mention the battles of Alexander, after Le Brun, each subject of the series being engraved on three or four large plates. The Abbé Fontenac remarks of him that, 'far from conceiving that a servile arrangement of strokes, and the too frequently cold and affected clearness of the graver, were the great essentials of historical engraving, he gave worth to his works by a bold mixture of free hatchings and dots, placed together apparently without order, but with an inimitable degree of taste, and has left to posterity most admirable examples of the style in which grand compositions ought to be treated.'

Gerard Edelinck, although born at Antwerp, may be fairly considered of the French school, and was an engraver of the highest order. In portrait Nanteuil is no less celebrated than his contemporaries: the beauty and clearness of his style has perhaps never been exceeded. The Drevets (Peter Drevet in particular) are scarcely less distinguished: nor must we omit the name of John Louis Roullet, whose engraving of the 'Dead Christ with the fainting Virgin,' after Annibal Carracci, is one of the finest specimens which the art has produced. In addition we can only notice the names of Le Clerc, Simoneau, Chereau, Cochin, Dupuis, Beauvais, Balechou, Le Bas, John George Wille, &c. &c. The modern and existing French school has produced very able engravers, whose chief defect is, that, deviating from the course pursued by Gerard Audran and all the first artists, they allow that which is merely mechanical to predominate in their works; and aiming at great dexterity in the use of the *graver* as the chief objects, they make an ostentatious display of lines, the uniformity and regularity of which is offensive to the eye of true taste, imparting, as it often does, even to the flesh, the appearance of net-work, when viewed closely.

The English school of engraving dates only from about the middle of the eighteenth century, previous to which time the arts had not flourished indigenously in our country, and such engravers as practised here were chiefly foreigners. With a school of painting however has arisen an assemblage of engravers in all the departments of art who may safely challenge comparison with those of any time or nation. It is true we had previously the Faithornes, Payne, and the Whites; but Hollar, Simon, and Crispin de Passe, Wallerant Vaillant, Blooteling, Gribelin, Dorigny, and Vanderbank, were all foreigners; and the principal engravings of the time were their productions.

The reign of George III. was however auspicious to the arts, and since then we can boast of a numerous train of engravers whose works do honour to the country and to the painters from whose works they are engraved. One of the earliest of these was Hogarth, an artist of most original genius, whose engravings were all from his own designs, in a walk of art entirely new. Landscapes had hitherto never been engraved in a satisfactory manner, the older engravers adhering to the use of the graver *only*, which was inadequate to express with sufficient freedom the playful luxuriance of foliage, the ruggedness of rocks, or the dash of foaming waters. These objects were first accomplished by Francis Vivares, who was a most accomplished etcher, and may be regarded as the father of English landscape engravers, who have unquestionably surpassed all their predecessors in this department of art. Woollett followed in the same tract, carrying his landscapes very forward with the etching point, and finishing them only with the graver. His best works are unrivalled; nor was he inferior in history, as his print of the death of General Wolfe, after West, sufficiently attests.

These two artists carried landscape engraving at once to perfection. Browne may be mentioned as a worthy follower; he produced many excellent plates after the old masters, and sometimes worked in conjunction with Woollett. In history and portrait Sir Robert Strange ably vindicated the honour of the art in this country: his engraving of flesh has perhaps never been equalled, certainly never excelled by any master: his works are however often much deteriorated by his defective drawing. Mezzotinto engraving, although not strictly born among us, has been in no other country practised with a degree of success at all approaching that attained by M'Ardell, Earlom, Smith, Valentine, Green, and others. Bartolozzi, Ryland, Sharpe, Paul Sandby, Middiman, Milton, Fitler, are among the most eminent of deceased engravers; and Mr. Wilson Lowry is entitled to most honourable mention as a great benefactor to the art, by the invention of the ruling-machine, an instrument of great value for many purposes, and the operation of which is perfect. At present every department of engraving is filled with artists of great abilities, any of whom it would be invidious to name to the exclusion of others: it is enough to say that their talents and their numbers have given the art a commercial importance in this country to which it never attained in any other.

A modern engraving is usually the result of two processes, viz. of direct incision with the graver, or the dry point, and of etching by corrosion. These we shall proceed to explain; and first we will enumerate and point out the uses of the different implements required. The principal instrument is the *graver*, or *burin*, which differs in size and shape according to the character of the line which it is intended to produce, but the ordinary graver is of the form of a quadrangular prism, both square and lozenge-shaped, and fitted into a short handle, the whole being about five inches and a half long. The square graver is used in cutting broad lines, and the lozenge-shaped for more delicate ones. In making the incision, it is pushed forward in the direction of the line required, being held by the handle at an angle very slightly inclined to the plane of the copper. It is requisite that the graver be well tempered, and great address is necessary in whetting it for use. The angle at the meeting of the two lower sides of the graver forms what is called its belly, and the breadth of the end is called its face. The two sides which form the belly are to be laid flat upon the oil-stone, and rubbed firmly until the belly slightly rises, so that if it were laid flat upon the copper the light could be seen underneath the point; otherwise it would be impossible to use it with freedom, as it would dig unequally deep into the copper. The face is next to be whetted, which is done merely by laying the face of the graver flat upon the stone, with the belly upward, and rubbing it steadily upon a moderate slope until it acquires a very sharp point, taking care that the stone be properly supplied with oil all the while. The gravers sold in the shops are commonly too hard for use, which is known by the frequent breaking of their points: when this is the case they should be tempered by holding them on a red-hot poker, at a distance of half an inch from the point, until they acquire a faint straw colour; they should then be put into oil to cool; or they may be tempered in a candle and cooled in the tallow. But it is best not to be hasty in tempering; for if the graver is only a little too hard, whetting alone will frequently bring it into good condition. An instrument called a *scraper* is required to scrape off the barb or burr which is formed by the action of the graver and dry point. The *burnisher* is used to polish the plate and to erase any scratches which it may accidentally receive, and also to make lighter any part of the work which may have been made too dark. An *oil-stone* is requisite for sharpening the instruments upon. *Etching-points* or *needles* are nearly similar in appearance to sewing-needles, but fixed into handles four or five inches long; some are made of an oval form, to produce broader lines with: their use will be explained when we are describing the process of etching. *Dry point* is, in fact, nothing more than the common etching-needle brought to a very fine point. It is used to cut or scratch the more delicate lines with, such as skies, &c. &c. It does not, like the graver, cut the copper clean out, but throws it up on each side of the line produced by its progress through the metal: this is called the burr, which is removed by a scraper. This burr was left on by Rembrandt, until it wore away in the progress of printing, which it soon does; but by his management it added greatly to the effect of the etching, and impressions from his works with the burr on are much valued. A *cushion* is a bag of leather filled with sand; its use is to support the plate so that it may be freely turned in any required direction; but it is not now much used by artists, being chiefly confined to engravers of writing. A *rubber* is a roll of cloth tied up tight, one end being kept in olive oil. It is useful to polish off more completely the burr and also to show the appearance of the work as it proceeds.

Etching is one of the greatest improvements in modern art, almost all plates of every size and description being now commenced by this process, and indeed brought by it to a very considerable effect, and afterwards carried on to the necessary degree of finish and strength with the graver and dry point. Etching is the superaddition of the chemical process of corrosion to drawing, when performed on a plate of copper over which a substance called *etching-ground* is laid, and through which the design is traced with an etching-needle, so as to expose the surface of the copper wherever it has passed. This etching-ground is a substance composed of wax, asphaltum, gum mastic, resin, &c. incorporated by melting over a fire, and capable of resisting the action of aquafortis. The *laying of the ground*, as it is called, is thus effected:—The plate must be heated over a charcoal fire, so that it may not be smoked. For this purpose a hand-vice is fixed to the most convenient part of the plate, by which it may be held in the hand. A piece of the etching-ground, rolled into the form of a ball, and tied up in a little silk bag, is then rubbed over the surface of the plate, the heat of which causes the ground to melt and come through the silk on to the copper. In order to effect a more equal distribution of the wax, a small dabber made of cotton wool, tied up in a piece of taffety, is quickly dabbed all over the face of the plate while yet warm, so as to leave the wax or etching-ground of uniform thickness; the ground is then rendered black, by being held over the smoke of a wax candle, or, if necessary, two or three wax candles tied together, care being taken to move the plate about, so that it be equally smoked all over; and this operation of smoking must be commenced before the plate has had time to cool. The whole operation of laying the ground requires address and dexterity. When cold, the plate is now ready to receive the design. To transfer the design to the copper, an outline is made with a black-lead pencil on a piece of thinnish and even paper, and laid with the face downwards on the etching-ground; the whole is then passed through a rolling-press, the effect of which is to transfer an impression of the outline on to the smoked ground. After this the design is completed with the etching needles, which remove the ground from the copper wherever they pass, and expose it to the action of the acid during the process o biting in, which is thus performed:—A substance called *banking wax*, which when cold is quite hard, but which on immersion in warm water becomes soft, and may be moulded into any form, is first rendered soft by being so immersed in warm water, and then banked up all round the margin of the plate, so as to form a trough capable of preventing the escape of the acid, a gutter only being formed at one corner for the purpose of pouring it off when requisite. This being done, the nitrous acid, reduced with water to the proper strength, is poured on, and its action on the copper becomes visible by the rising of innumerable bubbles. The aquafortis must be allowed to continue on the plate until the fainter parts are supposed to be corroded sufficiently deep; after which it is to be poured off, the plate washed with water and left to dry. The parts which are bitten-in enough, are now to be covered with what is called *stopping-ground*, which is a mixture of lamp-black and Venice turpentine; this is applied with a camel-hair pencil, and allowed to dry. After this the acid is again poured on, and this process of *stopping-out* and *biting-in*, is repeated until even the darkest parts are sufficiently corroded. After this the plate is again warmed, when the border of wax may be readily taken off. It is then made warm enough to melt the ground, which is removed by being wiped with a rag and a few drops of olive oil. The work is now complete, unless it is intended to finish it still further with the graver. We might here offer rules for the strength of the acid, and state the length of time it ought to remain on the plate, but we are convinced of the inefficacy of such instructions. Nothing but experience joined to some chemical knowledge of the effect of the acid will avail the artist on this point, which requires the greatest nicety and attention.

Etching on soft ground is a mode of etching formerly much in use, by which imitations of drawings in chalk and pencil were produced. It is now superseded by lithography, which is more successful in attaining the same objects. Soft ground etching is quite a distinct process from

Engraving in stipple, as practised by Bartolozzi, Ryland, and others, in imitation of chalk drawings of the human figure. Stipple is performed with the graver, which is so managed as to produce the tints by small dots, rather than by lines, as in the ordinary method. It is very soft in its effect, but is on the whole much inferior to the more legitimate mode of engraving.

Engraving on steel and *etching on steel* are performed in the same manner as on copper, for which steel has of late years been often substituted on account of its yielding a greater number of perfect impressions, owing to its superior hardness.

Medallic engraving is a species of etching lately practised by M. Collas and Mr. Bate. By this mode very beautiful representations are obtained of medals, &c., by means of a machine of peculiar construction, the principle of which is known; but minor inventions for the purpose of counteracting certain local tendencies to inaccuracy in the machine have been hitherto kept secret.

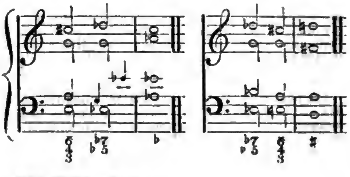
For account of *engraving on stone*, see LITHOGRAPHY; and for *engraving in mezzotinto*, see MEZZOTINTO.

Etching on glass is performed by laying on the glass a ground of bees' wax, and drawing the design thereon with the needle, as in etching upon copper. Sulphuric acid is then poured on, and fluor spar, or fluoric acid, sprinkled on it. After four or five hours it is taken off, and the work cleaned with oil of turpentine.

ENGROSSING; copying in a large hand; the writing a deed over fair, and in proper legible characters; from the French *grossir*, to make bigger. Among lawyers it more particularly means the copying of any writing fair upon parchment or stamped paper.

In statute-law *engrossing* means the purchasing of large quantities of any commodity, in order to sell it again at a high price. ('An Inquiry into the Laws, antient and modern, respecting Forestalling, Regrating, and Ingrossing: together with adjudged Cases, Copies of original Records, and Proceedings in Parliament relative to that subject:' by William Illingworth, 8vo., Lond., 1800.)

ENHARMON'IC, the third in order of the three genera of antient music. The enharmonic genus of the Greeks was distinguished by quarter tones, while the modern scale admits these small intervals theoretically only, not practically, except by a fiction. Thus C sharp and D flat are with the moderns practically the same note, at least on keyed instruments, though, strictly, the former is $\frac{4}{5}$ of the whole string sounding C, the latter $\frac{8}{15}$. The passage from one to the other of these intervals is called an *enharmonic change*, and a change of key so effected is designated by the term *enharmonic modulation*. Examples:—



ENHYDRA. [OTTER.]

ENIGMA. [ÆNIGMA.]

ENLISTMENT, an engagement to serve as a private soldier either during an unlimited period or for a certain number of years, on receipt of a sum of money. Enlistment differs from enrolment, inasmuch as it is a voluntary act, whereas the latter is, under some circumstances, rendered compulsory: as in the case of men who are selected by ballot for the militia in this country, or by the conscription, for military service generally, on the continent.

The practice of impressing men to serve as soldiers, on sudden emergencies, was formerly very common in England; and it is well known that within the last half century young men were entrapped and secretly conveyed away to recruit the armies employed in the east. The discovery of this illegal and disgraceful method of obtaining soldiers was speedily followed by its abolition; and now, the East India Company's troops, as well as those of the regular army, are obtained by voluntary engagement.

The number of young men who are induced to enlist by the ambition of entering upon a course of life which appears to hold out a prospect of distinguishing themselves by gallant achievements in the field is, however, too small for the wants of the military service; and the allurement of a bounty must necessarily be presented in order that the ranks of the army may be filled. But the profession of a soldier can never possess such advantages as might induce an industrious man who can obtain a subsistence in another way to embrace it; and it is to be regretted that too frequently those who enter the service are thoughtless youths or men of indolent habits or desperate fortunes. Some attention, however, to the character of a person offering himself for enlistment is necessary if it be desired to render the service honourable; for it is found that idle and dissipated men are with difficulty brought to submit to the necessary restraints of discipline; their frequent desertions entail heavy losses on the government, and they often corrupt those who are compelled to associate with them. When circumstances render it necessary to enlist such men, it is obvious that they ought to be distributed in small numbers among different regiments, and quartered in places remote from those from which they were taken.

By the 34th clause of the Mutiny Act, every person who has received enlisting-money from any military man employed in the recruiting service is considered as having enlisted; but within forty-eight hours afterwards notice is to be given to the recruit, or left at his place of abode, of his having so enlisted; and again, within four days from the time of receiving the money, the recruit, attended by any person employed as above-said, is to appear before a magistrate (not being a military man), when, if he declare that he has voluntarily enlisted, the magistrate is to question him concerning his name, age, and condition, and particularly to inquire of him whether he is then serving, or whether he have ever served, in the army or navy. The magistrate is then to read to the recruit the articles of war relating to mutiny and desertion, and administer to him an oath of allegiance, of which a form is given in a schedule to the act: if the recruit refuse to take the oath, he may be imprisoned till he do so.

But as the young and simple have been sometimes inveigled by illusory promises, or persuaded, while deprived of judgment by intoxication, to enlist, if a recruit, on reflection, wish to withdraw from the engagement into which he may have been surprised, it is provided by the 35th clause of the Mutiny Act that when taken before the magistrate as above he shall be at liberty to declare his dissent from such enlistment; on making which declaration and returning the enlisting-money, with 20*s.* in addition for the charges which may have been incurred on his account, he shall be forthwith discharged. But if he omit within twenty-four hours after so declaring his dissent to pay such money, he is to be considered as enlisted, as if he had given his assent before the magistrate.

If a recruit, after receiving the enlistment-money, and, after notice of having enlisted has been left at his place of abode, shall abscond, he may be apprehended and punished as a deserter, or for being absent without leave; and if it be discovered that he is unfit for active service, in consequence of any infirmity which he had not declared before the magistrate, he may be transferred to any garrison, or veteran or invalid battalion, though he may have enlisted for some particular regiment. If it be proved that the recruit concealed the fact of his being a discharged soldier, he may be sentenced to suffer punishment as a rogue or vagabond; and if, at the time of enlisting, he falsely denied being in the militia, he may be committed to the house of correction for a period not exceeding six months; and, from the day in which his engagement to serve in the militia ends, he is to be deemed a soldier in the regular forces.

An apprentice who shall enlist denying himself to be such is deemed guilty of obtaining money under false pretences; and, after the expiration of his apprenticeship, he is liable to serve in her Majesty's forces; but a master is not entitled to claim an apprentice who may have enlisted unless the claim be made within one month after the apprentice shall have left his service.

In the third clause of the Mutiny Act it is stated that no man enlisted as a soldier is liable to be arrested on account of any process for leaving a wife or child chargeable to a parish, or on account of any engagement to work for an employer (except that of an apprenticeship), or on account of any debt under 30*l.* And in the 39th clause it is declared that Negroes, purchased on account of the crown and serving in any of the regular forces, are deemed to be free, and are considered as soldiers having voluntarily enlisted. Every military officer acting contrary to the provisions of the Mutiny Act, in what regards enlisting recruits, is liable to be cashiered.

During the reign of Queen Anne it was the custom to enlist recruits for three years; but this period seems too short, considering the time unavoidably spent in training the men, to afford the government an advantage adequate to the expense of maintaining them; and the present practice is to enlist either for an unlimited period, as during the continuance of a war, or for certain defined numbers of years which vary in the different classes of troops. For the infantry the period is seven years; for the cavalry ten years, and for the artillery twelve years; but if the person enlisting be under eighteen years of age, the difference between his age and eighteen years is added to each period. The enlistments for the Honourable East India Company's service are also for unlimited periods, or for twelve years, provided the recruit be not less than eighteen years of age.

The advantages of a limited period of service are, that a greater number of recruits are obtained under that condition, probably because men are more willing to engage themselves for a certain number of years than for life; and that, during the period, opportunities are afforded of discovering the character of a man. Should this be such as to render it not advisable to retain him, he may be discharged at the end of his time of service; while an additional bounty, strengthened by the unwillingness of most men to leave the comrades with whom they have been long accustomed to associate, will probably induce a good soldier to re-enlist should the continuance of his services be desired.

By an act passed in 1835 a man is allowed to enlist in the navy for a period not exceeding five years, after which he is entitled to his discharge and to be sent home, if abroad, unless the commanding officer should conceive his departure to be detrimental to the service; such officer is then empowered to detain the man six months longer, or until the emergency shall cease, in which case the man is entitled, during such extra service, to receive an increase of pay amounting to one-fourth of that which he receives according to his rating. At the end of his time of service a seaman may re-enlist for a like period, and he will then be allowed the same bounty as at first. Seamen entering as volunteers within six days after a royal proclamation calling for the services of such men receive double bounty. In the year 1819 was passed that which is called the Foreign Enlistment Act, by which British subjects are forbidden to engage in foreign service without license from the crown: this is that act which is yearly suspended in favour of the troops now (1837) employed in the service of the queen of Spain. Lastly, a bill has recently passed, confirming the act of 55 Geo. III., by which her majesty is empowered to grant the rank of field and general officers to foreigners; and to allow foreigners to enlist and serve as non-commissioned officers and soldiers in the British service in the proportion of one foreigner for every fifty natural born subjects.

ENNIS, the assize town of the county of Clare in Ireland; situated in the barony of Islands on the west bank of the river Fergus, about three miles above the small town of Clare, at which place this river is navigable. [Clare.] The direct distance from Dublin is 136 English miles. The borough, as settled under the Boundary Act, embraces 469 statute acres, and comprises 1390 tenements, of which 564 only are slated houses. It is incorporated by charter of the 10th January, and returns one member to the Imperial Parliament. The corporation, consisting of provost and free burgesses, is virtually extinct.

The name of the place was originally Ennis Cluainruadha, so called from Clonroad, a favourite dwelling-place here of the O'Briens, Lords of Thomond. In 1240 Donogh Carbrac O'Brien built a monastery at Ennis for Franciscan friars, the erection of which probably gave origin to the town. It was repaired in 1305 by Turlogh Mac Tiege, and destroyed in 1306 by Dermot Mac Donogh, both of the same family. The ruins are still standing.

Ennis consists of two chief streets, one parallel to the Fergus, over which are three bridges, and one diverging towards Kilrush. Near the latter are the county gaol and court-house, the only buildings of consequence in the town. The suburbs consist of wretched cabins. There is no police, neither is Ennis watched, lighted, or regularly cleansed. There are no manufactures; but there is a moderate trade in grain and cattle. In 1821 the population of Ennis was 6701; and in 1831 it was 7711; the total population within the boundary of the borough in the latter year was 9727. In the parish of Drumcliffe, in which Ennis is situated, there were, in 1834, 21 schools educating 772 males and 428 females. Of these schools, four were Sunday-schools, seven were hedge-schools, and one was in connection with the National Board of Education. (*Statistical Survey of Clare; Parliamentary Reports and Papers.*)

ENNISCORTHY, a borough town in the baronies of Scarewalsh and Ballaghkeen in the county of Wexford in Ireland; situated about 12 English miles above Wexford on both banks of the river Slaney, which is here navigable for sloops. The direct distance from Dublin is about 57 English miles.

Enniscorthy was incorporated by charter of the 11th James I. The corporation consists of a portreeve and 11 burgesses. The portreeve holds a court once a week with jurisdiction to the amount of 3*l.* 6*s.* 8*d.* late Irish currency. The corporation has no revenue. The boundary is very irregular and extends in some directions two and three miles from the town.

Enniscorthy took its origin as a town from the erection of a castle here by Raymond le Gros, one of the early Anglo-Norman conquerors, about the end of the twelfth century. Gerald de Prendergast, another Anglo-Norman noble, founded a monastery here for Augustinian friars about 1230; and Donnell Cavanagh, an Irish potentate, founded a Franciscan convent for friars of the strict observance in 1460. On the dissolution of religious houses, the possessions of the Augustinians were granted to Edmund Spenser, the poet, and those of the Franciscans to Lord Henry Wallop. Some ruins of both edifices still remain. The castle also is still standing and in good preservation. It consists of a square keep flanked by round towers, and stands at the west end of the bridge, on the bank of the Slaney, opposite the remains of the Franciscan convent. Enniscorthy was taken by Cromwell in 1649, and was stormed and burned by the Irish rebels in 1798. On the latter occasion it is said that 478 dwelling-houses were destroyed. In the immediate neighbourhood is Vinegar-hill, the scene of a sanguinary engagement in the latter year. [Wexford.]

Enniscorthy is at present a thriving and handsome town. It has a very considerable trade in grain with Wexford. The population of that part of the town which lies in the barony of Scarewalsh, in 1821, was 3557; and in 1831 was 4375. The population of the entire town as situated in the baronies of Scarewalsh and Ballaghkeen was in the latter year 5955. In 1834 there were in the parishes of St. Mary's, Enniscorthy, and Templeshannon, in which the town is situated, 13 schools educating 499 males and 469 females. Of these schools that attached to the nunnery of Enniscorthy educates 230 females. (Brewer's *Beauties of Ireland;* Inglis's *Ireland in* 1834; *Parliamentary Reports, &c.*)

ENNISKILLEN, the assize town of the county of Fermanagh in Ireland; situated in the baronies of Tyrkennedy and Magheraboy, on an island in the narrow channel which connects the upper and lower lakes of Loch Erne. The direct distance from Dublin is about 87 English miles.

The antient borough comprises the island of Enniskillen, the site of the castle excepted: under the Boundary Act the borough now includes the two suburbs which are situated north-east and south-west of the island, in the parishes of Enniskillen and Rossory respectively.

Prior to the plantation of Ulster, the only building on the island of Enniskillen was a small fortalice of the Maguires, which came into the hands of the English during the last rebellion of Tyrone in 1602. The town was altogether the work of the Protestant settlers introduced by the new patentees. [FERMANAGH.] It was erected into a corporation while still in its infancy in 1612; but had increased so far as to cover the greater part of the island in 1641, when, through the exertion of Sir William Cole, it proved a most important asylum for the Protestants on that border of Ulster. In the subsequent war of the Revolution the inhabitants of Enniskillen were among the first to take decided measures against the government of James II., having refused admission to two companies of the Roman Catholic army sent thither by Tyrconnell, and immediately chose Sir Gustavus Hamilton their governor, and proclaimed William and Mary. Throughout the contest which ensued, the local levies of Enniskillen and its neighbourhood did excellent service; particularly in their defeat of Lord Galmoy, before Crom Castle, and in the battle of Newtown-Butler or Lismaskea, where, under the command of Wolsey, they routed the army of Macarthy advancing to the siege of the town with a slaughter of nearly 3000 Irish. Their exploits have been recorded in Hamilton's 'Actions of the Enniskilleners.'

The corporation consists of a portreeve and 14 free burgesses, but does not exercise any civil or criminal jurisdiction. The annual revenue is 596*l.* 10*s.* 9*d.*, arising chiefly from tolls: the expenditure 595*l.* 2*s.* Enniskillen is not watched or lighted. The principal road through the town is repaired at the expense of the county.

Enniskillen is well built and beautifully situated. Two bridges connect the island, which is covered to the water's edge with the buildings of the town and its defences, with the suburbs on each side. The country around swells into highly cultivated eminences; and numerous seats of gentry occupy the shores of the lake above and below. There is a brisk retail trade in the supply of those comforts required by the superior order of farmers who occupy the neighbouring districts, and everything wears a prosperous and decent appearance, which contrasts very strongly with the wretchedness of other towns lying but a short distance farther south. Three newspapers are published in Enniskillen, which in 1835 used 26,600 stamps. From its position, commanding the only pass into Ulster within a distance of 50 Irish miles, Enniskillen is a place of considerable military importance.

In 1821 the population of Enniskillen was about 4399; and in 1831 the entire town contained 6056 inhabitants, and the borough 6116. In 1834 there were in the parishes of Enniskillen and Rossory 50 schools, educating 1166 males and 728 females. Of these schools three were in connection with the National Board of Education, nine were Sunday-schools, and fifteen were hedge-schools. The royal school of Enniskillen is supported by the estates of the foundation. The head master receives 500*l.* yearly, a house, and 33 acres of land; the assistants receive 350*l.* yearly; and 400*l.* is annually divided among ten scholars of the house; 41 males were receiving instruction here in 1834.

Enniskillen is represented in the Imperial Parliament by one member. (Cox's *History of Ireland;* Leland's *do.*, Inglis's *Ireland in* 1834; *Reports, &c.*)

E'NNIUS, QUINTUS, the old epic poet of Rome, was born at Rudiæ, now Ruge, in Calabria, in the year 239 B.C., two years after the termination of the first Punic war. He was a Greek by birth, and is one among many instances how much Roman literature was indebted even directly to foreign talent. History does not inform us what his original Greek name was, for that of Ennius is evidently of Latin form, and was probably adopted by him when he was admitted to the privileges of a Roman citizen. Of his early life little is positively known. He entered the military service of the Romans, and in the year 204 was serving as a centurion in the island of Sardinia, where his abilities attracted the notice of Cato, who was then acting as quæstor under the first Scipio Africanus. When Cato left the island, the poet accompanied him to Rome, and fixed his residence on the Aventine hill. The introduction of Cato, his military character, and his poetical abilities, won for him the friendship and intimacy of the first men of Rome, and he was largely instrumental in introducing letters among a nobility who had hitherto gloried as much in their ignorance as their courage. Cato himself learned Greek from him. Scipio Africanus found in him a companion in peace and the herald of his glories in war. Scipio Nasica, the son of Africanus, delighted in his society; and M. Fulvius Nobilior, the consul, 189 B.C., himself possessing a high literary character, prevailed on the soldier-poet to accompany him in the war against the Ætolians. It was to the son of this Fulvius that he was indebted for his admission to the citizenship of Rome. His great social qualities unfortunately led him into intemperance, for which he paid the penalty in great sufferings from gout. Still a hardy constitution enabled him to complete his seventieth year, and to the very last to devote himself to his favourite muses. He died in the year 169, and was buried in the Cornelian sepulchre, one mile out of Rome, on the Appian road, where his statue still appeared with those of Publius and Lucius Scipio, even in the age of Livy, a lasting monument of his intimacy with those great men. He lived, as we have already said, in the splendid dawn of Roman literature. Nævius, the first poet of Rome, and Livius Andronicus were his predecessors by not many years. The tragic poet Pacuvius was his sister's son. Plautus was his contemporary, and the comic writer Cæcilius his companion in arms. The writings of Ennius were numerous and various. His great work called, somewhat unpoetically, by the name of Annals was an historical epic in eighteen books, written in hexameter verse, a form of metre which he is said to have been the first to introduce into Roman literature. This work traced the history of Rome from the mythical age of Æneas down to his own time. His labours in tragedy were extensive. He gave the Romans a translation, but evidently a very free one, of the Eumenides of Æschylus, the Medea, Iphigenia in Aulis, and Hecuba of Euripides, the Ajax Flagellifer of Sophocles, besides as many as nineteen from other Greek poets. He also wrote comedies. His other works were Phagetica, a poem on gastronomy, especially on the merits of fishes; an epic, or panegyric, entitled Scipio; a metrical translation from a philosophic work of Epicharmus, partly in dactylic hexameters, partly in trochaic tetrameters; poems entitled Asotus, Sotadicus, Protreptica, and Præcepta; also satires, epigrams, and acrostics; and a prose translation of the sacred history of Euemerus. Of all these works there is only an unconnected mass of fragments collected from quotations in Cicero and other writers. The work entitled Annals was for a long time the national epic of Roman literature, and Virgil has not scrupled to borrow freely from it. The best edition of Ennius is that by Hesselius, 4to., Amsterdam, 1707.

ENNUI, a French word adopted of late into the English language, signifies mental lassitude or languor, produced either by depression of spirits or satiety of enjoyment, or over excitement, and which leaves no relish for any mental pursuits or pleasures. 'Mourir d'ennui' is a French phrase, which means that the mind sinks under this kind of depression, without any apparent cause of either misfortune or grief. Persons in the upper ranks of society who have pursued a life of dissipation, or who have lived much in what is called the fashionable world, are often subject to this complaint. Madame du Deffand used to complain bitterly of ennui. Ennui in French means care, or disappointment in general; and a tiresome person is often called ennuyeux or ennuyant. The word 'noja' in Italian answers to the French ennui.

ENOCH, the Book of, is one of the Hebrew Scriptures which, with the book of Wisdom, of Tobit, Judith, Maccabees, and several others, were designated Apocryphal, that is, hidden books (Βίβλοι Ἀπόκρυφοι,) from the fact that, after the destruction of the temple at Jerusalem by the Romans, the Jews having established at Tiberias their sacred archives, called by the Greek Fathers Gazophylakia (Γαζοφυλάκια), they there concealed in a cell, under the seal of their patriarch, such books as it was considered expedient to withdraw from public inspection. (Epiphanius, *Hæres*, 30, § 6 and 4.) The Scriptures deemed canonical were here deposited in a new ark, called the Aron (Ἀρων), or ark of the Covenant (διαθήκης κιβωτὸς), but the holy books (ἁγιόγραφα), which were not included in this chest, and which, about the close of the first century, were suppressed by the Jews, and thus concealed, were thence called the Apocrypha (Ἀπόκρυφοι). It is stated that the use which was made of some of these scriptures by the zealous advocates of Christianity occasioned an anxiety among the Jews to hide them, and that the predictions of the Messiah in the book of Enoch were considered to be so obvious that it was on this account concealed. (See on this point Pezron, 'L'Antiquité des Tems défendue,' 4to, p. 430.) During the apostolic age the book of Enoch was commonly read by Jews and Christians. St. Jude, in his catholic epistle, cites it as the work of a divine prophet ('Enoch the seventh from Adam prophesied, saying,' &c., v. 14, 15,) so Tertullian (*De Idolatria*) refers it to the inspiration of the Holy Spirit: however, in another treatise (*De Cultu Fœminarum*) he states that by some it was not received. Irenæus, Jerome, and other Fathers, respectfully notice it, though not as canonical; and Origen (*contra Celsum*, lib. v.) observes that, in his time, it was not of great authority in the churches, which Pezron attributes to the fact mentioned by Syncellus (*Chronographia*), that it was maliciously corrupted by the Jews and Christian heretics. Whiston published in 1727 a learned Dissertation to prove it to be quite as canonical as any book to which that epithet is applied. In the Testament of the Twelve Patriarchs, translated by Robert Grotshead, bishop of Lincoln, the sons of Jacob speak often of reading in the book of Enoch. It was extant among Christian writers until the eighth century, when it appears to have been lost. Several fragments however remained, which, with a few citations collected from the Fathers and succeeding writers, supplied the only data for the critical discussions of learned divines during several centuries. All these relics, amounting to about 20, are inserted in the 'Codex Pseudopigraphus Vet. Test. of Fabricius, tom. i. p. 160—224.

At the end of the 18th century Bruce brought from Abyssinia three complete and beautiful copies of the book of Enoch, in the Ethiopic language, one of which he presented to the Bibliotheque du Roi at Paris, and another to the Bodleian Library at Oxford. Transcriptions and partial translations into Latin were made by Dr. Woide of Oxford and Dr. Gesenius of Halle; but the Ethiopic MS., which at first excited much curiosity, lay undisturbed during more than a quarter of a century, until the professor of Hebrew at Oxford, Dr. Lawrence, broke in, as he informs us, upon its repose, and published in 1826 an English version of the whole, entitled 'The Book of Enoch the Prophet, supposed for ages to be lost; translated from an Ethiopic MS. by the Rev. Richard Lawrence, LL.D., archbishop of Cashel.' A second and revised edition appeared in 1833. That this book is identical with that which, in the primitive ages of Christianity, was cited by Jude and the Fathers, is considered by Dr. Lawrence to be completely evident. His critical prolegomena and notes are incorporated in a more recent translation into German, which is accompanied with a much larger mass of learned researches, forming two thick volumes 8vo. ('Das Buch Henoch, in vollständiger übersetzung mit fortläufenden Commentar, ausführlicher einleitung und erläuternden excursen, von Andreas Gottlieb Hoffmann, Doct. Philos. Profess. Theol. an der Univers. zu Jena,' 1833.) As the allegorical statements of the book, as far as any meaning is clearly assignable, appear to relate to historical events which extend to the time of Herod the Great, it is supposed by those who reject the supposition of its being the antediluvian production of Enoch himself that it was anonymously written in Hebrew, shortly before the commencement of the Christian æra. (Scaliger and Lawrence.) The subject matter consists chiefly of relations of Enoch's prophetical and celestial visions, in the most remarkable of which the angel Uriel (lxx. et seq.) shows to the prophet all the mysterious scenes in heaven, including a survey and explanation of the solar and lunar revolutions according to the antient astrological theory. A view is also exhibited of the interior of hell. Occasionally religious and moral precepts are enjoined, but all sense of propriety is continually shocked with such preposterous combinations that Scaliger, judging merely from the fragments then possessed, scrupled not to designate the book as a tissue of disgusting lies and nonsense. (*Scaligeriana.*) It commences with some historical statements of which the following, from chap. 7, is a specimen:—'To the sons of men were born elegant and beautiful daughters, and when the angels, the sons of heaven, beheld them, they became enamoured of them, saying to each other, Come, let us select wives for ourselves and beget children.' Accordingly a band of 200 angels having descended on Mount Arnon, and sworn to accomplish this project, 'they then took wives, each choosing for himself; with whom they cohabited, teaching them sorcery and incantations; and the women conceiving, brought forth giants whose stature was each three hundred cubits (550 feet): these, when they had devoured all the produce of man's labour, began to devour men, birds, beasts, and fishes, eating their flesh and drinking their blood.' In representing persons and events by animals and inanimate objects of nature, combinations are introduced of such a monstrous nature, that, in comparison, the metamorphoses of the Pagan mythologies appear to be rational. The history of the prophet to whom this book is attributed, or rather whose visions it relates, is briefly recounted as follows, in Genesis v. 18—24:—Jared at the age of 162 begat Enoch, who at the age of 65 begat Methuselah, and afterwards walked with God 300 years, and begat sons and daughters. All the days of Enoch were 365 years; he walked with God, and was not, for God took him. (Compare Ecclesiasticus xliv. 16; Heb. xii. 5.) From the fact of his being the seventh from Adam, from the number of the years of his age being precisely the number of days in the year, and from several other points of curious coincidence, the sceptical Boulanger asserts, in a learned treatise on the subject (Enoch, in Œuvres Diverses), that the name is but a variation of the Phrygian Annac, a symbolical personification in Sabism, representing the solar period; and identical with the Oriental Anusch, the Phœnician Anac or Enac, the Etruscan Anus, and the Latin Janus. The names of the seven patriarchs, Adam, Seth, Enos, Cainan, Mahalaleel, Jared, and Enoch, are etymologically resolved into mythical symbols of the seven planets, that is, the Sun, Moon, Mars, Mercury, Jove, Venus, and Saturn. The translation of Enoch has also been compared with the antient mysterious burial at sunrise of noble and comely youths who prematurely died. (Eustathius, *Comment. in Odyss.*, tom. iii, p. 1527, § 51, ed. Rom., 1549.) They were said to have been not really dead, but carried up alive to the region of light in consequence of their being loved by the Supreme Being. The story of Ganymede is an instance. (See the learned disquisition on the subject in Montfaucon's *Religion des Gaulois*, tom. ii. p. 305, &c., and in his *Explication des Textes difficiles*, tom. i. p. 332.) Hence the well-known axiom, 'He whom the Gods love dies young.' (Plutarch, *De Consolatione Philosoph.*)

ENROLMENT, in law, is the registering, recording, or entering a deed, judgment, recognizance, acknowledgment, &c., in the Chancery, or any other of the superior or inferior courts being a court of record. But the enrolling of a deed does not make it a record, though it thereby becomes a deed recorded; for there is a difference between a matter of record and a thing recorded to be kept in memory; a record being the entry of judicial proceedings in a court of record; whereas an enrolment of a deed is the private act of the parties concerned, of which the court takes no judicial notice. Various statutes have directed instruments to be enrolled, as the 27th Henry VIII. c. 16, relating to deeds of bargain and sale of freehold lands; and the 53rd George III. c. 141, relating to memorials of annuities, &c. All deeds also relating to property in the counties of York and Middlesex are registered in the register-offices there established by statute. Wills affecting lands should, by the direction of the statutes, be registered both in Middlesex and Yorkshire, and also at Kingston-upon-Hull. A bill to establish a general register has several times within the last five years been introduced into parliament, but hitherto without success, owing chiefly to the opposition of the landed interest.

ENS (river). [AUSTRIA, p. 136.]

ENS, the **PROVINCES** of the, constitute the archduchy of Austria, which, with Styria, Carinthia, Carniola, Görz, Trieste, part of Istria, the Tyrol, and Vorarlberg, form what are denominated the hereditary dominions of the house of Austria. The archduchy is divided into the two provinces of the Lower and Upper Ens, commonly called Lower and Upper Austria, has altogether an area of about 14,881 English square miles, and about 2,147,000 inhabitants (in 1827, 2,075,335), and contains 52 towns and 12,143 market and other villages. Lower Austria is the most antient possession of the house of Austria, and was acquired by conquest from the Avari in the year 796. Charlemagne, who subjected it, formed it into a margraviate; it became a Bavarian fief, and so continued until Count Leopold of Babenberg was recognised as its independent possessor in 944. It continued in the possession of the princes of Babenberg, who added Upper Austria to it, and raised the whole into a duchy, until Ottokar, king of Bohemia, expelled them in the middle of the thirteenth century. In 1276, however, Rudolph of Habsburg wrested the duchy out of his hands, and his descendants have remained in possession of it to the present day. They assumed the title of archdukes in 1359, but were not recognized as such until the year 1453.

The province of the LOWER ENS, or LOWER AUSTRIA, lies nearly in the centre of the Austrian dominions, on both sides of the Danube, between 47° 26′ and 49° 0′ N. lat., and 14° 26′ and 17° 1′ E. long. It is the eastern portion of the archduchy, and its boundaries are, on the north, Bohemia and Moravia; the east, Hungary; the south, Styria; and the west, Upper Austria. According to the new admeasurement made by the quarter-master-general's department, the area of this province, which is very little less than Wales, is 7251 English square miles, of which 3651 are on the northern, and 3600 on the southern bank of the Danube. The subdivisions are as under:—

	Subdivisions.	sq. m.	Population.	Chief Towns.		
	Vienna Township	57	345,000			52 towns, 239 market villages, and 4996 villages.
South	Circle of the Lower Wienerwald	3,542	190,000	Traiskirchen	1,000	
	Ditto Upper ditto		232,000	St. Pölten	4,400	
North	Ditto Lower Mannhartsberg	3,652	275,000	Korneuburg	1,900	
	Ditto Upper ditto		238,000	Krems	3,800	
		7,251	1,280,000			

The Lower Ens is walled in both on the north and south by ranges of mountains. A branch of the Noric Alps, of limestone formation, not only occupies its southern districts, but spreads its branches over the whole country south of the Danube, with the exception of the most eastern parts. Its most elevated points are the Schneeberg, in the south-west of the Lower Wienerwald, which has two peaks, the Alpengipfel (Alpine peak), 7383 feet, and the Grosser Riese (great giant), 7331 feet high; the Goeller, 6327 feet, in the southern extremity of the same circle, and the Wecksel, in the same quarter, 6203 feet. A series of wooded heights, denominated the Wiener Wald (Vienna Forest), separate the Upper from the Lower Circles of the Wienerwald, and run from south-west to north-east. On the left bank of the Danube, and throughout the western and nearly the whole of the eastern districts of the northerly portion of the Lower Ens, the Bohemian and Moravian chains of the great Sudetsh range extend their last offsets in all directions until they subside in the valley of the Danube. A succession of these heights, called the Mannhart group, and running from north to south, divide the Upper from the Lower Mannhart circles, and give their name to them. The most elevated point in this quarter is the Yauerling, close to that river, in the south of the Upper Mannhartsberg circle, which is 3330 feet high. In the northern and eastern parts of the Lower Mannhartsberg circle the ranges of hills are of inferior height. The Cetian mountains on the right bank of the Danube are connected with the Noric Alps. Many of these chains are densely wooded; others are entirely naked. The most extensive forests are the Wiener (Vienna), Ernstbrunn, Hochleiten, and Mannhart; the line of the first of these divides the Lower from the Upper Wienerwald circle. It is estimated that the area occupied by the mountains of the Lower Ens is at least one-third of its whole surface: they are furrowed by numberless valleys, which give the province a beautifully varied and picturesque appearance.

The fine valley of the Danube spreads out on both banks of the river in a continuous level from Korneuburg as far as Krems, and the greater part of the streams which water the Lower Ens discharge themselves into that river. The Danube itself traverses the province from west to east for about 156 miles, entering it a little to the north-east of Neustädtel, and quitting it between Hainburg and Theben, which latter town is within the Hungarian borders. Between those towns it has a fall of more than 510 feet (450 Vienna feet), and its current is accordingly so rapid that it flows beneath St. Sophia's bridge, in Vienna, at the rate of nine feet per second. Its breadth across the island of Lobau, close to Vienna, is 3050 Vienna fathoms (18,986 English feet): but in some parts, particularly below Marbach and at Thalern below Krems, its channel is so narrowed by the high lands that it rushes forwards with a violence which, in former times, rendered the navigation extremely perilous. The tributaries of the Danube, so far as the Lower Ens is concerned, are of no great length or volume of water. On the right bank are the Ens, Ips, Erlaf, Billach, Trasen or Traisen, Schwechat, great Fischa, and Leitha: all these streams flow down from the Alpine mountains in the southerly districts of the Lower Ens, and are remarkable for the green colour of their waters; the great Fischa has also the peculiar characteristics of seldom varying in the body of its water and never freezing. The Danube, on its left bank, receives the Krems, which irrigates the south of the Upper Mannhartsberg circle, flowing through the beautiful valley of the Krems, antiently called the 'Vallis Aurea,' or Golden Valley, and falling into the Danube at Krems; the March, which, next to the Danube, is the largest river in the Lower Ens, and which, entering the province from Moravia, forms its boundary on the side of Hungary for about 48 miles, and is navigable to its mouth, where its breadth is about 1420 feet; and the Kamp. The only streams which are not tributary to the Danube are some rivulets which, like the Salza and the Mürz, flow down from the Alpine heights in the south of the province, and join the Mürz; and the Lainsitz in the north-west, where it takes the name of the Braunau at Gmünd and of the Schwarzbach at Schwarzbach, under which designation it ultimately falls into the Moldau, a tributary of the Elbe.

Independently of the Donau-canal (canal of the Danube), near Vienna, which is merely an enlarged arm of the Danube, the only canal in the Lower Ens is the Vienna or Neustadt canal, which opens out from the preceding and terminates at Wiener-Neustadt, about 34 miles south of the capital. The original plan was to carry this canal to the Adriatic, and thus connect the Danube with that sea.

There are some large natural sheets of water, but none deserving of the name of lakes: the largest is the Erlaf or Zellersee, which is about 4998 feet long, 1890 broad, and from 620 to 630 deep. Near the Mittersee there is a beautiful waterfall 200 feet high, and close to it is a spot called the Brüllender Stier (roaring bull), whence the roar of a subterraneous cascade is heard.

Among the mineral waters of the Lower Ens none are in such repute as those of Baden, in the Lower Wienerwald, about 19 miles south-west of Vienna, or 15 in a straight line. (Vol. iii., p. 261.) The waters of Medling (first discovered in 1805), Deutschaltenburg, Heiligenstall, Döbling, &c., are also used.

The varied character of the surface occasions considerable difference of climate. The mountainous nature of the north-western and southern parts of the province renders the temperature colder than it is in the low lands about the Danube and in the eastern districts. There is no mountain which attains the limit of perpetual snow, which would in this latitude be found at an elevation of about 9400 feet. By observation at the Vienna observatory, which stands at a height of 570 feet above the level of the sea, it has been ascertained that the average annual temperature in Vienna is about 51° Fahr.: in 1824 it rose to 52° 44′; the summer-heat is between 77° and 83°, and the maximum heat does not exceed 97°; the winter cold varies between 10° and 12° below the freezing point, and has never been greater than 22°. The weather is very variable, and on the lofty summit of the Schneeberg it changes, says Blumenbach, almost every hour. About Annaberg, in the south of the Lower Wienerwald, the country is so desolate that it goes by the name of the Siberia of Austria.

The soil of the Lower Ens differs much in productiveness. The richest tracts are in the centre of the province, from the confluence of the Ens eastwards as far as the Pulnafeld on the right bank of the Danube; and on the left bank, from Krems they extend until they spread over the south-eastern parts of the Upper Mannhartsberg to the efflux of the March into the Danube. The lands about the lower March, indeed, which are called the Marchfield, are a Delta, which, under efficient cultivation, might become the granary of the Austrian metropolis. There is an extensive level also in the vicinity of Vienna, which, in parts, is extremely fertile. On the whole, the Lower Ens does not rank among the more productive provinces of the empire. It is a manufacturing rather than an agricultural province.

The inhabitants of this province, as well as those of the other division of the Archduchy of Austria, are of German descent. After the Avari were driven out, it was re-peopled by Bavarians, Swabians, Saxons, and Franconians, principally indeed by the first mentioned; a circumstance which accounts for the similarity in language and manners between the native Austrian and his Bavarian neighbour. The majority is of the Roman Catholic persuasion, and the minority, Protestants, Greeks, and Jews, with a few Armenians. In 1800, the number of native born inhabitants was 1,016,512, besides about 30,000 settlers from the other parts of Austria and foreign parts. In 1808 it was 1,059,440: 1810, 1,073,294: and in 1825, 1,182,595, besides about 50,000 persons not born in the province: the present population is about 1,280,000. The proportion of males to females is as about 46 to 58. The number of houses in 1816 was 150,385: in 1827, 153,168: and it is at present about 155,500. In the eastern and north-eastern districts there are many Sclavonians, here denominated Croats. In 1828 the births amounted to 47,566, and in 1831 to 46,789: while the deaths amounted in 1828 to 45,520, and in 1831 to 49,063. In 1830 the marriages were 12,604.

Nearly one half of the province is devoted to the production of grain, vegetables, and wine; and of this about 1,900,000 acres are under the plough: yet, in spite of good husbandry, the soil and climate are so little favourable to the growth of corn, that wheat and rye do not yield more than five, barley not more than eight or nine, and oats not more than six or seven grains for each grain sown. The province, in fact, does not produce corn enough for its own consumption. The quantity of meadow-land is estimated at about 550,000 acres; the pastures at about 382,000; and the woods and forests occupy about 1,228,000. Peas and beans and potatoes are universally cultivated, particularly in Upper Mannhartsberg. Vegetables are abundant, and fruit likewise. Hemp and flax are cultivated, but the quality is indifferent and not equal to the demand. Saffron of very superior kind is raised near St. Pölten and Melk. The vineyards occupy about 112,230 acres of ground, and on an average yield 2,000,000 aulms (about 31,000,000 gallons) annually. The finest vineyards are those of Weidling, Klosterneuburg, Grinzing, and some others in the Lower Wienerwald; and the wines of Burgundy and Champagne have long been acclimatised in some parts. The mountain districts produce a very full-bodied durable wine. The woods and forests, which supply both fuel and timber, have suffered so much from neglect that they do not suffice for the consumption of the country. The most extensive, which lie in the circles of the Wienerwald, are chiefly composed of the beech, oak, maple, linden, elm, alder, pine, and fir.

The rearing of horned cattle has never recovered from the blow which it received during the repeated invasions of the French armies. The whole stock does not exceed 300,000 heads. A portion of it is of a very superior native breed. Although the establishments for breeding horses belonging to the crown and several noblemen have done something towards improving the race, this branch of economy is not pursued with much activity. Some writers do not estimate the stock at more than 57,000 or 60,000. Independently of several extensive sheepwalks in many of the upland districts, every peasant feeds his little flock of 10, 20, or 30 sheep. Upwards of one half of the whole stock, estimated at 450,000, are of breeds improved by crossing with merinoes and other foreign races. The largest flocks are those on the imperial estates. The yearly weight of wool obtained is about 1,190,000lbs., and much of it is exported. Goats and swine are not bred in great numbers. Poultry is fed on a large scale for the Vienna market. Some honey and wax are made: the stock of game is much diminished.

The mines of the Lower Ens are not of any great importance. The Annaberg no longer yields silver. There are iron mines at Reichenau, Pütten, Schottwien, Erdweis, Weitra, and other spots, but the quantity raised is but inconsiderable. There are numerous quarries of marble and freestone, &c., particularly in the south; gypsum and calcareous rocks, from which much lime is made are abundant; mill-stones, granite, slate, alum, potter's clay, quartz for making glass and china, and porphyry, are among the other mineral products. Coals are raised in the south and in some other parts.

The Lower Ens ranks next to Bohemia in a manufacturing point of view; and the principal seats of industry are the districts south of the Danube, the northern being chiefly agricultural. In 1811, the number of individuals employed in these districts was 163,171, about one-sixth of the then population of the whole province. Flax and hemp yarns are spun wherever the materials are grown; in the Upper Mannhartsberg 3800 hands are employed, besides those who spin for their domestic wants. Cotton wool is also spun in the same circle by hand, and employs between 5000 and 6000 persons. In 1828 the province had 30 factories, in which 224,518 spindles were at work. Much linen is woven, but mostly for home use; and the linen-tape manufactures of Sieghart's occupy above 1000 hands. Cottons, particularly of the finer sorts, are manufactured on an extensive scale at Vienna: large printing-works are carried on at Neunkirchen, Friedau, St. Pölten, Kettenhof, &c. Cotton embroidery, stockings, &c., are made at Vienna and elsewhere. The woollen manufacture has never prospered to any great extent, although there are some large factories in Vienna, at Rittersdorf, &c., but the silk manufacture has risen to great perfection in the capital, where, even as far back as 1827, it employed above 8000 looms: it is brisk also at Leobersdorf, Neustadt, Katzeldorf, &c. Laces, ironware, and cutlery; tools, copperware, brasswork, buttons, jewellery, and trinkets; articles of wood, leather, glass, mirrors, porcelain, earthenware, paper, musical instruments, soap, &c., form so many additional branches of industry.

The Lower Ens has a considerable trade with the neighbouring countries and foreign parts, by means of its communications by land with the Adriatic, Germany, Poland, &c., and by the Danube with Hungary, Turkey, and the East.

The various scientific institutions and schools, both in Vienna and the several towns in general, afford advantages to this province which must at all times promote its prosperity.

Among the towns not before mentioned are, in the Lower Wienerwald, Hainburg on the Danube 2800, Bruck on the Leitha 2600, Neustadt 10,503, Klosterneuburg on the Danube 3350, Schwechel 2100, Baden 4600, and Medling 2050; in the Upper Wienerwald, Baierisch-Waidhofen 2100, Tuln on the Danube 1500, Ips at the confluence of the Ips and Danube 1100, and Melk on the Danube 1020; in the Lower Mannhartsberg, Meissau 700, Rötz 2260, Labb on the Thaya 1250, Feldsberg 2600, Zistersdorf 1700, Stockerau 1550, and Mistelbach 2650; and in the Upper Mannhartsberg, Stein on the Danube 1700, Egenburg 2000, Weitra 1800, and Langenlois 2150.

The province of the Upper Ens, or Upper Austria, forms the western part of the Archduchy, and is situated on both banks of the Danube, but chiefly on the south, between 46° 57′ and 48° 46′ N. lat. It comprehends the duchy of Salzburg, which was incorporated with it in the year 1816. Its boundaries are, on the north, Bohemia; on the east the Lower Ens or Lower Austria; on the south Styria, Carinthia, and the Tyrol; and on the west Bavaria. Its area, according to the estimate of the quarter-master-general's survey, is 7630 English square miles, or about 205 more than that of Wales. The three eastern circles, the Mühl, Traun, and Hausruck, are called Old Austria; and the new circle of the Inn and Salzburg or Salzach, is termed New Austria.

Sub-divisions, &c.

Circles.	Sq. Miles.	Pop.	Chief Towns.		Towns.	Market Vill.	Vill. & Ham.
Mühl	1302	205,000	Lintz	21,500	17	120	7488
Hausruck	777	184,000	Wels	4000			
Traun	1533	186,000	Steyer	10,100	1815.	123,779	dwelling-
*Salzach	4018	292,000	Salzburg	13,300	1825.	134,987	houses.
	7630	867,000					

* Commonly called the Duchy of Salzburg.

The Upper Ens is a mountainous country: the parts south of the Danube contain the most elevated alpine regions in the Austrian dominions, and those north of it are intersected by lower ranges which are offsets of the great Bohemian forest range. The Rhætian Alps occupy a small portion of the south-west, and terminate at the Dreiherrenspitz, from which point the Noric Alps occupy the whole of the southern circles of Salzburg, Hausruck, and Traun. The highest summits in this part are the Grossglockner, 12,221 English feet above the level of the sea, on the most southern part of the Salzburg circle; the Ankogel, 11,798 feet; the Grosse Wiesbach or Krummhorn, about 11,770; the Hochkar, 11,270; and the Murauerkopf, 10,070 feet. All these are situated in the southern part of the Salzach circle. There are many wide and numerous small valleys, especially the noble valleys of the Salzach, Gastein, Saal, &c., among the mountain masses that overspread the land south of the Danube, which constitutes five-sixths of the whole surface of the Upper Ens. The only level country in the province is the immediate borders of the Danube. In the Mühl circle, which is north of the river, the most elevated point is the Plöckenstein, close to the common boundary of Bavaria, Bohemia, and the Upper Ens; its height does not exceed 2177 English feet.

Among the numerous streams of the Upper Ens there are five navigable rivers: the Danube, which enters the province in the north-west, below Passau, and quits it after receiving the Ens at the south-eastern corner of the circle of the Mühl; the Inn, which forms the western frontier for a short distance, and receives the Saal, another navigable river that divides the Upper Ens in part from Bavaria; the Ens; and the Traun, which last stream flows out of a small lake not far from Aussee, in Upper Styria, then crosses into the circle of the Traun, at its south-western end, turning from the west to the north, passes through the Lakes Halstätt and Traun, takes a north-easterly direction along the western side of the circle, throws itself over a precipice 60 feet high near Lambach, washes the eastern side of the town of Wels, in the Hausruck circle, and ultimately falls into the Danube, opposite Steyeregg, after a course of about 70 miles. It is navigable after quitting the Traunsee, and the obstruction from the fall at Lambach has been obviated by a side canal 1020 feet in length. Among the minor streams are—the Ayer, which unites the Mond and Kammer lakes, and joins the Danube near the Zizelau, the Salzach or Salza, which waters the south of the circle of that name, then flows through it in a north-westerly direction past Salzburg, and falls into the Inn a few miles south-west of Braunau, the Saal and Lammer, tributaries of the Salzach, and the Rana.

The Upper Ens abounds in lakes, of which the following are the largest. The Traun or Gmunder See, in the west of the Traun circle, 6310 Vienna fathoms long (39,437 English feet), 1570 fathoms (9812 feet) in its greatest breadth, and 598 Vienna feet (620 feet) in its greatest depth. The Halstätter See at the south-western extremity of the same circle, inclosed between high mountains, 4260 Vienna fathoms (26,622 feet) long, 1130 fathoms (7062 feet) broad, and 600 Vienna feet (622 feet) in its greatest depth. The Atter or Kammer See, in the south of the Hausruck circle, 10,300 fathoms (64,375 feet) long and 1745 (10,906 feet) broad; and the Matt or Mond See (Lake of the Moon, from its crescent-like shape), which lies west of the southern end of the Atter See, and is 5600 fathoms (35,000 feet) long and 1070 (6687 feet) broad. There is an immense number of smaller lakes, of which, in the Traun circle alone, 27 have been counted. Swamps and morasses of considerable extent occur in many parts, particularly near the Mond and Traun lakes, and in the Pinzgau, near the banks of the Salzach, in the south-west of the circle of Salzach.

The most celebrated mineral springs of the Upper Ens are those of Gastein, which lie deeply embosomed in the valley of that name among the most southern mountains of Salzach in 47° 5′ N. lat. and 13° 8′ E. long. The waters are of a sulphurous nature, perfectly pure and translucid, and the six springs vary from 95° to 112° of Fahrenheit in temperature. The cold mineral waters of St. Wolfgang are also in much repute.

The climate of the Upper Ens is much colder than that of the Lower Ens, though it lies in the same latitude; and much more so in the south than in the north. The warmest parts are in the valley of the Danube. On the whole it is not insalubrious, although not so healthy as the adjacent provinces. The annual mortality is one in thirty four.

Many extensive tracts, particularly among the alpine masses of the south, are extremely steril. The valleys north of the Tauern group in the Salzach circle abound in clay, limestone, slate, quartz, &c. The low lands of that circle, the northern parts of the Traun, and several districts in the Hausruck, and the western tracks along the Inn, are highly fertile.

The Upper Ens is not rich in native products. Marble however of peculiarly fine quality is found in the Salzach circle, where black, red, blue, and parti-coloured kinds are obtained. In the same circle are found alabaster, crystal, gypsum, garnets, beryls, topazes, emeralds, &c. Granite and sandstone occur generally. There was formerly a much larger produce of metals in the western parts of the province: gold and silver are however still found on the Gastein range at Kauris and Schellgaden, and gold dust in the Salzach and other streams; copper abounds on the Gerlos and in the valleys of Brunn, Stubach, Leogang, and Ramingstein, in the two last of which much lead is got; a plentiful supply of iron is procured from the mountains about Hüttau and Flachaw, the Hinteralp and Bundschuh, &c., as well as in the Traun circle, whence copper and lead are also obtained. Salt abounds in the hills of Ischil and Hallstätt, and in the Thunburg near Hallein, and the yearly produce is about 55,000 tons. Cobalt is found at Zinkwand. Coals are dug in several quarters; sulphur at Mühlbach and Grossarl in the Salzach; and there are extensive peat-mosses.

The Upper Ens contained 755,891 inhabitants in the year 1815; 826,575 in the year 1825; and the present number is estimated to be 867,000. The births in 1828 were 24,460, and in 1831, 24,035: the deaths in 1828 were 22,177, and in 1831, 21,080: and the marriages in 1829 were 5448. The majority of the inhabitants are of the same stock as the Bavarians. On the banks of the Ens and Traun are some villages peopled with individuals of Sclavonian extraction. The proportions throughout the province are said to be five agricultural labourers to two operatives, one of noble blood in every 438 persons, and one ecclesiastic in every 260. The Roman Catholic is the predominant religion, and there are not above 30,000 protestants in the whole province. The average issue of each marriage is estimated at from four to five children.

Agriculture is said to be in a more advanced state in the Upper than in the Lower Ens. The quantity of land under the plough is estimated at 1,162,510 acres: wheat, barley, oats, and rye are the chief crops; and agriculture is conducted on the largest scale in the circles of the Mühl, Hausruck, and Traun. About 35,600 acres are occupied as garden-ground; about 115 only for vineyards in the Mühl and Hausruck; about 510,600 as meadows; and 1,106,800 are used for grazing cattle. It is calculated that 1,346,900 are covered with woods and forests. Very considerable quantities of potatoes and fruit are raised in the Upper Ens. In some parts the produce of grain is so small, for instance in the Viechtau on Lake Traun, that in the best years it does not yield above three grains for every grain sown; in the northern parts of the Traun, on the contrary, wheat produces eightfold, and oats tenfold and upwards. The quantity of grain raised is about 1,480,000 quarters annually.

The province abounds in pastures and the rearing of cattle is general. The race of horses bred in the Pinzgau, a district among the Alps north of the Salza, is reputed to be the largest and tallest in Europe: they are generally 19 hands high. In 1830 the stock of horses of all kinds in the Upper Ens was 46,950. The horned cattle are of a large breed: the stock in 1830 was 85,579 oxen and 293,604 cows. The sheep are of an inferior race, and none of them yield fine wool: the stock in 1830 was 199,925, a diminution of 15,498 since 1827. Goats abound in the upland parts. The lynx, wolf, and bear are occasionally met with; foxes, stags, deer, marmots, polecats, squirrels, martens, hares, and wildfowl are more or less plentiful. Fresh water fish are abundant: and the beaver and otter are at times seen on the banks of the Danube, Mühl, and Aschach. The pearl muscle is found in some of the rivulets in the upper part of the Mühl circle.

The manufactures of this province, though less extensive than those of the Lower Ens, are considerable. The peasantry in general manufacture their own linens and woollens, and make what leather articles they require. Much linen thread is spun as well as woollen and cotton yarn, on which above 15,000 hands are employed in the Mühl circle alone, where there are upwards of 5000 looms for weaving linens, &c., and numerous factories where linens and cottons are printed. The manufacture of cotton cloths is most extensive at Schwanenstadt in the Hausruck, Lintz, Urfahr in the Mühl, Wels, Stejer, and Hallein. There is a considerable manufactory of woollens and carpets belonging to the crown, in Lintz; and others in Wels, Lanhalsen in the Mühl, Neuhof, &c. About St. Wolfgang in the Traun cloth of goats' hair is prepared. Large quantities of steel and ironware tools, &c., are made in the Upper Ens, particularly in Steyer and the districts to the south of it, at Steinbach, Sierning, Neuzeug: Steyer, in fact, has been called the Birmingham of Austria, but its manufactures are of coarser workmanship. There are copper and brass works at Ebenau in the Salzach, Reichraming, and near Wels. The preparation of wood for domestic and other purposes gives considerable employment to all the parts south of the Danube. Bleaching-grounds and tanneries are numerous. Paper, glass, leather, earthenware, chemicals, beer, and spirits are manufactured pretty extensively.

The exports of the Upper Ens are very considerable, and consist principally of salt, timber, and wood for fuel, yarns, linens, woollens, carpets, ironware, tools, nails, and screws, cutlery, flax, cotton-yarn, cottons, stockings, cheese, beer, cattle, earthenware, mill and polishing stones, stone for building, marble, and fruit.

The principal towns, independently of the chief towns in the several circles, are, in the Mühl circle, Freistadt on the Feldaist, 2200 inhabitants; Urfahr, or Ufer. Lintz, united by a bridge to Lintz, 2600; and Steyeregg on the Danube, 850: in the Hausruck circle, the towns of Efferding, 1000; Schwanenstadt; and Grieskirchen: in the Traun circle, Ens, on a steep hill on the left bank of the Ens, with five suburbs, 380 houses and 3000 inhabitants; Gmunden, at the efflux of the Traun from Lake Traun, 1300 feet above the level of the sea, with six suburbs, 440 houses and 3250 inhabitants, with saline springs and baths; Kremsmünster, built round a hill on the left bank of the Krems, with several public schools, a rich abbey, an observatory, and collections in natural history, &c., and 950 inhabitants; Kirchdorf, St. Florian, Serning (1200 inhabitants), and Grünau on the Alben, 1750. In this circle lies the Salzkammergut (Salt-domain of the Crown), between lakes Traun, Atter, and St. Wolfgang, the Salzach circle, and Styria; it contains an area of 236 square miles, and has 79 villages and hamlets, 2450 houses, and 16,200 inhabitants: there is no level land whatever in this district. The salt-mines yield about 40,000 tons of salt, and it is said a clear revenue of upwards of 70,000*l*. annually. Coals, alabaster, and gypsum are also obtained from this district. It contains the market-towns of Ischil on the Traun, with 250 houses and 1800 inhabitants, two salt-works, saline baths, and a theatre and hospital. Hallstätt, on the lake of that name, 1050 inhabitants; Laufen, with 370, and salt and coal-works; Goisern, a village of 756, on the Traun, and Langbath, on the southern side of Lake Traun, with salt-boiling-houses, saw-mills, &c., and a population of 1100. The Salzkammergut lies between 47° 29′ and 47° 51′ N. lat., and 13° 29′ and 13° 51′ E. long. In the Salzach circle are the towns of Hallein on the Salzach, where there are salt-works and boiling-pans, 330 houses and 5000 inhabitants, and Radstadt, on a hill on the left bank of the Ens, with about 920. In this circle lies the beautiful valley of Gastein among the Alps, from 30 to 40 miles in length and about two in breadth, in which are 21 villages and hamlets, including Hof or Hof in der Gastein, the chief place in the valley, and the baths called Wildbad-Gastein, which have upwards of 1200 visitors in the season. Gredig, with its rich marble quarries and prince's well, the source of the Glaubach, Ebenau, where there is a manufactory of copper, brass, and ironware, and the esteemed springs of St. Wolfgang on the Weichsel brook are also in this circle.

(Blumenbach; Lichtenstern; Hassel's *Archduchy of Austria;* Röhrer's *Statistics; Historical and Statistical Survey of the Austrian Monarchy;* Jenny's *Manual; &c.*)

ENSIGN, a commissioned officer, the lowest in degree, and immediately subordinate to the lieutenants in a regiment of infantry. One of this rank is appointed to each company, and the junior ensigns are charged with the duty of carrying the colours of the regiment. Ensigns in the regiments of foot guards have also the rank of lieutenants. In the rifle brigade, and in the royal corps of artillery, engineers and marines, in place of an ensign, a second lieutenant is attached to each company.

Among the Spaniards and Italians, in the seventeenth century, it appears that no officer existed like the lieutenant of a company, whose rank is between that of a captain and ensign, any such being considered superfluous, and as tending to diminish the importance which was attached to the post of the officer who had the charge of the colours, on the preservation of which, in action, the honour of the regiment was made greatly to depend.

When, as formerly, a battle partook far more than at present of the nature of a melée, the loss of a standard, which served as a mark for the soldiers under each leader to keep together in the fight or to rally when dispersed, must have been a serious misfortune, and probably was often attended by the total defeat and destruction of the party; and hence, no doubt, arose the point of honour respecting the colours. A French military author, who served and wrote in the time of Charles IX., intending to express the importance of preserving the colours to the last, observes that, on a defeat taking place, the flag should serve the ensign as a shroud; and instances have occurred of a standard-bearer who, being mortally wounded, tore the flag from its staff and died with it wrapped about his body. Such a circumstance is related of Don Sebastian, king of Portugal, at the battle of Alcazar, and of a young officer named Chatelier at the taking of Taillebourg, during the wars of the Huguenots.

In the antient French service, the duty of carrying the oriflamme at the head of the army was confided to a man of rank, and also of approved valour and prudence; the post was held for life.

The price of an ensign's commission in the foot guards is 1200*l*., and his daily pay is 5*s*. 6*d*.; in the regiments of the line the price is 450*l*., and the daily pay 5*s*. 3*d*.

ENTABLATURE. [Civil Architecture; Column.]

ENTAIL. [Estate.]

ENTALO'PHORA. [Sertularicæ.]

ENTERI'TIS, *Inflammation of the Intestines*. The inflammatory affections of the whole alimentary canal constitute an extensive and highly important class of diseases, several of which are properly designated by specific names, since they have a peculiar seat, and require a peculiar treatment. Enteritis is one of these. This term is employed to denote an acute inflammation of the external or peritoneal coat of the intestines. When inflammation is seated exclusively or chiefly in the peritoneal coat of the intestines, both the local and the constitutional affection is widely different from that which is produced when inflammation is seated in the mucous coat. It is therefore with good reason that these diseases are distinguished by different names.

The distinctive characters of enteritis are pain in the bowels, vomiting, invincible constipation, fever, and sudden and great prostration of strength.

The pain is often exceedingly severe, and is usually especially acute about the navel. The inflammation may be confined to a small portion of the intestines, or its seat may be very extensive. The pain is felt in the part in which the inflammation is seated; hence the pain is occasionally restricted to a particular part of the abdomen; but far more commonly it is spread over a large portion of it, and, as has just been stated, is peculiarly severe about the navel. The pain is constantly present; it is never for a moment entirely absent; but it is occasionally very much aggravated in paroxysms. It is always greatly increased by pressure over the seat of the part inflamed. Though severe pain be a very constant attendant on enteritis, yet occasionally cases occur in which the pain is never so great as to occasion much alarm, and these insidious attacks are the most dangerous.

The vomiting, though occasionally absent, is pretty constantly present, and is sometimes frequent and most distressing. In the intervals between the acts of vomiting there is a sense of nausea. It has been thought that when the vomiting is urgent, it is an indication that the inflammation has extended to the stomach; but the inspection of the body after death has fully shown that there may be most distressing vomiting when not the least appearance of disease can be traced in the stomach.

Obstinate constipation is a diagnostic mark of enteritis

It is not indeed invariably present, but it is present in so large a proportion of cases, that when absent it must be considered as an exception to the general rule. Its absence should leave no doubt upon the mind of the nature of the attack if the other symptoms are present.

More or less fever is always present. The skin is usually hot and dry, and the heat is often preceded by a sense of chilliness or by a distinct rigor. The tongue is usually white and furred; there is much thirst, and the pulse is quick, small, sharp, and incompressible.

The expression of the countenance is peculiar. The features are sharp and compressed; in severe cases, and in almost all cases in the advanced stage quite sunk; the expression is anxious and wild, and the first glance conveys to the beholder an irresistible conviction that the individual is labouring under some intense internal disease.

The impression upon the powers of life is so great and rapid that the patient is far more exhausted after a few hours' illness in this disease than after an attack of as many days' duration in most other acute maladies. This rapid and extreme prostration is highly characteristic of enteritis, and if it be combined with any one of the symptoms which have been described, should leave no doubt of the existence, in an intense form, of one of the most dangerous diseases to which the human body is subject.

As the inflammation advances the pulse becomes more rapid and feeble; the abdomen swollen, tense, and tympanitic; the prostration increases; the skin, instead of being hot, becomes cold and clammy, and the extremities, more especially, are cold.

The inflammation has a peculiar tendency to terminate in gangrene. Before this event happens it is usually conceived that the inflammatory action extends from the peritoneal to the muscular coat, and that in the most intense cases all the coats of the intestine become involved. The signs that mortification has taken place are cessation of pain, hiccup, increased frequency and weakness of the pulse, greater collapse of the countenance, and increased prostration. But it is remarkable that often when the patient dies under the ordinary symptoms of mortification, on the examination of the intestine after death, nothing can be detected but the usual appearances of inflammation; there is no trace of a gangrenous spot; death is produced by the intensity of the inflammation.

The brain usually remains unaffected to the end; the mental faculties are but little impaired; but sometimes, as the disease advances, the mind becomes confused and wandering, and occasionally delirium sets in early—a certain sign that the disease is of extraordinary intensity.

The exciting causes of the disease are acrid and indigestible matters taken into the stomach in large quantity; habitual full living on highly seasoned food; the accumulation of hardened fæces, cold drinks, especially when the body had been previously overheated. But perhaps the most common cause of the disease is cold, combined with moisture, applied either directly to the abdomen, or to the body generally, and more especially to the lower extremities. It is also frequently superinduced by strangulated hernia; and on the sudden occurrence of the symptoms of enteritis the abdomen should always be carefully examined with a view to ascertain whether hernia be present. It may also be caused by an event which cannot be known until after death—the involution of one fold of the intestine within another (intus-susception or volvulus), so as to occasion a complete obstruction to the passage of the contents of the bowels.

Enteritis can scarcely be confounded with any other disease excepting colic, and the relation between these two affections is so close that severe colic is very apt to lapse into enteritis; and this it is very important that the practitioner should bear in mind. But when colic exists as a distinct disease it is clearly distinguished from enteritis by the absence of fever, and of the prostration so characteristic of enteritis; by the occurrence of the pain more decidedly in paroxysms with intervals of complete ease; by the diminution, not the increase, of the pain on pressure, and by the strikingly different state of the pulse.

Enteritis may attack persons of all ages, from the infant a day old, to the man who reaches the extreme term of human life. It may occur at all seasons of the year. Its attack is often sudden, and it sometimes proves fatal with frightful rapidity. It is by no means uncommon for a person apparently in sound health to be destroyed by this disease within twenty-four hours from the commencement of the attack.

Hence the importance of a knowledge of its early symptoms, and the necessity of attacking it with the utmost promptitude and vigour. The ordinary remedies for inflammation must be employed with decision. The character of the pulse, the sunk countenance, the prostration of strength may appear to contra-indicate blood-letting; but these are false indications, and if regarded, the event will be fatal. After a copious bleeding the pulse often diminishes in frequency and increases in strength; the expression of the countenance improves, and the vital energies recover, as if the system were relieved of an oppressive load. Bleeding must be carried as far as possible, until it appears to have made an impression upon the inflammatory action. It is a very useful practice to bleed from the arm two or three times in succession, after an interval of two or three hours, if the symptoms of inflammation do not abate.

It is without doubt highly desirable to procure evacuations from the bowels; but the disease is to be cured by the removal of the inflammation, not by opening the bowels. Death often takes place though the bowels are opened, and the fatal event is not unfrequently hastened, if not brought about, by the acrid nature of the cathartics given to remove the constipation. These acrid cathartics, if they open the bowels, do not necessarily save the patient; and if they do not open the bowels they greatly increase the inflammation. Only the mildest aperients should be employed. This is one of the diseases in which the judicious employment of calomel and opium is attended with the best results.

Colic is often converted into enteritis, or a case of enteritis mistaken for colic is frightfully aggravated, by taking spirituous cathartics, as tincture of rhubarb, for the relief of the pain. In no case whatever should any vinous or spirituous cathartic be taken for pain in the bowels, however slight, without the sanction of a medical man. Persons continually sacrifice their lives by taking brandy, or a large dose of some tincture, for what they call spasm of the stomach or bowels. The so-called spasm oftentimes is inflammation, which the stimulus of the alcohol increases to such a degree that the disease is no longer to be restrained by any remedies that can be employed.

ENTOMO'LOGY, that branch of science which treats upon insects. The term *entomology* literally signifies a discourse upon insects, it being derived from the two Greek words *éntomon*, an insect, and *logos*, a discourse.

The term entoma was first applied to these animals by Aristotle, and is synonymous with the Latin word insecta (whence is derived the English name *insects*), both having reference to a striking character exhibited in the insect tribe, that of having the body *insected*, or, as it were, cut and divided into numerous segments. [INSECT.]

ENTOMOSTO'MATA, De Blainville's name for his second family of his first order, *Siphonobranchiata*, of his first subclass, *Paracephalophora Dioica*, of his second class, *Paracephalophora*, of *Malacozoa*. This family appears to be nearly the same with the genus *Buccinum* of Linnæus, and is thus characterized by De Blainville:—

Animal spiral, with the foot, which is shorter than the shell, rounded in front. *Mantle* provided in front of the respiratory cavity with a long canal always uncovered, which the animal uses as an organ of prehension. *Head* furnished with a single pair of blackish tentacula, which carry the *eyes* on an enlargement (renflement) of the half of their base. *Mouth* armed with a proboscis, as in the preceding family (*Siphonostomata*), without any labial tooth, but with a small tongue. Organs of *respiration* formed by two unequal pectinated branchiæ. Organs of *generation* —termination of the oviduct in the females at the right side, at the entrance of the branchial cavity. Termination of the deferent canal at the extremity of a long flattened contractile excitatory appendage, situated at the right side of the neck. *Shell* very variable in form, whose opening sometimes very large, and sometimes very small, is without an apparent canal, or with a very short one suddenly recurved upwards, but always more or less deeply notched anteriorly. *Operculum* horny, unguiform, oval, subconcentric, with the summit a little marked and marginal.

De Blainville observes that this family differs evidently very little from that of the *Siphonostomata*, whether in the soft parts or in the shell. The species which it embraces are not all absolutely marine, though a very great number of them are: some live at the mouths of rivers, and a very small number are entirely fluviatile

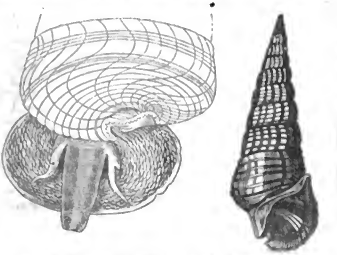
Genera.

*

Turriculated.

Cerithium

Animal very much elongated, the mantle prolonged into a canal at its right side, but without a distinct tube; the foot terminated by a depressed, proboscidiform muzzle; tentacula very distant, with large rings, swollen, as it were, in the lower part of their length, and carrying the eyes at the summit of this enlargement. Mouth terminal, in the form of a vertical slit, without any labial tooth, and with a very small tongue furnished with regularly disposed reflexed teeth. A single straight branchia.



Animal of Cerithium Telescopium, and shell of Cerithium palustre.

Shell more or less turriculated, tuberculous; aperture small, oval, oblique; the columellar border very much excavated, callous; the right lip sharp-edged, and dilating a little with age. *Operculum* horny, oval, rounded, subspiral, and striated on its external surface, sunk, and bordered on its internal surface.

α.

Species which have evidently a small canal very short, and obliquely recurved towards the back.

Example, *Cerithium Vertagus.* Locality, Indian Ocean and Moluccas (Lamarck).

β.

Species which have a still smaller canal, but straight throughout, and a well-formed sinus at the posterior union of the two borders.

Example, *Cerithium Aluco.* Locality, Indian Ocean and Moluccas (Lam.).

γ.

Species whose aperture is divided into three by the shutting of the short anterior tube, and that of the posterior sinus. (Genus, *Triphore*, or *Tristome*, Deshayes.) *Triforis?* Deshayes.

Example, *Cerithium Tristoma.*

δ.

Species which have a small straight canal, and the whorls of the spire flat and ribanded, with a deep umbilicus, two decurrent plaits on the columella, and one on the right lip. (Genus, *Nerinea*, Defrance.)

Example, *Cerithium Nerinea.*

ε.

Species which have no canal, but a simple notch, and whose right lip is much dilated in age. (Genus, *Potamides*, Brongniart; *Pyrazus*, De Montfort.)

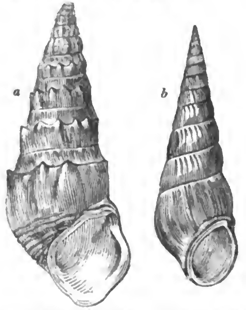
Example, *Cerithium palustre.* Locality, coasts of the East Indies, in the salt marshes (Lam.).

ζ.

Species whose aperture, without a canal, is a little notched in front and rear, the notch being replaced by a sinus; the columellar border curved in its middle; the right lip not dilated. (Genus, *Pirena*, Lam.)

Example, *Cerithium Madagascariense.*

De Blainville makes the genus *Cerithium*, as established by him, contain fifty-six species characterized by Lamarck: adding that the greater part are marine, but many from the mouths of rivers, and some entirely lacustrine, and that there is but one belonging to the French seas (nos mers), whilst more than a hundred fossil species are found in France and Italy. M. Defrance's genus *Nerinea*, he remarks, would be better placed among the *Pyramidellæ.*



a, Cerithium Madagascariense (Lam.); *b*, C. Madagascariense (Pirena, Lam.), according to De Blainville. N.B. It is not clear that these are not the same species, notwithstanding the comparative smoothness of *b*.

Lamarck places *Cerithium* at the commencement of the first section (Canalifères) of his *Zoophagous Trachelipods*, immediately after *Turritella*, the last of his *Phytiphagous* (Plant-eating) *Trachelipods.*

Cuvier gives it a position after *Purpura, Cassis*, and *Terebra*, and before *Murex.* This, as the Rev. M. J. Berkeley and Mr. Hoffman observe in their interesting paper on the anatomical structure of *Cerithium Telescopium*, would imply a structure of the parts of the mouth adapted for boring shells, according to the known habits of *Murex*, and certain allied genera; but, they remark, a single glance at Adanson's figure is sufficient for conviction that the animal is much more nearly allied to the *Trochoides;* and that Lamarck judged rightly, according to the evidence before him, in placing it on the confines of his two great classes. This is corroborated, they add, by the little additional information of M. Sander Rang, who describes the mouth as toothless, but furnished with a small tongue.

M. Sander Rang states that this genus, so numerous in species both living and fossil, contains only marine animals; but, nevertheless, there are some of them which live at the mouths of rivers, and these are precisely the individuals which M. Brongniart has united to form the genus *Potamides*, which cannot be adopted in zoology, inasmuch as it does not rest upon sufficiently marked characters. M. Rang adopts, generally, the divisions of De Blainville with approbation, but he rejects the sixth group (ζ), which comprehends the genus *Pirena*, which Rang, following the example of M. de Férussac, places with *Melanopsis.* Rang agrees with De Blainville in thinking that the division containing Defrance's *Nerinea* is, perhaps, doubtful, and that its position would be better near the *Pyramidellæ.* He observes that they have in France but two or three living *Cerithia;* but a great number of fossil species.

Deshayes makes the number of living species eighty-seven; not reckoning *Triforis*, of which he gives three species, nor *Pirena*, of which he also gives three; of the latter Lamarck records four.

Anatomy, Habits, &c.—Our limits make it necessary to refer the reader to the paper of the Rev. M. J. Berkeley, A.M., and G. H. Hoffman, Esq., for the anatomy of *Cerithium* (*Zool. Journ.*, vol. v., p. 431). Adanson, speaking of the habits of one of the species, says that it lives in the sand amongst grass and mangroves, feeding on 'scolopendres,' and other small marine worms. The individual which formed one of the subjects of the investigation by Mr. Berkeley and Mr. Hoffman, and which was brought from Calcutta, though placed in fresh sea-water, the utmost care being taken to renew it frequently, and though all kinds of marine substances were supplied to the animal for food, refused all nourishment, contenting itself with simply walking over the substances, and, in so doing, touching them with its proboscis. As it would not feed, this individual was killed by immersion in spirit. The other specimen, which was anatomized by the zoologists above mentioned, was brought from Ceylon. Mr. Gray (March 25, 1834) read a note to the Zoological Society of London, giving an account of the arrival in England of two living specimens of *Cerithium armatum*, which had been obtained at the Mauritius, and had been brought from thence in a dry state. That the inhabitants of *land shells* will remain alive without moisture for many months, is, he remarked, well known. [BULINUS, vol. vi., p. 8]. He had had occasion to observe that various marine *Mollusca* will retain life in a state of torpidity for a considerable time; some facts, in illustration of which, he had communicated to the Society (*Zool. Proc.*, part i., p. 116). The present instance included, however, a torpidity of so long a continuance as to induce him to mention it particularly. The animal, though deeply contracted within the shell, was apparently healthy, and beautifully coloured. It emitted a considerable quantity of bright green fluid, which stained paper of a grass-green colour: it also coloured two or three ounces of pure water. This green solution, after standing twelve hours in a stoppered bottle, became purplish at the upper part; but the paper retained its green colour though exposed to the atmosphere. A specimen of *C. Telescopium*, sent from Calcutta to Mr. G. B. Sowerby in sea-water, lived out of water in a small tin box for more than a week. *Cerithium* has been found in the sea on various bottoms, and in estuaries, at a depth ranging from the surface to seventeen fathoms.

FOSSIL CERITHIA.

Deshayes in his tables gives the number of fossil (tertiary) *Cerithia* at 220, and of these he records *Cerithia vulgatum, Latreillei, doliolum, giganteum, alucaster, granulosum,* and *bicinctum*, as both living and fossil. He gives two fossil (tertiary) species of *Pirena* and two of *Triforis*. The form is found from the Supracretaceous to the Oolitic group, both inclusive. *Potamides* is recorded in the weald-clay Sussex (Mant.); and *Nerinea* in the Oolitic group (Bailly), near Auxerre, St. Mehiel (Meuse), Kimmeridge Clay, Coral Rag, Bernese Jura, Forest Marble, Oxford oolite, Dorset (*Nerinea, Goodhallii*), Inferior oolite.

Mr. Lea (*Contributions to Geology*) describes and figures from the Claiborne beds a shell which he names provisionally *Cerithium ? striatum;* observing that he is by no means satisfied in placing this shell among the *Cerithia*. It has a stronger resemblance in the mouth to the genus *Melania*, but being a marine shell cannot, he remarks, with propriety be placed in that genus. De Blainville, he adds, figures a shell (*Malacalogie*, pl. 21, bis, fig. 2), under the name of *Potamides fragilis*, which certainly ought to belong to the same genus with this, the mouth being very nearly the same. Until more species shall be obtained, Mr. Lea has forborne to create for it a new genus. He further states, that there have been no *Cerithia* yet found in the beds at Claiborne, although they abound in England and on the Continent in the tertiary formation, there being 137 species in the Paris basin alone.

Melanopsis.

Animal furnished with a proboscidiform muzzle, with two contractile, conical, annulated tentacula, having each at their external base an oculated peduncle; foot attached to the neck; respiratory orifice in the canal formed by the union of the mantle with the body. *Shell* with an epidermis, elongated, fusiform or conico-cylindrical, with a pointed summit; whorls of the spire from six to fifteen, the last often forming two-thirds of the shell; aperture oval, oblong; columella solid, callous, truncated at its base, separated from the anterior border by a sinus, the callosity prolonged upon the convexity of the penultimate whorl, forming a canal backwards; sometimes a sinus at the posterior part of the right border. *Operculum* horny, subspiral.

Habits, &c.—The genus is rather fluviatile than marine, contrary to *Cerithium*, according to De Blainville. Lamarck, who gives but two species, *M. costata* and *M. lævigata*, speaks of them decidedly as fluviatile. Rang says that the genus was established by M. de Férussac for fresh-water shells, whose callous and truncated columella did not permit their arrangement with *Melania*. The latter, in his monograph, divides them into two groups, the first consisting of those species which have a single sinus at the border of the aperture, separating it from the columella (*Melanopsis*, Lam.; *M. buccinoidea*); the second consisting of those species which have two distinct sinuses at the external border of the aperture, one which separates it from the columella, the other situated near the union of this border with the penultimate whorl. (*Pirena*, Lam.) De Blainville gives the following division of the genus.

α.

Subturriculated species.

Example.—*Melanopsis costata.*

Locality.—Syria in the Orontes (Lamarck).

Melanopsis costata.

β.

Oval species.

Example.—*Melanopsis buccinoidea.*

γ.

Convex species (Espèces rouflées).

Example.—*Melanopsis Bouei.*

It appears to us that *Pirena* comes more appropriately in the place assigned to it by M. de Férussac and M. Rang than in that allotted to it by M. de Blainville.

M. Deshayes gives ten living species of *Melanopsis*, and, as has been stated above, three of *Pirena*, Lamarck giving four.

FOSSIL MELANOPSIDES.

M. Deshayes, in his tables, gives eleven fossil (tertiary) species of *Melanopsis*, and of these he records the following species, *Melanopsides buccinoidea, Dufourei, costata, nodosa, acicularis,* and *incerta*, as both living and fossil (tertiary). Of *Pirena*, he records two fossil (tertiary) species. Dr. Fitton, in his Systematic and Stratigraphical List of Fossils of the strata below the chalk (*Trans. Geol. Soc.*, 2nd series, vol. iv.), mentions two species with a note of interrogation after the generic name, viz., *M. attenuata* and *M. tricarinata*, from the weald-clay, Dorsetshire, and the Hastings' sand, Sussex. He also alludes to a third unnamed species with a query, from the Purbeck, Bucks.

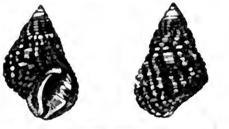
Planaxis.

Animal unknown. *Shell* oval, conical, solid, transversely furrowed; aperture oblong; columella flattened and truncated anteriorly, separated from the right border or lip by a sinus; right lip furrowed or rayed within, and thickened by a decurrent callosity at its origin. *Operculum* horny, oval, delicate, subspiral.

Lamarck established this genus for certain small shells approximating closely to the *Phasianellæ*, but differing from them by the truncation of the anterior part of the columella. He only records two species, viz., *P. sulcata* and *P. undulata*. M. Rang states that he possesses six well-distinguished species.

Habits, &c.—Planaxis is a littoral shell, and is sometimes found under stones. M. Rang says that he had had occasion to observe the animal at the Isle of France, where the rocks are sometimes covered with them, but, having lost his notes, he is unable to give its principal characters. According to his recollection, the animal differed very little from that of *Phasianella*. M. Deshayes in his tables puts the living species at four.

Example.—*Planaxis sulcata.*



Planaxis sulcata.

FOSSIL PLANAXES.

Deshayes in his tables gives five fossil (tertiary) species.

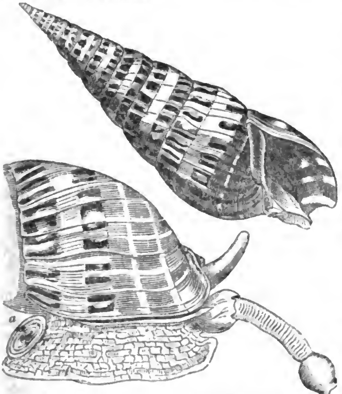
Subula.

Animal spiral, very much elevated; foot very short and round; head with extremely small triangular tentacula, bearing the eyes at their summit; a long labial proboscis without hooks (crotchets), at the bottom of which is the mouth equally unarmed. *Shell* without an epidermis, turriculated, and with a pointed spire; whorls smooth, ribanded, bifid; aperture oval, small, deeply notched anteriorly; external lip thin and sharp-edged; internal or columellar lip with an oblique *bourrelet* at its extremity. *Operculum* oval, horny, lamellar, and as it were imbricated.

M. de Blainville thus characterizes a genus which he says he found himself compelled to establish upon examining the animal brought home, by MM. Quoy and Gaimard, the shell of which had been hitherto confounded with the *Terebræ;* and he arranges under this new genus all those species whose shell is very much elevated, whose spire is very pointed, and whose whorls are ribanded; and, consequently, the greatest number of the twenty-four living species characterized by Lamarck, and which nearly all belong to the East Indies and Australasia.

Example.—*Subula maculata* (Lam.), *Buccinum maculatum* (Linn.).

Locality.—Moluccas and Pacific Ocean, according to Lamarck, who speaks of his possession of a specimen taken on the shores of Owhyhee.



Shell of Subula maculata, and last whorl of the shell with the animal and operculum *a*.

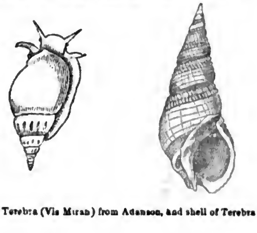
M. Rang observes that it is much to be desired that new observations on the animals of these shells may lead to the decided line of separation between the *Subulæ* and the *Terebræ*

* *

Turbinaceous; or genera whose spire is moderately elongated, rarely subturriculated.

Terebra.

Animal spiral, rather elevated; foot oval, with a transverse anterior furrow and two lateral auricles; head bordered with a small fringe; cylindrical tentacula terminated in a point and very distant; eyes but little apparent at the origin and outside of the tentacula; mouth without a proboscis; tube of the respiratory cavity very long. *Shell* without an epidermis, inclining to oval; spire sharp, not much elevated or subturriculated; aperture large, oval, strongly notched anteriorly; columella with an oblique bourrelet at its extremity. No *operculum*. (De Blainville.)



Animal of Terebra (Vis Miran) from Adanson, and shell of Terebra vittata.

M. De Blainville only leaves in this genus, which he thinks ought perhaps to belong to the family of non-operculated *Entomostomata*, those species of Lamarck's *Terebræ*, which, in their general form, bear some resemblance to the *Buccina*, such, for example, as his *Vis buccinée* (*Terebra vittata*); because De Blainville supposes that the animal resembles that of the *Miran* of Adanson, which is the type, and which differs much from that of the subulated species to which De Blainville gives the generic name of *Subula*, *Alène*, in French.

Habits, Locality, &c.—The species, De Blainville observes, appear to come from warm climates only, like the *Subulæ*. *Terebra* (Lamarck) occurs at depths ranging from the surface to 17 fathoms. The species sometimes creep on reefs out of the water, but within reach of the spray.

Since the publication of the works of M. De Blainville and of M. Rang, Mr. Gray, on the 8th July, 1834, exhibited an extensive series of the shells of *Terebra*, and enumerated 45 species (21 of them new), all of them either in the British Museum or in his own private collection. He stated that the animal has a small foot, and a very long *proboscis*, at the base of which are seated two very small *tentacula;* the *operculum* is ovate, thin, horny, rounded behind, and rather tapering in front. The shell is covered by a very thin, pellucid, horn-coloured *periostraca:* it is usually white, variously streaked with brown, the streaks being often interrupted or broken into spots by the two spiral bands of the shell; one of these bands is placed near the spiral groove and the other on the middle of the whorl. The *apex* of the cavity is frequently filled up by a calcareous deposition; but this deposition has never been observed in *Ter. duplicata*. Mr. Gray divides the species into the three following sections. 1st. *Anfractibus sulco spirali cingulum posterius efformante; labio interiore, tenui concavo.* He observes upon this section, that the cingulum is most conspicuous in young shells; and that the internal lip is very rarely thickened in adults. To this section he refers 30 species (*Terebra maculata*, Lam., &c.), 15 of them new. 2nd. *Anfractibus sulco spirali cingulum posterius efformante; labio interiore incrassato, subelevato.* He observes that the species of this section (seven, five of which are new) somewhat resemble the *Cerithia* in the aperture. 3rd. *Anfractibus sulco postico nullo.* These last he divides into two sub-sections * *with a thin internal lip*, which he subdivides into (*a*) those species which have an *elongated slender shell*, and (*b*) those which have a *short shell*, and * * *with the internal lip thickened and elevated, and the shell short;* and he observes that these approximate somewhat to the *Nassæ*, but have neither the internal dilated lip, nor the external thickened lip. This third section contains eight species, one of which is new.

Mr. Gray does not notice *Subula* of De Blainville, and it may therefore be considered that he does not admit the generic distinction.

Fossil Subulæ and Terebræ.

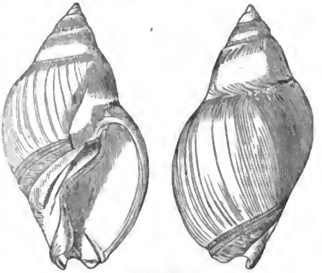
De Blainville refers to his genus *Subula* many of the fossil species which had been considered as *Terebræ*, and which coincide with his definition of the former genus; but he does not enumerate the species, nor draw any distinct line of demarcation between the fossils of these respective genera. He remarks that M. Defrance makes the fossil species of both these genera seventeen, of which five are identical, three from Italy, one from Grignon, and one from Bourdeaux. The 'vis scalarine fossile de Parnes' De Blainville thinks should be referred to the genus *Terebra*. M. Deshayes, in his tables, makes *Terebra* (of Bruguière and Lamarck we presume, for he does not notice *Subula*) consist of 44 living species and 16 fossil (tertiary), of which last he considers two new species, and *Terebræ Fuval*, *strigilata* and *pertusa*, to be both living and fossil (tertiary). Dr. Fitton, in his stratigraphical and local distribution of the fossils of the strata below the chalk, records *T. Port-*

landica as occurring in the Portland stone in Dorset, South Wilts, North Wilts, Oxford, and Bucks. Mr. Lea describes and figures three additional species of *Terebra* (Lamarck) from the Claiborne beds, remarking that four species of the genus have been observed in England, three in the Oolitic group, and one in the London clay. He refers to the 16 species given for the tertiary by M. Deshayes, and says that ten of these are found at Baden (Miocene) and seven at Bourdeaux (Miocene). Here is evidently an error in the number. He adds that Mr. Conrad had observed one species, which he calls *simplex*, in the tertiary of Maryland, 'being the only one heretofore observed,' adds Mr. Lea, 'in our formations.'

Eburna.

Shell oval or elongated, smooth; spire pointed, whorls running together as it were, without a marked distinction of suture; aperture inclining to oval, elongated, widened, and deeply notched in front; right lip entire; columella callous posteriorly, umbilicated subcanaliculated at its external part.

Geographical Distribution.—The seas of warm climates; sandy mud? Of the five living species, Lamarck refers the locality of three to the East Indies and one to South America and perhaps India.



Eburna glabrata.

Fossil Eburnæ.

De Blainville states in his 'Malacologie' (1825) that no *Eburnæ* had then been discovered in a fossil state. M. Rang remarks (1829) in his 'Manuel' that there are fossil species. Deshayes, in his tables, records five living species and one (new species) fossil (tertiary).

Buccinum.

To avoid repetition the reader is referred to the character of the family at the beginning of the article for a general description of the animal. Dr. Buckland observes that the organ by means of which the carnivorous Trachelipods bore holes through shells for the purpose of extracting the juices of the animal is well exemplified in the English species *Buccinum Lapillus* (*Purpura Lapillus*) and *Buccinum undatum*. The proboscis is armed with a number of minute teeth set upon a retractile membrane for the purpose of perforation. Mr. Osler (Phil. Trans., 1832) gives a figure of the rasp-like perforating tongue of *B. undatum*. See also Dr. Buckland's *Bridgewater Treatise*.

Shell oval, elongated, with a pointed but moderately elevated spire; aperture oblong or oval, deeply notched anteriorly; right lip entire, sometimes thick; columella simple or callous; *Operculum* horny, oval, subconcentric; summit but little marked and marginal.

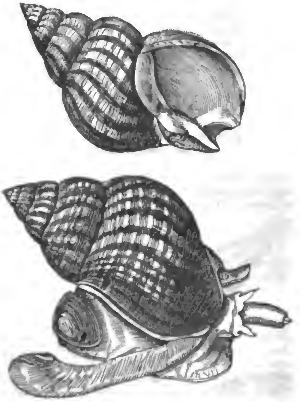
Geographical Distribution.—Very wide. Species occur in almost all seas. *Buccinum glaciale* and *Buccinum Sabinii* are noted in the supplement to the appendix of Captain Parry's first voyage as having been met with during the period in which the expedition remained within the Arctic circle.

Habits.—The species have been found at depths ranging from the surface to 17 fathoms. The greater part of the genus is littoral.

M. De Blainville subdivides the species into many sections comprehending the true *Buccina*, including the genera *Alectrion* (*B. papillosum*) and *Cyclops* (*B. neriteum*) of De Montfort, and the genus *Nassa*, Lamarck. M. De Férussac divides the genus into two subgenera, viz., *The Buccina properly so called*, of which *B. undatum* may be considered the type, and the *Eburnæ*. M. Sander Rang adopts this arrangement. We confine ourselves to the true *Buccina*.

The species are very numerous. Deshayes, in his tables, gives 140, and new species are continually arriving. Mr. W. Lytellton Powys, for instance, describes (Zool. Proc., 1835,) four new species from Mr. Cuming's collection.

Example.—*Buccinum undatum.* *The Waved Whelk.*



Shell of Buccinum undatum, and animal (male) creeping with its shell and operculum.

This is the species so commonly exposed for sale as food on the street stalls in the metropolis. Pennant, speaking of another species that occurs in vast abundance on our rocks near low-water, namely, *B. Lapillus* (*Purpura Lapillus*) above alluded to, remarks that it is one of the English shells that produces the purple dye, analogous to the *Purpura* of the antients; and Mr. William Cole, of Bristol, thus describes (1684) the process of obtaining the English *Purpura*:—'The shells, being harder than most of other kinds, are to be broken with a smart stroke with a hammer, on a plate of iron or firm piece of timber (with their mouths downwards), so as not to crush the body of the fish within; the broken pieces being picked off, there will appear a white vein, lying transversely in a little furrow or cleft, next to the head of the fish, which must be digged out with the stiff point of a horsehair pencil, being made short and tapering. The letters, figures, or what else shall be made on the linen (and perhaps silk too), will presently appear of a pleasant light green colour, and, if placed in the sun, will change into the following colours, *i.e.*, if in winter, about noon; if in the summer, an hour or two after sunrising, and so much before setting; for in the heat of the day, in summer, the colours will come on so fast, that the succession of each colour will scarcely be distinguished. Next to the first light-green it will appear of a deep-green, and in a few minutes change into a sea-green; after which, in a few minutes more, it will alter into a watchet-blue; from that, in a little time more, it will be of a purplish-red; after which, lying an hour or two (supposing the sun still shining), it will be of a very deep purple-red, beyond which the sun can do no more. But then the last and most beautiful colour, after washing in scalding water and soap, will (the matter being again put into the sun or wind to dry) be of a fair bright crimson, or near to the prince's colour, which afterwards, notwithstanding there is no use of any stiptic to bind the colour, will continue the same, if well ordered, as I have found in handkerchiefs that have been washed more than forty times; only it will be somewhat allayed from what it was after the first washing. While the cloth so writ upon lies in the sun, it will yield a very strong and fœtid smell, as if garlic and *asafœtida* were mixed together.' (Phil. Trans., Abr. II. 826.)

We have inserted this account here, because the shell which is the subject of it may be more familiar to our readers under the Linnæan name of *Buccinum Lapillus* than of *Purpura Lapillus*, but it is properly arranged under the genus *Purpura*.

Fossil Buccina.

M. Deshayes in his tables makes the number of fossil (tertiary) species 95, and he records the following as both living and fossil (tertiary), *Nassa* not appearing as a genus in his list,—*Buccina undatum, reticulatum, maculosum, mutabile, clathratum, neriteum, Desnoyersi, prismaticum, asperulum, musivum, inflatum, polygonum, D'Orbignii, Linnæi, politum*, and five new species, the names of which are not given. Dr. Fitton in his 'Stratigraphical and Local Distribution' notes two species below the chalk, viz., *B. angulatum* and *B. naticoïde* in the *Portland stone* (N. Wilts, S. Wilts, Bucks), and the last-named species in the *Portland sand* (Bucks). Mr. Lea notes one species (new), *B. Sowerbii*, in the Claiborne Beds, Alabama. He observes that of the genus 27 species, including *Nassa*, have been observed in Great Britain, several as low as the mountain limestone, but chiefly in the London clay and the crag. After repeating the number given by Deshayes, Mr. Lea says that the genus appears to be much more abundant in the upper formations. The Pliocene of the sub-apennines furnishes 27 species. Bourdeaux (Miocene) 21. Paris (Eocene) 9. In America, he adds, four species have been found, Mr. Say having described two from the older Pliocene, Maryland, and Mr. Conrad two from York Town, Virginia, also older Pliocene.

Nassa.

Animal very much depressed, with a very large foot extending beyond the body on all sides, but especially in front, where it is large and angular, whilst posteriorly it is insensibly narrowed. For the rest like the animal of *Purpura*. *Shell* globular, oval or subturriculated; aperture oblong, notched anteriorly; right lip sharp-edged, often plaited within; columellar lip covered with a large callous plate, extending more or less far. *Operculum* horny.

Mr. Lea (*Contributions to Geology*) says, 'I have not hesitated to separate this genus from *Buccinum* (although Lamarck united them after having made the division) because they certainly form a very natural group. Cuvier separates it, as M. de Blainville also does, into a sub-genus.' M. de Blainville certainly makes one of his sections of Buccinum consist of the genus *Nassa;* but Rang separates it decisively.

Geographical Distribution. There are many living species mostly from the warmer climates. A very small number belong to Europe.

Habits. Much like those of *Buccinum*. The species have been found on reefs, coral sand, sand, sandy mud, and under stones, at depths ranging from the surface to 15 fathoms.

Mr. Powys has lately described eight new species from Mr. Cuming's collection. Example. *Nassa nodifera*. Locality. The Gallapagos Islands and the shores of Panama.

Fossil Nassæ.

There are many fossil *Nassæ*, as the reader must have collected from the notice of the genus among the fossil *Buccina*. Mr. Lea describes and figures a new species from Claiborne, and adds that Mr. Conrad has observed in the tertiary of Maryland four species, three of which have been described by Mr. Say, in a recent state, upon the American shores. The genus occurs among the Gosau fossils, and Dr. Fitton in his Stratigraphical Table records two species below the chalk, viz., *N. costellata* and *N. lineata*, both from Blackdown.

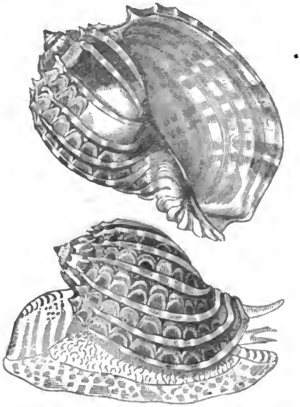
* *

Ampullaceous Entomostomata, or those whose shells are, in general, globular.

Harpa.

Animal with a large head, without a proboscis, having the mouth opened below; two anterior tentacula, conical and very much approximated, carrying the eyes upon an enlargement situated externally a little below the middle; foot large, furnished anteriorly with a sort of heel; siphon rather large and a little elongated; branchial pectinations unequal, two in number; orifice of the oviduct at the entrance of the branchial cavity of the right side, orifice of the deferent canal at the extremity of a very voluminous excitatory organ; vent on the same side.

Shell oblong, more or less convex, generally rather delicate, enamelled, furnished with regular longitudinal ribs; spire a little elevated and pointed, the last whorl very large; aperture oval, elongated, widely notched anteriorly, the right lip with an external *bourrelet*, columella simple, pointed anteriorly. No *operculum* according to M. Reynaud.



Shell of Harpa ventricosa, and animal crawling with its shell.

Geographical Distribution, Habits, &c.—The genus is found in the seas of warm climates, and is more especially abundant at the Mauritius and the neighbouring islands, whence the finest of the more common species and the many-ribbed harps are procured. The animal is said to be of a rich vermilion red. The fishery is principally carried on at low water with a small rake, to which a net is attached, on sand-banks at night, and at sunrise when the harps are probably out upon their feed. They have been known to take the bait on the fishing lines laid for olives (*Oliva*). MM. Quoy and Gaimard, and, afterwards, M. Reynaud state, that the animal of the harp can, sometimes, when attacked by an enemy, disembarrass itself of the posterior part of the foot, and completely withdraw itself into the shell. M. Reynaud explains this phenomenon by giving his opinion that the transverse laceration which causes, in the movement of contraction exerted by the animal, the separation of the posterior part of the foot, arises from the resistance which that part, too voluminous to enter the shell after the animal, encounters from the edges of the shell. M. Rang observes, that though no operculum has been found, (and the animal appears to have been carefully examined,) he does not hesitate to leave the genus among those which are provided with one, because, in the first place, *Harpa* is similarly organised, and, in the next, if deprived of that appendage, it has, at least, the posterior part of the foot to take, in some sort, its place.

Authors generally make the number of living species eight, and of these the most precious, though lately greatly depressed in value, is the *Many-ribbed Harp* (*Harpa imperialis*.) But some of the species are very difficult of definition, though others are well marked. The shells when in fine condition are great favourites with collectors, and, indeed, a drawer of fine harps in all the freshness of their beauty is a sight worth seeing. Care should be taken to keep them with their mouths downwards and from the sun and light, or their brilliant colours will soon fade.

Example, *Harpa ventricosa*. Locality Mauritius, &c

Fossil Harps.

Only two species are recorded, in the tertiary formation.

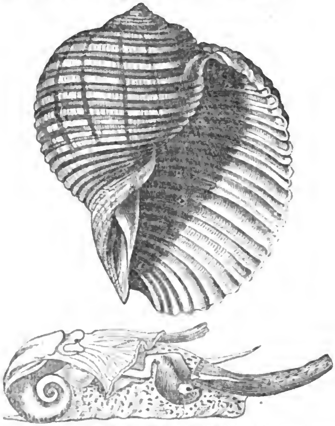
De Blainville adds, that one of these is an analogue, but Deshayes, who gives Paris as the locality for both, does not rank either of them among the species found both living and fossil.

Dolium.

Animal generally resembling that of *Purpura*. *Shell* delicate, nearly globular, ventricose, furrowed transversely; spire but little elevated, pointed, the last whorl forming nearly the whole of the shell: aperture large, oval, right lip undulated; columella often twisted, *operculum* horny.

Geographical Distribution.—The seas of warm climates, especially those of India. One species, *Dolium galea*, inhabits the Mediterranean. The species are often found on reefs, some of them are very large. Seven seems to be the greatest number hitherto recorded, and Cuvier has separated the species into two sections, viz.: The Tuns (*Dolium*) and the Partridge Tuns (*Perdix* of De Montfort).

Examples, *Dolium galea*, and *Dolium perdix*.



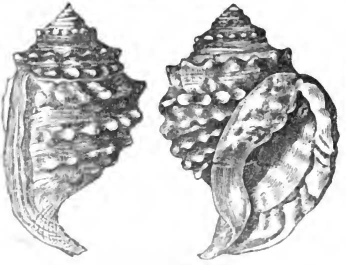
Shell of Dolium Galea, and animal denuded (diminished).

FOSSIL DOLIA.

Deshayes gives but one fossil (tertiary) species, and that (*D. pomum ?*) he gives doubtingly, placing it in the column headed 'species found both living and fossil (tertiary).' De Blainville alludes to four fossil species, two of which are analogues, according to Brocchi.

Cassidaria.

Animal supposed to bear a general resemblance to that of *Buccinum* and *Purpura*. *Shell* ovöid, ventricose, with the spire but little elevated; aperture long, rather narrow, with the anterior canal recurved; right lip furnished with a *bourrelet;* columellar lip covered by a large callosity, often granulous or wrinkled. *Operculum* horny.



Cassidaria echinophora.

Geographical Distribution.—The seas of comparatively warm climates. Lamarck gives the Mediterranean as the locality of two species. Rang states that only one species is European. De Blainville speaks of the genus as inhabiting all seas except that of the North.

The number of living species recorded appears to be seven.

Example, *Cassidaria echinophora.* Locality, the Mediterranean.

FOSSIL CASSIDARIÆ.

Deshayes, in his tables, states the number of fossil (tertiary) species to be eight; and of these, two, viz., *C. echinophora* and *C. Tyrrhena*, he records as both living and fossil (tertiary).

Oniscia.

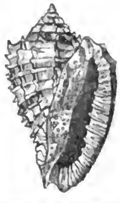
A genus separated from *Cassidaria* by Mr. G. B. Sowerby, and considered by him as having its place next to that genus in the natural system. It differs from *Cassis* in the canal not being suddenly reflected; but Mr. Sowerby states that he has seen *Cassides* which very nearly approach *Oniscia* in the form of the aperture, and in the short, scarcely reflected canal. He thinks that the genus is intermediate between *Cassidaria* and *Cassis*.

Shell oblong, subcylindrical, apex generally rather obtuse, spire short, sometimes very short; base rather acuminated: aperture longitudinal, elongated, extending at the base into a very short canal: outer lip thickened, denticulated within, and rather contracted in the centre; inner lip expanded and covered with granules (Sowerby). The outside of the shells is tuberculated, cancellated, or ribbed. 'Of the animal,' says Mr. Sowerby, 'we know nothing; but there is every reason for believing it to be related to that of *Cassis*, and that it has an operculum, though we have never seen it.'

Habits.—Littoral. Found in coarse sand.

Three living species are recorded, one from the South Seas.

Example, *Oniscia cancellata.* (Sowerby's Genera, Oniscia, fig. 1, 2, adult; 3, young. N.B. the specimens figured were from Mr. Broderip's collection, now in the British Museum.)



Oniscia cancellata, adult.

FOSSIL ONISCIA.

One fossil species only is recorded. It is figured by Mr G. B. Sowerby from the Italian tertiary.

Cassis.

Animal said to resemble generally that of *Purpura*.

Shell inclining to oval, convex, with a spire but little projecting, nearly flat; aperture oblique, long and narrow with the anterior canal very short and recurved towards the back; right lip thick, furnished with an external *bourrelet* and toothed within; columellar lip callous, nearly straight and marked nearly throughout its length with transverse long teeth. *Operculum* horny, very rudimentary.

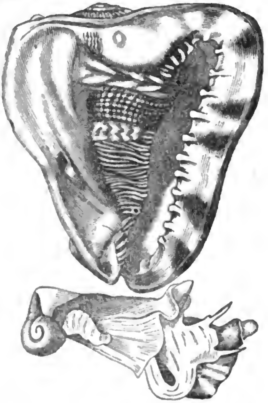
Geographical Distribution.—The genus occurs principally in very warm latitudes; two or three are said to be found in the Mediterranean.

Habits.—The species have been found at depths ranging from five to eight fathoms on sands.

Deshayes gives thirty as the number of living species These are divided into two groups by Lamarck; the first consisting of those species whose spire is marked by *bourrelets* (*C. cornuta*, for example); and the second of those whose spire is without bourrelets (*C. rufa*, for example).

De Blainville divides the species into two groups also the first consisting of those whose aperture is long, and external lip nearly straight (*C. tuberosa*, for example); the second of those whose aperture is suboval, and the external lip excavated (*C. flammea*, for instance).*

Example, *Cassis tuberosa*. Locality, West Indian Seas.



Shell of Cassis tuberosa, and animal, denuded, of Cassis sulcosa (diminished).

FOSSIL CASSIDES.

Deshayes, in his tables, states the number of fossil (tertiary) species to be fifteen, of which he records *Cassides flammea, granulosa, crumena, saburon, bisulcata*, and a new species, as both living and fossil (tertiary).

Ricinula.

Animal nearly entirely resembling those of *Buccinum* and *Purpura*. Mantle provided with a tube; foot much wider, and auriculated, as it were, anteriorly; head semilunar, with conical tentacula, supporting the eyes at the middle of their external surface; excitatory organ of the male very large, recurved in the branchial cavity. Such is De Blainville's description, who made his observation on 'la Ricinule horrible,' *Ricinula horrida*.

Shell oval or subglobular, thick, beset with points or tubercles, with a very short spire; aperture narrow, long, with a notch (which is sometimes subcaniliculated) anteriorly; right lip often digitated externally and toothed within; the left lip callous and toothed or wrinkled.

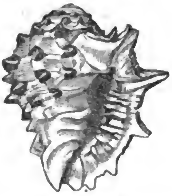
Operculum horny, oval, transverse, concentric. De Blainville describes the elements of the operculum as a little imbricated.

Geographical Distribution.—De Blainville says that of nine species of this genus, all those whose locality is known come from the Indian Seas.

Habits.—The speeies have been found on coral reefs and rocks.

Deshayes, in his tables, gives the number of recent species as fourteen. De Blainville separates the species into three sections: the first consisting of those with an evident canal anteriorly and behind the aperture (en arrière de l'ouverture) *Ricinula digitata;* the second of those without a canal and beset with spines, *R. horrida;* and the third of those without a canal and tuberculous, *R. morus*. He observes that this genus is evidently artificial: thus it contains one species which is a true *Murex*, whilst others are closely approximated to certain species of *Turbinella;* in fact, they have two or three plaits on the columella; finally, some of them scarcely differ, he says, from the true *Purpuræ*.

Example, *Ricinula horrida*.



Ricinula horrida

Fossil Ricinulæ.

De Blainville and Rang both say that there is no fossil *Ricinula*. Deshayes, in his tables, records one, a new species, in the tertiary formations. (Bourdeaux, Dax, Turin.)

Cancellaria.

Animal said to resemble generally that of *Purpura*.

Shell oval or globular, rather convex, reticulated, thick with a spire slightly elevated and pointed; aperture demioval, notched or subcaniliculated anteriorly; right lip sharp-edged, striated within; columella nearly straight, with many well defined plaits. *Operculum* horny.

Geographical Distribution.—The species are all exotic, and the inhabitants of warm seas. The localities of the bulk of those known are said by De Blainville to be inhabitants of the Indian and African seas (but see below).

Habits.—The species have been found on sandy bottoms, at a depth ranging from seven to sixteen fathoms.

De Blainville speaks of twelve recent species. He observes that the genus as adopted by him is not entirely the same as that of Lamarck, who gives that number. De Blainville withdraws from the genus the species whose aperture is evidently caniliculated, such as *C. senticosa*, which, as it appears to him, ought to remain among the *Murices* or the turriculated *Turbinellæ*. Deshayes, in his tables, makes the number of living species thirteen. Mr. G. B. Sowerby ('Zool. Proc.,' 1832) describes twenty-two new species from the collection of Mr. Cuming, most of them from the warm latitudes of the Pacific side of South America. One of them, *C. uniplicata*, dredged in sand near Panama at a depth of ten fathoms, is the only species known to Mr. Sowerby with a single fold on the columella.

Example, *Cancellaria reticulata*. Locality, Southern Atlantic Ocean (Lamarck).

Cancellaria reticulata.

FOSSIL CANCELLARIÆ.

Lamarck records seven fossil species. Rang says there are a good number. De Blainville observes that, according to Defrance, there are twenty species, two of which are identical, one from Italy, the other from Grignon, and one analogue from Italy. Deshayes makes the number of fossil (tertiary) species forty-two, one of which he notes as both living and fossil (tertiary). Mr. Lea describes and figures, in addition, eight species from the tertiary formation of Alabama (Claiborne). He observes that the genus has been observed in England only in the London clay, from whence three species have been described; and, referring to Deshayes' Tables and his forty-two species, remarks that sixteen are from the Subapennines (Pliocene), twelve from

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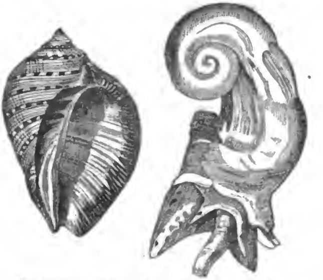
* Mr. R. Stutchbury distinguishes *Cassides rufa, testiculus*, and *coarctata*, &c. generically under the name of *Cypræcassis*, which, he says, has no operculum. Mr. G. B. Sowerby objects to this genus.

Bourdeaux (Miocene), and five from Paris (Eocene). In America, he observes, a single species only, *C. lunata* (Conrad), had been theretofore observed. It was from the tertiary beds of Saint Mary's.

Purpura.

Animal rather elongated, widened in front; head large with a very short proboscis; two tentacula, generally in front and approximated, conical, and supporting the eyes on an enlargement situated at the middle of their external part; mouth below, nearly always hidden by the foot, which is rather large, very much advanced and bilobated, as it were, anteriorly; branchial pectinations two, unequal; orifice of the oviduct at the entrance of the branchial cavity on the right side; orifice of the deferent canal at the right side of the neck, at the extremity of the exciting organ, which is generally voluminous; vent on the same side.



Shell of Purpura Persica, and animal of Purpura hæmostoma.

Shell oval, thick, unarmed or tubercular, with a short spire, the last whorl larger than all the others together; aperture very much dilated, of an oval form, terminated anteriorly by an oblique notch; columella flattened, finishing in a point anteriorly; right lip sharp-edged, often thickened and furrowed internally, or strongly armed anteriorly with a conical point. *Operculum* horny, demicircular, the summit posterior.

Geographical Distribution.—The form is widely distributed, but the number of European species is very small; the greatest development takes place in warm seas where the species are most abundant, particularly in South America.

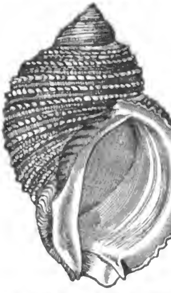
Habits.—The larger proportion of the species of this genus are littoral. The true *Purpuræ* have been found at depths ranging from the surface to twenty-five fathoms, and the division which forms the genus *Monoceros*, generally on rocks, at depths ranging from the surface to seven fathoms.

De Blainville states that there are fifty living species of ordinary *Purpuræ*, of which four only belong to the French seas. The species of *Monoceros*, he states, to be five; all from South America. Deshayes, in his tables, gives seventy-six as the number of living species of the genus *Purpura* (Lam.), and six as that of the living species of *Monoceros*. Mr. Lea states that his cabinet has nine. We are not sure whether M. Deshayes includes among his seventy-six species *P. granatina*, *P. squamigera*, and *P. squamosa*, described by him. Mr. Broderip describes two new species, and Mr. Powys one, from Mr. Cuming's collection (Port St. Elena, Valparaiso, and Maldon Island, in the Pacific), and Mr. Broderip another, *Purpura Gravesii*, figured under the name of *Murex cariniferus*, in Mr. Sowerby's Conchological Illustrations. (*Zool. Proc.*) Mr. Sowerby describes nine species of *Monoceros*, among them, *M. punctulatum* (Gray), from Mr. Cuming's collection.

De Blainville divides the species into four sections:—1st. Those whose right lip, near the notch, is armed with a conical horn, or tooth, which is pointed, and more or less curved. This section is the genus *Monoceros* (De Montfort), the animal of which, according to M. Rang and others, differs in nothing from that of the other *Purpuræ*. 2nd. The *Buccinöid Purpuræ*, whose lip is without a tooth, and whose aperture is moderately widened. *Purpuræ Lapillus* (Buccinum Lapillus, Linn.) for example. (See above, Buccinum.) 3rd. The *Patulous Purpuræ* also without a tooth at the lip, and whose aperture is very wide; *Purpura Persica* for instance. 4th. The ventricose tuberculated species, of which he gives *P. neritöides* as the type. M. Rang divides the species into two groups only. The first, consisting of those which have the right lip simple, or only furrowed internally: the second, of those whose right lip is always thickened and armed anteriorly with a conical point.

Example of the first, *Purpura Persica*. Locality, East Indian Seas.

Example of the second, *Purpura imbricata* (*Monoceros imbricatum*, Lam.). Locality, South America.



Purpura imbricata, Monoceros imbricatum.

FOSSIL PURPURÆ.

De Blainville states (Malacologie) that no fossil species of *Monoceros* were then known. Deshayes, in his tables, records one (tertiary) from Italy. Mr. Lea describes and figures three new fossil species from the tertiary of Claiborne, Alabama (Eocene of Lyell). Of the ordinary *Purpuræ*, De Blainville states that there are nine fossil species, one of which is the analogue of *P. Lapillus* (*Buccinum Lapillus*, Linn.), so common on our coasts, as well as those of France. Deshayes, in his tables, gives the number of fossil (tertiary) species as four, of which he records one, *P. hæmastoma*, as both living and fossil.

* * * *

Patelloid Entomostoma; that is, one whose shell is very large in its totality, very flattened, with a spire but little marked, and without a columella.

Concholepas.

De Blainville speaks of the *animal* as entirely unknown; but according to Lesson, it resembles that of *Purpura*. *Shell* thick, rude, and wrinkled transversely on its external surface; spire very small, hardly projecting; aperture oval, very large, notched anteriorly, where there are two dentiform appendages; no columella; muscular impression of a horse-shoe shape, and very visible. *Operculum* horny, transparent, trapezöidal, concentric, with a marginal summit.

Geographical Distribution.—South America is the locality of Concholepas. It is very abundant on the coasts of Peru and Chile, and sometimes attains to a very large size.

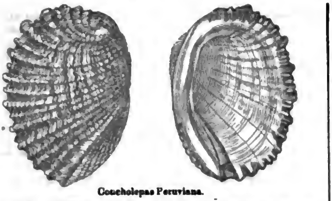
Habits.—Concholepas is, as yet, only known as a littoral species.

Lamarck first placed *Concholepus* near *Purpura*. Cuvier gives it very nearly the same position. M. Rang remarks that he might have well united the genus to *Purpura*, after the example of De Férussac. In fact, he adds, M. Lesson's communication touching the animal which the latter brought home from the South Sea had proved to M. Rang that it differs in nothing from that of *Purpura*; its operculum alone affords a well-defined character.

There is but one species known; but M. Rang states that there are two distinct varieties.

Example, *Concholepas Peruviana*.

Concholepas is not known in a fossil state, properly so called. It occurs among other species of the coast, at considerable elevations above the sea.



Concholepas Peruviana.

ENTOMO'STRACA (Müller). Shell Insects; for such is the meaning of the term applied to certain aquatic animals forming, according to Latreille and others, the second general division of the crustaceans, and for the most part inhabiting the fresh water. The brain, or rather the nervous knots which supply its place, consists of one or two globules merely. The heart is in the form of a long vessel. The branchiæ, composed of hair-like processes, which are either isolated, or connected in a beard-like form, a pectinated shape, or one resembling aigrettes, form a portion of the feet, or of a certain number among them, and sometimes mandibles and the upper jaws. [CYPRIS, vol. v. p. 341.] Hence the term BRANCHIOPODA. [See the title, vol. v. p. 338.] The number of the feet varies, and in some of the genera is above a hundred. These feet, ordinarily, are proper for no purpose but swimming; and are sometimes ramified or divided, and sometimes furnished with pinnules, or composed of lamellar joints. Nearly all of them have a shell, consisting of from one to two pieces, very delicate, and most frequently almost membranous and transparent, or at least a large anterior thoracic segment, often confounded with the head and appearing to replace the shell. The teguments are generally rather horny than calcareous, a condition which, as Latreille remarks, approximates the Entomostracans to the Insects and Arachnids. In those which are provided with ordinary jaws, the inferior or external ones are always uncovered, all the jaw-feet (pieds-mâchoires) performing the office of true feet, and none of them being applied upon the mouth. The second jaws, with the exception of the *Phyllopoda*, resemble those organs, and Jurine has sometimes designated them under the name of hands. These characters, says Latreille, distinguish the masticating *Entomostraca* (Entomostracés Broyeurs) from the *Malacostraca;* the other *Entomostraca* which compose his order *Pœcilopoda* cannot, he says, be confounded with the *Malacostraca*, because they are deprived of organs fit for mastication, or because those parts which appear to perform the office of jaws are not collected anteriorly and preceded by a labrum as in the true *crustacea* and the masticating insects (insectes broyeurs), but simply formed by the haunches of the locomotive organs, and furnished, for the purpose of enabling them to execute that office, with small spines. The *Pœcilopoda*, he observes, represent in this class those of the class of insects which are denominated suctorial (suceurs). They are almost all parasites, and seem to lead us by degrees (par nuances) or shades of difference to the *Lernææ;* but the presence of eyes, the property of moulting or changing the skin, or even of undergoing a metamorphosis, and the faculty of being able to transport themselves from one place to another by means of feet, appear to Latreille to establish a well-defined line of demarcation between the animals last named and the preceding. With regard to the metamorphosis, he remarks, that the young of the *Daphniæ* and of some other nearly allied genera, those probably also of *Cypris* and of *Cytherina*, differ not at all or scarcely at all from their parents, in point of form, at the time of their exclusion from the egg; but the young of *Cyclops*, of the *Phyllopoda*, and of *Argulus*, undergo in their infancy remarkable changes, as well in the form of the body, as in the number of feet. These organs, indeed, in some (in the *Arguli* for instance) suffer transformations which modify their uses. The same author states that he has consulted, relative to these transformations, several well-informed naturalists, who have had frequent occasion to observe the *Lernææ*, and that those observers had never seen a *Lernæa* change its skin. The antennæ of the *Entomostraca*, the form and number of which vary much, serve in many for swimming. The eyes are very rarely placed upon a pedicle, and when they are so placed, the pedicle is no more than a lateral prolongation of the head, and is never articulated at its base. The last-named organs are often very much approximated, and even compose one only. The tail is never terminated by a fan-shaped fin, and never presents the false feet of the *Malacostraca*. The eggs are collected under the back, or external, and under a common envelope, having the form of one or two small groups situated at the base of the tail. They possess the power of preserving their vitality for a long time in a state of desiccation. [BINOCULUS, vol. iv. p. 410.] It would appear that not less than three moults are undergone by many of these animals before they become adult and capable of propagating their species, and it has been proved, in the case of some of them, that a single copulation will fecundate many successive generations. [BRANCHIOPODA, vol. v. p. 342.]

In M. Latreille's second method, the *Entomostraca* were treated as a sub-class, with the following characters:—Mandibles naked or none; mouth formed of two rows of pieces; antennæ and feet of a branchial form; tarsi without a horny nail at the end; shell clypeaceous or shield-like, univalve or bivalve, or with annular horny or membranous segments of the body; eyes sessile, often united so as to form one.

1st SECTION. (*Operculés*, shell univalve or bivalve.)

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Shell univalve. (*Clypeacés.*)
1st order, *Xyphosures.* (Example, Limulus.)
2nd order, *Pneumonures.* (Ex. Ozolus.)
3rd order, *Phyllopodes.* (Ex. Apus.)

*

Shell bivalve. (*Ostrachodes.*)
4th order, *Ostrachodes.* (Ex. Cypris.)

2nd SECTION. (*Nues*, body annulated throughout its length.)
5th order, *Pseudopodes.* (Ex. Cyclops.)
6th order, *Cephalotes.* (Ex. Polyphemus.)

In the last edition of Cuvier's 'Règne Animal' M. Latreille divides the *Entomostraca* into two orders.

I. BRANCHIOPODA. (See that title, vol. v., p. 338.)
II. PŒCILOPODA.*

The PŒCILOPODA he divides into two families.

1st. *Xyphosura.*

This family consists but of one genus, viz., *Limulus.*

2nd. *Siphonostoma.*

This family he separates into two tribes.

1. Caligides.

This tribe contains the genera *Argulus, Caligus*, and its sub-genera *Pandarus, Dinemoura*, &c., and *Cecrops.*

2. Lernæiformes.

This tribe consists of *Dichelestium* and *Nicothoë.*

M. Milne Edwards remarks, that at the first glance the branchial feet of *Apus* and of many other *Entomostraca* would appear to have hardly anything in common with the ambulatory feet or buccal members of the Decapods; but, nevertheless, the same parts are found among the former. In fact, he observes, in the great foliaceous laminæ or blades, the structure of which seems as complicated as it is anomalous, the analogues of the flagrum (fouet), palp, and stem (tige) are easily traced. The first of these appendages constitutes the flattened vesicle which occupies the basilary and external part of the foot: its form is the same as among the *Stomapods*, and its structure further confirms the approximation.

The last-named author proposes the following method, differing from that of Latreille not only in the number of the orders under which the different *Crustacea* are arranged, but also in the limits assigned to many of those divisions:—

A

Mouth deprived of special organs of mastication.

Orders.

Xyphosures.
Siphonostomes.

B

Mouth armed with special organs of mastication, viz., with one pair of mandibles, and with one or more pairs of jaws.

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* The reader will find those Pœcilopoda, which are not already noticed in this work, either under that title, or under their generic names.

Orders.
Ostrapodes.
Cladoceres.
Phyllopodes.
Copépodes.
Lœmipodes.
Isopodes.
Amphipodes.
Stomapodes.
Decapodes.

M. Milne Edwards further states that Latreille, a little before his death, was again occupied with the subject, and introduced into his method many modifications, which made it approach nearly to that proposed by M. Milne Edwards. The latter says that Latreille in fact admitted into the class *Crustacea* 12 orders, viz., the *Decapods*, the *Stomapods*, the *Lœmipods*, the *Amphipods*, the *Isopods*, the *Dicladopods*, the *Lophyropes*, the *Ostrapods*, the *Xyphosures*, and the *Siphonostomes;* and that the *Dicladopods* very nearly correspond to the *Copepods* of M. Milne Edwards. The last-named author, when speaking of Latreille's classification in the first edition of the 'Règne Animal,' speaks of Latreille's not attaching to the distinction of *Malacostraca* and *Entomostraca* an importance which those divisions do not deserve; but M. Milne Edwards still retains the term *Entomostraca;* for we find in his synoptical table (*Histoire Naturelle des Crustacés—Suites à Buffon*), under the subclass of *Maxillated Crustaceans*, the legion of *Branchiopods*, containing the orders *Ostrapoda* and *Phyllopoda*, and the legion of *Entomostraca*, consisting of the orders *Copepoda* and *Cladocera.*

The reader who wishes to study the classification, economy, and anatomy of the Entomostraca, should more particularly consult, besides the works above alluded to, those of Swammerdam, Needham, Leuwenhoek, De Geer, Ramdhor, Schoeffer, Straus, Hermann, the younger Fabricius, the Jurines, father and son, Adolphe Brongniart, Slabber, Desmarest, De Blainville, Thompson, and Audouin.

ENTOZO'A (from the Greek words *entos* (ἐντὸς), within, and *zóon* (ζῷον) an animal). Under this name are designated the different living beings which are produced and developed within other living beings. It comprehends a series of animals differing greatly from one another in form and organization, and having but one character in common; which is, that they are all parasitic, or have their exclusive habitation in, and live at the expense of the bodies of other animals. They can scarcely be said to form a distinct class in the animal kingdom, some of the species being closely resembled both in external appearances and internal structure, by individuals placed in other classes, and only differing from them in the localities where they are found; thus the zoosperms, or seminal animalcules, which are enumerated by some zoologists with the entozoa, closely resemble the true cercariæ of vegetable infusions.

Entozoa are found in most animals; they have been discovered in all the mammalia from man down to the cetacea; they also occur in the other classes of the vertebrata; indeed, it seems that a greater number reside in birds, reptiles, and fishes than in mammals. The invertebrata have also their peculiar parasites; and they have been ascertained to exist in all the insect tribes, and in beings still lower in the scale. The best known species are those which inhabit the intestines of the human subject, and vulgarly go by the denomination of worms, which term was probably derived from the resemblance which the *Ascaris lumbricoïdes* bears to the common earth-worm, as this species is most frequently met with, and was the first described of the human entozoa, being mentioned by Hippocrates, who called it the ἕλμινς στρογγύλος, or round worm.

A short list of the different kinds of worms found in the human intestinal canal, with an enumeration of their causes, the morbid symptoms which they occasion, and the mode of treatment, are given under the article ANTHELMINTICS.

With regard to the causes of the formation, or the primary origin of the entozoa, nothing is known; and the whole subject is entirely involved in darkness; they must either be supposed to be the product of spontaneous generation, or the germs of them are introduced from without. Many arguments have been adduced on both sides of the question, but as the discussion would lead to no useful results, we shall leave it untouched, and proceed to give a short sketch of these curious and interesting animals

According to the derivation of the word *Entozoa* and the definition which we have given of it, this term should include every living creature found in the body of another (which has not been introduced from without): therefore the small microscopic animalcules detected in the semen of animals, called *Spermatozoa*, come under this head; and in a very able paper on the entozoa by Mr. Owen, we find them placed accordingly in this class, only situated in a separate group, denominated *Protelmintha*, and divided from the animals forming the class entozoa of Rudolphi. These minute beings, which, from their size and organization, rank with the assemblage of animalcules which are collected under the head Infusoria in the 'Règne Animal,' have been detected in the secretion of the testicles of various mammiferous animals arrived at maturity. When a drop of the secretion is expressed from a divided vas deferens shortly after death, and examined with a microscope, after being diluted with water, it is seen to be filled with minute beings resembling tadpoles, and swimming about in various directions, with different degrees of velocity, guided by the inflection of a slender tail. It has been doubted whether these are animated beings at all, or are to be considered as analogous to the moving filaments of the pollen of plants; but leaving this undecided, we may proceed to state that the body is always of a compressed form, which will distinguish these animalcules from the vegetable infusoria, in which the body is always ovoid or rounded. With regard to their organization, no alimentary canal or gastric cavities have been detected, nor organs of generation; they are said to be fissiparous, the body and tail spontaneously dividing, and forming two independent beings. The shape of these zoosperms differs in different animals, the large end, or body, being bigger in proportion to the tail in some than in others, and their size not being always in relation to that of the animal to which they belong: thus those of the rabbit are nearly as large as those from the bull. That these animalcules perform some office in the economy of nature seems probable from the fact that in those animals which are subject to periodical sexual development, as the hedgehog and mole (in which the testes undergo an alteration in size in different seasons), these creatures are not found during the period of quiescence, or partial atrophy of the glands; neither do they exist in the seminal passages before the age of puberty. But the part in the physiology of generation which these zoosperms perform is not so clear. The *spermatozoa* have been detected in the other orders of the vertebrate and in the articulate animals.

In the present group are also included those minute internal parasites which have been detected in the bodies of many of the entozoa themselves, and which, from their external form, are referrible to the infusoria.

The Trichina Spiralis, an entozoon, found inhabiting the muscles of the human subject, has been placed by Mr. Owen, who first described it, with the preceding animalcules; but further observations on its organization have discovered a complexity of structure which qualifies it to occupy a place in the highest instead of the lowest group into which the present class of animals is divided.

We now proceed to the more legitimate part of our subject, viz. the true parasites forming the class *Entozoa* of Rudolphi, and it is first necessary to arrange them according to some classification. Availing himself of the difference in their internal organization, Cuvier divided them into the 'cavitaires,' or those which have an abdominal cavity, and a distinct intestinal canal within it, and the 'parenchymateux,' or those in which no intestinal tube is traceable, and which for the most part consist throughout of an homogeneous structure; but this classification is any thing but a natural one, as worms the most dissimilar in their general appearance are here promiscuously congregated together. Mr. Owen, in the article which we have before alluded to (in the *Cyclopæd. of Anat.*), has adopted the arrangement of Cuvier, only inventing new Latin names derived from the Greek, instead of the French terms: thus he denominates the 'parenchymateux' 'sterelmintha,' from *elmins*, 'a worm,' and *stereos*, 'solid;' and the 'cavitaires' 'cœlelmintha,' from *elmins*, and *cœlos*, 'hollow.' Zeder laid the first foundation of a good classification of these animals, dividing them into five classes, afterwards called families, at Rudolphi's suggestion; and these were again subdivided into genera and species. Rudolphi himself doubted the possibility of ever reducing all the species of entozoa to absolutely natural and well-defined families, but as Zeder's system seemed the most perfect, he has adopted it for his own; and it does not seem that we can do better than follow the arrangement of this great entozoologist in the present article.

According to this classification the entozoa are divided into five orders, or families, the Nematoidea, Acanthocephala, Trematoda, Cestoidea, and Cystica. The only point in which we shall depart from this arrangement will be, that, instead of commencing with the most perfect, and descending to the most simple, we shall begin with the lowest in the scale of organization, and ascend to those possessing the most complicated structure, as this is most in accordance with the laws of the animal kingdom.

Order I. is *Cystica* (from *cystes* (κύστις) a bladder) hydatids: the characters are:—body flattish, or roundish, and terminating posteriorly in a transparent cyst filled with pellucid fluid, which is sometimes common to many individuals; the head is retractile, and provided with pits two or four in number, or four suckers and a circle of hooklets, or with four unarmed or uncinated tentacles. The organs of generation and nutrition are unknown. This is not a very natural family, the species being closely allied to those of the next order in the structure of the heads and the *Ecchinococcus*, or granular hydatid, though referred to it, is not hollow.

Order II. *Cestoidea* (from *cestos* (κεστὸς), 'a band;' and *eidos* (εἶδος), 'form),' tape-worms. Characters:—body elongated, flattened, soft, continuous, or articulated, furnished with lateral or marginal pores, and erectile papillæ passing through them, supposed to be the male organs of generation. Head generally provided with two or four pits, or suctorial orifices, and sometimes with four retractile, unarmed, or uncinated tentacles; but the head is so dissimilar in different genera, and their shape varies so much, that they do not form a very natural family. There is no trace of intestinal canal; unless the vessels proceeding from the suckers be considered as such. In some species nutrient vessels and ovaries are to be seen. They are all androgynous.

Order III. *Trematoda* (from *trema* (τρῆμα), 'a foramen'), fluke-worms. Characters:—body soft, rounded, or flattened. Head indistinct, with a suctorial foramen; one or more suctorial pores on the under surface of the body, which furnish the grounds for their subdivision into genera: they have no intestinal canal, and the organs of generation of the two sexes co-exist in the same individual: this is a very natural order.

Order IV. *Acanthocephala* (from *acantha* (ἄκανθα), 'a thorn;' and *céphale* (κεφαλή), 'the head),' hooked-worms. Characters:—body elongated, round, subelastic; the anterior extremity or head has a retractile proboscis, furnished with hooks or spicula, arranged in rows. They have no intestinal canal, but distinct genital organs, and a separation of the sexes. This is a very natural group, and includes the most noxious of the internal parasites: there is only one genus, and fortunately no species is known to infect the human body.

Order V. *Nematoidea* (from *nema* (νῆμα), 'a thread,' and *eidos*, 'form'), round-worms. Characters:—body cylindrical, elongated, and elastic; structure very complicated, there being a true intestinal canal, terminated by a distinct anus. The mouth, by its varieties, affords generic characters; the sexes are distinct; the females, which are longer than the males, being for the most part oviparous: they constitute a very natural order.

Having given the above brief view of the orders into which the class *Entozoa* is divided, with the leading or characteristic differences in their form and organization, we will now enumerate the principal genera contained in each group, and make a few observations on some of the most interesting species. Following the order of classification, we must commence with the most simple group, the *Cystica;* and here the first parasite which attracts our attention is the common hydatid, which consists of a globular bag, composed of condensed albuminous matter of a laminated texture, and contains a limpid colourless fluid. No head or appendices of any sort being attached to it, it is appropriately denominated an *acephalocyst*, that is, a headless cyst. This genus was established by Linnæus, who regarded as animals those productions which before his time had been considered simply as cysts. Considerable diversity of opinion still exists as to their nature, and it is impossible to determine whether an hydatid is an animal or not, till we can agree what is the definition of an animal; if an animal must have sensation and motion, this is not one, as the best observers agree that the acephalocyst is impassive under the application of stimuli of any kind, and manifests no contractile power, either partial or general. If an animal is characterized, on the other hand, by independent existence merely, the hydatid is one; and as such we shall regard it, for it is certainly an independent organized being, growing by intrinsic power of imbibition, and reproducing its species by gemmation: the young are developed between the layers of the parent cyst, and thrown off internally or externally, according to the species. It is a being certainly far inferior in the scale to the Cysticercus, but still not the less an independent creature. Its structure is very similiar to that of some of the lowest forms of algæ in the vegetable kingdom, as the *protococcus nivalis* or red snow of the arctic regions, which consists of simple and minute vesicles, which propagate their kind by gemmules developed from the external surface of the parent. Acephalocysts have been found in almost every structure and cavity of the human body, but particularly in the liver, uterus, kidneys, and cellular tissue. The species which resides in man is called *A. endogena*, the pill-box hydatid of Hunter, from the gemmules being detached from the internal surface of the cyst; and it is thus distinguished from those of the ox and other ruminating animals, which are exogenous, or have the gemmules excluded from the external surface.

2. The next genus is *Ecchinococcus*, which, as the name implies, is a round body covered with asperities. The *E hominis*, or many-headed hydatid of the Germans, occurs in cysts in the liver, spleen, omentum, and mesentery: the cyst, which is externally yellow and coriaceous, is unprovided with head or mouth, and contains minute bodies, which are described as possessing the armed and suctorious head characteristic of the Cœnuri and Cysticerci. From observations made on another species, the *E. veterinorum*, found in animals, the particles adhering to the internal surface of the cyst being examined with a microscope, appeared to be minute animalcules, moving about by means of external vibratile cilia, having an orifice at each extremity of the body, and the centre occupied by large globular stomachs. From this structure these parasites ought to be classed with the Polygastric Infusoria.

3. *Anthocephalus* is the next genus. It occurs in fish, in the liver, mesentery, and peritoneum, and within hydatids in the viscera. Each animal exists solitarily in a double bladder, of which the outer layer is hard and elastic, the inner more thin and delicate. The body is long, flat, terminated behind by a caudal vesicle, and in front by a head with two or four fossæ, and four probosces furnished with spicular processes.

4. *Cœnurus*. This has the terminal cyst common to many bodies and heads; the former are elongated, flattish, and wrinkled; the latter are furnished with a rostrum, on which there are hooks and suckers, adhering in greater or less number to the surface of a bladder filled with fluid. The best known species is the Cœnurus cerebralis, commonly developed in the brain of sheep, and giving rise to the disease called the staggers.

5. *Cysticercus*. Here there is a dilated cyst forming the termination of a single entozoon: the head has four suckers, and a rostrum furnished with recurved processes or hooks. Of this genus one species is known to infest the human subject, the *C. cellulosæ;* it is developed in the interfascicular cellular tissue of the muscles, and is invariably surrounded by an adventitious capsule of condensed surrounding substance. This entozoon occurs much more rarely in this country than on the continent; it is not confined to the muscular structures, for several individuals have been detected in the anterior chamber of the eye, where they may occasion so much irritation and inflammation of the organ as to require extraction, which occurred in a recent case in the Glasgow Ophthalmic Infirmary. These parasites also occur in quadrupeds, particularly the hog, giving rise to that state of the muscles which is called 'measly pork.'

Of the *Cestoid* order of Entozoa, Rudolphi has described eight genera, two only of which contain each a single species that infest the human body:

1. *Bothriocephalus*, the species of which occur frequently in fishes and birds, in the branchiæ, œsophagus, pyloric appendices, intestines, and abdominal cavity. The one which affects the human subject, B. latus, or Tænia lata, rarely falls under the observation of the English entozoologist, but is common in the intestines of man in Switzerland, Russia, parts of France, &c. It may be distinguished from the

Tænia solium by the form of the segments, which are broader than they are long, and by the position of the genital pores, which are on the under surface of the body, instead of at the sides; the head is also very different, for, instead of having four round oscula, characteristic of the true tæniæ, there are two lateral longitudinal fossæ, or bothria.

2. *Tænia.* This genus has the body flat, long, articulated, with four suckers on the head; it occurs in the intestines, biliary ducts, gall-bladder, and liver of vertebrate animals. The T. solium, common tape-worm, inhabits the human intestines, but not with equal frequency in all countries, though its distribution seems to be much more extensive than that of the Bothriocephalus latus. It occurs in England, Holland, Germany, Sweden, Italy, Greece, and most countries in Europe, and also in Egypt and the East; and in all these situations the other genus is comparatively rare.

The delicacy of their structure, and their so seldom being obtained entire, has thrown great obstacles in the way of their investigation. The head was for a long while unknown, and it was disputed whether nourishment was taken in by the lateral pores of the several joints, or by the mouth alone. Rudolphi says the latter, and it seems now pretty clearly determined that the former are mere outlets of the generative organs. The length to which the T. solium is capable of attaining is very considerable, but quite indefinite. Those passed now-a-days seldom exceed twenty feet, but in former times we read of much more gigantic specimens; but whatever may be thought of some of the accounts which are quite improbable, it indubitably has occasionally attained a very great length, having been found extending from the pylorus to within a few inches of the anus, and then by no means fully stretched out. Such cases are however very rare.

The determination of the species in this genus is very difficult: they may be divided for greater convenience into three sections: The first are without a proboscis, the *Tæniæ inermes*; the second have one, but unarmed, *T. rostellatæ:* the third are furnished with an uncinated proboscis, *T. armatæ*.

3. *Caryophyllæus* has the body flat, continuous; the head dilated, and divided into flattish processes; it is furnished with an upper and under lip: the species of this genus occur in the intestines of fishes (carp, &c.).

4. *Scolex.* The body is flat and continuous; the head has four fossæ on it; it occurs also in the intestines and abdomen of fishes, sepiæ, &c.

5. *Gymnorhynchus.* This genus has the body very long, with a globular receptacle at the neck; head with two opposite fossæ, and four naked retractile probosces; the species occur in the muscular substance of many fish.

6. *Tetrarhynchus.* Body flat, continuous, head with four fossæ and four retractile probosces, furnished with recurvated spicular processes; it occurs in reptiles, fishes, mollusca, in the muscles, branchiæ, stomach and its membranes, the liver, and peritoneum.

7. *Ligula.* In its first stage of development the body is elongated with a longitudinal fissure, without any appearance of head, or organs of generation. In its perfect state there is a simple fossa on each side of the head, and the ovaries and processes form a single or double row along the median line. The species occur very frequently in birds and fishes, but very rarely in mammalia.

8. *Triænophorus* has the body elongated, flat, sub-articulated, mouth bilabiate, and furnished on each side with two tricuspid acicular processes; it is found in fishes.

The *Trematode* order is divided into six genera, which also include only two species infesting the human body.

1. The first genus is *Monostoma*, which has only a single anterior pore: it occurs in mammalia, birds, reptiles, and fishes.

2. *Amphistoma* is furnished with two pores, one anterior and one posterior. Found in the stomach, intestines, and abdomen, and in the hydatids of the viscera of mammals, birds, and reptiles.

3. *Distoma.* In this genus there are two pores: an anterior and a ventral. An immense number of species are known, occurring in mammalia, birds, fishes, &c. The D. hepaticum, or fluke-worm, frequents the gall-bladder and ducts very frequently in some animals, as the ruminating, and is particularly common in the sheep in the disease called the rot. It has been discovered in the gall-bladder of the human subject, though very rarely. It bears a considerable resemblance in its shape to a melon-seed, being flat, and appearing lanceolate at each end, as seen with the naked eye, though, when magnified, the extremities are found to be obtuse, the tail being the broader of the two. The anterior pore, or true mouth, is round and small; the posterior cavity is imperforate, and only subservient to adhesion and locomotion; it is situated in the ventral aspect of the body, in the anterior half. Between these there is a third orifice, destined to the generative system, and from which a small cylindrical process is generally protruded. The fluke is hermaphrodite and oviparous: it lives upon the bile, which is absorbed by the mouth, and is at once so digested or modified by the vessels which go off from thence, as to become immediately fitting nourishment for the animal.

4. *Tristoma* has three pores, the anterior simple, and the posterior radiated: it is found in the gills of one or two species of fish.

5. *Pentastoma.* The mouth is here situated between two pores on each side, through which a spicular process comes out. It occurs in the frontal sinuses, lungs, and surface of the liver of the mammalia (dog, horse, wolf), and in reptiles.

6. *Polystoma.* This genus has six anterior pores, besides a ventral and posterior one. It mostly occurs in the throat and branchiæ of fishes, and the bladder of frogs; but one species, the *P. pinguicola*, was discovered by Treutler in the cavity of an indurated adipose tubercle, in the left ovarium of a female aged 20, who had died in child-bed. The tumour, which was apparently formed entirely of indurated fat, was of a reddish colour and hollow within; the cavity was nearly filled by the above-named worm, which was about half-an-inch in length, and between one and two lines in width.

The 4th order, *Acanthocephala*, contains but one genus, *Echinorhyncus*, to which belong numerous species occurring in all classes of vertebrate animals except man they are generally found in the intestinal canal, fixed between its membranes, and occasionally even in the peritoneal cavity; they have also been found in the neck under the skin.

We now come to the last and most highly organized group of the entozoa, the *Nematoidea*, which contains a greater number of genera, and includes more species inhabiting the human body than any of the preceding. It has been divided into 11 genera, viz.

1. *Filaria;* these are of nearly equal thickness throughout their whole length; they occur in all parts of the vertebrata, though principally in the cellular membrane; they are also even found in insects and their larvæ.

2. *Trichosoma.* On its anterior extremity, which is very thin, is the mouth, resembling a minute point: it is found in mammalia, birds, and amphibia, between the coats of the stomach, in the intestines, and the urinary bladder.

3. *Trichocephalus.* This genus differs from Filaria in the capillary form of the anterior part of the body, and in its swelling out behind; it occurs principally in the cæcum of the mammalia.

4. *Oxyuris* is characterized by being subulate posteriorly, having the mouth orbicular, and the penis in a sheath. The Ascaris vermicularis is included in this genus by Bremser.

5. *Cucullanus* is attenuated posteriorly. It occurs in the intestines and abdomen of reptiles and fishes.

6. *Spiroptera* is attenuated at each end. It occurs under the nictitating membrane of birds, in various parts of fish, and is said to have been found in the urinary bladder of man.

7. *Physaloptera* is attenuated at both extremities; the tail of the male is bent downwards, winged, and furnished below with a sort of bladder. The species are found in the stomach of mammalia, birds, and reptiles.

8. *Strongylus.* This has both ends attenuated: the tail of the male terminates in what Rudolphi calls a bursa, and through this the penis passes out; it occurs frequently in various situations in the three first classes of vertebrate animals.

9. *Ascaris.* This genus, which is the most numerous of the intestinal worms, 80 species having been already described, has the extremities attenuated, the mouth furnished with three valves or tubercles, and the penis double. The species occur in almost every part of the bodies of vertebrate animals.

10. *Ophiostoma* is attenuated at the extremities, and has the mouth furnished with two lips. It is found in the intestines of mammalia and fishes.

11. *Liorhynchus* nas the mouth at the end of a sort of erectile and polished tube. It occurs in the stomach and intestines of some of the mammalia and of many fishes.

In the above list of the genera of the cavitary, intestinal, or round worms, we have not made any particular mention of the species parasitic in man, and as several of them possess considerable interest, we need no apology for giving a short description of them. We may begin with the genus Filaria, three species of which are enumerated as human inhabitants, though two of them have been only *once* detected. The *Guinea Worm* (Filaria Medinensis) frequently occurs in hot climates, but the countries where it most abounds are Arabia, Upper Egypt, Abyssinia, and Guinea. Its general habitation is the subcutaneous cellular tissue, particularly of the lower extremities; but it is also found in the scrotum, and very rarely beneath the tunica conjunctiva of the eye. The length of this worm varies from six inches to twelve feet: it is about as thick as the string of a violin. Its colour is generally white, but occasionally brown; it is round, and of nearly equal dimensions in its whole length, but becomes a little attenuated towards the anterior extremity. The tail of the male is obtuse, and armed with a spiculum; in the female it is acute and bent. The mode of development of this entozoon is unknown. It seems that it may exist for many months without being detected, cases occurring where it has not been discovered till more than a twelvemonth after leaving the country where it was contracted. After a time it produces irritation; in some point of the skin a vesicle, pustule, or small abscess forms, breaks, and then the end of the worm makes its appearance, which may be taken hold of, and cautiously and gradually extracted. If the filaria is broken, the portion remaining beneath the skin dies, and produces inflammation, sinuous abscesses, and often great constitutional disturbance, requiring amputation of the limb. It seems to be capable of slowly shifting its situation in the cellular membrane. According to Rudolphi, its coming out through the skin is not to be attributed to perforation of that membrane, which it is not at all capable of effecting, but only to the irritation which it excites in approaching the integuments. It seems sometimes to affect people within the tropics in an endemic or even epidemic form, nearly half the men in a regiment having been attacked at the same time by it. This species has been mentioned as having been found occasionally beneath the conjunctiva of the eye; but another, and much smaller kind, has been detected within the eyeball itself, viz. the *Filaria oculi humani*, which Nordman met with in the liquor Morgagnii of the capsule of the crystalline lens of a man who had had the operation of extraction for cataract performed. Two minute worms were discovered coiled up together. This species differs from the large Filaria found in the eye of the horse The third species is the *F. bronchialis*, which was nce detected in the enlarged bronchial glands of a man by Treutler; its length was about an inch. The *Trichocephalus dispar*, or long thread-worm, is about an inch and a half or two inches in length, the male being smaller than the female. The capillary portion makes about two-thirds of the whole length of this species. This worm is very common in the cæcum and large intestines, but does not seem to occasion any inconvenience, though inflammation of the intestinal follicles and fever has been erroneously ascribed to it. The existence and history of the following entozoon are involved in a good deal of mystery. *Spiroptera hominis* is the name given to some small intestinal worms which were sent to Rudolphi, together with some other vermiform bodies of an elongated form and solid homogeneous texture, which were passed from the bladder of a poor woman still living in St. Sepulchre's work-house, London. There were also discharged, together with these substances, numerous small granular bodies, considered by Rudolphi as mere morbid concretions, but which subsequent examinations have caused to be regarded as ova. The small nematoid worms, which were six in number, and of different sexes, are supposed to have been expelled from the woman at the same time; they were from eight to ten lines in length, slender, white, and elastic; the other elongated bodies varied in length from four to eight inches. Some of the latter substances and ova are preserved in the Museum of the College of Surgeons; but none of the former entozoa, denominated *Spiroptera hominis*, are to be found among them.

The *Strongylus gigas* also inhabits the urinary apparatus. Before Rudolphi's time it was generally confounded with the *Ascaris lumbricoïdes*, to which it bears some resemblance. It occurs, though rarely, in the substance of the kidneys, where it sometimes attains on enormous size, having been met with three feet long, and half an inch in diameter The more ordinary dimensions however are about fifteen inches in length and two lines in thickness. The common colour is blood-red, arising from the nature of their food, as they obtain their nourishment from the contents of the renal vessels: they occasionally find their way into the bladder, and are discharged with the urine. This entozoon occurs much more frequently in some animals, as the dog, horse, &c., than in man. Their presence in the kidneys does not seem to give rise to any peculiar symptoms differing from those of other renal diseases.

The *Ascaris lumbricoïdes*, the common round worm so frequently met with in children, is so well known as to require a very brief notice here. It occurs in the hog and the ox, as well as in man, and chiefly inhabits the small intestines. The male is smaller than the female, and much more rare; it may be distinguished by the end of the tail being curved, and terminating in an obtuse point, at the apex of which a small black speck may be frequently observed. In the female this extremity is straighter and thicker. The anus is situated close to the tail in both sexes. In the female there is generally a constriction in the centre of the body where the organs of generation are placed. This worm, when minutely examined, will be found to consist of integuments, muscles, digestive organs, genital apparatus, and a nervous system consisting of an œsophageal ring and a dorsal and ventral cord. It has been supposed to feed on the chyle or mucus in the intestines, and to adhere to the coats of the bowels, but on these points there is considerable doubt. They are often found in great numbers.

The last human species in this group is the *Ascaris vermicularis*, the maw-worm, thread-worm, or ascarides. It is very minute, the male seldom exceeding two lines, and the females five lines in length, and being proportionally slender. Their colour is white; they are so small that there is great difficulty in detecting their structure, but Rudolphi says that he has repeatedly observed the three tubercles round the mouth characteristic of the genus. Their abode is the large intestines, particularly the rectum, where they sometimes occur in immense numbers, and occasion great irritation.

We have now enumerated all the genera of *Entozoa* described by Rudolphi and other Entozoologists, but before we conclude our subject we will say a few words on the *Trichina spiralis* which we have before mentioned. It is a microscopic parasite, infesting the muscles of the human subject, belonging to the voluntary class, and found in greater numbers in those that are superficial than in tho deep seated. Their nidus seems to be in the interfascicular cellular tissue. A portion of muscle affected by these animals appears beset with whitish specks, which, if examined with a microscope, are found to be little cysts containing a minute worm coiled up. The cysts are of an elliptical shape, and attenuated towards the extremities their length is about $\frac{1}{50}$th of an inch, and breadth $\frac{1}{100}$th. By cutting off one extremity of the cyst, the *trichina* may be extracted entire, when it is generally found rolled up in two or two and a half spiral coils. Being straightened out, it will be found to measure $\frac{1}{30}$th of an inch in length and $\frac{1}{700}$th of an inch in diameter. From the minuteness of the object, it is necessary to employ a magnifying power of considerable intensity to examine it satisfactorily, and from the difficulty of managing the investigation, and the deceptive appearances produced under the microscope, it is not easy to detect its organization. Mr. Owen never succeeded in discovering an intestinal tube, or cavity, and therefore, as we have stated, placed this entozoon in his first group along with the seminal animalcules. (See *Zool. Trans.*, vol. i.; and *Zool. Proceedings*, *Feb.* 1835.) Dr. Arthur Farre observed by very patient and minute observation with the microscope, under favourable circumstances, that it possesses an intestinal canal with distinct parietes, (*Med. Gazette, Dec.* 1835), and upon this ground it ought to occupy a higher station among the nematoid or intestinal worms; but further researches are necessary, before it can be stated with confidence in which group this entozoon should be placed. It seems that this parasitical affection of the human body is unconnected with age, sex, or any particular form of disease, and it appears that it may exist without giving rise to any debility of the vital powers, or even without interfering with the enjoyment of robust health, as has been shown in a case lately met with.

All the known parasites residing within the human body have now been mentioned, and we have given a general outline of the groups and genera of the class Entozoa. It would far exceed our limits to attempt to enumerate all the species which have been discovered, and described by authors; which would even then probsbly include but a small number of those which exist. In fact, if we assent to the theory of their being the product of some irregular process of nutrition or secretion within animal bodies, or, as it is called, spontaneous or equivocal generation (which is perhaps more probable than that they are introduced from without), new and dissimilar species may be formed every day, by some unknown modification of the nutritive process which gives birth to them. The laws which, according to this hypothesis, regulate the difference of structure in these beings, from the simple acephalocyst to the complicated ascaris, are as much involved in obscurity as those which cause the varieties of organization in morbid productions connected with and participating in the life of the rest of the body; for instance, the various classes of tumours.

ENTRE DOURO E MINHO, a province of Portugal, bounded on the north by the river Minho, which separates it from Gallicia in Spain, and on the south by the Douro, which divides it from the province of Beira. From its position between these two rivers the province has derived its name, although it is sometimes also called the province of the Minho, for brevity's sake. To the east it is bounded by the province of Tras Os Montes, and to the west by the Atlantic Ocean. Its length is about 60 miles from north to south, and its breadth is about 40 miles. Its area is, according to Miñano, 240 square leagues, of 20 to 1 degree of latitude, or about 2880 English square miles. Its population, by the same authority, as well as that of Antillon, is about 900,000, which is nearly one-fourth of the whole population of Portugal, it being by far the most thickly inhabited province of that kingdom. It is divided into five comarcas, or districts, namely, Braga, Viana, Penafiel, Guimarães, and Oporto. The principal towns are, Braga, the capital of the northern division of the province [BRAGA]; Porto or Oporto, the capital of the southern division, by far the most important town in it [OPORTO]; Guimarães, on the river Ave, an antient town, once the cradle and the capital of the monarchy, at present an industrious busy place, with manufactures of linen, leather, and cutlery, and 6000 inhabitants; Viana, with 8000 inhabitants, and a harbour at the mouth of the Lima, carrying on a considerable trade; Villa do Conde, with a small harbour, and 3000 inhabitants; Barcelos, with 3900; Valença, on the Minho, a frontier town and fortress, with about 1600 inhabitants; Penafiel, with 2300; Caminha, at the mouth of the Minho, with a harbour, and about 1000 inhabitants; S. João da Foz, at the mouth of the Douro, below Oporto, with 3300 inhabitants; Amarante, on the Tamega, with about 1000 inhabitants. The surface of the province is hilly, but there are some plains near the sea-coast. One ridge of mountains, the Serra de Marão, runs from north to south through the east part of the province, near the borders of Tras Os Montes; the rivers Cavado, Ave, and Neiva have their sources in these mountains. The river Lima, which, next to the Douro and the Minho, is the largest in the country, has its source in the mountains of Gallicia; it enters the province of Entre Douro e Minho at its north-east extremity near Lindoso, runs through the north part of the province, passes by Ponte de Lima, and enters the sea near Viana. The river Tamega, which has its source in Tras Os Montes, flows through the province of Entre Douro e Minho in a southern direction, passes by Amarante and Canavezes, and then enters the Douro.

This province is the most fertile in Portugal, the climate is healthy, and the soil is irrigated by numerous streams. The principal productions are wine, oil, flax, Indian corn, some wheat and oats, and vegetables and fruits of all sorts. Pastures are rather scarce, yet a considerable quantity of cattle, both large and small, are reared. The principal article of exportation is wine, which is made chiefly from the vineyards which are planted all along the valley of the Douro, and which is shipped at Oporto under the name of port-wine. There are fisheries along the coast, which occupy a great number of hands. The natives of Entre Douro e Minho are considered, together with their neighbours of Tras Os Montes, as the finest race of men in Portugal: they are industrious, civil to strangers, and orderly. The province is divided into two administrative divisions, Braga and Oporto, called also Alto Minho and Baixo Minho, each having its military and civil governors and its courts of justice. The division of Alto Minho includes Braga and Viana, and all the northern part of the country from Braga to the Minho; that of Baixo Minho, which is by far the larger, includes Oporto, Guimarães, Penafiel, Amarante, and all the country southwards as far as the Douro.

ENTRESOL, a French term used to signify a floor between other floors. The entresol consists of a low apartment or apartments, usually placed above the first floor. In street architecture it is desirable to form the basement story on a scale of grandeur, and in so doing a greater space than necessary would be given to the first floor, if it were not for the entresol.

There is a very good example of an entresol under the colonnade of the Quadrant in London. In continental cities the entresol is frequently employed, especially in Paris.

The term Mezzaninro (or little middle floor) is used in Italy to indicate the same arrangement of floor, as well as the attic story of a house. The windows of the entresol, or mezzaninro, are usually, from the lowness of the floor, either square, or a little more or less than a square.

ENTRY, from the French *entrés*, and Latin *intrare*, to enter, in law, is a taking possession by the legal owner of lands and tenements when another person is wrongfully in possession of them. At the common law this might be effected by force; but as it was the cause of great abuses, forcible entries were made punishable by fine and imprisonment by two statutes of Richard II., enlarged by a statute of 8 Henry VI. c. 9. (See 1 Ad. and E. 627, and 3 Ad. and E. 817.)

A party availing himself of this summary process against an aggressor must enter upon some part of the property claimed, and the safer course is formally to declare that thereby he takes possession of the whole. The entry must be repeated in each county in which the lands lie. This remedy, however, can only be adopted in certain cases, namely, where the original entry of the holder of the land was by unlawful means.

In other cases, where the original entry is lawful, and possession held by an apparent right, the owner of the estate must proceed by an action, as an apparent right cannot be legally overthrown by the mere act of a claimant.

The Statute of Limitations, 21 James I., c. 16, and the statute 4 and 5 Anne, c. 16, and the more recent enactment 3 and 4 William IV., c. 7, regulate the law on this subject, and also the periods within which entries may be made.

Entry, forcible, is an entry made with a strong hand, with unusual weapons, an unusual number of servants, or with menace of life; if effected with violence, and the entry only amounts in law to a trespass, it is not within the meaning of the statutes of Richard II. above referred to. The remedy for parties aggrieved, and the mode of obtaining restitution, is either by an action at law, by indictment, or by justices of the peace upon the view. If made by more than three persons, they may be proceeded against as in a case of a riot. (Bacon's *Abridgment*; Burn's *Justice*.)

Entry, writ of, was another method of gaining possession of disputed property by trying the title of the occupant. The earliest mention of this writ occurs in the third year of the reign of Edward III. This writ was directed to the sheriff, requiring him to command the tenant that he render to the demandant the premises in question which he claims to be his right and inheritance, &c. The tenant thereupon was either compelled to deliver up the possession of the land, or to show cause why he refused to do so. This might be done by justifying his own title or that of others under whom he claimed. The claims of the respective parties were then tried before a jury, and the possession of the land was awarded to him who produced the clearest evidence of his right.

There were several writs of entry both at the common law and by statute; but they appear to have long fallen into disuse, and but few instances have occurred in modern times of their being resorted to in practice. The learning respecting them, which is somewhat curious, may be found in Reeve's *History of the English Law*.

Under the provisions of the 3rd and 4th William IV.,

c. 27, all writs of entry as well as writs of right were abolished, from the 31st December, 1834.

ENVOY, a diplomatic minister or agent, inferior in dignity to an ambassador, but generally invested with equal powers. [AMBASSADOR, DIPLOMACY.]

ENYED, NAGY-ENYED, ENIED, or **STRASZBURG**, a town in the county of Carlsburg or Unteralben, in Transylvania. It is situated in 46° 18′ N. lat., and 23° 42′ E. long., in a valley on the right bank of the Marosh: it is built in the old-fashioned style, is the seat of the district government, and is governed by its own magistracy, the head of whom is styled 'Doctor Nobilium.' Enyed contains a Roman Catholic, a Lutheran, and a Reformed Lutheran church; but is most celebrated for its richly endowed college (founded in 1622) for Protestant students, the number of whom is above 1000, and they are accommodated in 84 halls and chambers. The college has a library, and collections of coins and in natural history and experimental philosophy. On the market-place are the remains of the antient burg or castle, with its towers and loopholes, in which the Saxons, who built the town, were accustomed to defend themselves against their Transylvanian assailants in former days. It now contains the parish minister's residence and two places of worship. The streets still retain their Saxon names, although the town is now inhabited principally by Magyàrs or Hungarians. The population is about 6100, among whom are some Saxons, Armenians, Greeks, and Walachians. There are a paper-mill and some manufactures in the town, and extensive vineyards in the neighbourhood. The Magyàr language is said to be spoken here with remarkable purity.

EOLI′DIA, Cuvier's name for a genus of *Nudibranchiata* (the second order of his Gastropods) [NUDIBRANCHIATA]. In De Blainville's arrangement *Eolidia* is placed next to *Cavolina*, under his family *Polybranchiata*, with the name of *Eolidia*, and it forms, under the appellation of *Eolis*, the second genus of Lamarck's *Tritonians*, the first section of his Gastropods, with external branchiæ placed above the mantle, either on the back or on the sides, and not being in a particular cavity. Cuvier describes his *Eolidiæ* as having the form of small snails or slugs (Limaces) with four tentacula above, and two at the sides of the mouth. Their branchiæ, he observes, are laminæ, or foliations disposed like scales, more or less close set on each side of the back. Rang, who includes under *Eolidia* two subgenera, viz., the *Eolidiæ*, properly so called, and Bruguière's *Cavolinæ*, gives the following generic character.

Animal pelagian, limaciform, gelatinous; head distinct, furnished with two or three pairs of tentacula; foot entire, and occupying nearly the whole length of the animal; branchiæ formed of flattened or conical cirrhi, disposed in rows on the superior part of the body; organs of generation united in the same tubercle on the right side anteriorly; vent a little more backwards.

Geographical Distribution.—Cuvier, speaking of his *Eolidiæ*, says, that there are some of them in all seas. Rang observes, that the genus is composed of a great quantity of small pelagic and littoral animals. The masses of *fucus natans*, which are so often met with between the tropics, always present, he states, a great number of them, and it is easy to recognize them from their elongated and creeping form, as well as from the tentaculiform branchiæ with which they are beset. They do not swim, according to the last-named author, but they suspend themselves at the surface of the water, with the foot uppermost, and move well by means of sudden undulations.

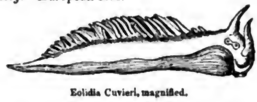
*

Eolidiæ properly so called.

Branchiæ disposed in transverse rings distant from each other.

Eolidia.

Example.—*Eolidia Cuvieri.*
Locality.—European seas.

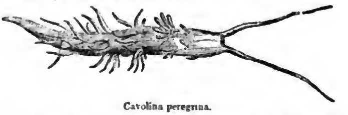


Eolidia Cuvieri, magnified.

Cavolina.

De Blainville, who says that Cavolina is to be found in all seas, remarks, that this closely approaches the preceding, and might without inconvenience be united with it, thus confirming the arrangement of M. Rang.

Example.—*Cavolina peregrina.* (*Doris peregrina*, Gme. Cavolin. polyp. mar. 3, p. 190, t. vii., f. 3.)
Locality.—The Mediterranean.



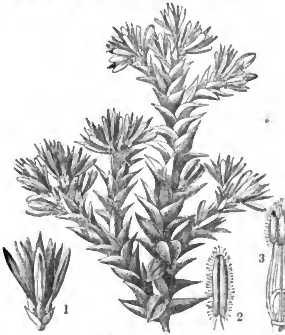
Cavolina peregrina.

De Blainville states that he has examined a very small species brought home by MM. Quoy and Gaimard (Voyage of the Uranie).

EOLIPILE. [ÆOLIPILE.]

EOPSA′LTRIA (Zoology). [PACHYCEPHALINÆ.]

EPACRIDA′CEÆ, a natural order of monopetalous exogens, very closely allied to Ericaceæ, with the small-leaved genera of which they entirely agree in habit, and from which they are scarcely distinguishable by any character beyond their anthers being in all cases one-celled. Dr. Brown, in founding the order in the year 1810, explained his motives for doing so as follows:—'The family of Ericeæ is now so vast that it seems to constitute a class rather than an order, of which one part, although not a very natural one, has been already separated by Jussieu under the separate name of Rhododendra, on account of some diversity in the structure of the fruit. I therefore may be allowed to propose another order (Epacrideæ) which is truly natural, although it depends upon the single character of the unusual simplicity of the anthers; a character, however, which is of the greater value as opposed to the two-celled anthers of Ericeæ, which are generally divided and furnished with appendages; the propriety of the measure is moreover confirmed not only by the number of Epacrideæ, large as it is, but also by their geographical disposition; for all, as far as we at present know them, are inhabitants of Australasia or Polynesia, countries in which not more than one or two species of Ericeæ are found.' (*Prodr.* p. 536.)



Sprengelia incarnata.

1. A flower with a calyx as long as the 5-parted corolla, and several bracts imbricating the base. 2. An anther. 3. The stamens and ovary.

The species consists of shrubs with alternate or occasionally opposite leaves, which are either articulated with the stem, like those of Ericeæ or broad at the base and half-surrounding the stem in a kind of hood or sheath. Their flowers are usually monopetalous, but as in the order Ericaceæ, it is not unfrequent to find them with their corolla divided or divisible into several pieces, and therefore truly polypetalous. The size and colour of the corolla are often striking, and the species then become exceedingly showy, and are favourites with gardeners. None of them are of any particular use, unless those are considered an exception whose succulent fruit is eatable, like Lissanthe sapida and others, which constitute the Australian cranberries.

Dr. Brown mentions 24 genera and 144 species of this order in his work upon the New Holland Flora, but a considerable number has to be added.

EPACT, the number of days in the moon's age at the beginning of the year.

EPAMINONDAS, a Theban statesman and soldier, in whose praise, both for talents and virtue, there is a remarkable concurrence of antient writers. Nepos observes that, before Epaminondas was born, and after his death, Thebes was always in subjection to some other power: on the contrary, while he directed her councils, she was the head of Greece. His public life extends from the restoration of democracy, by Pelopidas and the other exiles, B.C. 379, to the battle of Mantineia, B.C. 362. In the conspiracy by which that revolution was effected he took no part, refusing to stain his hands with the blood of his countrymen; but thenceforward he became the prime mover of the Theban state. His policy was first directed to assert the right and to secure the power to Thebes of controlling the other cities of Bœotia, several of which claimed to be independent. In this cause he ventured to engage his country, single-handed, in war with the Spartans, who marched into Bœotia, B.C. 371, with a force superior to any which could be brought against them. The Theban generals were divided in opinion whether a battle should be risked: for to encounter the Lacedæmonians with inferior numbers was universally esteemed hopeless. Epaminondas prevailed with his colleagues to venture it; and devised on this occasion a new method of attack. Instead of joining battle along the whole line, he concentrated an overwhelming force on one point, directing the weaker part of his line to keep back. The Spartan right wing being broken, and the king slain, the rest of the army found it necessary to abandon the field. This memorable battle was fought at Leuctra. The moral effect of it was much more important than the mere loss inflicted on Sparta, for it overthrew the prescriptive superiority in arms claimed by that state ever since its reformation by Lycurgus.

This brilliant success led Epaminondas to the second object of his policy—the overthrow of the supremacy of Sparta, and the substitution of Thebes as the leader of Greece in the democratical interest. In this hope a Theban army, under his command, marched into Peloponnesus early in the winter, B.C. 369, and, in conjunction with the Eleians, Arcadians, and Argians, invaded and laid waste a large part of Laconia. Numbers of the Helots took that opportunity to shake off a most oppressive slavery; and Epaminondas struck a deadly blow at the power of Sparta, by establishing these descendants of the old Messenians [ARISTOMENES] on Mount Ithome, in Messenia, as an independent state, and inviting their countrymen, scattered through Sicily and Italy, to return to their antient patrimony. Numbers, after the lapse of 200 years, obeyed the call. This memorable event is known in history as the return of the Messenians.

In 368 B.C. Epaminondas again led an army into Peloponnesus; but not fulfilling the expectations of the people, he was disgraced, and, according to Diodorus (xv. 71), was ordered to serve in the ranks. In that capacity he is said to have saved the army in Thessaly, when entangled in dangers which threatened it with destruction; being required by the general voice to assume the command. He is not again heard of in a public capacity till B.C. 366, when he was sent to support the democratic interest in Achaia, and by his moderation and judgment brought that whole confederation over to the Theban alliance without bloodshed or banishment.

As the narrowness of our limits forbids us to trace the motives which led to the formation of so powerful a Theban party in Peloponnesus, so we cannot enter into the causes of its decline, except by saying, that it soon became plain that a mere change of masters, Thebes instead of Sparta, would be of no service to the other states. Achaia first, then Elis, then Mantineia and great part of Arcadia, returned to the Lacedæmonian alliance. To check this defection Epaminondas led an army into Peloponnesus for the fourth time, B.C. 362. Joined by the Argians, Messenians, and part of the Arcadians, he entered Laconia, and endeavoured to take Sparta by surprise; but the vigilance of Agesilaus just frustrated this scheme. Epaminondas then marched against Mantineia, near which was fought the celebrated battle in which he fell. The disposition of his troops on this occasion was an improvement on that by which he had gained the battle of Leuctra, and would have had the same decisive success, but that in the critical moment, when the Lacedæmonian line was just broken, he received a mortal wound. The Theban army was paralyzed by this misfortune; nothing was done to improve a victory which might have been made certain, and this battle, on which the expectation of all Greece waited, led to no important result. 'Each party,' says Xenophon, 'claimed the victory and neither gained any advantage: indecision, trouble, and confusion, more than ever before that battle pervaded Greece.'

Whether Epaminondas could much longer have upheld Thebes in the rank to which he had raised her, is very doubtful: without him she fell at once to her former obscurity. His character is certainly one of the fairest recorded in Greek history. His private life was moral and refined; his public conduct uninfluenced by personal ambition, or by personal hatred. He was a sincere lover of his country, and if, in his schemes for her advancement, he was indifferent to the injury done to other members of the Grecian family, this is a fault from which, perhaps, no Greek statesman, except Aristides, was free. (Xenophon, *Hellen.*; Plutarch, *Pelopidas*, *Agis*, &c.)

EPAULEMENT originally signified a mass of earth, about 7 feet 6 inches high and 18 or 20 feet thick, which was raised for the purpose either of protecting a body of troops at one extremity of their line, or of forming a wing or shoulder of a battery to prevent the guns from being dismounted by an enfilading fire. The term is now, improperly however, used to designate the whole mass of earth or other material which protects the guns in a battery both in front and on either flank; and it can only be distinguished from a parapet by being without a banquette, or step, at the foot of the interior side, on which the men stand to fire over a parapet. That part of the epaulement which is between every two embrasures is called a merlon; and the part under the embrasure is called the genouillère.

EPE'E, CHARLES MICHEL DE L'. A comparative estimate of L'Epée's character and labours has been given under DEAF AND DUMB: the following are a few biographical particulars respecting him.

He was born at Versailles, in November, 1712. His father was the king's architect, a man of talent and probity. Young L'Epée was educated for the church, a profession for which his mild, cheerful, and pious disposition peculiarly fitted him. There were difficulties at first in the way of his admission to the priesthood. He was required, according to the established practice of the diocese of Paris, to sign a formulary of faith; and this being opposed to his own opinions (which were Jansenist), he could not do so conscientiously. He was however admitted to the rank of deacon, but was told never to pretend to holy orders. This obstruction led him to the study of the law, but this profession did not suit the bias of his mind. At last he succeeded in obtaining holy orders, being ordained by the bishop of Troyes, a nephew of Bossuet. From him M. de l'Epée received a canonry in the cathedral of Troyes.

An accidental circumstance led him to devote himself to the instruction of the deaf and dumb. Business took him one day to a house where he found only two young women, who were busily engaged in needlework, but paid no attention to his questions. The mother of the young women arriving shortly afterwards, explained to him with tears that they were deaf and dumb. An ecclesiastic named Vanin had commenced the education of these young persons by means of pictures; but death had removed him, and no other person had offered to instruct the mutes. 'Believing,' says M. de l'Epée, 'that these two children would live and die in ignorance of their religion, if I did not attempt some means of instructing them, I was touched with compassion, and told the mother that she might send them daily to my house, and that I would do whatever I might find possible for them.'

John Paul Bonet's book came in the way of M. de l'Epée; a person offered a copy of it to him, urging him to buy it, which he at first refused, not knowing the nature of the work, and alleging that he did not understand Spanish, and that the book was therefore of no use to him. Opening it casually, he found the copper-plate engraving of Bonet's one-handed alphabet. The book was immediately bought, and De l'Epée learned Spanish to enable him to read it.

M. de l'Epée was persevering and disinterested in his instruction of the deaf and dumb. He persevered until he converted opposition and contempt into approbation. His income was about 400*l*., of which he allowed about 100*l*. for his own expenses, and appropriated the remainder to the support and instruction of indigent mutes. 'The rich,' he said, 'only come to my house by tolerance; it is not to them that I devote myself—it is to the poor; but for them, I should never have undertaken the education of the deaf and dumb.'

M. de l'Epée died December 23, 1789, aged 77. His memory received various honours; his funeral oration was pronounced by the Abbé Fauchet, the king's preacher. He ranks deservedly among those whose lives have been devoted to the amelioration of the condition of their fellow men, and the fruit of whose labours do not die with them. (*Gallery of Portraits*.)

EPERIES, or Pressova, a royal free town, and the capital of the county of Sáros, in Upper Hungary: in 48° 58′ N. lat., and 21° 15′ E. long. It is situated in an agreeable country on the banks of the Tartsza, is surrounded with walls defended by bastions, which are encircled by extensive gardens and inclosures, among which are the suburbs. it contains about 960 houses and 7660 inhabitants. The streets are broad, and embellished with several handsome buildings, among which are the county hall, four Roman Catholic churches, a Lutheran church, a synagogue, the quadrangular buildings of the Protestant college, a Roman Catholic high-school, attached to the monastery of Franciscans, who conduct it, a head Normal school, a chapter-house, town-hall, orphan asylum, and refuge for the indigent. It is the seat of a Greek Catholic bishopric erected in 1807, has a good episcopal library, and is frequented by the pious for the sake of an imitation of Mount Calvary, on which several chapels are built. Eperies manufactures woollens and linens, and possesses a large earthenware manufactory and breweries, as well as a considerable trade in cattle, wine, and grain, to which the annual fairs greatly contribute. About four miles from the town, the environs of which are agreeably diversified, there is an esteemed chalybeate, called Cremete or Krasyna-voda, with baths.

EPERNAY, a town in France, in the department of Marne, on the south bank of the river Marne, 73 miles in a straight line east by north of Paris.

The antient name of the town is said to have been Aquæ Perennes, from which came first Aixperne and afterwards Epernay. At an early period Epernay belonged to the archbishops of Reims, by whom a fortress was built here. In the wars of the English in France Epernay was twice besieged. In the earlier part of the sixteenth century it was burnt by Francois I. in order to destroy the stores which the Emperor Charles V. had established here. In the religious contests of the same century it was also an object of contest: it was besieged and taken by the Spaniards and Leaguers; and retaken in 1592 by Henri IV. In 1657 Epernay was ceded to the duke of Bouillon in exchange for the sovereignty of Sedan; but the duke never exercised all his rights.

Epernay is in a small valley in the midst of a romantic country, well wooded, and producing the finest Champagne wines. It is a handsome town. It has a church of modern construction, built in the place of one of greater antiquity, of which only the gate remains. There are some remains of the antient fortifications of the town, consisting of a gate and two towers. The population in 1832 was 5318. The inhabitants carry on a considerable trade in wine, which is deposited in deep and extensive cellars hollowed out in the chalk on which the town is built. They manufacture a great quantity of earthenware. Of the utensils manufactured half are sent to Paris in boats which descend the Marne, and a quarter into Lorraine; the rest is sent into Picardie or is retained for home use. The clay of which it is made is dug about fifteen miles from Epernay: large quantities of it are sent in an unwrought state to Paris and into the departments of Meurthe and Aisne. Millstones are quarried in the neighbourhood of the town; and sand is dug, which is much sought after for making glass, and is sent by land-carriage into Lorraine and even into Alsace. Many women are employed in making hats, purses, bags, &c., of silk twist. Hosiery and woollen yarn are manufactured.

There are at Epernay a theatre, a high-school, and a library of 10,000 volumes. It is the capital of an arrondissement, which contained in 1832 a population of 83,278.

EPHE'MERIS (ἐφημερίς, from ἐπὶ, and ἡμέρα), a name given to almanacs, from their containing matter for each day. In astronomy it is usual to call any table which assigns the place of a planet for a number of successive days an ephemeris of the planet. [ALMANAC.]

EPHESIANS, ST. PAUL'S EPISTLE TO THE, is the fifth, in numerical order, of the fourteen apostolical letters of St. Paul, contained in the canon of the New Testament. Throughout the primitive ages of Christianity it was generally regarded by the principal fathers as being of genuine and sacred authority. According to Dr. Lardner (*Credibility of Gosp. Hist.*, vol. ii.) the writings of Ignatius, who was St. Paul's contemporary, contain seven citations from this epistle. It is also cited by Irenæus, Clemens Alexandrinus, Tertullian, Origen, and many subsequent Christian writers. There were, however, several important and numerous sects, as the Nazarenes, or Ebionites (paupers and the Severians, Encratitæ and other followers of Tatian, who, in the first and second centuries, denied both the genuineness and the authenticity of this and the other writings of St. Paul; rejecting them as a tissue of errors, and denouncing St. Paul himself as an apostate, and a perverter of the original system of Jesus of Nazareth. (Origen *contra Celsum*, l. v.; Euseb. *Eccles. Hist.*, l. iii., c. 21 and 27; Epiphanius, *Hæres.* 30; Hieron. *in Math.*, c. 12; Nicephorus, *Hist. Eccles.*, l. iv., c. 4, l. v., c. 12; Toland's *Nazarenus*, p. 25—29.) A second epistle of St. Paul to the Ephesians is mentioned by Jerome (*De Scriptoribus Eccles.*) and by Epiphanius (*Hom.* 42). The place and date generally assigned to this epistle by biblical critics are Rome, A.D. 61, that is, in the first year of the apostle's imprisonment at Rome (ch. iii. 1, ch. iv. 1, ch. vi. 20, and the postscript), but Mr. Greswell, in his elaborate chronological disquisition on the harmony of the Gospels, says, 'St. Paul wrote no epistles in his first imprisonment.' Much has been written by commentators for and against the opinion that St. Paul addressed this letter to the Ephesians; and notwithstanding the words of the first verse, 'to the saints at Ephesus' (ἐν Ἐφέσῳ), appear in all the antient MSS., and that the postscript says, 'written from Rome unto the Ephesians,' this is doubted and denied to be the fact by Grotius, Mill, Wetstein, Vitringa, Benson, Paley, and Greswell, who adopt the statement, said by Tertullian to have been made by Marcion, that it was written to the Laodicæans. Macknight, Lardner, Hartwell Horne, and many others, see no difficulty in believing it to have been addressed to the Ephesians, though Greswell (vol. ii. p. 67) maintains that by its internal evidence it is undoubtedly shown to have been addressed, not to the Christians at Ephesus, where Paul had resided three years (*Acts* xx. 31), but to personal strangers (i. 15, iii. 2, &c.); that it has been miscalled by mistake; and that, if it be not the epistle which Paul wrote to the Laodicæans (*Coloss.* iv. 16), that apostolical epistle must have been lost, for the one with this title inserted in the 'Codex Fabricii' and in Jones's work on the Canon, though of a very early date, is regarded as a forgery. Usher, Bengel, Michaelis, and Hug suppose it to be *encyclical*, that is, intended for circulation. The style is exceedingly animated and fluent, and has less of the metaphorical obscurity which generally characterizes the compositions of St. Paul. The object appears to be to establish an earnest faith in the doctrines of Christianity, by giving exalted notions of their importance and moral excellence, and to encourage a perseverance in the Christian warfare with temporal and spiritual enemies. The three first chapters are occupied in especially setting forth the principles of predestinarianism (i. 4, 5, 11, iv. 30), and the three last are devoted chiefly to the enjoining of moral duties with respect to husbands, wives, parents, children, masters, and servants. 'No real Christian,' says Dr. Macknight, 'can read the doctrinal part of this epistle without being impressed and roused by it, as by the sound of a trumpet.' On the undesigned coincidences with the 'Acts' see Paley's *Horæ Paulinæ*, p. 208—234. The moral and doctrinal precepts of this epistle, with respect chiefly to election, have occasioned theological critics, especially those of Germany, to write elaborately on its proper interpretation. See the comments of Bucer, Röell, Bosc, Schütze, Cramer, Rosenmüller, Koppe, Müller, Brinkmann, Ziegler, Krause, and Bemmelin, cited in Seiler's *Biblical Hermeneutics* by Dr. Wright; also Macknight's *Translation and Commentary on the Epistles*, 4to., vol. ii.; Michaelis's *Introduct.*, vol. iv.; Horne's *Introduct.*, vol. iv.; and the *list of Commentators and Sermons on Ephesians in* Watt's *Biblioth. Britannica*.

E'PHESUS, a city of Asia Minor, and one of the twelve that belonged to the Ionian confederation. (Herod. i. 142.

The ruins of the city are situated near the river Cayster, at a short distance from the place where it falls into the Bay of Ephesus, and near a modern village called Aiasalouk. The city, according to Pococke's plan, was irregularly enclosed with solid walls. Towards the east the external wall crosses a hill, called Lepre, which has a channel or hollow in the middle. The wall is then continued southward on the edge of a valley, which is bounded by another hill, called the Corresus. (Strab. 640.) Other internal walls extend further south across another valley, and communicate with wall-works running east and west along the side of Mount Corresus. The walls then turn northward, and extend along the side of a lake, probably Lake Selinusia, near the temple of Diana, which is about a furlong to the west of the hill Lepre. On this, the west wall, is a tower, called the Prison of St. Paul, which is a building with Gothic or pointed arches. The walls, after leaving the lake, curve on the north, and run straight toward the east on a slight eminence. Near the circus the walls are set back a short distance, and then are continued straight till they turn with a curve, and join the boundary on the Lepre hill.

The whole compass of the walls, according to Pococke, is about four miles. They are built in a rough manner, but cased with hewn stone, and defended in places with square towers. In some parts the walls remain almost entire; in others the foundations only are visible, and are ten feet thick. The site of Ephesus has been frequently changed, and Lysimachus, one of Alexander's generals, is said to have adopted the expedient of stopping the drains in the low parts of the city, in order to drive the inhabitants into the higher, or, what he conceived, the most advantageous situation for the city, which he had enclosed. (Strab. 640.) Pococke is of opinion that the ruins of the present walls are the work of Lysimachus. Part of one of the entrance-gates, adorned with some bas-reliefs remarkable for their fine taste, still remains. Within the city there were extant, at the time of Pococke's visit, ruins of theatres, a circus, and other public buildings; and without the city, on the south-east side of Lepre, are the ruins of an extensive and magnificent edifice, which Pococke supposed to be a gymnasium. The outer walls are of brick and stone, formed of four or five courses of each, laid alternately, and constructed with great solidity.

In 'The Antiquities of Ionia,' vol. ii., published by the Dilletanti Society, there is an interesting view of this gymnasium, and also a plan. (See Plate 40, and following plates.) The Cryptoporticus is full of Exedræ. There is also a Palæstra and an Ephobium, with rooms on the right and left, having a communication with the Palæstra only. A passage leads from the Ephebium to the apartments of the baths, of which there were two sets for bathing. There is however only one Laconicum. In the niche of the Calidarium, on the right hand, are painted several sorts of fish, and boys swimming on dolphins: the colours of the painting are so well preserved as to show the water to be of a light green. The Laconicum is vaulted, and is totally dark. Plate 43 gives some details of the architecture of this building.

The remains of a temple at Ephesus are given in plates 44 and 45 of the same work. This temple was 130 feet long and 80 broad. The cella is constructed of large coarse stone; the portico is of marble, and of the Corinthian order. The columns are nearly 47 feet high, and the shafts are fluted, and of one piece of stone. The style is Roman, and the temple was constructed, probably with the permission of Augustus Cæsar, to the deified Julius.

The circus is a very curious building, 780 feet long, and 290 broad: the width of the chariot-course is 135 feet. On the north side the seats are constructed on a series of arches, but on the south they are laid on Mount Lepre. The circus was entered by descending the hill side, as the boundary was surmounted with a wall, having arched openings three feet wide at about forty feet distant from each other. The masonry consists of rusticated stone-work, and the Ionic order appears to have been used in some of the decorative parts of the architecture. The great theatre, which is partly constructed, and partly hollowed out of the hill, is about 330 feet in diameter, the plan being a large segment of a circle, with thirty rows of seats.

The temple of Diana has a lake on the west side of it, which is now a morass, extending westward to the Cayster. This building and the courts about it were surrounded with a strong wall, which was a double wall to the south. Within the enclosure were four open courts, that is, one on each side of the temple; and on each side of the court to the west there was a large open portico, or colonnade, of four columns deep, extending to the lake: on these columns arches of brick were turned. The front of the temple was to the east. The temple was built on arches, and the foundation appears to have been most solidly constructed. This agrees with the statement of Pliny (xxxvi. 14), who, speaking of the great temple which existed in his time, said that it was built on marshy ground, as being thus more secure against earthquakes, and that the foundations were formed of rammed charcoal and wool. In the narrow archways of the foundation Pococke saw a great number of earthen pipes. In the front of the temple was a large portico, constructed with grey and red granite columns, some of the fragments of which are fifteen feet long and three feet six inches in diameter. Similar columns form part of the mosque of St. John at Aiasalouk, with a most beautiful composite capital. Pococke judges from the remains which he saw, that the whole building was cased with marble, and that arches were turned on the columns. The temple itself has something of the figure of a cross, and is divided into several chambers. There was probably a portico on the side opposite to the great entrance. The length of the temple, according to Pliny, was 425 feet, the breadth 220, and it contained 137 columns 60 feet high.

Ruins still remain on the lower part of the hill Lepre, and there seems to have been a suburb on the south side of Lepre, and near a mile from the south-east corner of it towards that hill, about which the present village of Aiasalouk is situated. On another hill is a Turkish castle, and round the top of the hill are extensive ruins of thick brick walls, with numerous small arches, which Pococke judges to be of the time of the Greek emperors. To the east of Mount Lepre are the burial-places. Pococke saw there a very large marble coffin (sarcophagus), with an imperfect inscription on it, and he says he has reason to think that they cut holes in the rock in order to deposit their dead there. There are several arches all round the hill, and on some of them are ruins of an aqueduct. On the low ground between the hill Lepre and the village of Aiasalouk there are remains of many square piers, made of single stones laid one on another. Not only on the sides of Mount Lepre, but on Mount Corresus, as well as in the valley between them, there are still great ruins of the antient city.

Mounts Lepre and Corresus being of marble, probably supplied abundant materials for building. (Pococke's *Travels;* and *The Antiquities of Ionia, by the Dilletanti Society.*)

According to Strabo, the oldest inhabitants of the site of Ephesus were Carians and Leleges, most of whom were ejected by the settlers from Greece under Androclus. Lysimachus, as Strabo observes, built the walls which existed when he wrote, and which are doubtless those described by Pococke. He also gave the place the name of his wife Arsinoë, but the old name was afterwards restored. The first great temple of Diana was built by Chersiphron, which having been set on fire by Herostratus and destroyed, the great edifice described by Pliny was erected. Strabo says that the priests of the temple were once eunuchs, but that in his time the usages of the place were somewhat changed. This temple was a noted asylum for malefactors and for debtors, till this privilege was taken away by Augustus. In Strabo's time Ephesus was a place of great trade, and the chief commercial city of the western part of Asia Minor; and it would appear from the Acts of the Apostles (xix.) that it was a place of some note for workers in silver.

Coin of Ephesus.

British Museum. Actual Size. Silver. Weight, 176¾ grains.

E'PHORI (ἔφοροι), a body of magistrates at Sparta, who were possessed of great privileges. The institution of this office is usually ascribed to Theopompus, the grandson of

Charilaus the Proclid, but it has been inferred from the existence of an ephoralty in other Dorian states before the time of Theopompus, and from its being apparently placed among the institutions of Lycurgus by Herodotus (i. 65) and Xenophon (*de Rep. Lac.*, viii. 3) that it was an antient Dorian magistracy. Dr. Arnold supposes (Thucyd., vol. i., p. 646) that the ephori, who were five in number, were coeval with the first settlement of the Dorians in Sparta, and were merely the municipal magistrates of the five hamlets which composed the city (see Müller, *Dorians*, ii., p. 550, Engl. transl.); but that afterwards, when the Heraclidæ began to encroach upon the privileges of the other Dorians, and, it would seem, in the reign of Theopompus, who endeavoured to diminish the powers of the general assembly of the Spartan aristocracy, the Dorians, in the struggle which ensued, gained for the ephori an extension of authority which placed them virtually at the head of the state, although the nominal sovereignty was still left in the hands of the Heraclidæ. Thus the ephori were popular magistrates as far as the Dorians themselves were concerned, and were in fact the guardians of their rights from the encroachments of the kings, though they were in relation to the Periœci (περίοικοι) the oppressive instruments of an overbearing aristocracy. (Plato, *Legg.*, iv., p. 712 D.) The ephori were chosen in the autumn of every year; the first gave his name to the year: every Spartan was eligible to the office without any regard to age or wealth. They were empowered to fine whom they pleased, and exact immediate payment of the fine; they could suspend the functions of any other magistrate, and arrest and bring to trial even the kings. (Xenophon *de Rep. Laced.*, viii. 4.) They presided and put the vote in the public assemblies (Thucyd., i., 87), and performed all the functions of sovereignty in receiving and dismissing embassies (Xen. *Hell.*, ii., 13, 19), treating with foreign states (Herod., ix., 8), and sending out military expeditions. (Xen., *Hellen.*, ii., 4, 29.) The king, when he commanded, was always attended by two of the ephori, who exercised a controlling power over his movements. (Herod., ix., 76.) The ephori were murdered on their seats of justice by Cleomenes III., and their office overthrown (Plutarch, *Vit. Cleomen.*, c. viii.); but they were restored by Antigonus Doson and the Achæans in 222 B.C. (Polyb., ii., 70; Pausan., ii., 9, 2); and the office subsisted under the Roman dominion. (See Böckh, *Corpus Inscriptionum*, i., p. 604-613.) On the ephoralty, the reader may consult Müller's *Dorians*, book iii., c. 6; Plass's *Geschichte des alten Griechenlands*, vol. ii., p. 113; and Tittmann's *Darstellung der Griech. Staatsverfassungen*, p. 104-117.

E'PHORUS, a Greek historian, born at Cyme in Æolis, in the year 405 B.C. (Suidas.) He survived the passage of Alexander into Asia (333 B.C.), which he mentioned in his history (Clem. Al., *Strom.*, i., p. 337 A.). He studied rhetoric under Isocrates, but with so little success that after he had returned from Athens his father Demophilus sent him back to the rhetorician for fresh instructions. (Plutarch, *Vit. Isocratis*, p. 366 Wyttenb.) Isocrates perceiving his unfitness for public speaking, recommended him to turn his attention to historical composition (Seneca *de Tranquillit. Animi*, c. vi.); but his style was low and slovenly even in his histories (Dio., i., p. 479); and Plutarch remarks upon the silliness of the set speeches which he introduced. (*Polit. Præcon.*, p. 803 B.) Polybius observes that, though in his account of naval matters he is sometimes happy, he always fails in describing battles by land, and was entirely ignorant of tactics. (*Excerpt. Vatican.*, p. 391.) Ephorus wrote—1. A History of Greece, in 30 books, beginning with the siege of Troy, and terminating with the siege of Perinthus (340 B.C.). Part of the thirtieth book was written by his son Demophilus. (Diod., xvi., 14.) 2. On Inventions, in 2 books. 3. On Goods and Ills, in 24 books. 4. On remarkable Objects in various Countries, 15 books. 5. The Topography of Cyme. 6. On Diction. The fragments of these works have been collected by Meier Marx, Carlsruhe, 1815.

E'PHYRA. [MEDUSA.]

EPIALTUS. [MAIDÆ.]

EPIC POETRY is that form of art which produces an imaginative description of external facts and occurrences, as distinguished from lyric poetry, which employs itself in registering, in an imaginative manner, all those internal facts and occurrences which go by the name of feelings and emotions.

Those who find this definition insufficient must remember that it does not and is not intended to apply to any single epic or lyric poem. With the exception perhaps of some of our old national romances, there does not exist an epic poem of any length which is perfectly free from lyrical passages; but this is no reason why we should confound the two forms of art, and not assign to poetry the one name or the other according to the proportion which it contains of either element.

From what we know of the operations of our own minds, and of the analogy which subsists between the growth of individual and national intellect, it appears most natural that epic should be the earliest species of poetry. A child, borne into a crowd of circumstances all claiming his attention and exciting his interest, busies himself with the external world long before it ever occurs to him to examine what is going on within himself. Nay, more than this, his imagination, the idealizing faculty, takes the models of its exertions entirely from the external world. His dreams, his reveries, his waking fancies are active and epical, as any one who has watched the movements of children must acknowledge; but the time when he begins to notice his own thoughts and feelings—the lyrical age—does not come till later.[*]

The progress of literature bears a close analogy to that growth of an individual mind which we have just described. Men look round them before looking within, and thus it is that natural philosophy has always preceded metaphysics, and epic poetry, as far as we know, been prior to lyrical. Again, the imagination gets the start of the logical faculty Men can invent before they can argue, and thus it appears that facts, real or supposed, are usually put in the imaginative form of epic poetry before they are recorded and examined with regard to the conclusions which they suggest, as in political history. (Schelling, *Vorlesungen über die Methode des Academischen Studium*, p. 226.) It may be objected to this theory, that if we assert every individual to have gone through both epical and lyrical periods, there is no reason why the two forms of art which we suppose to have arisen from the prevalence of either set of feelings should not have been contemporaneously produced; but it will be seen that a sufficient reason is supplied for the priority of that form which addresses itself to the spirit of action, in the fact that this spirit predominates in the earliest ages of society, to the complete repression—we might almost say destruction—of those contemplative feelings which in after ages are allowed full and unrestrained exercise. The heroic age of Greece, for instance, as far as we know anything about it, was very little likely to encourage reflection, much less reflective poetry, and accordingly we hear nothing of such poetry for centuries after it had ceased.

The earliest specimens of this form of art, which probably consisted of tales rhythmically arranged and recited to a very simple musical accompaniment, no doubt belonged to the unconscious æra, during which the poet, setting before him no aim, or seeing it at best but very imperfectly, acts purely from the stirring impulse of his own imagination. Into this class we may perhaps admit some of our oldest and simplest romances, but the poetry of Homer and Hesiod, the twofold epic of the Greeks, cannot be denied to be, in great measure at least, the work of conscious artists. We shall notice the writings of the early Greeks first in order; and as it would swell this article to an unnecessary length were we to examine in detail the principal epic poems which we possess, we shall confine ourselves, in a great measure, to those which were composed during the periods both of antient and modern history, when epic poetry could be said to be the poetry of the age, and leave those detached productions which owe their existence to the imagination of isolated men, in times long after the disappearance of the living epos, for a separate examination.

There are two divisions into which the epic poetry of the Greeks naturally falls; the heroic or romantic epos of Homer and of the Cyclic poets, and the hieratic epos of Hesiod. The attention of that age was centered, as ours is at present, on two grand ideas, the state and religion; whence we find a political and a hieratic epos. The Iliad and Odyssey are the two poems which remain as specimens of the former kind, and they are particularly worth the attention of all who are interested in the history of epic poetry, as they afford by far the most perfect instance of poems of that kind composed in an age differing but little in its characteristics from that to which they refer, and stand consequently in strong contrast to the Æneid, a poem with which they are most frequently compared. The Æneid, in common with most Latin poetry, depends more on beauty of language and arrangement than on anything in the story, exquisitely managed as it is, to excite the interest of its readers. As it traces the life of an individual, it stands in closer juxta-position with the Odyssey than with the Iliad; but how superior is Ulysses to Æneas, and how much more romantic are the adventures of the Greek than those of the Trojan hero!

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[*] We are aware that this is opposed to the assertion of a late German writer (Wilhelm Müller, *Homerische Vorschule*, p. 5); but he has not adduced any arguments which lead us to change our opinion on the point.

Perhaps there is not in the whole compass of literature a more perfectly drawn character than Ulysses, certainly none proceeding from so early a source. His touching exhibitions of feeling, the inimitable circumstantiality of the fictions which he spins in such profusion, apparently for no purpose except to confound his auditors; the manner in which all the interest of the story winds around him, the comic nature of the interludes, and the peculiarities attaching to the supernatural parts of his adventures, all unite to render the Odyssey a poem more fitted perhaps than the Iliad itself to interest an age like ours, when everything which gives a lyrical character to poetry is so much although so unconsciously sought for.

It usually happens that sacred poetry partakes strongly of a lyrical character, and Hesiod has perhaps struck out the only path which an epic writer in a simple age could follow without lapsing into the lyrical spirit as he approached theological subjects. The only poet of antiquity with whom he can be compared is Lucretius, but the 'De Rerum Naturâ' approaches so much more nearly to the character of a treatise on philosophy, that it is hard to give it the name of an epic poem, although it, as well as all didactic works like Virgil's Georgics, come under the definition. The reason why we are slow to recognize them as epics arises from the habit of taking the heroic epos, one species, although the primary one, for the whole class, which really includes other species, as a reference to our definition cannot fail to show.

It has been observed by a German writer (Schelling, *Vorlesungen*, &c., p. 224) that, properly speaking, an epic poem has no regular beginning or end; it is a metrical and imaginative production, which, if it consist of narrative, may take it up and lay it down at any period. This is the case with the Iliad, as well as with the Odyssey and Æneid, although the two last are considerably more complex in the arrangement of the narrative, and evidently draw to a more decided close than the Iliad. There appears however to be a greater unity in the plot of the Odyssey than in that of Virgil's poem, in this respect, that the events never get the upper hand of the hero. We are interested in his adventures because they are his; while in the Æneid they strike us rather as embellishments intended to possess independent merit.

The early romantic epos deserves notice as the first distinct form of modern art. Much discussion has been expended in order to ascertain whence arose those cycles of metrical romances which have for their subjects the exploits of Alexander the Great, King Arthur, and other heroes; but it rather concerns us here to notice that the second birth of civilization which ensued on the breaking up of the Roman empire was productive of a series of events in literary history, parallel, as far as we can judge, to those which occurred in the times of Homer.

The traces of heroic poetry which remain in Livy's History are plain enough to enable us to infer with considerable probability that a series of epic poets appeared in Rome about the time of the Tarquins onwards; but as no fragments remain, we are too much in the dark as to the nature of their writings to enable us to refer to them as we do to Homer.

We find that the northern nations possessed numerous poems of an epical kind, some of which remain, and are or might be read with considerable interest. The cycles of romances on Troy and Alexander the Great compose a form of art which could only exist in a revival of imaginative spirit, as they derive their subjects from an older date and a different country, although, as regards every thing but the name of Greek or Trojan, the hero is usually the countryman of the bard; but the numerous poems on Arthur, with 'Havelok the Dane,' and 'Horn Child,' in our own language, 'Beowulf,' in Anglo-Saxon, 'The Poem of the Cid,' in Spanish, and the 'Nibelungen Lied,' in old German, are quite sufficient proofs of the coincidence of epic spirit with an early stage of society.

The Italian epic arose somewhat later than that of any of the northern nations, which may be attributed to the fact that it was only to a strong admixture of barbarian blood that the Italians owed their restoration to political existence. The dregs of a nation never possess a national literature.

Coleridge has observed that 'Gothic art depends on a symbolical expression of the infinite,' or what cannot be circumscribed within the limits of actual sensuous being, while in antient art everything was finite and material. (*Lit. Remains*, vol. i. p. 68.) This applies more directly to architecture, but in a measure also to literature, although we think that the introduction of Christianity had more to do with it than the cause which Coleridge assigns, namely the wild liberty of the Northman's habits and manners and the imagery of nature which surrounded him. Perhaps the greatest difference which is traceable between the antient and the modern epic has been produced by that spirit of devotion to the female sex which characterizes all the Gothic nations; and arising as it does, partly from the refinement of an instinct and partly from religious impressions,* is very superior, as a motive of action, to the mere unmitigated instinct for war which constitutes the prevailing feature of the antient epic, or at least of the heroic poems.

We have been at no pains to notice those detached epic poems which have appeared at different times since the revival of learning, although some of the most noble specimens of this style of poetry are to be numbered amongst them; still less have we intended to give anything like sketches of any which we have mentioned, as this is properly done under the heads of the several authors.

(Thirlwall's *History of Greece*, vol. i.; Ulrici, *Geschichte der Hellenischen Dichtkunst*; Dunlop, *History of Roman Literature*; Baehr, *Abriss der Römischen Literatur-Geschichte*; *History of Spain* in the *Cabinet Cyclopædia*, vol. ii., Appendix H.)

EPICHARMUS, the son of Helothales, was born in the island of Cos, and accompanied Cadmus, the son of Scythes, to Sicily about the year 485 B.C. He must have arrived at maturity by this time; for he was a pupil of Pythagoras (who died in 497 B.C), and according to Aristotle (*Poet.* iii. 5), lived long before Chionides and Magnes (who, if we may believe Suidas, began to exhibit in 487 B.C.); so that there can be no truth in the statement of Diogenes, that Epicharmus was brought from Cos to Sicily when a child of three months old (viii. 78). He and his brother were physicians, and therefore, perhaps, belonged to the Coan house of the Asclepiads. It appears that he resided some short time at Megara, and possibly removed to Syracuse when Gelo transported the inhabitants of Megara thither (484 B.C.). It was at Megara that Epicharmus probably got the idea of writing comedies; for the Megareans, as well in Greece as in Sicily, are always spoken of as the originators of that branch of the drama. Epicharmus is called by Theocritus (*Epigram.* xvii.) the inventor of comedy, and Plato says that he was the chief comedian, just as Homer was the chief tragedian. (*Theætet.*, p. 152, E.) The latter remarks refer, we believe, to his having first furnished the *comus*, or band of revellers, who were the original chorus in comedy, with a systematic dialogue and a plot of an epic character. That the comedies of Epicharmus had a chorus, and that this chorus was the representative of the comus, as in the old Athenian comedy, appears probable from the fact that one of his dramas was called 'Vulcan,' or the '*Comastæ*.' 'The subjects of the plays of Epicharmus,' says Müller (*Dorians*, iv. 7, §. 2), 'were mostly mythological, *i e.*, parodies or travesties of mythology, nearly in the style of the satirical drama of Athens. Thus, in the comedy of "Busiris," Hercules was represented in the most ludicrous light, as a voracious glutton; and he was again exhibited in the same character (with a mixture, perhaps, of satirical remarks on the luxury of the times) in "The Marriage of Hebe," in which an astonishing number of dishes was mentioned. He also, like Aristophanes, handled political subjects and invented comic characters like the later Athenian poets; and indeed the extent of his subjects was very wide. The piece called

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* The worship of the virgin in particular. (Coleridge, ubi supra.)

"The Plunderings," which described the devastation of Sicily in his time, had a political meaning; and this was perhaps also the case with "The Islands:" at least it was mentioned in this play that Hieron had prevented Anaxilas from destroying Locri. In his "Persians" also there were allusions to the history of the times. Epicharmus also introduced and almost perfected characters which were very common in the drama of later times; and if the plot of "The Menæchmi" of Plautus was, as the poet seems to state in the prologue, taken from a comedy of Epicharmus, it must be granted that the ingenious construction of plots was not beyond the powers of that poet.' Epicharmus lived to the age of ninety (Diog., *Laert.*, viii. 78) or ninety-seven (Lucian, Macrob., xxv.) The titles of thirty-five of his comedies are given in Fabricius (ii. p. 300).

EPICTE'TUS was born at Hierapolis, a city of Phrygia. The year of his birth is not known, nor are we able to make any very close approximation to it. He must have been born however before the end of the reign of the emperor Nero, 68 A.D.; else he could not have been more than twenty-one when Domitian published that edict against philosophers, in the year 89 A.D., in consequence of which Epictetus retired from Rome. At the age of twenty-one, he was not likely to have attained sufficient notoriety to bring him within the operation of such an edict.

Epictetus was born most probably during the last eight years of Nero's reign. The names and condition of his parents are unknown; neither do we know how he came to be brought to Rome. But at Rome he was for some time slave to Epaphroditus, who was a freedman of Nero's, and one of his body-guard. An anecdote related by Origen, which illustrates the fortitude of Epictetus, would also show, if it is true, that Epaphroditus was a most cruel master. 'Epictetus, when his master was twisting his leg one day, smiled and quietly said, "you will break it;" and when he did break it, only observed, "Did I not tell you that you would do so?"' (Origen *c. Cels.* vii. p. 368.) We are not told how or when Epictetus managed to effect his freedom; but he could not have been still a slave when he left Rome in consequence of the edict against philosophers. This, which is the only event in his life whose date we can assign, took place, as has been said, in the year 89 A.D., being the eighth year of Domitian's reign. Epictetus then retired to Nicopolis, in Epirus; and it is a question whether he ever returned to Rome. The chief ground for believing that he did is a statement of Spartian (*Vit. Hadr.* 16), that Epictetus lived on terms of intimacy with the emperor Hadrian; while it is argued on the other hand, that there is no evidence of any of his discourses having been delivered at Rome, but that they contain frequent mention of Nicopolis. This argument is however hardly sufficient to overthrow the express testimony of Spartian.

We do not know when he died. Suidas says that he lived till the reign of Marcus Aurelius; and a confirmation of this statement has been thought to be furnished by Themistius, who says (*Orat. V. ad Jovian. Imp.*) that the two Antonines patronized Epictetus. But if, as there is good reason to believe, Epictetus was born before 68 A.D., the adoption of Suidas's statement would make him almost a hundred years old at his death; and what is said by Themistius might very well be true, even though Epictetus did not live under either of the Antonines. It may be added, that Suidas's account of Epictetus is in other respects inaccurate. But the strongest argument against Suidas is derived from Aulus Gellius, who, writing during the reign of the first Antonine, speaks of Epictetus in two places as being dead. (*Noct. Att.* ii. 18; xvii. 19.)

Epictetus led a life of exemplary contentment, simplicity, and virtue, practising in all particulars the morality he taught. He lived for a long while in a small hut, with no other furniture than a bed and lamp, and without an attendant; until he benevolently adopted a child whom a friend had been compelled by poverty to expose, and hired a nurse for its sake. There is a story connected with his lamp which illustrates the equanimity of Epictetus. He had bought one day an iron lamp, which was very soon after stolen from his hut, while he was himself standing in a corner wrapped in meditation; and when on looking up he came to miss it, he observed with a smile, 'I shall disappoint this thief to-morrow, for if he comes back for another lamp, he shall only find an earthen one.' (Arrian, *Epict.* ii. 6.) Neither was it in trifles alone that his equanimity was manifested, as the anecdote of his patience under his master's cruelty may suffice to prove. The biographers of Epictetus have taken particular care to commemorate his love of neatness.

Epictetus was a teacher of the Stoic philosophy, and the chief of those who lived during the period of the Roman empire. An anecdote given in the 'Discourses' collected by Arrian (i. 7) seems to show that he had been a pupil of Musonius Rufus, a Stoic philosopher whom Nero banished to Gyara, and who was subsequently recalled to Rome by Vespasian. The lessons of Epictetus were principally, if not solely, directed to practical morality. His favorite maxim, and that into which he resolved all practical morality, was 'bear and forbear,' ἀνέχου καὶ ἀπέχου. He appears to have differed from the Stoics on the matter of suicide. (Arrian, *Epict.* i. 8.) We are told by Arrian in his Preface to the 'Discourses,' that he was a powerful and exciting lecturer; and, according to Origen (*c. Cels.* vi. ad init.), his style was superior to that of Plato. It is a proof of the estimation in which Epictetus was held that, on his death, his lamp was purchased by some more eager than wise aspirant after philosophy for three thousand drachmæ. (Lucian, *adv. Indoct. libr. ement.*, tom. ii., p. 386.)

Though it is said by Suidas that Epictetus wrote much, there is good reason to believe that he himself wrote nothing. His Discourses were taken down by his pupil Arrian, and published after his death in six books, of which four remain. The same Arrian compiled the Encheiridion, and wrote a life of Epictetus, which has been lost. [ARRIAN.] Some fragments have also been preserved by Stobæus.

The best edition of all the remains of Epictetus is that by Schweighæuser, in six volumes, Leipzig, 1799. The same editor has published the Encheiridion, together with the Tablet of Cebes, in a separate volume. Coray published an edition of the Encheiridion, with a French translation by another hand, in the seventh volume of the Parerga of his Bibliotheca Græca, Paris, 1826, 8vo. There is an English translation of the Encheiridion, or Manual, by Mrs. Carter. (Bayle's *Dictionary*; Fabricii *Bibliotheca Græca*, ed. Harles. vol. v. p. 64.)

EPICU'RUS was born in the year 341 B.C., seven years after the death of Plato. He was born in the island of Samos, whither his father had gone from Athens in the year 352 B.C., among 2000 colonists then sent out by the Athenians. (Strab., xiv., p. 638.) He was however an Athenian born, belonging to the deme Gargettus, and to the tribe Ægeis. His father Neocles is said to have been a schoolmaster, and his mother Chæristrata to have practised arts of magic, in which it was afterwards made a charge against Epicurus that, when he was young, he assisted her. (Diog. Laert., x. 4.) Having passed his early years in Samos and Teos, Epicurus went to Athens at the age of eighteen. We are told that he had begun to study philosophy when only fourteen, having been incited thereto by a desire, which the teachers whom he had applied to had failed to satisfy, of understanding Hesiod's description of chaos; and that he began with the writings of Democritus. In Samos he is said to have received lessons from Pamphilus, a follower of Plato. (Suidas; Cic. *de Nat. Deor.*, i. 26.) At the time when Epicurus arrived in Athens, Xenocrates was teaching in the academy, and Theophrastus in the Lyceum; and we may suppose that he did not fail to avail himself of the opportunities of instruction which were thus within his reach. Indeed it was stated by Demetrius Magnes (Diog. Laert., x. 13) that Epicurus was a pupil of Xenocrates. He is also said, on the testimony of Apollodorus, to have received lessons from Lysiphanes and Praxiphanes; and again it is stated that he was a pupil of Nausiphanes. (Id. x. 14; Suid.) It was however Epicurus's wont to boast that he had learnt from no man but himself.

On the occasion of his first visit to Athens, Epicurus stayed there for a very short time. He left it in consequence of the measures taken by Perdiccas after the death of Alexander the Great, and went to Colophon to join his father. In his thirty-second year, 310 B.C., he went to Mitylene, where he set up a school. Staying only one year at Mitylene, he next went to Lampsacus, where he taught for four years. He returned to Athens in the year 306 B.C.; and now founded the school which ever after was named from him. He purchased a garden for 80 minæ, wherein he might live with his disciples and deliver his lessons, and henceforth remained in Athens, with the exception only of two or three visits to his friends in Asia Minor, until his death in the year 270 B.C. The disease which brought on his death was the stone. He was in his seventy-second year when he died, and he had been then settled in Athens as a teacher for thirty-six years.

Epicurus is said by Diogenes Laertius (x. 9) to have had so many friends 'that even whole cities could not contain them.' Pupils came to him from distant places, very many from Lampsacus; and while men often deserted other schools to join that of Epicurus, there were only two instances at most of Epicurus being deserted for any other teacher. So remarkably was this the case, (and it continued to be so as long as the Epicurean school lasted,) that it is related as a question put to Arcesilaus, 'why men change from other sects to that of the Epicureans, but never leave this?' (Diog. Laert., iv. 43.) Epicurus and his pupils lived together, in the garden which has been mentioned, in a state of friendship, which, as it is usually represented, could not be surpassed; abstaining from putting their properties together, and enjoying them in common, for the quaint yet significant reason that such a plan implied mutual distrust. The friendship subsisting between Epicurus and his pupils is commemorated by Cicero (*De Fin.*, i. 20). In this garden too they lived in the most frugal and virtuous manner, though it was the delight of the enemies of Epicurus to represent it differently, and though Timocrates, who had once been his pupil, and had abandoned him, spread such stories as that Epicurus used to vomit twice a day after a surfeit, and that many immodest women were inmates of the garden. (Diog. Laert., x. 6, 7.) An inscription over the gate of the garden told him who might be disposed to enter, that barley-cakes and water would be the fare provided for him (Senec., *Ep.* 31); and such was the chastity of Epicurus, that one of his principal opponents, Chrysippus, endeavoured to account for it, so as to deny him any merit, by saying that he was without passions. (Stob. *Serm.* 117.) Epicurus did not marry, in order that he might be able to prosecute philosophy with less interruption. His most attached friends and pupils were Hermachus of Mitylene, whom he appointed by will to succeed him as master of the school; Metrodorus, who wrote several books in defence of his system, and for whose children Epicurus in his will liberally provided; and Polyænus. Epicurus's three brothers, Neocles, Chæredemus, and Aristobulus, followed his philosophy; as also one of his servants, Mys, whom at his death he made free. Besides the garden in Athens, from which the followers of Epicurus in succeeding time came to be named the philosophers of the garden (Juv. *Sat.* xiii. 122, xiv. 319), Epicurus possessed a house in Melite, a village near Athens, to which he used often to retire with his friends. On his death, he left this house, together with the garden, to Hermachus, as head of the school, to be left by him again to whomsoever might be his successor.

Epicurus divided the whole field of knowledge into three parts, to which he gave the names respectively of *canonics*, *physics*, and *ethics*. The first two were subordinate to the third. The end of all knowledge, of ethics directly or immediately, of canonics and physics indirectly or mediately through ethics, was, according to Epicurus, to increase the happiness of man.

Canonics, which was a subject altogether introductory both to physics and ethics, treated of the means by which knowledge, both physical and ethical, was obtained, and of the conditions or (as they were called by Epicurus) *criteria* of truth. These conditions or *criteria* were, according to him, sensations (*αἰσθήσεις*), ideas or imaginations (*προλήψεις*), and affections (*πάθη*). From these three sorts of consciousness we get all our knowledge. What Epicurus then called canonics, viewed in relation to physics and ethics, is, viewed absolutely or in itself, psychology. Epicurus seems to have explained rightly the dependence of ideas upon sensations (Diog. Laert., x., 33); but in accounting for sensations, he, like Democritus, left the path of sound psychology, and introduced the fanciful hypothesis of emanations from bodies.

In physics he trod pretty closely in the footsteps of Democritus [DEMOCRITUS]; so much so that he was accused of taking his atomic cosmology from that philosopher without acknowledgment. He made very few and unimportant alterations; and of these Cicero remarks (*De Fin.* i. 6), 'Democrito adjicit perpauca mutans, sed ita ut ea quæ corrigere vult mihi quidem depravare videatur.' According to Epicurus, as also to Democritus and Leucippus before him, the universe consists of two parts, matter and space, or vacuum, in which matter exists and moves; and all matter, of every kind and form, is reducible to certain indivisible particles, atoms, which are eternal. These atoms, moving, according to a natural tendency, straight downwards, and also obliquely, have thereby come to form the different bodies which are found in the world, and which differ, in kind and shape, according as the atoms are differently placed in respect of one another. It is clear that in this system a creator is dispensed with; and indeed Epicurus, here again following Democritus, set about to prove, in an *à priori* way, that this creator could not exist, inasmuch as nothing could arise out of nothing, any more than it could utterly perish and become nothing. The atoms have existed always, and always will exist; and all the various physical phenomena are brought about, from time to time, by their various motions.

It remains to speak of the Epicurean system of ethics. Setting out from the two facts, that man is susceptible of pleasure and pain, and that he seeks the one and avoids the other, Epicurus propounded that it is a man's duty to endeavour to increase to the utmost his pleasures and diminish to the utmost his pains; choosing that which tends to pleasure rather than that which tends to pain, and that which tends to a greater pleasure or to a lesser pain, rather than that which tends respectively to a lesser pleasure or to a greater pain. He used the terms pleasure and pain in the most comprehensive way, as including pleasure and pain both of mind and of body; and he esteemed the pleasures and pains of the mind as incomparably greater than those of the body. Making, then, good and evil or virtue and vice depend on a tendency to increase pleasure and diminish pain, or the opposite, he arrived, as he easily might do, at the several virtues to be inculcated and vices to be denounced. And when he got thus far, even his adversaries had nothing to say against him. It is strange that they should have continued to revile the principle, no matter by what name it might be called, when they saw that it was a principle that led to truth. But even in our own age and country the same cry has been raised; and men, ignorant of the principles of the antient and of the modern philosopher alike, have endeavoured, by bringing to bear on it as a hard name the name Epicurean, to crush the philosophy of Bentham.

Though Epicurus dispensed with a Divine Being as creator of the world, he yet did not deny the existence of gods. That there was an inconsistency in this is obvious. But he professed that the universal prevalence of the ideas of gods was sufficient to prove that they existed; and thinking it necessary to derive these ideas, like all other ideas, from sensations, he imagined that the gods were beings of human form, hovering about in the air, and made known to men by the customary emanations. He believed that these gods were eternal and supremely happy, living in a state of quiet, and meddling not with the affairs of the world. He contended that they were to be worshipped on account of the excellence of their nature, not because they could do men either good or harm. (Cic. *De Nat. Deor.* i. 41; Senec. *De Benef.* iv. 19.)

The two chief sources of knowledge concerning the doctrines of Epicurus are the tenth book of Diogenes Laertius, and the poem of Lucretius 'De Rerum Naturâ.' In the first of these are letters from Epicurus himself to three of his friends, which give a brief account of all the parts of his system. Information is furnished also by the writings of Cicero, principally the 'De Finibus' and the 'De Naturâ Deorum;' by those of Seneca; and the treatise of Plutarch entitled 'Against Colotes.'

Epicurus was, according to Diogenes Laertius, a more voluminous writer than any other philosopher, having written as many as 300 volumes, in all of which he is said to have studiously avoided making quotations. All that now remains of his works are the letters contained in the tenth book of Diogenes Laertius, and parts of two books of his treatise on Nature (*περὶ φύσεως*), which were discovered at Herculaneum. The last were published at Leipzig in 1818, being edited by Orelli. A critical edition of the first two letters of Epicurus was edited by J. Glo. Schneider, Leipzig, 1813.

Diogenes Laertius is the principal authority for the life of Epicurus; brief and incidental notices are also supplied by Suidas, Cicero, Seneca, and Plutarch. There is an account of the life and defence of the character of Epicurus, in eight books, by Gassendi (Lugd. Bat. 1647), and a life by a Frenchman of the name of Rendal (Par. 1679). It is unnecessary to mention the accounts given in Fabricius, Bayle, and all the common histories of philosophy.

The Epicurean school was carried on, after Hermachus, by Polystratus and many others, concerning whom nothing particular is known; and the doctrines which Epicurus had taught underwent few modifications. When introduced among the Romans, these doctrines, though very much opposed, were yet adopted by many distinguished men, as Lucretius, Atticus, Horace; and under the emperors, Pliny the Younger and Lucian of Samosata were Epicureans. A list of Epicureans among the Greeks and Romans will be found in Fabricius, 'Bibliotheca Græca,' ed. Harles. vol. iii. p. 598-614.

EPICYCLE, a circle, the centre of which is carried round upon another circle: a term of the PTOLEMAIC HYPOTHESIS.

EPICYCLOID. [TROCHOIDAL CURVES.]

EPIDAURUS, a celebrated city of antient Greece, situated on the eastern coast of Argolis, on a small bay in the Saronic gulf, and surrounded by mountains on the land side. (Strabo, p. 374.) Its more antient name was Epicarus, and its earliest inhabitants were Carians, who were subsequently joined by some Ionians from Attica. (Aristot. apud Strab.) When the Dorians got possession of Argos, Epidaurus yielded without resistance to them, and admitted a Dorian colony under Deiphontes. (Pausan. ii. 26, 1.) The constitution of Epidaurus was originally monarchical; in the time of Periander of Corinth his father-in-law, Procles, was tyrant of Epidaurus. (Herod. iii. 53.) Afterwards the government was aristocratical; the chief magistrates were called Artynæ, or Artyni, as at Argos (Thucyd. v. 47), and were the presidents of a council of one hundred and eighty; the common people were termed *konipodes* (κονίποδες), or dusty-feet, in allusion to their agricultural pursuits. (Plutarch, *Quæst. Gr.* 1.) Epidaurus was the mother-city of Ægina and Cos, the former of which was once dependent upon it. (Strabo, p. 375.) As the chief seat of the worship of Æsculapius, Epidaurus was for a long period a highly important place. The temple of Æsculapius was situated at the upper end of a valley about five miles from the city, and was one of the richest and most renowned sanctuaries in Greece. In 293 B.C. it was so celebrated that during a pestilence at Rome a deputation was sent from that city to implore the aid of the Epidaurian god. (Liv. x. c. 47.) The temple was always crowded with invalids, and the priests, who were also physicians, contrived to keep up its reputation, for the walls were covered with tablets describing the cures which they had wrought, even in the time of Strabo. Near the temple was a remarkably beautiful theatre, built by Polycleitus (Pausan. ii. 27, 5), which is in better preservation than any other theatre in Greece, except that at Trametzus, near Joannina, and was capable of containing 12,000 spectators. Of the temple itself and the other buildings mentioned by Pausanias there are but few remains. (Leake's *Morea*, vol. ii., p. 423.) Epidaurus sent ten ships to Salamis, and 800 hoplites to Platæa. (Herod. viii. i. ix., 102.) The inhabitants were for a long time the allies of Sparta. (Thucyd. i. 105, ii. 56; Xen. *Hell.* iv. 2, 16, vii. 2, 2.) In the time of Aratus they joined the Achæan league. (Polyb. ii. 5.) The territory of Epidaurus was covered with vineyards in the time of Homer (*Il.* B. 561), and the vine is still cultivated on the site (Leake, *Morea*, ii. p. 430), which is indicated by a small village called Pidnavro.

There were two other cities of this name; one in Laconia, called Epidaurus Limera, which had also a well-known temple of Æsculapius. There are still some remains of the fortifications. (Leake's *Morea*, i. p. 211.) This Epidaurus had a capital harbour, from which, according to Apollodorus, it derived its name Limera. (Strabo, p. 368.) The third Epidaurus was a maritime city of Illyria, mentioned by Hirtius. (*De Bello Alexandrino*, c. 44.)

Coin of Epidaurus.
British Museum. Actual Size. Silver. Weight, 38½ grains.

EPIDEMIC (ἐπιδήμιος, *epidémius*; from ἐπὶ, in the sense of 'over' 'all through,' and δῆμος, 'people') diseases are those which prevail among a large portion of the people of a country, rage for a certain time, and then gradually diminish and disappear, to return again at periods more or less remote. Thus cholera and influenza lately prevailed as epidemic diseases in this country; and the continued fevers called synochus and typhus, and what are termed the eruptive fevers, as scarlet fever, the small-pox, the measles, frequently prevail as epidemics in different parts of the country. It is essential to the medical notion of an epidemic disease that it be dependent on some common and widely-extended cause, of a temporary in contradistinction to a persistent nature. [ENDEMIC.]

EPIDENDRUM, an old name for all the orchidaceous plants which grow upon the branches of trees, and which are now called Epiphytes. [EPIPHYTES.] In its modern sense, it is restricted to a considerable genus of the order with the labellum united to the column, and four pollen masses adhering to as many little straps bent back upon them. Some of them are showy and interesting, particularly E. Skinneri, oncidioides, cochleatum, aromaticum, bifidum, auropurpureum; but many are inconspicuous, and of no importance except to botanists.

EPIDERMIS, the external covering of the skin, commonly called cuticle. [SKIN.]

EPIDOTE (*Thallite, Pistazite*), a mineral which occurs crystallized, massive, and granular. The primary form of the crystal is an oblique rhombic prism, variously terminated and longitudinally striated. Its colour is of various shades of green, greenish grey, brownish yellow, and blackish red. The streak is greyish white. Specific gravity, 3.425 to 3.45. It is transparent or opaque. Lustre vitreous. Hardness, 6.0, 7.0. Fracture uneven. The massive varieties are amorphous; structure granular, compact, or fibrous. Before the blowpipe it fuses at the extreme points, then intumesces, but does not fuse even at a very high temperature. Epidote occurs in many parts of Europe, as in Norway, Switzerland, France, and England, and also in North America and the East Indies. According to Vauquelin, it consists of

Silica . .	37
Alumina . .	21
Lime . .	15
Oxide of iron .	24
Oxide of manganese	1·5
	98·5

EPIGRAM ('Επίγραμμα, *Epigramma*; from the Greek ἐπὶ, *on*, and γράφειν, *write*), in its proper sense, is—a writing on—an inscription; whence it comes to signify a short poem, such as might be comprised within the limits of an inscription. For an account of the class of poems called epigrams by the Greeks, see ANTHOLOGY; they are dedicatory, descriptive, amatory, elegiac; rarely humorous or satirical: and their merit consists 'in the justness of a single thought, conveyed in harmonious language.' (Preface to Bland and Merivale's *Anthology*.) Much of early Greek history was preserved in epigrams, to which Herodotus and Thucydides often refer; as for instance those concerning the battle of Thermopylæ (Herod. vii. 228), one of which is thus literally translated: 'Here once four thousand from Peloponnesus fought with three millions.'

The Latin epigram approaches nearer to the English acceptation of the term, being much oftener dependent for its merit upon humour and personality. The most distinguished Latin epigrammatists are Catullus and Martial, in whom there is much wit, disfigured by much scurrility and obscenity; but many of the epigrams of Martial are epigrams in the Greek sense, and some of them are characterized by a propriety of thought and felicity of expression that could not easily be surpassed. The Latin Anthology of Peter Burman the younger contains a large collection of epigrams, by numerous authors, of which many resemble in simplicity the Greek epigrams.

In English the word signifies a short poem, which, to be good in its kind, must be clear, concise, and elegant in expression, and must contain a point, *i. e.* some striking and unexpected turn of thought. Whether it be humorous or serious is indifferent. The following terse and elegant compliment addressed by Pope to Lord Chesterfield, on being asked to write with that nobleman's pencil, may serve as well as any for a specimen:—

Accept a miracle: instead of wit,
See two dull lines by Stanhope's pencil writ.

EPILEPSY, *epilepsis* (ἐπίληψις), 'a seizing.' Synonymes: *morbus divinus, herculeus, comitialis, caducus; falling sickness.* Sudden abolition of sensation and consciousness, with convulsions [Convulsion] of the muscles of voluntary motion, ending in a state of sopor or apparent sleep, the attack recurring in paroxysms more or less regular. The attack of epilepsy is usually quite sudden. The person, while in his ordinary health, and perhaps engaged in his usual occupation, utters a piercing scream. If standing, he falls to the ground, where he lies for a moment in a state of extreme rigidity, almost amounting to tetanic stiffness; but this state is quickly succeeded by convulsions, which variously agitate the limbs and the trunk of the body. The head is generally thrown backwards; the eyes are open, fixed, and staring; the pupils are dilated; the vessels of the head and neck are swollen, rendering the countenance flushed, and sometimes of a dusky hue; the muscles of the face are in violent action, producing frightful distortions of the countenance; the muscles that move the lower jaw close the mouth with violence, producing gnashing of the teeth; the tongue, which is swollen and livid, is thrust out forcibly between the teeth, and is often grievously wounded; the arms are sometimes tossed violently about the chest, or struck against it; the hands and fingers are in a state of rapid alternation, between the motions of flexion and extension; the lower extremities are agitated in a similar manner; the thumbs are drawn inwards, and the toes incurved; and a quantity of frothy saliva flows from the mouth, which is often bloody from the wounds inflicted on the tongue. The muscles on one side of the body are commonly more violently agitated than those of the other. Several cases are on record in which the muscular contractions were so violent that the bones of the limbs were broken, the teeth fractured, and the joints dislocated. Generally the convulsions have for a few moments some remission, when they are again suddenly renewed with great violence. The breathing is disordered in consequence of the convulsion of the muscles of respiration. At first heavy and difficult as if a load were placed upon the chest, it becomes at length quick, short, irregular, and storterous, and is often accompanied with sighing and moaning. The diaphragm, the muscles of the abdomen, and the muscular fibres of the bladder, contract with so much violence, that the fæces and the urine are discharged involuntarily and with great force. The pulse, always difficult to be felt, is commonly quick and small; but it becomes distinct towards the end of the paroxysm, and is then more slow and languid. The action of the heart is irregular, tumultuous, and loud, and the carotids throb vehemently. After the contractions of the muscles have continued for some time, the convulsions diminish in violence, and at length cease altogether. Perspiration breaks out about the head, neck, and breast; the convulsive respiration is followed by sighs, and the spasms of the muscles by subsultus. The patient is now restored to a slight degree of consciousness; but, as if exhausted by the violence of the struggle, he soon sinks again into a state of profound insensibility, and lies in a deep sleep. During the state of sleep, the perspiration becomes copious and general over the whole body; the pulse fuller, softer, and slower, and the respiration freer and easier. After a time the person awakes, sometimes suddenly, but in general it is only by degrees that sensation, consciousness, and the power of motion return. Commonly there is no consciousness whatever of anything that has passed during the paroxysm. On coming out of the fit there is generally headache, and always languor. The convulsive stage may last from one or two minutes to fifteen or twenty, and the sleep from one to several hours. The duration of the whole paroxysm is generally from five to ten minutes; but often two or three attacks follow each other in such rapid succession, that the paroxysm seems to be protracted for several hours. Occasionally death takes place unexpectedly in the midst of the fit, either in consequence of injury inflicted on the brain by congestion of the cerebral blood-vessels, or by the suspension of the respiration through the spasm of the muscles of the larynx, which close the opening of the glottis so completely and for so long a time as to induce the state of asphyxia.

Such are the general circumstances which accompany an epileptic attack, and the general form of the disease is pretty much the same in all the persons afflicted by it; the chief difference is in the slightness or severity of the phenomena, in which there is every possible variety from an attack so severe as to produce instantaneous death to one which is so slight that it can scarcely be perceived. Sometimes, for example, instead of the regular and violent fit just described, the seizure consists merely of loss of consciousness, slight rigidity, spasms or convulsions of a few muscles or of a single limb, the attack lasting only a minute or two. At other times the patient is seized with sickness or a sensation of faintness, the sight becomes dim, the recollection imperfect, and the power of voluntary motion so far impaired, that the person slips from his chair, or falls from his horse, and lies on the ground insensible, pale, perspiring, but without convulsions. Or the attack may be so slight that consciousness is not wholly lost; but the mind becomes confused, the power of articulation suddenly diminished, and instead of finishing the sentence he was uttering, the person continues to mumble for half a minute or a minute the last words he was attempting to speak, in a slow, monotonous, gibbering manner; and then recovering, he takes up the thread of his discourse, being soon aware of an interruption of consciousness, which interruption there is often an effort to conceal. This state is described by the persons subject to it as one of great mental distress and depression, like a frightful dream: they feel perplexed and afflicted by an imperfect reminiscence of some overwhelming calamity, or a sense of remorse for which they cannot assign a cause. A paroxysm of this kind is like a short mood of extreme melancholy, and such is the impression that the countenance of the patient, which is full of sadness, makes upon the spectator. These slighter paroxysms may recur only at very distant intervals; but they more commonly return often, and sometimes three or four times a day.

The return of the regular epileptic paroxysm is exceedingly various in different individuals. Several years may intervene between the seizures; or they may recur once every month, week, or day. It is stated that they sometimes recur periodically, and with remarkable exactness to the very day; once a year, or once a month. When they recur monthly, and observe a stated day, that day sometimes coincides with the new or full moon, a coincidence to which great importance was attached in former times. The interval of a lunar month is more commonly noticed among females, from the connexion of the disease with the uterine functions. In some instances, the paroxysms occur every week, on the same day; and occasionally every day, or night, at the same hour; but they most frequently come on when first falling asleep, and are often for a time unsuspected or overlooked. Sometimes several slight seizures take place in one day; but their recurrence is often extremely irregular. When they are neglected, they usually either become more and more severe, or occur after shorter intervals. Consciousness and sensation being abolished, pain cannot be felt during the fit.

Though the epileptic attack usually comes on suddenly, yet it sometimes gives distinct warning of its approach. The symptoms premonitory of an epileptic fit are analogous to those which precede an attack of apoplexy [Apoplexy], namely, headache, giddiness, flushing of the face, throbbing of the temples, drowsiness, sense of weight or heaviness of the head; flashes of light before the eyes, sleeplessness, fretfulness, irritability, or unusual cheerfulness and hilarity; disorders of the digestive organs, as voracious appetite, sickness, vomiting, constipation, or diarrhœa. But there is one peculiar sensation, termed the *aura epileptica*, of which many epileptics are conscious immediately before the fit. This consists of a feeling as if something were moving in some part of the limbs, or trunk of the body, and creeping thence upwards towards the head. Sometimes it is described as a sensation of a current of air, a stream of water, or a slight convulsive tremor; at other times no distinct idea can be given of the feeling further than that it is a sensation of something moving along. This remarkable sensation does not appear to follow very distinctly the course of a nerve, but it seems to pass along the integuments. When it reaches the head, the patient is instantaneously deprived of sense, and falls down in convulsions. The sensation arises in different parts of the body, in the toe, foot, leg, and groin; in the finger, hand, and arm; at the bottom of the spine; in the uterus, loins, abdomen, and chest. But, in the great majority of cases, the attack of epilepsy is preceded by no such warning; and even where the premonitory symptoms do exist, the attack does not by any means always follow.

Epilepsy rarely occurs in a person otherwise in sound health. Out of three hundred cases, the early history of each of which was carefully investigated, very few had been perfectly well previously to the accession of the disease. Convulsions during the first dentition, eruptions on the skin, mental excitement, diseases of the glands, chorea, hysteria, tremor, cramp, vertigo, palpitation, headache, flushing, bleeding from the nose, precede the first epileptic attack, and perhaps may be considered, at least in part, as predisposing causes of the malady.

As this disease is often long preceded by other maladies before tho actual seizure, so, after it has subsisted for some time, it induces a peculiar state of the constitution, and more especially, it would appear, in the nervous system, which predisposes to the recurrence of the attack, and the signs of which internal state are manifest in a peculiar expression of the external features. The eyelids become swollen: the eyes prominent and unsteady; the look vacant; the cheeks pale, the lips thick; and the individual features, however originally beautiful, grow coarse, and lose their fine expression. The steadiness and energy of tho mind progressively diminish; the purpose becomes irresolute, and the power of continuous application for the accomplishment of a given object is lost. Instances are recorded in which, though the disease recurred frequently for a long series of years, neither the memory nor any other mental faculty appeared to be impaired; but this is exceedingly rare. In general, in the severe and protracted cases, the following melancholy description, given by an antient author, is but two correct: 'If the disease be of long duration the patients become torpid, languid, and dejected; they avoid the sight and the society of men; time does not afford any mitigation of their sufferings; they are often oppressed with watchfulness, and when they do sleep they are terrified with horrible dreams; they loathe food, and digest with difficulty; their natural colour disappears, and changes to a leaden hue; they have a difficulty of comprehension, on account of torpor of mind and of sense; they are dull of hearing, are affected with a ringing of the ears and a confused sound in the head; tho tongue is unable to do its office, either on account of the nature of the disease, or from injuries which it may have received in the paroxysms; they are agitated by convulsions, and sometimes the mind is so disturbed by the complaint, that persons labouring under it become fatuous or idiotic.' It is an old observation that those who become insane at an early age are first epileptic; and it is certain that epilepsy often terminates in mania, a violent attack of mania often immediately following the epileptic paroxysm. 'Of 298 epileptics in the Salpêtrière, in 1813, 80 were maniacal, and 56 in various states of mental alienation and imbecility. In 1822, out of 339 cases in the same hospital there were 2 monomaniacs, 30 maniacs, 34 furious maniacs, 129 insane for some time after the paroxysms, 16 constantly insane, 8 idiotic, 50 upon the whole reasonable, but with impaired memories, and liable to occasional slight delirium and tendency to insanity, and 60 without aberration of intellect, but irascible, capricious, obstinate, and presenting something singular in their characters.' In this country a very common termination of epilepsy is apoplexy or paralysis.

Authors commonly divide epilepsy into two species: first, idiopathic, where the disease depends on some primary affection of the brain, and, secondly, sympathic, in which it depends on an affection of some remote part, as the stomach, the liver, the bowels, the generative organs, the circulating system, &c.

Tho state of the brain on which epilepsy depends is unknown. Dissection shows that the brain of the epileptic is seldom sound; but much as this subject has been investigated, little light has hitherto been shed upon the pathology of the brain as connected with this disease. The most common morbid appearances are the thickening of the bones of the skull; spiculæ or morbid growths of the bone from the inner table of the skull; vascular turgescence, or inflammation of the membranes of the brain; preternatural hardness or softening of the substance of the brain and of the spinal cord; effusion of serum, blood, jelly, or pus between the membranes, upon the surface or into the ventricles of the brain; tumors or morbid growths in its substance; adventitious deposits, as tubercles, or parasitic animals, as hydatids. Recent researches appear to indicate that the parts of the brain which most commonly undergo morbid changes of structure in this disease are the parts more immediately in the neighbourhood of the sphenoid bone, and especially the pineal and the pituitary glands, and particularly the latter. But occasionally, where violent epilepsy has existed during life, the most careful examination of the brain after death has led to the discovery of no appreciable change in its structure; while even the morbid appearances which are manifest are often observed to be present without being accompanied with epilepsy; so that the relation between any known morbid change in the structure of the brain and epilepsy is not yet certainly established. It follows, as has been stated, that nothing is really known of that condition of the brain which causes epilepsy.

But many of the causes of the malady are well ascertained, and the knowledge of these is of great importance in the prevention and cure of the disease. It is conceived that there is a constitutional predisposition to epilepsy, although it does not seem easy to assign with exactness in what this predisposition exists. Several of the exciting causes are weak impressions which are applied to most persons with little or no effect. 'I conclude therefore,' says Cullen, 'that the persons affected by those causes are more easily moved than others, and therefore that in this case a certain mobility gives the predisposition. It is clear that there is a greater mobility of constitution in some persons than in others, as is manifest in the state of the mind. If a person is readily elated by hope and as easily depressed by fear, and passes equally and quickly from the one state to the other; if he is easily pleased and prone to gaiety, and as easily provoked to anger and rendered peevish; if liable from slight impressions to strong emotions, but tenacious of none; this is the boyish temparament, *qui colligit ac ponit iram temere, et mutatur in horas*; this is the *varium et mutabile fæmina*; and, both in the boy and woman, every one perceives and acknowledges a mobility of mind. But this is necessarily connected with an analogous state of the brain; that is, with a mobility, in respect of any impression, and therefore liable to a ready alternation of excitement and collapse, and of both to a considerable degree. There is therefore, in certain persons, a mobility of constitution, generally derived from the state of original stamina, and more exquisite at a certain period of life than at others; but sometimes arising from, and particularly modified by, occurrences in the course of life. And this mobility consists in a greater degree of either sensibility or irritability.' Dr. Cheyne conceives that epilepsy is as certain a manifestation of tho strumous diathesis as tubercular consumption, psoas abscess, hereditary insanity, or certain congenital malformations or defects of organization which are inherited only from scrofulous parents. Epileptic patients are of the habit of body in which scrofula occurs. It is an hereditary disease. If due inquiry be made, it will generally be found that although the direct progenitors, father or mother, may have escaped, yet that some member of the family, uncle or aunt, grandfather or grandmother, has been subject to fits; and if epilepsy occur for the first time in a family it is probably in consequence of the strumous diathesis having been exalted by the intermarriage of two persons inheritors of that condition or tendency of the constitution, and which it has been in a yet more remarkable degree if the parents were of the same blood and nearly related; we may then expect, if an epileptic patient has several brothers and sisters, that his case will not be a solitary one in the family.

The exciting causes consist of two classes, those which act by exciting the energies of the brain, and those which act by depressing the brain. Those which act by over-stimulating the brain are mechanical, chemical, and mental stimulants, and the peculiar stimulus of over-distention; as sharp-pointed ossifications, arising either from the internal surface of the cranium or formed in the membranes of the brain; powerful mental emotions, such as joy and anger; congestion of the blood-vessels of the brain; suppressed discharges; violent exercise; too large a quantity of highly nutritious food or of stimulating drink. 'I have observed,' says Fothergill, 'that epileptics are often extremely incautious with respect to diet; that children highly indulged are liable to the disease; that in every other period of juvenescence, and in middle-aged adults, if they were attacked with the disease, it was when they had either committed some excesses or by one means or another were plethoric, and that in habits subject to epilepsy, the disease seldom recurred without either an habitual indulgence in eating or a neglect of necessary exercise.'

But the very opposite causes, those which manifestly weaken the energy of the brain, occur in epilepsy, as hemorrhage, whether spontaneous or artificial; terror, horror, disgust; any powerful and disagreeable sensations, and especially certain disagreeable odours; excessive evacuations, great fatigue, inanition, and sedative poisons.

The medical treatment of a case of epilepsy must of course differ essentially according as it is idiopathic or sympathic, and connected with a plethoric and robust, or debilitated and exhausted state of the system. Unless he previously ascertain the condition of the brain and spinal cord, or the nature of the affection of the remote organ in sympathy with which the brain is suffering, the practitioner must work entirely in the dark, and must be liable to adopt the very opposite course of treatment to that which the case really requires. When the appropriate remedies are judiciously employed, and the proper regimen is strictly adhered to, epilepsy is often permanently cured, and the suffering is greatly mitigated even in those forms of the disease which do not admit of cure. Dr. Cheyne has laid down some excellent rules for the management of epileptic patients, of which, as they are of a popular nature, and applicable to the great majority of cases, we give the substance.

In prescribing a rule of diet suitable to all epileptics, moderation in quantity and simplicity in the preparation of the food are indispensable points. The diet best calculated to preserve an individual liable to scrofula from an attack of that disease is best suited to a patient liable to epilepsy. Fermented liquors should in general be altogether withheld. Flesh-meat ought to form the principal part of one if not two meals in the day; and milk, if it do not retard digestion, which it is less liable to do when fermented liquors are laid aside, is the article next in value. The epileptic ought to be trained so as to be in good wind, so as to put his muscles in a state of the utmost strength and firmness. Epileptics should be put under a regular course of training like the athletæ of antient, and the gentlemen of the fancy in modern times. When the patient leaves his bed in the morning, he may have a rusk or a slice of toasted bread with an egg beat up in a teacup full of warm water; then let him dress, make all needful arrangements, and walk three or four miles. Two hours or more after he has left his bed, let him have his second meal, milk or cream in water, or cocoa with bread a day old and butter. Rest for three hours after breakfast. This will be the best time to devote to business or education. Then he must again walk, if an adult possessed of sufficient vigour, from five to eight miles. At from five to six hours after his second meal, let him have a third, consisting of meat of the best quality, mutton, poultry, game, or very tender beef, roasted or boiled, of which an adult must not eat more than six ounces; bread, and one moderate helping of tender well-boiled vegetables; of drink, not more than a common tumbler full of distilled water, Seltzer water, with a little milk, or toast and water. Then rest for two hours; that is, stroll in a garden, read an amusing book, or engage in any occupation which will not raise the pulse by one beat; then resume more active exercise for an hour or two. In five or six hours after dinner, a light supper may be taken, consisting of not more than four ounces of meat with bread, or of a cup of milk with a water biscuit. The rest of the evening may be spent in cheerful society, in a large airy room, not over lighted nor over heated, but sufficiently warm to prevent that chill which in the latter part of the day often follows very active exercise; and every occupation by which the mind is depressed or is excited, and thereby subsequently exhausted, must be avoided. The patient must be in bed at eleven and up at six, nothing in general being more hurtful to epileptics than sleep unnecessarily prolonged.

The scalp in all epileptics ought to be shaved once a week, and daily well rubbed with a flesh-brush after the tepid shower bath, or, what answers nearly as well, after pouring a flaggon of tepid water on the head inclined over a large basin. The patient may gradually bring himself to sleep without a night-cap and without curtains, with the shoulders and head raised and the feet well protected from the cold, in a chamber as large and airy as possible and without a fire.

A patient liable to epilepsy must not be permitted to ride nor to hold the reins in a carriage. The grates in all the apartments which he frequents ought to be guarded by a deep and strong fender; he ought to avoid the streets of a crowded city, in which the whirl of carriages, the tide of human beings, and the multiplicity and distraction of objects produce a vertiginous hurry of thought, which to him is ever dangerous. He ought not to walk near water. A fine young man of twenty came to an untimely end in his own garden, by falling into a runnel, in which he was drowned, although the water was not more than four inches deep.

If an attack of the disease come on while the patient is in his chamber, he ought immediately to be laid on his back on a bed, with an attendant standing on each side to prevent him from injury during the struggle. If he is much flushed, his head and shoulders ought to be elevated, the warmth of his extremities supported, while at the same time air is freely admitted into the room. All attempts to make him swallow or to stimulate the nostrils are improper. A medical practitioner ought to be sent for, and ought to remain in attendance while the struggle lasts. In a first attack, if the fit is severe, blood ought to be procured from the temporal artery, a precaution which will also be necessary in patients of an apoplectic diethesis whensoever they labour under a prolonged fit of apoplexy. (Cheyne, *Cyclopæd. of Pract. Med.*; Copland, *Dict. of Pract. Med.*; Prichard, *Diseases of the Nervous System*; Cooke, *Hist. and Method of Cure of the various Species of Epilepsy.*

EPILOGUE (ἐπίλογος, epilogus) (compounded of ἐπὶ, *on* or *after*, and λόγος, *speech*) signifies, in Greek, a summing up, the end or peroration of a discourse. In English it is applied only to the short poems or copies of verses (invariably, we believe, written in the heroic couplet) which formerly were commonly subjoined to new plays, and recited on the stage at their conclusion. An epilogue is usually written in a lively tone, with such allusions to the play, the author's circumstances, the news or fashions of the day, or other subjects of existing interest, as are thought likely to conciliate favour, and send the audience away in good humour. 'If it be true that good wine needs no bush, 'tis true that a good play needs no epilogue: yet to good wine they use good bushes, and good plays prove the better by the help of good epilogues.' (*As You Like It.*)

EPI'MACHUS. [PROMEROPIDÆ.]

EPIME'NIDES was born in the year 659 B.C. (Suidas), at Phæstus, in Crete, according to some accounts; or at Cnossus, according to others; at all events, he was a citizen of the latter place, though his father appears to have been a Phæstian. (Diog. Laërt., i. 109.) He passed his youth in solitary retirement, which is explained in the antient account as a supernatural sleep into which he fell when a youth, and did not awake till more than fifty years after, when he made his appearance among his fellow-citizens with long hair and a flowing beard, and with knowledge of medicine and natural history, which then appeared more than human. The event of his life for which he is best known, was his visit to Athens at the request of the inhabitants, in order to pave the way for the legislation of Solon by purifications and propitiatory sacrifices. These rites were calculated, according to the spirit of the age, to allay the feuds and party dissensions which prevailed there; and although what he enjoined was mostly of a religious nature (for instance, the sacrifice of a human victim, the consecration of a temple to the Eumenides, and of two altars to Hybris and Anædeia, the two evil powers which were exerting their influence on the Athenians), there can be little doubt but that his object was political, and that Solon's constitution would hardly have been accepted had it not been recommended and sanctioned by some person who, like Epimenides, claimed from men little less than the veneration due to a superior being. The Athenians wished to reward Epimenides with wealth and public honours, but he refused to accept any remuneration, and only demanded a branch of the sacred olive-tree and a decree of perpetual friendship between Athens and his own country, Cnossus. Epimenides visited Athens about the year 596 B.C., and died soon after his return to Crete. He wrote a poem on the Argonautic expedition, and other works, which are entirely lost. For a more detailed account of this remarkable personage the reader is referred to C. F. Heinrich's *Epimenides aus Kreta*, Leipzig, 1801.

EPINAL, a town in France, the capital of the department of Vosges. It is on the bank of the Moselle, about 190 miles in a straight line, east by south of Paris, 232 miles by the road through Meaux, Château Thierry, Epernay, Châlons sur Marne, Bar sur Ornain (otherwise Bar le

Duc), Domremy, and Mirecourt; or 243 miles through Bar sur Ornain, Nancy, and Charmes.

No mention occurs of Epinal earlier than the end of the tenth century, when it was the residence of the bishops of Metz: the lordship however passed subsequently into the hands of the dukes of Lorraine. It was formerly well fortified, and had a fine castle; but the fortifications have been rased.

The town is situated at the foot of the chain of the Vosges, and in a district abounding with delightful situations. The rapid stream of the Moselle, whose clear and shallow waters here roll over a bed of large pebbles, divides the town into two unequal portions: the part on the right bank is called 'la Grande Ville;' it is at the foot of an eminence on which stand the ruins of the castle: the part on the left bank is called 'la Petite Ville;' it is on an island formed by the main channel of the Moselle, and a smaller arm of that river: on the left bank of this arm is a suburb, formerly named 'the Suburb of the Capuchins,' from a convent of the monks of that order. The streets of Epinal are well laid out. The office of the prefect is the finest edifice in the place; the court of justice is tolerably handsome; the church is of Gothic architecture, mingled with some parts in the style of a later age. There is a theatre; also an hospital on an eminence on the right of the Moselle. There are some public walks. The population in 1832 was 8670 for the town, or 9070 for the whole commune. The manufactures are lace, paper, and earthenware; and, in the neighbourhood, block tin, wrought iron, paper, earthenware, and leather. There are several establishments for the purposes of public instruction, a library of 17,000 volumes, a collection of paintings and antiquities, and a drawing-school.

The neighbourhood produces wheat, rye, oats, buckwheat, peas, lentils, Jerusalem artichokes, hemp, and flax: and trade is carried on in the town in grain, wine, oil, fir planks (for sawing which there are several yards round Epinal), linen yarn, linen cloth, and cattle. The arrondissement of Epinal had in 1832 a population of 91,578.

EPIPHA'NIUS, SAINT, a Christian bishop and author of the fourth century, was born of Jewish parents at a village called Besanducan, near Eleutheropolis, in Palestine. He spent his youth under the discipline of the Gnostics in Egypt, where he acquired a great fondness for the monkish asceticism then so prevalent in that country. Having become a zealous disciple of Hilarion, the patriarch of the monks of Palestine, he founded and long presided over a monastery near his native village. About the year 368 he was made bishop of Salamis, the metropolis of the island of Cyprus, where he continued about 36 years, and composed most of his writings. His spirit of opposition was especially excited by the Platonic doctrines of the learned and laborious Origen, against which he wrote and preached with implacable bitterness. On this subject he hotly quarrelled, in 391, with John, bishop of Jerusalem, who favoured Origen's views; but he found in Theophilus, the violent bishop of Alexandria, a worthy coadjutor, who in 399 convened a council, and condemned all the works of Origen. Epiphanius himself then called a council in Cyprus A.D. 401, and reiterated this condemnation, after which he wrote to St. Chrysostom, then bishop of Constantinople, requesting him to do the same; and on finding this prelate disinclined to sanction his violent proceedings, he forthwith repaired to Constantinople for the purpose of exciting the bishops of that diocese to join in executing the decrees which his Cyprian council had issued; but having entered a church in the city in order to repeat his anathemas, he was forewarned by Chrysostom of the illegality of his conduct, and was obliged to desist. Exasperated at this disappointment, he applied to the imperial court for assistance, where he soon embroiled himself with the Empress Eudoxia; for, on the occasion of her asking him to pray for the young Theodosius, who was dangerously ill, he replied that her son should not die provided she would not patronise the defenders of Origen. To this presumptuous message the empress indignantly answered, that her son's life was not in the power of Epiphanius, whose prayers were unable to save that of his own archdeacon, who had recently died. After thus vainly endeavouring to gratify his sectarian animosity, he resolved to return to Cyprus, when, according to Sozomen (lib. 8, cap. 15), the following farewell colloquy occurred between the bishop of Salamis and the bishop of Constantinople:—'I hope,' said Epiphanius to Chrysostom, 'you will never die a bishop.' Chrysostom, returning the compliment, replied with equal courtesy, 'I hope you will never get back to your own country;' and it is remarkable that each of these malevolent wishes was accomplished; for Chrysostom was deposed, and died in exile, and Epiphanius died at sea, on his passage to Cyprus, A.D. 403. His works in Greek were first printed in fol. at Basle, in 1544. Several editions, with a Latin translation by Cornarius, subsequently appeared at Basle and at Paris during the sixteenth century; but the best is by Petavius, who made a new Latin translation of the Greek text, and added a biography of the author and critical notes. This edition is in 2 vols. fol., Paris, 1622, and Cologne, 1682. In the 'Epiphanii Opuscula, ex editione Petavii,' are some very curious and valuable old prints. The principal works of Epiphanius are, 1. The Πανaριον, Panarion, or a treatise on Heresies, that is, peculiar sects (αἵρεσις). This is the most important of the author's writings. It treats of 80 sects, from the time of Adam to the latter part of the fourth century. The first section of the first of the three books into which the treatise is divided contains an account of 20 heretical sects before the birth of Christ; the remaining portion is occupied with the description of 60 heresies of Christianity. 2. 'Anacephalæosis,' or, an Epitome of the Panarion. 3. 'Αγκυρωτὸν, Ancoratus,' or, A Discourse on the Faith; explaining the Doctrine of the Trinity, Resurrection, &c., in confutation of the Pagans, Manicheans, Sabellians, and Arians. 4. A Treatise on the antient Weights, Measures, and Coins of the Jews, with a Catalogue of Canonical Scriptures. Besides these there are several treatises and epistles, some of which are falsely attributed to Epiphanius. (See Riveti *Crit. Sacr.* c. 28 and 29.)

Epiphanius was an austere and superstitious ascetic, and, as a bitter controversialist, he often resorts to very false arguments for the refutation of heretics. That his inaccuracy and credulity were equal to his religious zeal is apparent from his numerous mistakes in important historical facts, and his reliance on any false and foolish reports. He gravely relates the story of the seventy-two translators having been shut up each in a separate cell for the production of the Greek Septuagint version of the Hebrew Scriptures; and in the 'Panarion' (Heres. 39) he observes, that the Devil, before the coming of Christ, lay quietly by, in expectation of being pardoned; but that, finding no chance of salvation from the Saviour, he at once became fearfully refractory, and has ever since done his utmost to occasion all possible mischief to Christ and his church. Jerome admires Epiphanius for his skill in the Hebrew, Syriac, Egyptian, Greek, and Latin languages, and accordingly styles him, Pentaglottos (πεντάγλωττος), or the Five-tongued; but Scaliger calls him an ignorant man, who committed the greatest blunders, told the greatest falsehoods, and knew next to nothing about either Hebrew or Greek. However, his writings are of great value as containing numerous citations from curious works which are no longer extant. (Du Pin, *Bibliothèque Eccles.* tom. 2; Cave's *Lit. Hist.*; Bayle's *Dict.*; Dr. A. Clarke's *Succession of Sacred Literature.*)

EPIPHANY, from the Greek 'Επιφάνεια (*Epiphaneia*), appearance, or manifestation, a church festival, celebrated on the twelfth day after Christmas, in commemoration of our Saviour's being manifested to the world by the appearance of a miraculous star; likewise denominated Twelfth Day. This day is said to have been first observed as a separate feast in the year 813. The customs of this day, though various in different countries, all agree in the same end, namely, to do honour to the eastern magi, or kings, who visited and made offerings to our Saviour at his birth. (Brady's *Clavis Calendaria*, 8vo., London, 1812, vol. i., p. 145; Brand's *Popular Antiq.*, 4to. edit., vol. i., p. 18.)

EPIPHYLLOSPERMOUS PLANTS, so called by the old botanists, because they bore their seed upon the back of their leaves. They are what have more recently been called dorsiferous ferns. [FILICES.]

EPIPHYTES are plants found growing upon other vegetables, adhering to their bark and rooting among the scanty soil that occupies their surface, in which respect they are distinguished from parasitical plants, which, like Miseltoe and the various species of Loranthus, strike their abortive roots into the wood, and flourish upon the blood of the individual to which they attach themselves. In this sense of the word, mosses, lichens, ferns, and plants of many other families, are epiphytes; but as in this country at the present day the word is principally employed with reference to those Orchidaceæ which grow upon trees, it is to plants of that description that we propose to devote the present article.

It had long been known, from the reports of travellers, that orchidaceous epiphytes were plants of extremely curious organization, and that great numbers were also remarkable for the singular beauty and fragrance of their flowers; but when imported into this country, their habits were found to be so unlike those of other plants, that no gardener could succeed in keeping them even alive for any considerable time, except in a very few instances; and it was not till about the year 1820 that the real method of managing them successfully began to be understood. About that time the late Mr. Cattley and the writer of this notice began to direct their attention to the subject with some success: since that period the difficulties of cultivating orchidaceous plants have been gradually disappearing, and at the present day they may be said to be almost entirely overcome; so that in the gardens of the duke of Devonshire at Chatsworth, of Mr. Bateman at Knypersley, of Lord Fitzwilliam at Wentworth, of Mr. Harrison of Liverpool, and of many other amateurs, they have acquired a beauty quite unknown to them in a wild state. Species which in their native woods yield no more than two or three of their curious blossoms in a cluster have been found to produce from nine to between twenty and thirty, and the whole order has in short been found willing to submit to domestication with as much advantage as has ever attended roses, hyacinths, tulips, or dahlias, — those well-known flowers which we have from time to time reclaimed from their wild habits, and by the arts of cultivation invested with a splendour of appearance that never could have been anticipated from their original appearance in a savage state. Previously to the year 1820 it is doubtful whether any garden in England could at any one time have produced twenty species of these plants, and now at least a thousand are successfully preserved in the collections of the Messrs. Loddiges, Rollisson, Knight, and other nurserymen near London.

We do not propose in this place to give any botanical account of these curious plants; for such particulars we refer to the article on **ORCHIDACEÆ**. Upon the present occasion we shall confine ourselves to an account of their natural habits, and of those methods of cultivation which appear to have met with so much success. In preparing the following account, we depend in part upon our own experience, in part upon the information contained in the writings of botanical travellers, and in part upon the useful communications which within the few last years have been made to the current horticultural publications, especially the 'Transactions of the Horticultural Society' and the 'Gardener's Magazine.'

Orchidaceous Epiphytes grow naturally upon trees in the recesses of tropical forests. They establish themselves upon the branches, and either vegetate amidst masses of decayed vegetable and animal matter, or cling by their long succulent grasping roots to the naked branches of trees, from which and the humid atmosphere together they exclusively derive their food. It appears from the testimony of Mr. Henchman that they are never found upon dead erect trees in forests; but if upon dead wood at all, then only upon fallen trunks, which, from their situation near the ground, are constantly damp. Such situations are, however, said to be by no means favourable to their growth. They will also flourish upon rocks and stones in hot and damp climates. Mr. W. Harrison of Rio Janeiro is said, by one of the Horticultural Society's collectors who visited him, to have cultivated with the most perfect success above seventy species upon a wall in his garden at Boto Fogo.

We even see some of them germinate and grow most luxuriantly in damp places, in the stove, upon the sides of the garden-pots, and among gravel; some genera, such as Brasavola, are even reported to prefer stones; and Dr. Wallich found them in all cases growing equally well in Nepaul upon trees and stones, provided the latter had a certain quantity of mould and moss adhering to them. In the botanic garden at Calcutta they are said to be cultivated with success in raised beds of solid brickwork, so contrived as to insure a perfect drainage; the soil being rich vegetable matter mixed with at least two-thirds small pebbles, and covered with a dense layer of moss. A certain quantity of shade seems, in many cases, essential to them, their natural situation being in forests, or among the branches of growing trees. In Brazil numbers of them occupy damp woods and rich valleys, among vegetation of the most luxuriant description, by which they are embowered. Reinwardt describes others as inhabiting in great abundance those deep shady gloomy forests which form the lower zone of vegetation in Java, where the air is heavy and damp with vapours that cannot ascend, and where the thickness of the vegetation is really frightful; where, in short, heat, moisture, and a most extraordinarily deep and rich vegetable soil combine to produce wood of a fungus-like softness and an inconceivable abundance of twining plants and epiphytes. In those forests more especially where huge fig-trees constitute the principal part of the timber, intermingled with the most tropical forms of vegetation, such as sterculiaceæ, sapindaceæ, and artocarpeæ, tufts of orchidaceous plants abound, in company with araceæ, acanthaceæ, and zingiberaceæ.

In Nepaul Dr. Wallich states that orchidaceous epiphytes grow in company with ferns; and the thicker the forest, the more stately the trees, the richer and blacker the natural soil, the more profuse the orchidaceæ and ferns upon them. There they flourish by the sides of dripping springs in deep shady recesses, in inconceivable quantity, and with an astonishing degree of luxuriance. It would however be a great error to suppose that it is only in very shady places that orchidaceous epiphytes appear. On the contrary, it is probable that the cases just cited are extreme, and that they more commonly prefer situations where the broken rays of the sun can readily reach them. Mr. John Henchman states (*Gardeners' Mag*. ii. 139) that he has observed in Demerara 'that orchidaceæ appear to rejoice in a light situation and a free circulation of the atmosphere; but are decidedly adverse, with few exceptions, to exposure to the intense rays of the sun. We may except from this remark oncidium luridum, the catasetums, and a fine pseudo-bulb found on the Spanish Main (which I suppose to be an epidéndrum), which seem not only to exist, but to rejoice, in exposure to the sun.' Mr. Bateman also found, from the report of his collector, Colley, that the situations in which they are most usually seen are those parts of a forest where old and broken wood occurs, or on the skirts of savannas. These savannas are large open breaks in the woods, covered with fine white sand, which has, at night, the appearance of snow. They contain also many low and stunted bushes. The orchidaceæ seem to like an airy and exposed dwelling-place; being found on the more prominent parts of a tree, and not in the shade, as is generally supposed. Mr. Colley only found in one instance an orchidaceous plant in the heart of a forest, and this was growing on the prostrate trunk of a tree so rotten as to fall to pieces when pressed with the foot. (*Gard. Mag*. ii. 4.)

This quite corresponds with the statements of travellers in Brazil, who speak of their occurring most abundantly in open glades of the forests, and on the faces of naked rocks, or on shaded banks, although they are also met with 'in sombre glades where heated vapours are incessantly circulating.'

Where the climate suits them, they are sometimes prodigiously numerous. Descourtilz, in his manuscripts, speaks of a whole tree being overrun with a single species; and Henchman also assures us that in Demerara masses of oncidium altissimum and maxillaria parkeri are to be seen, which would defy any attempt at intrusion; on the Spanish Main he saw the epiphyte commonly called the spread eagle, which will possibly prove an epidendrum, clasping enormous trees, and covering them from top to bottom; and he also met with two or three species, supposed to be maxillarias, which were growing with uncommon vigour. But, he adds, 'with the above exceptions, I have not found orchidaceæ growing in such quantities as it has been reported they do; often, as Mr. Bateman justly observes, single specimens only are to be obtained. This cannot be more strongly illustrated than in the case of a beautiful oncidium, which I was happy enough to meet with on the Spanish Main; its leaves are nearly six inches in width, of a very firm texture, and possessing an uncommonly strong nerve; and though the plant, judging from the remains of the original stem, which had gradually decayed as the plant progressed, must have occupied its station for nearly half a century, yet I searched the neighbourhood in vain for another specimen, nor did I see another plant of it on the Main.'

This altogether corresponds with what we know of such plants in other countries, and with the general habit of the whole order, which is extremely local in the majority of cases

Upon comparing the orchidaceous plants of Java, of Ceylon, and of the Burmese country, it is quite extraordinary how few species those countries possess in common; and the quantities of species found exclusively in every large collection are a corroboration of the same fact. Mr. Bateman assures us that in Guiana 'a river may be ascended for twenty miles without an orchidaceous plant being seen; while, on a sudden turn of the stream, every tree becomes covered with them: yet they do not appear to have a favourite aspect; for on some of the rivers which Mr. Colley visited he found them exclusively on the northern exposure, while on others they occupied the southern.' The part of the tree on which they are principally found is as uncertain as their station. It is said that they love the loftiest branches, and are hardly found near the bottom, and M. Descourtilz confirms this statement by describing some of them as swinging in the air from the top of the old patriarchs of the forest, or exposed to all the violence of storms in the most exposed situations. But Mr. Henchman asserts that in Demerara at least they 'do not grow in such high situations upon trees as is generally supposed. Twenty or twenty-five feet is the greatest height, with few exceptions, at which I have seen them growing. Some of the bulbless epidendrums, the spread eagle plant, and oncidium papilio, attain a much greater height. The other oncidiums I have not seen growing above seven feet or eight feet from the ground, and generally on some of the small closely interwoven branches, and not on the stem or main branches of the tree. The various species of Gongora, Coryanthes, and Rodriguezia, are, almost without exception, found in the same position; while, again, the genera Maxillaria, Fernandesia, Epidendrum, Ceratochilus, Cattleya, Zygopetalon, Brassavola, Ornithidium, Camaridium, Pleurothallis, Brassia, Ornithocephalus, Trizeuxis, Catasetum, and many other genera supposed to be new, I have found always attached to the trunk or strong limbs of the tree, which they clasp with surprising tenacity. It may be also observed that rough and soft barked trees are favourite habitats of orchidaceæ. The calabash tree, which has a peculiarly soft and woolly bark, often possesses many of the more minute species. Indeed, I sent home pieces of the calabash tree, about a foot long, on some of which were six and on others seven distinct species of orchidaceæ.'

A high mean temperature throughout the year, and a climate either constantly humid or at least periodically so, are also atmospheric elements eminently favourable to the production of these plants. All those species which simply exist clinging by their roots to the branches of growing trees, and probably others also, must necessarily derive their nourishment in a great measure, if not entirely, from the moisture, in a very elastic state, that surrounds them. And although nature seems in general to have provided for the scantiness of their food by the construction of them with a cuticle only capable of parting by slow degrees with the fluid they receive by their roots, yet it is obviously requisite that they should be so situated as to be within reach of an abundant supply, not only at the time when they are growing, but also at all other times to a certain extent. Hence we find that the hottest countries if dry, and the dampest if cold, are destitute of them, while there is no instance of a country both hot and damp in which they are not plentiful. For example, in Africa they are unknown in its sandy deserts and parched atmosphere, notwithstanding the high temperature of that part of the world; yet they abound in Sierra Leone, where the climate is damp, and even at the Cape of Good Hope they occur not unsparingly in all that jungly district to the eastward of the Cape Town to which the name of Outniqualand is applied.

In the West India Islands they exist in great quantities, particularly in Jamaica and Trinidad, not however so much on the coast as upon the lower ranges of hills. This is in conformity with their habits elsewhere: in these islands the air of the level of the sea is dry, while that of the mountains is humid. Captain Sabine found the air of the level of the sea at Trinidad indicate 5° of dryness, and that of Jamaica 7°; while the atmosphere was saturated with humidity in the first of these islands at 1060 feet above the level of the sea, and in the second at an elevation of 4080 feet. At Rio Janeiro the mean temperature is 74° 3′, and much higher inland; the woods are so damp that it is difficult to dry plants; and in such situations multitudes of orchidaceous epiphytes spring up. But in the immediate vicinity of Buenos Ayres, where the mean temperature is 67° 6′ and the air dry, they are unknown; and in the high dry land of Mendoza, where the aridity is still greater, the whole order disappears, with the exception of a single species. On the west coast of South America, as high as Lower Peru, orchidaceous epiphytes are unknown, a circumstance which is not surprising when we consider the effect of the currents setting round Cape Horn, which bring the mean temperature of even Lower Peru itself down to 60° at night, and how arid the whole of that region is, with the exception of a few valleys. No country however exhibits in a more striking manner than India the necessity of a hot and damp climate for the production of orchidaceous epiphytes. In the Malayan Archipelago, the mean temperature of which is estimated at between 77° and 78°, and is very damp, they are found in profusion. In Nepaul it is upon the sides of the lower mountains that they occur, where they vegetate amongst clouds and constant showers; while on the continent of India they are almost unknown, their place being occupied by parasitical Loranthi. The traveller finds himself in the morning on the dry plains of Hindustan, where the mean temperature is 80°, and where all the trees are destitute of orchidaceæ; and at noon he is at the foot of the first range of the Nepaulese hills, where every tree teems with that class of plants. There are however places on the continent of India where they are not less numerous than in Nepaul; at the æstuaries of the Ganges, the Brahmapootra, the Irawaddi, and the rivers of Martaban, they exist in vast quantities: but all these stations are excessively damp. In the Botanic Garden at Calcutta they grow most vigorously during the rainy season, but in the fiercely hot season, which begins in March and lasts till the 10th of June, they perish, notwithstanding all the care they receive. Madagascar and the Isle of France offer similar evidence to the same effect.

While however these statements are applicable to a very large part of orchidaceous epiphytes, there are some striking exceptions that require to be pointed out, both with regard to atmospheric moisture, and to the temperature requisite for their production.

Mr. Allan Cunningham has shown in the 'Botanical Register,' fol. 1699, that in New Holland there are three of these plants which require a very dry atmosphere, and it is probable that others exist in other countries. 'These are Dend. æmulum, Br., an epiphyte uniformly found upon the rugged trunk of Eucalyptus resinifera, or Ironbark, in the open very dry forest grounds of the older colony at Port Jackson; Cymbidium canaliculatum, Br., which, of late years, has been observed beyond the Tropic, both at Moreton Bay and still further to the southward at Hunter's River, growing upon the principal limbs of several of the eucalypti in the dry open shadeless forest. These two epiphytes flourish most luxuriantly in an extremely dry atmosphere, and flower usually in the summer season in their native wilds, the high temperature of which is oftentimes greatly increased by the blighting hot winds which not unfrequently prevail at that period from the north-west. The third is Dendrobium undulatum of Mr. Brown, a handsome species, originally discovered by Sir Joseph Banks at Bustard Bay, and which has been lately found on barren hills, naturally clear of timber, upon the banks of the Brisbane River at Moreton Bay, where the plant forms tufts on bare rocks exposed to the full heat of the sun, which, during nine months of the year, is very considerable on that part of the coast.'

In many cases a much lower temperature than that hitherto spoken of is natural to these plants, and there are some instances where they are naturally accustomed to rigorous weather. In America, their favourite station, according to Humboldt, is in the gorges of the Andes of Mexico, New Grenada, Quito, and Peru, where the air is mild and humid, and the mean temperature 63°—67° Fahr. (17°—19° Cent.) In these localities they are so abundant, that, according to the authors of the 'Flora Peruviana,' above 1000 species might be found in Tarma, Huanuco, and Xauxa alone. It is therefore not surprising that one species, Epidendrum conopseum, should advance as far to the northward as the rice climate of Florida, where it grows on the bark of Magnolia glauca, nor that others should be found in the damp maritime parts of the government of Buenos Ayres. But it is more remarkable that an oncidium nubigenum should occur at the height of 14,000 feet on the mountains of Peru, and that other species should, upon the authority of M. Descourtilz, be able to bear without difficulty the cold glacial winds of the high serras of Brazil. The same peculiarities occur in the eastern world. Reinwardt speaks of great quantities of Orchidaceæ in the Storax and Laurel woods of Java, growing along with Nepenthes, Rhododendrons, Magnolias, and Oaks, in a zone of vegetation whose lower limit is 3000 feet above the sea. Dendrobium nobile, Renanthera coccinea, and some others, bear the periodical cold of Canton, where it occasionally freezes; Dendrobium catenatum and moniliforme occur in Japan as far north as 37° or 38°, or the parallel of Lisbon, and are periodically subject to a very low temperature; and Dr. Royle met with the deciduous Cælogynes and Dendrobium alpestre on the Himalaya Mountains at the height of 7500 ft., where snow sometimes lies in winter for a week or more. To the southward they not only occur in the latitude of Port Jackson, where the mean temperature does not exceed 66° 6′, but even in much higher latitudes. The beautiful little Gunnia australis grows on the branches of shrubs in Emu bay, in Van Diemen's Land, in about 41° S., and Earina mucronata extends to 45° 45′ S., in 'the very permanently damp woods which clothe the shores of Dusky Bay in New Zealand,' where it was originally observed by Forster in Cook's second voyage, and where it has since been met with by Mr. Cunningham, whose words we quote.

Such are the more important data that we possess to guide us in the cultivation of orchidaceous epiphytes: the result of which is, that they are kept in this country in stoves the air of which is maintained in a state of constant moisture and at a temperature varying from 56° to 90° or more. The requisite uniformity of their atmosphere is provided for by keeping the houses but little ventilated and the glass of the roof well puttied at the junction of the squares. Shade is secured either by moveable laths or by a screen of netting or coarse canvass, or by some such contrivance; some even grow their plants in a house exposed only to the north: but it does not appear that this plan is a good one; for it is an object not only to exclude excessive light, but also to be able to admit it if requisite, and this cannot happen in a hothouse with a northern aspect.

The soil in which the plants are made to grow is peat or some other kind of decayed vegetable matter, thoroughly drained, and yet so compact as not to be liable to become dry by excessive loss of water. In many cases it is found advantageous to make the plants grow upon the apex of a truncated cone of earth rising several inches above the rim of the pot. Certain kinds are suspended in baskets, or in frames so contrived as to be filled with moss and decayed vegetable mould *rammed in very tight;* and provided that precaution is attended to, the caulescent drooping species, especially Dendrobiums and Vanda-like plants, thrive admirably; but in general it is found most advisable to plant in earth in common garden-pots. Attempts have been made to grow some species on decayed dead wood, but they are generally abandoned now; nor have the trials to cultivate them on the branches of living trees hitherto proved more successful. The orange tree was employed for this purpose by Mr. Lance with great success in Surinam; but in the hothouse it does not appear to suit them.

By attending to the natural habits of these plants, and observing the precautions just pointed out, the management of orchidaceous epiphytes has been brought quite within the skill of any good gardener. There are however two or three capital points about which cultivators entertain great difference of opinion.

The first is temperature. Some allow the thermometer to rise to 100° and higher in a summer's day, and never suffer it to fall below 65°; the consequence of which is, that their houses are so unpleasant that few persons can visit them to inspect the beautiful objects they contain. Others keep the temperature of even midsummer down to 80° at the most, and permit the minimum heat to be low in proportion: their houses are consequently cool and pleasant at all times. If we must admit that the first practice is eminently successful with some, so is the other most assuredly so with others, and we entertain no doubt that in the end it will be the only method followed.

The second question is the amount of moisture. Some form water tanks in their houses, the evaporation from the surface of which keeps the air continually at the point of saturation; others simply keep the air sensibly moist, by syringing or similar devices; the first is accompanied by a high, the latter by a moderate, temperature; in this case also we incline to believe that the latter practice is the best. The fact is that it may be reasonably doubted whether it is right always to follow nature literally in what we suppose to be her practice, and whether we ought not rather to adapt the management of our plants to the new and artificial condition under which they are placed. Keeping plants in a state of constant excitement by exposure to an excessive climate is a certain means of weakening them in the long run, and may be compared to keeping an animal always awake. It may be very true that this may seem to happen in nature; but does it really happen? Is it not probable that the long diurnal darkness of a tropical situation may be intended as a compensation for the high excitement of daylight? and are not we, with 18 hours' daylight in summer, in an essentially different position from what orchidaceous epiphytes from equinoctial regions are exposed to in a wild state? Moreover, it can hardly be doubted that a moderate temperature is sufficient for them, even if they can be made to bear an excessive climate.

The third unsettled point is of another nature. In our hothouses we often maintain a high temperature all the year round, keeping our stove-plants growing from January to December. In nature this hardly ever happens. If a country has no winter, it has its dry season, during which plants become more or less torpid. This is quite the case in all the countries inhabited by orchidaceous epiphytes with the exception of some of the temperate parts of Mexico, where the climate is equal and mild. Should we not therefore give such plants, when cultivated, a similar period of repose? About this the opinions of cultivators are so much divided that we cannot say on which side the majority of votes would go. Mr. Bateman calls attention to the fact in his account of Colley's mission to Guiana. 'In consequence,' he says, 'of the unexampled length of the dry season, scarcely an orchidaceous plant was seen in flower, or a pseudo bulb which had not lost its leaves. When, however, the rains had commenced, that is, in the month of July, the Orchidaceæ were pushing rapidly into flower, as were also some of those collected by Mr. Colley, which reached this country in as dry and shrivelled a state as Dutch bulbs usually come over in. This may afford a hint for their cultivation.'

And Henchman, in like manner, urges the circumstance upon the consideration of gardeners:—

'The atmospheric changes,' he says, 'are very great in tropical climates; and, as I consider that Orchidaceæ derive their main support directly from the atmosphere, I think too much attention cannot be paid to the various changes by which they are in their natural state liable to be affected. One of the principal objects kept in view by growers of Orchidaceæ appears to be the keeping up a regular heat in the stove. Nothing can be more contrary to nature; for in the tropics, to a sultry day, with the thermometer standing at from 85° to 95°, succeeds a cool night and a cold morning, the thermometer falling to 60° or 55°; effecting in twenty-four hours a change of temperature of from 26° to 30°. During the dry season, periods of two, three, and often extending to five or six months, the whole nourishment derived by the Orchidaceæ must be communicated through the agency of the tree to which they are attached, or from the atmospheric moisture which is the effect of the action of the sun upon the dew which has fallen during the night and morning; for the situations generally occupied by Orchidaceæ preclude the possibility of the dew reaching them in its descent; and slight though the moisture be which is communicated through these channels to Orchidaceæ, it is nevertheless sufficient to retain the vital principle in the pseudo-bulb, though not sufficient to rouse it into action. The dry season then appears to act upon Orchidaceæ on much the same principle as our winter acts upon our trees, &c. It is for them a period of rest; and the pseudo-bulbs having been well ripened, are ready, when the wet season has given them a sufficient stimulus, to push forth luxuriantly both leaves and flowers.' Nevertheless some of our best gardeners object to the plan of periodical resting; and, it must be added, appear to succeed without attending to it.

So far as the opinion of the writer of this article is of any value, it is rather in favour of the system of resting these plants for three or four months annually, by lowering the temperature to 60°, or thereabouts, and diminishing the moisture very considerably; indeed in regard to Catasetum, Cycnoches, Phaius, Bletia, Geodorum, and some others, with deciduous leaves, there is no doubt that the plan is indispensable; and it would probably be equally advantageous with respect to all the kinds with fleshy stems or pseudobulbs; but how far it may suit caulescent species with the habit of Vanda and Aerides can only be ascertained by direct experiment.

EPI'RUS (ἤπειρος, mainland), a name given to that district in Northern Greece which extended from the Ceraunian mountains on the north to the Ambracian gulf on the south, and from the Ionian sea to the chain of Pindus, probably to distinguish it from the large, populous, and wealthy island of Corcyra, which lay opposite to the coast. It appears that in very antient times Acarnania was also included in the term, and in that case the name was used in opposition to all the islands lying along the coast. (Strabo, p. 453; Homer, *Odyss.*, xiv. 100.) The antient geography of Epirus was attended with great difficulties even in the time of Strabo; the country had not then recovered from the effects of the destruction caused by Paulus Æmilius in 167 B.C., who destroyed seventy towns, and reduced to slavery 150,000 of the inhabitants (Polyb. ap. Strab., p. 322; Liv., xlv. c. 34; Plut. *Æmil.*, c. 29), after which the greater part of the country remained in a state of absolute desolation, and where there were any inhabitants they had nothing but villages and ruins to dwell in. (Strabo, p. 327.) The inhabitants of Epirus were scarcely considered Hellenic. The population in early times had been Pelasgic. (Strabo, p. 221.) The oracle at Dodona was always called Pelasgic [Dodona], and many names of places in Epirus were also borne by the Pelasgic cities of the opposite coast of Italy (Niebuhr's *Hist. of Rome*, i. p. 34); but irruptions of Illyrians had barbarized the whole nation; and though Herodotus (ii. 56) speaks of Thesprotia as a part of Hellas, he refers rather to its old condition, when it was a celebrated seat of the Pelasgians, rather than to its state at the time when he wrote his History. In their mode of cutting the hair, in their costume, and in their language, the Epirotes resembled the Macedonians, who were an Illyrian tribe. (Strabo, p. 327.) Theopompus (apud Strab., p. 323) divided the inhabitants of Epirus into fourteen different tribes, of which the most renowned were the Chaonians and Molossians, who successively maintained a preponderance in this district. The Molossians claimed a descent from Molossus, the son of Neoptolemus and Andromache. Neoptolemus is said to have migrated from Thessaly into Epirus after the Trojan war, and to have settled there in obedience to the injunctions of an oracle. We hear nothing of his descendants till the time of Themistocles, who was hospitably received by Admetus, king of the Molossians, while flying as a persecuted exile from the reach of his enemies. (Thucydides, i. 136.) The other kings of the Molossians are mentioned between this period and the time of Philip of Macedon, when this kingdom rose into importance by the matrimonial connexion of Alexander of Epirus with the king of Macedon. Philip married Alexander's sister, Olympias, and gave him his daughter Cleopatra in marriage. (Diod. Sic., p. 557.) Alexander was the first of the Molossian princes who bore the title of king of Epirus. (Strabo, p. 280.) He invaded Italy to assist the Tarentines against the Brutii and Lucani, and was slain near Pandosia. (Liv., viii. 24.) After the death of Alexander, Æacides and Alcetas, the sons of his predecessor, Arybas, successively mounted the throne. Pyrrhus, the son of Æacides, is the best known of the sovereigns of Epirus. The family of Pyrrhus became extinct three generations after his death, and the government was turned into a republic, which subsisted till the year 167 B.C., when the Epirotes were suspected of favouring Perseus of Macedon, and utter destruction was, as we have already mentioned, inflicted upon them by the Roman general P. Æmilius. Of the other Epirotic nations, the Thesprotians were most celebrated. They are mentioned by Homer, who does not name the Chaonians and Molossians (*Odyss.*, xiv. 315), and are considered by Herodotus to have been the progenitors of the Thessalians. (vi. 176.) In their territory were the oracle at Dodona, the old city of Ephyra, and the rivers Acheron and Cocytus, celebrated in the old mythology. It is not possible to draw accurately boundary lines of the district occupied by these three tribes of the Epirotes: it is known that the Chaonians occupied the northern district, and the Molossians the southern, while the Thesprotian territory lay in the middle. The most celebrated cities in Molossia were Ambracia and Nicopolis. The former was a Corinthian colony, founded about 650 B.C. It had a harbour on the Gulf of Arta, and a small naval force. It contributed seven ships to the united fleet at Salamis (Herod. viii. 45), and twenty-six to their Corinthian expedition against Corcyra, just before the Peloponnesian war. (Thucyd. i. 46.) Ambracia sustained a very severe blow in the defeat upon the Amphilochians a short time after (Thucyd. ii. 68), but their losses were in some measure repaired by a new colony from Corinth. (Thucyd. iii. 105, &c.) Pyrrhus made Ambracia his usual place of residence. (Liv. xxxviii. 9.) It sustained a very remarkable siege during the war between the Romans and Ætolians. (Polyb. xxii. 13.) Under the Roman dominion it sunk gradually into insignificance, and its ruin was completed by the transfer of its inhabitants to Nicopolis, which was founded by Augustus to commemorate his victory at Actium. The ruins of this last city are very extensive. (Hughes's *Travels*, ii., p. 412.) The reader will find a minute description of the Gulf of Arta in the *Journal of the Royal Geog. Society*, vol. iii., p. 77.

The modern Albania corresponds in part to Epirus. As the domain of Ali Pacha, it has been a district of great interest in modern history, and Suli and Parga have become well-nigh classic names. [Albania.]

Coin of Epirus.

British Museum. Actual size. Silver. Weight, 151¼ grains.

EPISCOPACY. [Bishop.]

EPISCO'PIUS, SIMON (whose real Dutch name was Bisschop), was one of the most learned men of the seventeenth century, and the chief supporter of the anti-calvinistic doctrines advocated by his contemporary Arminius. He was born in the year 1583, at Amsterdam, where he received his school education. In 1600 he went to the then newly-founded university of Leyden, of which he became a distinguished member, and entered with zeal and great ability into the predestinarian controversy between the Arminians and Gomarites, which at that time excited a deep and general interest. He was ordained in 1610, as the minister of the village of Bleyswyck, near Rotterdam, and in the following year he was deputed to the office of Arminian advocate at the conference held at the Hague between the Remonstrants and their opponents, the Calvinists. It is a proof of the influence and of the acknowledgment of his superior theological learning that he was chosen to fill the chair of professor of divinity in the university of Leyden, as the successor of the celebrated Professor Gomar, whose doctrinal theory he had powerfully opposed. The predestinarian controversy was carried on shortly after with such virulence and popular excitement that Episcopius was not only exposed in the streets and in the pulpit to the greatest abuse and insult, but, on one occasion, barely escaped from being stoned to death. The predominant party of Calvinists, or Gomarites, treated him with great injustice and tyranny at the synod of Dort, to which he went as a deputy from the states of Holland. He was refused a hearing in behalf of the less numerous party of Arminians. He was told that the synod had met not to discuss but to judge; and it having been decreed that he and the other professors who formed the body of the Arminian delegates should neither explain nor maintain any point without being asked to speak, Episcopius and his colleagues refused to submit. They were, in consequence, expelled from the synod, and were subsequently deposed from the functions of the ministry and banished from the territory. Episcopius retired to France, and continued to write in defence of Arminianism, and to console and encourage his unfortunate brethren. In 1626, when sectarian animosity had somewhat subsided, he returned to Holland, and became the minister of the church of Remonstrants at Rotterdam. Finally, he was made rector of the college founded by the Remonstrant party at Amsterdam, where he died, in 1643, at the age of 60. His works were published collectively in 2 vols. fol., entitled 'Opera Omnia Theologica,' &c., Curcellæi edita. Amsterdam, 1650, 1665, and 1671; and in London in 1678. They consist chiefly of the following treatises: 'Collegium Disputationum Theologicarum in Academia Leydensi,' Dortdrecti, 1688; 'Fur Prædestinatus,' Dort., 1642; 'Antidotum adversus Synodi Dortdracenæ Canones;' 'Confession of Faith;' 'Popish Labyrinth, or a Treatise on Infallibility,' &c., English translation, London, 1763. The latter works were written on the occasion of the author's being solicited by Peter Wadingus, a learned Jesuit, to become a Papist.

The highest eulogiums have been bestowed on the abilities of Episcopius by Le Clerc, Mabillon, Grotius, Bishop Bull, and many other eminent scholars of different sects. In England he was closely imitated by Dr. Hammond and Archbishop Tillotson. In his controversial writings he descends occasionally to abusive expressions; but in extenuation of this failing it should be considered that his opponents overwhelmed him with the insulting calumny of a stronger party. It was among the least of their accusations that he was a Socinian, a charge which is not without some degree of evidence to support it, for he strongly maintains that, throughout the first three centuries, the pre-existence of Christ was not an article of faith; and the refutation of this position of Episcopius occasioned Bishop Bull a great expenditure of learning. (*Life of Episcopius*, by Limborch, and by Curcellæus; *Life and Death of Arminius and Episcopius*, London, 1672, 12mo.; Moreri's *Dict.*; Chalmers's *Biog. Dict.*)

EPISODE (*ἐπείσοδος, epeisodos*). The Greek word *eísodos*, the principal member of this compound, when applied to the drama, means an entrance of the chorus on the stage; *epeisódion*, that part of a play which lies between two choral songs; and as these recitations had, in the rude beginning of the Greek drama, no connexion with the choral part, which they were introduced to relieve, the word, with its derivative Latin form, comes to signify a thing connected with, but not essential to, that of which it is part,—which may be taken out and leave a perfect work;—as, for instance, the Catalogue of Ships, in the Iliad, or the War in Heaven, in Paradise Lost. Episodes should grow naturally out of the subject; and when judiciously used, they relieve and diversify the main narration. But they should be sparingly introduced, so as not to create confusion. In the Orlando Furioso, for instance, or the Fairy Queen, the episodes are so many and so long, that the whole resembles a set of detached legends inartificially patched together, rather than a single poem pervaded by one intention. Episodes are commonly the most highly-finished portions, since their shortness warrants a degree of elaboration and ornament which could hardly be maintained through a long composition, and indeed might be wearisome if it could.

EPISPASTICS. [Blisters.]

EPISTYLE, the first layer of stone placed on columns to form the architrave. The term is derived from the Greek epistylium (ἐπιστύλιον), and that from the words *epi* (ἐπί) 'upon' and *stylus* (στῦλος), 'a column.'

EPITAPH (*ἐπιτάφιον, epitáphium*), an inscription on a tomb; from ἐπί, upon, and τάφος, a sepulchre. Inscriptions in honour of the dead are perhaps as old as tombs themselves; the most antient however with which we are now acquainted are probably those of Simonides upon Megistias the soothsayer of the little army of Leonidas, and on the heroes who fell at Thermopylæ, preserved by Herodotus. (vii. 228.) Another epitaph of very high antiquity may be referred to in the antient Greek inscription found in the Ceramicus at Athens, upon the warriors who fell at Potidæa 432 years B.C. The original, in a mutilated state, is among the Elgin marbles in the British Museum. (No. 348.) The reader will find examples of Greek and Roman epitaphs in the Elgin and Townley marbles of the British Museum, published under the superintendence of the Society for the Diffusion of Useful Knowledge.

The earliest epitaphs of this country were those of the Romans or Romanized Britons, which usually began with D. M. (*Diis Manibus*), followed by the name, office, and age of the deceased, and a conclusion which informed the reader by whom or through what means the inscription was erected. This seems to have been the ordinary formula of the sepulchral inscriptions of that period.

Whether the Saxons or the Danes used monumental inscriptions among us, either in their own or in the Latin tongue, has been doubted. The few which we have for people of the Saxon times are the compositions of a later date. Three or four small slabs, however, bearing crosses and some female names, supposed to be those of nuns, were dug up a few years ago at Hartlepool.

The regular series of English epitaphs begins in the 11th century, when they were still written in the Latin language. One of the most remarkable of this period is that preserved in Sir William Dugdale's Baronage, for William de Warren, earl of Surrey, who died in 1089, copied from the abbey register of St. Pancras Lewes, of which he was the founder, where it is said to have been engraven on white marble.

Hic Gulielme Comes locus est laudis tibi fomes
Hujus fundator, & largus sedis amator.
Iste tuum funus decorat, placuit quia munus
Pauperibus Christi, quod prompta mente dedisti.
Ille tuos cineres servat Pancratius hæres,
Sanctorum castris qui te sociabit in astris.
Optime Pancratie, fer opem te glorificanti;
Daque poli sedem, talem tibi qui dedit ædem.

A mutilated epitaph for Gundreda, daughter of William the Conqueror, and wife of this earl of Surrey, is still remaining in the church of Southover in Kent; she died in child-bed in 1085. The generality, however, of the epitaphs of this period are neither so long nor so laboured as the earl of Surrey's. Vitalis, the twenty-first abbot of Westminster, who died in 1082, had only these lines—

A vita nomen qui traxit, morte vocante,
Abbas Vitalis transiit, hicque jacet.

In the 12th century our epitaphs are few. The tomb usually consisted of a single figure; and the inscription added to it was little more than a mere designation of the person: such as that at Hereford, of the year 1148,

Dominus Robertus de Retum episcopus Herefordensis;

or that in the chapter-house at Gloucester, 1176,

Hic jacet Ricardus Strongbow, filius Gilberti Comitis de Pembroke.

Early in the 13th century we begin to find the epitaph in French, occasionally accompanied by promises of absolution to such of those who passed the tomb as might pray for the soul of the deceased. Weaver gives an instance of this in his 'Funeral Monuments,' in an inscription for Robert the third earl of Oxford, who died in 1221:

Sire Robert de Veer le premier Count de
Oxenford le tierz git icy. Dieu de l'ame ei lui
Piest face merci. Ki pur l'alme priera xl.
Jors de pardon avera. + Pater noster, &c.

At the church of Kingswear in Devonshire we have an epitaph of this kind in rhyme—

Vos qui ici venes
Pur l'alme Philip priez.
Trente jours de pardon
Serra vostre gwerdon.

Henry the Third's epitaph, in the same language, with a prayer for mercy to him, still remains embossed in old capitals round the ledge of his tomb in Westminster Abbey, A. D. 1272.

The epitaph in French continued till the middle of the 14th century; after which time inscriptions in the vernacular tongue become common. One of the earliest, perhaps, was that upon a stone over one of the Savile family at Thornhill in Yorkshire,—

Bonys emongq stongs lys ful
steyl, gwylste the sawle wanderis
were that God wylethe.

Blomfield, in his 'History of Norfolk,' has preserved a curious specimen of the English of the time, in an epitaph from Holm Church in that county, about A. D. 1404:—

Henry Notingham and his wyff lyn here
That mayden this church, stepull, and quere,
Two vestments and belles they made also,
Christ them save therefore fro wo!
And to bringe ther soules to bles of heven
Saith Pater and Ave with mylde steven.

Gough, in his 'Sepulchral Monuments,' whence much of our information has been obtained, gives the following from the church of St. Peter at St. Albans, 1420:—

In the yere of Christ on thousand and four hundryd ful trew with four and sixteene
I Richard Skipwith gentylman in birth late fellow of New inne.
In my age twenti on my sowl partyd from the body in August the 16th day
And now I ly her abyding God's mercy under this ston in clay,
Desyring yow that this sal see unto the Meyden pray for mee
    That bare both God and Man,
Like as ye wold that other for ye shold
    When ye ne may nor can.

The clergy and religious, however, still preferred Latin, perhaps, as their more familiar idiom; and one or two in stances occur, even so late as the middle of the 15th century, where the epitaph is given in Latin rhyme. The last edition of Hutchins's Dorsetshire mentions the following as engraved round the arch of the church door at Durweston near Blandford, A. D. 1459:—

Hic jacet sub tumulo Downton Willielmus humatus:
Rector erat villæ Durweston; Okfordie natus.

The generality of the Latin epitaphs of this period were on strips of brass, and began most frequently with *orate pro anima*, perhaps followed by *miserrimi peccatoris;* an address, says Dr. Johnson, to the last degree striking and solemn, as it flowed naturally from the religion then believed, and awakened in the reader sentiments of benevolence for the deceased, and of concern for his own happiness. There was nothing trifling or ludicrous, nothing that did not tend to the propagation of piety and the increase of devotion.

With the reformation of religion even this ceased. The reign of Elizabeth affords but few instances to the contrary: though it is singular that two occur beginning 'pray for the soul,' upon monuments at Stanton Harcourt in Oxfordshire, one dated 1566, the other 1569.

After this period the diffusion of learning gave a classic turn even to the epitaph, and though the reigns of Elizabeth and James I. can furnish but few of a pure standard, there is one of Ben Jonson's on the Countess of Pembroke which scarcely yields to any in the Anthologia.

Underneath this sable hearse
Lies the subject of all verse:
Sidney's sister, Pembroke's mother.
Death, ere thou canst find another,
Good, and fair, and wise as she,
Time shall throw a dart at thee.

The epitaph on Sir Christopher Wren need hardly be repeated; though it is said to have been borrowed. In real merit it is probably surpassed by the latter part of that in King's College Chapel, Cambridge, over the resting-place of Thomas Crouch,—

Aperiet Deus tumulos; et educet
  Nos de sepulchris.
Qualis eram, dies isthæc cum
  Venerit, scies.

Wit and humour have also marked the composition of the epitaph in almost all ages. Innumerable instances will be found in all the printed collections. Margaret of Austria composed for herself the following couplet, when in imminent danger of shipwreck:—

Cy gist Margôt, noble demoiselle,
Deux fois mariée, et morte pucelle.

Collections of epitaphs, antient and modern, are numerous; there are many of great merit in the Greek Anthologia. A very large collection of epitaphs will be found in 'Theatrum Funebre, exhibens per varias scenas Epitaphia nova, antiqua, seria, jocosa, &c., in quatuor partes distinctum, extructum a Dodone Richea (seu Ottone Aicher),' 4to. Salisburgi, 1675; Hacket's 'Select and Remarkable Epitaphs on illustrious and other Persons,' 2 vols. 8vo., 1757, probably preserves the best English collection.

The funeral orations of the Greeks were called by the name of *Lógos Epitáphios* (Λόγος Ἐπιτάφιος), or a discourse over the tomb made at the time of interment. It is only necessary to mention this to prevent any confusion of this kind of epitaph with that which is the subject of the present article.

EPITHALA'MIUM (*ἐπιθαλάμιον*, from ἐπὶ, 'at' or 'near,' and *θάλαμος*, 'chamber,' especially that of a new-married couple), a poem composed in honour of a marriage. It was sung by youths and maidens conjointly, at the door of the bridal chamber, after the bride and bridegroom had entered, and also before they rose in the morning. The first Greek epithalamium known to have been written was a poem by Hesiod, now lost, on the marriage of Thetis and Peleus. The most remarkable extant are those of Catullus, who has left three beautiful specimens of this sort of composition. The first, on the marriage of Julia and Torquatus, is the most curious and interesting as an illustration of manners. That on the marriage of Peleus and Thetis, which is probably only a fragment, is one of the most beautiful extant specimens of Latin poetry. Among the Hebrews, as well as the Greeks and Romans, this species of rejoicing was in use. The subject is hardly in accordance with modern manners. Spenser has treated it beautifully and delicately in his Prothalamium and Epithalamium on the marriage of the Ladies Somerset. Many other English specimens may be found, especially among the writers of the seventeenth century: but we know of none remarkable enough to require notice.

EPOCH. (Astronomy.) This term is frequently applied to signify, not a moment of time, but the longitude which a planet has at that moment of time. In order to predict the longitude of a planet at any epoch, some preceding epoch must be taken, at which the longitude is known. This latter is called, *par excellence*, the epoch; and the term longitude at the epoch has been abbreviated into epoch.

EPOCH. (Chronology.) [ÆRA.]

EPODE (in Greek ἐπῳδὸς, *after-song*, from ἐπὶ, 'on' or 'upon,' and ᾠδή, 'song') is one of the three divisions of the Greek ode. [CHORUS.] The performers in singing it stood still; it was not, like the strophe and antistrophe, symmetrical with another member of the ode; so that the poem was unfettered as to its length and as to the choice of measures. The epode, however, is not essential to an ode; many of the Greek choruses have none. Most of Pindar's odes, on the contrary, have an epode interposed between each antistrophe and the following strophe. Epode, according to the grammarians, is also a metrical term given to those measures in which a short verse follows a long one, of which the former is called *proodic*, the latter *epodic*. Hence the fifth book of Horace's Odes is called the Book of Epodes, because nearly all of them are written in that sort of measure: as, for instance,—

'Ibis Liburnis inter alta navium,
Amice, propugnacula.'

EPPING. [ESSEX.]

EPSOM. [SURREY.]

EPSOM SALT. [MAGNESIUM.]

EQUAL. Two magnitudes are equal when one of them may be made to coincide with the other. This is the geometrical definition of Euclid, and is placed by him among the axioms, though in reality it is nothing more than the definition of the word equal. Nor is it quite sufficient: a triangle for instance and a parallelogram may be equal in area, and yet neither can, without alteration of form, be made to occupy the same space as the other. The truth is, that the idea of equality is one which will admit no definition: and moreover, it is to the more general notion of the existence of ratio (of which equality is one particular case) that all metaphysical discussion upon this term should be referred.

Some geometers have proposed to use the word equivalent as applied to solids of equal area but different forms: and the distinction is at least harmless. We cannot say more; for when it is once established that the term used by Euclid is to be understood in a wider sense than the words of the axiom will bear, no liability to confusion remains.

EQUATION (in pure mathematics), an assertion of the equality of two magnitudes, represented to the eye by the symbol =. Thus A=B is to be understood as a proposition, declaration, or assertion that the magnitude A is equal to the magnitude B. It is not immaterial to insist upon this definition; for beginners frequently confound the notion of an equation (an *assertion* of equality) with the idea of equality itself, and speak of two *equations* being *equal*.

To treat of equations is to write on mathematics in general; for when two magnitudes A and B are of the same kind, A must be either greater than, equal to, or less than B. The objects of mathematics generally require that it should be determined (supposing A and B not equal) by how much one exceeds the other: and the assertion that A exceeds B, and exceeds it by M, is equivalent to the *equation* A=B+M. The assertion of inequality is called by continental writers an *inequation:* and one work (we are not aware of any other) has been written on the subject; Canard's 'Traité des Inéquations,' &c.

An equation may be one of two kinds: necessarily true, whatever may be the value of the symbols employed, and called *identical;* or true only upon the supposition of some particular value being given to certain magnitudes, or of some particular relations existing. The latter species are called equations of *condition*. Thus—

$$a=a, \quad a+a=2a, \quad (a+b)^2=a^2+2ab+b^2$$

are identical equations: while

$$2a+1=13, \quad x^2=5x-$$

are equations of condition; the first re be 6, and the second that x should be either 4 or 1. Again, $a+b=1$ is an equation of condition.

Certain equations being supposed to be true, the determination of all their consequences, that is, of all equations which follow from them, is the great object of mathematical analysis. The difficulties which lie in the way are of various classes, and give rise to various modes of considering equations. These are so widely separated from each other, and diverge into such different subjects, that we can here do no more than point out two or three of the most remarkable species of inquiries. This we shall do in short articles headed by the word Equation.

EQUATION. (Astronomy.) The characteristic of all the heavenly motions is, that they nearly follow a simple law, but not quite. The small corrections which must be added to or subtracted from the results of the simple law, in order to secure accurate prediction, are called equations. Thus, the moon moves round the earth with a motion which is not very far from uniform; the average motion is therefore ascertained, and, starting from a given epoch, at which the true place is known, the longitude for that epoch is first increased by the longitude which would have been described by the moon, had she moved with her average motion. The result must then be altered by a number of different *equations*, some being consequences of the elliptic figure of the moon's orbit, some of the sun's attraction, &c. When all these equations have been annexed, the result is the moon's longitude for the time proposed.

EQUATION OF THE CENTRE. [Sun, Moon, &c.]

EQUATION OF THE EQUINOXES. [Precession.]

EQUATION OF TIME. [Sun.]

EQUATION, ANNUAL. [Moon.]

EQUATION OF PAYMENTS, an arithmetical rule, for the purpose of ascertaining at what time it is equitable that a person should make payment of a whole debt which is due in different parts payable at different times. This rule is now of no practical use, as it rarely, if ever, happens that it is considered necessary to *equate* payments. Sums of money due at future periods are generally secured by bills of exchange or by promissory notes, and when the date of payment is altered, it is usually immediate payment which is contemplated. [Interest.]

EQUATIONS, COMMON ALGEBRAICAL. In these the question is to find what number or expression must be substituted for a letter, in order that an equation may be true. Example, what must be the value of x, in order that

$$x^2 = (a+b)\,x - ab$$

the answer is x is either $= a$ or $= b$: meaning that, *if the equation be true*, x must be one of the two, a or b. These results are called values of x, roots of the expression $x^2-(a+b)\,x+ab$, or solutions of the equation.

We ought in this place to give some account of the history of inquiries, which at one time composed the whole of algebra, and are still considered of fundamental importance. But here, as in some other cases, we are induced to defer the consideration of the subject to as late a period as we can, on account of the rapid progress which is being made on points which have presented difficulty for centuries. The mere mention of the very recent researches of M. Sturm in France, of Mr. Jerrard in England, &c., will be, to those who understand the subject, a sufficient excuse for our referring to Theory of Equations; this being, moreover, the most common title of the subject in question.

EQUATIONS, DIFFERENTIAL, and EQUATIONS of DIFFERENCES. The difficulty in this case is the inversion of the processes of the Differential Calculus and the Calculus of Differences. We give an example of each case:—

$\dfrac{d^2y}{dx^2} - \dfrac{dy}{dx} = x$; is a differential equation. The question asked is, what is y, that function of x, of which it is the property that the first differential co-efficient subtracted from the second will always leave x.

$\Delta y = y+1$, is an equation of differences. The question asked is, what must y (understood to be a function of x) be, in order that an increase of a unit in the value of x shall increase y by $y+1$. This is in reality a simple functional equation, as follows. Required ϕz, so that

$$\phi(x+1) - \phi(x) = \phi x + 1.$$

The two classes of equations, thus briefly noticed, include in their history that of most of the mathematico-physical sciences. The progress of the theory of gravitation since Newton is contained in successive attempts to solve certain differential equations. All questions of dynamics, electricity, the theory of light and heat, &c. &c., resolve themselves at last into the solution of differential equations. Works on the differential calculus contain but little on this subject, its utility considered: and it is to the applications themselves that the student must look for further information.

EQUATIONS, FUNCTIONAL. In this case the question is to find the form of a function which will satisfy certain conditions. For instance $\phi(x^2) = \phi x + 1$. Here the question asked is, what is that algebraical expression which will be increased by 1, *whatever may be the value of x*, by changing x into x^2. [Functions, Calculus of.]

EQUATOR and ECLIPTIC, the two principal circles of the sphere. The first is that circle of the apparent celestial sphere which is in all points equally distant from both poles; the second, the circle through which the sun appears to move. The equator is so called from being the circle on the arrival of the sun at which the day and night become equal. The ecliptic derives its name from being the circle on which (or near which) the moon must be in the case of an eclipse. [Sphere, Doctrine of the.]

EQUATORIAL INSTRUMENT. This name is generally given to astronomical instruments having their principal axis of rotation in the direction of the poles of the heavens. When the purpose of a machine of this nature is simply to carry a telescope, it has been called a *machine parallactique* or *parallatique* by the French, and sometimes *polar axis* by English writers; but we shall include both in this article.

The complicated system of circles which formed the astrolabe of Hipparchus, described by Ptolemy (Almagest., lib. v., cap. i.), was made moveable on two pins, which marked the places of the pole in a metallic meridian circle, and thus may be called in some sort an equatorial. There is an excellent plate of the astrolabe in the title-page of Halma's translation, tom. i. This instrument and the copies which were made of it afterwards, according to Ptolemy's description, by the Arabs and by Walther of Nuremberg, were designed for observing the longitude and latitude of a heavenly body directly. The torquetum of Regiomontanus was for the same purpose, using surfaces instead of axes to determine motions, but we know not whether it ever was actually made. Tycho seems first to have seen the immense superiority of the simpler instrument, which sufficed for determining right ascension and declination; and the genuine equatorial is therefore due to him. In his 'Astronomicæ Instauratæ Mechanica,' Noribergæ, 1602, we find the figures and descriptions of three 'equatorial armillæ' of different sizes and constructions: in one, the diameter of the meridian circle was 7 cubits, or 10½ ft. (For Tycho's equatorials see Astrolabe.) In the 'Rosa Ursina' of Scheiner, Bracciani, 1626-30, p. 350 et seq., there is a plate and description of an equatorial mounting, invented by Gruenberger, to be used with a lens or telescope, for forming an image of the sun—the mode of observation then in vogue,—or, with a telescope, in the modern manner for viewing the moon, stars, and other phenomena. Gruenberger's equatorial is almost identical with that described and figured by Cassini as his *machine parallactique*, 'Mémoires de l'Académie,' 1721, p. 18, and which is also drawn and described under the same name by Bailly, 'Histoire de l'Astronomie Moderne,' vol. i., p. 601, plate v., fig. 38; and by Lalande, 'Astronomie,' 1792, § 2400, et seq., plate xxiv. In 1674 Hooke published his 'Animadversions' on the first part of the Machina Cœlestis of Hevelius. In this remarkable tract he describes, p. 67 et seq., tab. 2, fig. 15, the polar axis, on which he proposes to fix his quadrant for measuring intermutual distances, and 'the watch-work, which is to make it move round in the same time with the diurnal revolution of the earth[*].' The regulator of the watch-work is a ball and string, describing a conical surface. When so near an approach had been made to this great desideratum in telescope-mounting, it is somewhat remarkable that nearly 150 years should elapse before it was realized. The astronomical sector with which Flamsteed observed at Greenwich from 1676 to 1689 bears so strong a resemblance to the quadrant and stand described in Hooke's tract, that we are inclined to attribute the merit of its contrivance to Hooke, particularly as he recommends the artificer Tompion as 'having been employed by him to make that which he had.' Flamsteed's instrument was a sextant mounted upon a polar axis; and a description of the instrument, with a plate, will be found in the 'Historia Cœlestis,' vol. iii. p. 103.

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[*] Hooke asserts that a clock with a circular pendulum was invented by him in 1665, and complains that Huyghens had published a description of this (in 1674) 'without naming him at all as concerned therein.' Huyghens says that he invented the clock with a circular pendulum about the same time that he applied the oscillating pendulum, i. e., sixteen years before the date of his book, and that several clocks of this description had been made, 'non sine successu,' in the mean time. Both Hooke and Huyghens promise a complete description of this clock at another opportunity.

The next step in constructing the equatorial was made by Roemer, to whom we owe the transit and circle, and whose merits as an astronomical mechanic surpass even his great countryman Tycho. According to Horrebow, *Basis Astronomiæ*, p. 39, tab. 1, the equatorial of Roemer was erected about 1690. Here we have the second essential to the instrument, a telescope mounted on a cross axis, which is placed at right angles to the polar axis; (this is sometimes called the declination axis, from carrying the declination circle, or transit axis from its analogy to the transit.) In this construction the telescope can be pointed in every direction, and we have heard Roemer's general idea recommended by a very competent judge as that which he would now follow in mounting a 20-foot telescope. Graham's differential sector and Sisson's equatorial are described in Vince's 'Practical Astronomy,' § 136 and 140, with figures. In both these instruments there is a long polar axis, supported at its upper and lower extremities; the telescope, with its circle or sector, is placed on one side and towards the middle of the axis.

A portable equatorial stand for carrying a reflecting telescope was invented by Short, and is described and figured in the 'Phil. Trans.' for 1749. This must have been a very ricketty affair, judging from the plate. In 1771 Nairne gave a description and figure of a much better instrument in the same work; and in 1772 or 1773 P. and J. Dollond published an account of a 'universal equatorial instrument, or portable observatory,' which in firmness and contrivance is very similar to that of Nairne. This construction, with some slight variations, was followed by Ramsden, in a portable equatorial made for Sir George Shuckburgh in 1779. All these portable equatorials labour under this serious defect; the telescope cannot be pointed on the same star in reversed positions, nor upon any star within 30° or 40° of the pole. Lalande, in his *Astronomie*, § 2413, pl. xxvi., gives an account of an equatorial made by Megnié, for the President de Saron, in which this difficulty is overcome by fixing the telescope at the extremity of the cross axis so as to overhang the hour circle. A very beautiful universal equatorial, in which the same position of the telescope is adopted, was constructed by Troughton, a plate and description of which will be given at the latter end of this article. There are some equatorials by Nairne and Adams which have a telescope at one end of the cross axis, but we are not aware of any plate or description.

A new era in the equatorial commences with the construction by Ramsden for Sir George Shuckburgh in 1791, which is very elaborately described with plates in the *Phil. Trans.*, 1793. In this instrument the telescope and declination circle form a complete and symmetrical transit circle, which is supported at its extremities by two assemblages each of three long parallel brass tubes forming the polar axis. The upper ends of these tubes are set into a circular open frame, from the centre of which the top pivot rises, and their lower ends rest on the base of an inverted cone which has the bottom pivot at its vertex. The polar axis is so long as to allow the telescope to revolve completely, and the object-glass is large enough to give a sight of the pole through the upper circle. The general form of this instrument is followed with some variations in almost every considerable English instrument which has been since made with the view of being used to measure with the circles. All have had a long polar axis supported at the extremities, and divided in the direction of its length into two limbs or cheeks, within which the declination axis is supported as a transit between its piers. Of this kind are the equatorials of Cambridge and Brussels, of Armagh, described in Rees's *Cyclopædia*, and of Camden Hill, described by Troughton, and figured in the *Phil. Trans.* for 1825, in the Preface to Herschel and South's Observations of Double Stars.

After Fraunhofer had succeeded in forming larger and better achromatic object-glasses than had hitherto been thought possible, he chose for a stand one which is in principle identical with the Machine Parallatique, only having the telescope hung on one side exactly as in the portable equatorial of Megnié. To these he applied a very ingenious clock movement, which greatly facilitated the optical use of the instrument, and rendered it a better micrometrical measurer than had existed. To prevent the telescope from bending, Fraunhofer applied a system of balance weights, which were, we believe, invented or brought into extensive use by Reichenbach. It would probably have been better if he had made the telescope stiff, by bracing a form, and had omitted the balance weights for the telescope altogether. It is evident, from their construction, that the least jar or roughness in handling the telescope must set the weights in motion, and consequently ruin the action of the object-glass until they come to rest; and it is not worth while to purchase a little useless accuracy in the measurement with the circles at such a cost. There is a considerable inconvenience in this construction: that in many positions a star cannot be followed from one side of the meridian to the other without bringing the telescope over; that is, turning the polar axis and the telescope each of them half round. This is particularly disagreeable in the measurement of double stars, which ought, if possible, to be observed near the meridian. There is, perhaps, a little more inconvenience in giving small motions to the telescope; but neither this nor the impossibility of using reversed observations in a majority of instances is of much consequence. On the other hand, when the workmanship and material and engineering are good, an instrument of this form may be expected to stand better in adjustment, and to admit of larger dimensions, and to require less room, than any other.

The most celebrated of Fraunhofer's equatorials is one which is erected at Dorpat, and has been described by Professor Struve. (*Beschreibung des grossen Refractors von Fraunhofer*, Dorpat, 1825, folio, with plates.)

Some enormous telescopes have been mounted on this principle: one carrying the largest achromatic telescope we believe in existence, of 14 inches aperture and 25 feet focal length, was erected at Markree Castle, county of Sligo, for E. J. Cooper, Esq., by Mr. Grubb, of Dublin. The tube of the telescope was constructed under the direction of Mr. Cubitt, and is a capital step in the art of applying large telescopes. The form is that of a very long barrel. T bars of wrought iron extend longitudinally from the object to the eye end, the edge bars being directed towards the centre, and these, after they are connected crosswise by strong rings, are covered with iron plate, which is $\frac{1}{4}$ inch thick in the centre and $\frac{1}{16}$ inch at the extremities. The stiffness of this tube is more perfect than would be readily believed without actual examination, and we see no reason to doubt that a telescope, of at least twice these dimensions, may be mounted with success, so far as the tube is concerned, whenever such an object-glass can be procured. In all the other large equatorials which we have seen, the telescope is the weakest part; and as it is the habit of many observers to move their instruments by laying hold of the eye end, it is desirable, for this and for some better reasons, to have it as stiff as possible. In an equatorial to carry a 20-foot telescope now constructing for the observatory of Cambridge, at the expense of his grace the duke of Northumberland, and of Ramsden's form, though with many peculiarities and improvements, Mr. Airy has employed a square wooden tube, which promises to do very well. Mr. Dollond has recently made several equatorials on Sisson's construction, which answer very well. The polar axis in these is square, and composed of four strong slabs of wood, making a sort of tube, a little tapered towards the extremities. This is found to be abundantly stiff and firm, at least up to the dimensions which have been tried, viz., for telescopes of from 10 to 12 ft. focal length.

Though the problem of mounting a large telescope equatorially is not yet fully solved, yet great progress has been made in the last half-dozen years, and we may mention, as the results of recent experience, that it is not expedient to rest the pivots on small superficial bearings, or to relieve the weight by friction rollers, unless the axis of the rollers be made large. It appeared, in Mr. Cooper's equatorial and elsewhere, that when a heavy pressure was laid on a small bearing, the surfaces did not slip freely, but clung as it were, causing small oscillations about the position of rest. Again, great care should be taken in following Sisson's construction, or that which we have described as Ramsden's, to provide against any twisting in the axis; simple flexure is of little importance. In Sisson's construction, the junction of the telescope and its cross axis should be very firm; in Ramsden's, the union of the two sides of the polar axis with the base should be such as to prevent all wriggling; and in both, the telescope ought to be very stiff, if it is likely to be roughly handled. To Ramsden's we should apply steadying rods. It is also better to rest the pivots of the declination axis in Ys than in collars; but if a collar is preferred, it should be formed of an upper and lower half, which can be adjusted to clasp the pivot close when the collar wears loose. After all possible precautions, accuracy is not to be expected from a large equatorial, when used as an instrument measuring with its circles, compared with those of moderate size. The equatorial by Troughton, at Armagh, which is perhaps the finest instrument existing as a measuring circle, carries a telescope of only 42 inches focal length and 2¾ aperture, with an hour circle of 5 feet, and yet the telescope is more powerful than the circles used. Large equatorials are required whenever optical power is wanted, as in the examination of nebulæ, noting occultations, &c., where the micrometer is alone required for measurements, as in observations of double stars, or determinations of the diameters and forms and constitutions of planets, and investigation of the systems of those which have rings, satellites, &c.

The adjustments of an equatorial instrument are easy enough to a person tolerably familiar with the management of other astronomical instruments; and the corrections which are to be applied to observations made with an unadjusted equatorial, ought not to present any difficulty to an astronomer acquainted with spherical trigonometry, and with the ordinary rules for determining the value of the coefficients. Still, as there are many persons possessing equatorially-mounted telescopes, who have not the knowledge or even the leisure to understand this subject thoroughly, we shall proceed to give directions which will enable any one to adjust his instruments with more than sufficient accuracy and without trouble.

We suppose the latitude of the place and the direction of the meridian to be approximately known; and we shall always speak as if the instrument showed north polar distance, and the hour circle, when the sun is observed, read as an ordinary clock. Let the polar axis be placed nearly in the direction of the poles of the heavens. The adjustments proceed in the following order:—1st. The polar axis is placed at the altitude of the pole. 2nd. The indices of the declination circle are made to read 0, when the telescope points to the pole; this is sometimes called correcting the collimation in declination or north polar distance. 3rd. The pole of the instrument is brought into the meridian, and as it has already been set at the proper altitude, it now coincides with the pole of the heavens. 4th. The line of sight of the telescope is made perpendicular to the declination axis; this is similar to the collimation adjustment in the transit. 5th. The declination axis is placed exactly at right angles with the polar axis, if the means of adjustment are allowed. 6th. The hour-circle is made to read 0^h, when the telescope is in the meridian of the place.

1st. Observe any known star in north polar distance, and then turning the polar axis half round, observe the same star again; these observations should be as near the meridian as possible; and if the instrument is much out of adjustment, the star should not be very near the pole. Take the mean of the two observations, which is the distance of the star from the pole of the instrument, correct it for refraction, and then compare the result with the true north polar distance given by the Nautical Almanac, or computed from a standard catalogue. If the star be above the pole, and the instrumental north polar distance be *greater* than the true north polar distance, it is clear that the instrumental pole is farther from the star than is the pole of the heavens, or that it is too *low;* but if the instrumental north polar distance be *less* than the true north polar distance, then the pole of the instrument is too *high*. Correct this error by the proper screws for raising or depressing the polar axis, which may be done at once if the thread of the screw and the length of the polar axis be known.

2nd. Take half the difference of the above two observations; this is the index error of the declination verniers or microscopes, and they must be moved just so much in the proper direction by their adjusting screws, and set, if there be more than one, at their proper distances. The polar distance read off will now correspond with the true *instrumental* polar distance in every position of the instrument. Several pairs of observations should be taken, in order to ascertain these two errors with great accuracy before they are finally corrected and considered to be settled.

3rd. Turn the instrument six hours from the meridian either way, and observe the north polar distance of any known star not very near the pole nor yet near the horizon. Correct this for refraction. We will suppose the star observed to the east of the meridian, and that the observed distance exceeds that given by the Nautical Almanac or the standard catalogue; then the pole of the instrument is further from the star than is the pole of the heavens, or is to the west of its proper place; hence the upper pivot must be shifted to the east, or the lower pivot to the west, the proper quantity. In this, as in the former case, several stars should be used for greater accuracy; but there is no necessity for reversed observations, as the index error is already supposed to be corrected, or at least to be known, and therefore easily allowed for. The polar axis is now adjusted both in altitude and azimuth.

4th. Observe the transit of an equatorial star over the middle vertical wire or mean of the wires, note the time, and read off the verniers of the hour-circle. Turn the polar axis half round, and observe the same star a second time exactly as before. Now if the time between the two observations corresponds exactly to the difference between the two readings of the hour circle, all is right; if not, it is evident that one of the transits has been observed too early, and the other too late, on account of the erroneous position of the wires. If the time elapsed be *greater*, by 6^s suppose, than the difference of the hour angles, the first transit has taken place 3^s too early and the second 3^s too late. Set again upon the star and observe how far it appears to travel in 3^s; and then, if the instrument is in the first position, move the wires this quantity in R.A. with the star, and *versâ vice* if the instrument be in the second position. The rule *mutatis mutandis* will apply to any case, and where there are no means of measurement and no mark, the adjustment must be made by repeated trials. With a micrometer in R.A., or with a mark, it may be performed with accuracy at once.

5th. This adjustment may be performed in two ways, either astronomically, or, when there is a level attached to the declination axis, mechanically. In the first case observe the transit of a star, not less than 45° from the equator, in reversed positions of the polar axis, exactly as in determining the collimation. Since an elevation of the west end of the declination axis causes the line of sight to describe a circle to the east of the pole, all the transits observed in that position will be too early, and *versâ vice* all will be too late when the east end is high. Again, if the west end is too high before reversing, the east is too high after reversing; so that an error of inclination has a different effect upon observations in reversed positions, and thus the interval is increased or diminished by twice the error of a single observation. The law of the error is that it varies as the tangent of the star's declination. Suppose the star observed to have 45° declination, and that the interval between the observations is, according to the clock, $3^m\ 8^s$, and according to the hour circle only 3^m. It is evident that the first observation was 4^s too early and the second 4^s too late, and since the tangent of declination $= 1$, the west end of the declination axis was elevated $1'$ in the first position and depressed $1'$ in the second. If the star had had any other declination, as δ, the 4^s should have been divided by the tangent δ before it was converted into an arc There is a second astronomical method which may perhaps suit some observers better, though less satisfactory, as it depends entirely on the accuracy of the position of the polar axis in azimuth. Having clamped the hour circle very firmly when the instrument is nearly in the meridian, observe the transits of some stars near the equinoctial and others distant from it. If the distant stars agree in giving the same clock error with the stars near the equinoctial, the declination axis is rightly placed in respect of inclination; but if not, then, taking the clock errors from the equatorial stars, it will readily be seen whether the stars between the pole and equator pass too early or too late. If they pass too early, the west end is high, if too late, the east end is high, and the inclination of the axis in arc is equal to $15'' \times \frac{\textit{error in time}}{\textit{tan. } \delta}$. In both these astronomical modes no error of collimation is supposed to exist.

The mechanical adjustment varies a little according as the level is applied. [LEVEL.] This may rest with its Ys upon the pivots of the declination axis, as in the altitude and azimuth circle [CIRCLE] and transit [TRANSIT], or hang from two cylinders, which, being fixed on the declination axis and parallel to it, project so far as to allow a level suspended from them to swing clear of the axis in all positions of the telescope. Place the declination axis horizontal by the level, and read the hour-circle, turn the polar axis half round, and place the declination axis horizontal again, and again read the hour-circle. If the readings are the same (or where the graduation is to 24^h, differ exactly 12^h) in both positions, the declination axis is adjusted, but if not, place the hour-circle half way between the positions it actually has and that which it ought to have, and make the declination axis horizontal by raising or depressing the screws which adjust it. The swing level requires a preliminary adjustment, that of making the cylinders from which it hangs parallel to the declination axis, which is to be performed thus—By turning round the telescope, bring the level directly below the declination axis; and by turning round the polar axis, bring the bubble into the middle, and clamp the hour-circle. Turn the telescope half round, when the level will be directly above the declination axis. Then, if the bubble run towards one end, bring it half way back by the screws which raise one of its supports, and the other half by the tangent screw of the hour-circle. The process must be repeated till it is satisfactory. The level itself is to be adjusted, as all levels are, by reversing it end for end on its cylinders.

6th. The instrument having been placed in the meridian, and clamped there, the hour-circle verniers, or microscopes, are to be set to mark 0^h. If the observer have the means of getting his time with tolerable accuracy, he may perfect this adjustment thus: Clamp the instrument approximately in the meridian, observe the transit of one or more known stars not far from the equator, and correct the time of observation for the known error of the clock. Then, as the right ascension of the star = true sidereal time of observation ± true hour angle from the meridian, the true hour angle is known, and the verniers, or microscopes, may be set to mark it. Or the declination axis may be set horizontal by the level, when, if the previous adjustments have been properly performed, the instrument is in the meridian, and the verniers or microscopes set to mark 0^h.

By attending to these rules and repeating the operation (stars near the pole may be safely used the second time), the instrument will be found to be very nearly in adjustment, and it is desirable that it should be so. The computation of instrumental corrections is tedious and perplexing, and most ordinary observers would blunder in the attempt; after all, the results of an equatorial, used as an *independent* instrument, are little to be relied upon. Except for observations of N.P.D. near the meridian, in reversed positions of the polar axis, as described in the first and second adjustment, the best equatorial must always be inferior to an indifferent vertical circle. Out of the meridian the careful observer will always use it as a differential instrument, which is its peculiar destination.

In the rules above given it will be remarked that the observer is directed, in every case but the 3rd, to place the instrument nearly in the meridian. This is the most favourable position of the instrument in its ordinary construction as regards symmetry and strength. Besides this advantage, the computation for refraction in or near the meridian is very simple, being the same in N.P.D. as in zenith distance[*], while it is 0 in R.A. For the third adjustment the formula of computation, where great accuracy is not required, is refraction = $57.''7 \times$ tang. N.P.D. of star, or the ordinary formula for refraction in altitude, using the star's polar distance instead of its zenith distance. The formula is more accurate the nearer the star is to the pole, but in these latitudes will be sufficiently correct if the N.P.D. do not exceed 60°. An adjustment within 10″ may be considered to be close enough for all practical purposes.

The equatorial, being thus adjusted, is ready for use, and may be turned upon any star at pleasure. Suppose it is required, at sidereal time $13^h\ 14^m$, to find a star, the R.A. of which is $17^h\ 33^m$, N.P.D. 67° 28′. As the R.A. of the star is greater than the sidereal time, the star has not yet come to the meridian, or the hour angle is east. Subtracting $13^h\ 14^m$ from $17^h\ 33^m$, we have $4^h\ 19^m$ for the east hour angle. Turn the telescope to the east, and set to the reading $12^h - 4^h\ 19^m$, or $7^h\ 41^m$ of the hour-circle[*]; then set the declination circle to 67° 28′ N.P.D., and the star will be nearly in the centre of the field. With a little habit an observer can make an approximate allowance for refraction by taking away a few seconds from the hour angle, and a minute or two from the N.P.D. If the star be very near the horizon, the usual course is to put on a low power to the telescope, and, having thus found the star, to set the telescope exactly upon it, and then to apply the power best adapted to the observation in view. The telescope being clamped in N.P.D. will follow any star by moving the instrument round in R.A. with an angular velocity equal to the apparent motion of the heavens. This motion is best given by clockwork, which is now coming pretty generally into use; and, indeed, for the measurement of double stars, the observation of occultations, eclipses of Jupiter's satellites, and all optical and micrometrical purposes, is nearly indispensable.

It is not necessary actually to correct each adjustment before proceeding to the next, and the errors in R.A. may be determined at the same time with those in N.P.D. by any person who understands the mysteries of a simple equation and the *law* of the errors. As the subject has not, we believe, been treated very satisfactorily, at least in any English publication, we shall proceed to deduce the errors and corrections of an equatorial every way out of adjustment from observations.

July 8, 1836.

Star	Face of Dec. Circle.	Sidereal Time.			Observed Hour-Circle.			Observed N.P. Distance.		
		h.	m.	s.	h.	m.	s.	°	′	″
β Urs. Min	E.	14	53	14.5	0	2	56.6	15	15	5
Ditto . .	W.	15	4	53.8	0	14	16.8	15	8	55
α Urs. Maj.	W.	17	1	8.0	6	8	45.8	27	16	52
δ Aquilæ .	W.	19	18	11.8	0	2	15.2	87	11	21
Ditto . .	E.	19	29	41.3	0	13	48.4	87	17	36

The sidereal time is corrected for the error of the clock, and the mean readings of the hour-circle and declination circle are corrected for refraction.

The instrumental N.P. distances, instrument east, are larger than those, instrument west, and the difference is

for β Ursæ Minoris .	6′	20
for δ Aquilæ . .	6	15
Mean	6	17.5 = double index error.

or the index error is 3′ 8.7″ to be *subtracted* inst. E, and *added* inst. W.

Again taking the mean of the N.P.D. inst. E. and W.

	Instl. N.P.D.			N.A. Alm.			Differ.	
	°	′	″	°	′	″	′	″
β Ursæ Minoris	15	12	5.0	15	10	17	1	48
δ Aquilæ .	87	14	28.5	87	12	23	2	5.5
						Mean	1	56.7

and as the instrumental exceeds the true N.P.D. and both stars are above pole, it follows that the pole of the instrument is *below* the pole of the heavens.

α Ursæ Majoris is nearly in the 6 hour meridian west, and therefore in a proper position for determining the azimuthal deviation of the pole: we shall suppose it is exactly at 6 hours from the meridian. Correcting for the index error, we have 27° 16′ 52″ + 3′ 9″ = 27° 20′ 1″, for the instrumental N. P. D., whereas the Nautical Almanac gives the true N. P. D. of this star = 27° 21′ 42″. The difference is 1′ 41″, which is the quantity by which the pole of the instrument is to the west of the pole of the heavens. We have therefore determined the error of the polar axis and the index error of the declination circle, which may be corrected, if necessary, by altering the screws.

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[*] The refraction in N.P.D. may be taken from any of the tables, as the zenith distance is equal to the N.P.D. of the star, after subtracting the colatitude for the upper culmination and adding it for the lower. The correction is to be added to the instrumental N.P.D., when the star is south of the zenith or sub pole, and to be subtracted when the star is between the pole and zenith.

[*] The hour angle reckoned from the meridian is always the difference between the sidereal time and the R.A. of the star. When the sidereal time is less than the R.A. of the star, add 12h to the sidereal time, and then, after subtracting the R.A. of the star, you have the reading of the hour-circle, according to the graduation into two twelves. If the graduation is from 0h. to 24h, add 24h instead of 12h to the sidereal time, and subtract the R.A. as before.

δ Aquilæ is very near the equator, and therefore proper for determining the error of collimation in R. A. The sidereal time between the observations is $11^m\ 29^s.5$, and the difference between the readings of the hour circle is $11^m\ 33^s\ 2$, hence the error of collimation in the equator is $\frac{3^s.7}{2}$ or $1^s.85$ which is to be added to the hour angle of the observation, Inst. W., and subtracted, Inst. E. For stars out of the equator this correction is to be multiplied by the secant of declination. Now the secant of declination for β Ursæ Minoris = 3.82, hence the effect of collimation for this star $= 3.82 \times 1^s.85 = 7^s.1$ nearly, and subtracting this from the hour angle of the first or E. observation and adding it to the second or W. observation, we have E. $0^h\ 2^m\ 49^s.5$ and W. $0^h\ 14^m\ 23^s.9$ for the hour-circle readings corrected on account of collimation. The difference between these is $11^m\ 34^s.4$, while the sidereal time elapsed is $11^m\ 39^s.3$, and half the discordance between these two results $\frac{4^s.9}{2}$ or $2^s.45$ is the error due to the inclination of the declination axis. As this error varies as the tangent of declination, which in β Ursæ Minoris = 3.69, the error for any other star $= \frac{2.45}{3.69} \times \tan.\ \delta = 0^s.7 \times \tan.\ \delta$ nearly. It is evident that this correction is to be subtracted from the instrumental hour angle, Inst. E., and to be added, Inst. West. The sign is to be changed if the correction is to be applied to the sidereal time of the observation, that is, if the observer wishes to adjust his instrument (when it is E., for instance), he must make the time of passage later than it is, which is done by lowering the west end of the declination axis. In this case the quantity is $0^s.7$ or $10''.5$.

No considerable error arises from omitting the effect of inclination upon δ Aquilæ in the above example; but it is more satisfactory to deduce both the coefficients of collimation and inclination at once. Let c be the constant of the correction for the collimation and i for the inclination, both + when Inst. W. and when the correction is to be applied to the hour angle; then substituting the numerical values of the secants and tangents of the two stars, we shall have for the corrected hour angles

$$\begin{array}{lrrl}
 & \text{h.} & \text{m.} & \text{s.} \\
\beta \text{ Ursæ Minoris E.} & 0 & 2 & 56.6 - 3.82c - 3.69i \\
\quad \text{"} \qquad \text{W.} & 0 & 14 & 16.8 + 3.82c + 3.69i \\
\hline
\text{Difference - -} & & 11 & 20.2 + 7.64c + 7.38i = 11^m\ 39^s.3. \\
\delta \text{ Aquilæ, W.} & 0^h & 2^m & 15^s.2 + 1.00c + 0.05i \\
\text{E.} & 0 & 13 & 48.4 - 1.00c - 0.05i \\
\hline
\text{Difference} & 0 & 11 & 33.2 - 2{\cdot}00c - 0.10i = 11^h\ 29^m.5,
\end{array}$$

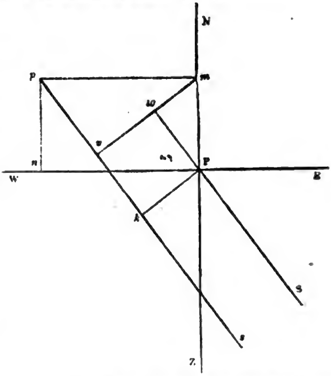
which give for the determination of c and i

$$7.64c + 7.38i = 19.1$$
$$2.00c + 0.10i = \ \ 3.7$$

from which i is found $= 0.71$ $c = 1.81$ nearly as before.

In this way, by forming an equation for each star, and combining all the observations in which i has a small coefficient into one equation (when stars have south declination, or are sub polo, the coefficient is negative), and those where the coefficient of i is large into another, the value of i, and consequently of c, may be determined with great accuracy. It is not absolutely necessary that the observations for deducing these corrections should be near the meridian, but it is desirable that as little time as possible should elapse between each of the pair of observations, on account of the variation of refraction and of the effect of polar error, if that be considerable. As a general rule, it would be well to keep within a few minutes of the meridian, for in the above example the variation of refraction in β Ursæ Minoris is $0^s.5$, while the variation of the effect of polar error is no less than $1^s.3$. Besides, the instrument is always most perfect near the meridian, and is to be used there when possible.

If the errors be corrected by adjustment, the index error of the hour-circle is simply the difference between the observed hour angle and the true hour angle. Or supposing the true sidereal time unknown, the index error must be determined by a level, as we have described above, after placing the declination axis horizontal. But if instead of actually adjusting the instrument, the errors are noted and corrections applied, we have yet to compute the effect of polar deviation upon the observations in R. A. before the index error can be correctly obtained. In order to do this, we must consider the polar deviation more minutely; and as we have reason to think that from a want of skill in detecting the polar error of an equatorial, or in applying the corrections which depend upon this error to observations, especially in R. A., observers have been led to impeach too hastily the character of instruments, we shall explain this part of the subject very fully.



Let P be the place of the pole of the heavens and p that of the pole of the instrument when prolonged indefinitely, as seen on the sphere of the heavens by a spectator outside; N P Z the meridian of the place, which, when produced towards Z, passes through the zenith and the south point of the horizon; E P W, the 6-hour meridian, which passes through the east and west points of the horizon. Let fall $p\,m$ and $p\,n$ perpendicular on Z N and E W, and let $p\,m$ or $\text{P}\,n = x''$ and $p\,n$ or $\text{P}\,m = y''$. It is presumed that the index error of the declination circle has been obtained by reversed observations, which is indeed the universal rule, and therefore that the observed N. P. distances, corrected for index error and refraction, express the actual distances of the stars from p.

Let a tolerably distant star be observed, the place of which is in the direction of $p\,s$ when continued; draw Pk perpendicular to $p\,s$, and also P S from the true pole towards the star, hence Z P S is the true hour angle of the star.

Then since the instrument is nearly in adjustment and the star not very near the pole, PS and $p\,s$ are nearly parallel, and Pk is perpendicular to both, hence the distances of the star from P and k are equal, and the effect of polar error on the N. P. D. of the star is to make its instrumental polar distance too large by $p\,k$. Drawing $m\,v$ perpendicular and P$\,w$ parallel to $p\,s$,

$$p\,k = p\,v + v\,k \text{ or } \text{P}\,w$$
$$= p\,m \times \cos.\ m\,p\,v + \text{P}\,m \times \cos.\ m\,\text{P}\,w;$$

or, since $m\,p\,v$ is the complement of $n\,p\,v$, which is = Z P S and $m\,\text{P}\,w$ = Z P S,

$$p\,k = x'' \times \sin.\ \text{east hour angle} + y'' \times \cos.\ \text{east hour angle}.$$

From this formula if x and y be known in quantity and direction by observations in the meridian and at six hours from it, the value of $p\,k$ may be computed and applied as a correction to the observed N. P. D. of any star, and the observed hour angle will serve for the computation.

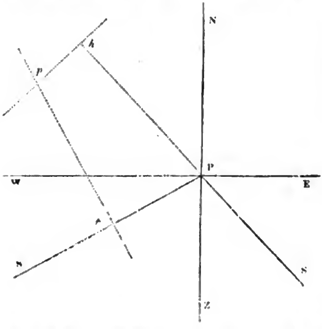
In practice we have found it sufficiently accurate to draw $p\,n\,\text{P}$ on a scale where seconds are visible, *i.e.*, equal to about $\frac{1}{20}$ inch, and then making the angle $n\,p\,s$ equal to the observed hour angle, and letting fall P$\,k$ perpendicular on $p\,s$ to ascertain the value of $p\,k$ by compass and scale. It is not possible to commit an error of more than 2″ or 3″, which is generally of little importance; and besides the superior rapidity of the operation, there is no danger of confounding the *sign* of either part of the correction, whether the star be above or below pole, which even careful and experienced computers can scarcely at times avoid. In any case the graphical process will afford a very useful check.

The effect of the displacement of the polar axis upon the readings of the hour circle may easily be gathered from the same figure. Suppose the two lines P S and $p\,s$ to be continued till they meet at the star, and to be produced, if necessary, until they cut the equator in Σ and σ. The reader may imagine or draw the figure. If the star be north of the equinoctial, the lines $\mathrm{P\,S}\,\Sigma$ and $p\,s\,\sigma$ cross at the star, and the hour angle corresponding to p is to the east, and greater than the hour angle corresponding to the true pole P. Hence the reading of the hour circle is too small in the case represented in the figure, or $\Sigma\,\sigma$ is to be added to the reading of the hour circle. Also, since $\sigma\,\Sigma : \mathrm{P}\,k :: \sin.\ \delta : \cos.\ \delta\ \therefore\ \sigma\,\Sigma = \mathrm{P}\,k \times \tan.\ \delta$. Again,

$$\begin{aligned} \mathrm{P}\,k &= m\,v - m\,w \\ &= p\,m \times \sin.\ m\,p\,v - \mathrm{P}\,m \times \sin.\ m\,\mathrm{P}\,w \\ &= x'' \times \cos.\ \text{east hour angle} - y'' \times \sin.\ \text{east hour angle}. \end{aligned}$$

The reader will have no difficulty in following out the rules with regard to the signs of the correction in each particular case, but it will be much safer and quite accurate enough to take the value of Pk from the figure and to multiply it by $\frac{1}{15}$ tan. δ for the correction. As a practical direction we have found this convenient. Join Pp, and produce it both ways. Then according to this figure, the correction is additive to the hour circle reading for all stars having north declination which are observed on the south side of Pp produced, and *versâ vice* for stars on the north side. The tangent of declination is negative when the star is south of the equinoctial, and the rule is reversed. There is no correction for stars in the direction of Pp, that is for stars having an east hour angle from the south or a west hour angle from the north, such that its tangent $= \dfrac{x}{y}$. After this correction has been applied, the index error of the hour circle may be deduced in the manner pointed out.

It sometimes happens that an observer, from carelessness or want of time or knowledge, does not determine the position of the pole of the instrument by the best means, viz., by observations in the meridian and at 6 hours from it, but that this position is to be deduced from a higgledy piggledy mass of observations made in different parts of the heavens. To form equations such as we have just given for each observation, and to solve them by the method of minimum squares, might possibly be the most accurate mode; but the labour would be very great, and on such an object very much mispent. We have found the graphical process quite sufficient, and it has the further advantage of exhibiting to the eye those observations which, from their extravagance, are probably errors in bisecting the star or in reading off the verniers. Suppose such a set of observations to be given for reduction. Draw W E and N Z, figure 2, at right angles to each other, and intersecting at P, and then draw from P lines such as P S, P S′ for each known star observed, making the angles S P Z, S′ P Z equal to the observed hour angles of the stars. If the instrumental polar distance be less than that of the catalogue, as in S′, take P h' = the difference; if the instrumental distance be greater, as in S, prolong S P and take P h = the difference. Through h and h' draw perpendiculars to P S and P S′, and these will intersect at p, the place of the instrumental pole. Repeating this process for each known star, the eye will show pretty nearly where p should be chosen among the various intersections. The place of p being determined, the observations of an unknown star or comet may be corrected as shown above; and by dropping perpendiculars on P W and P N, the azimuthal and vertical errors of the pole of the instrument may be determined.



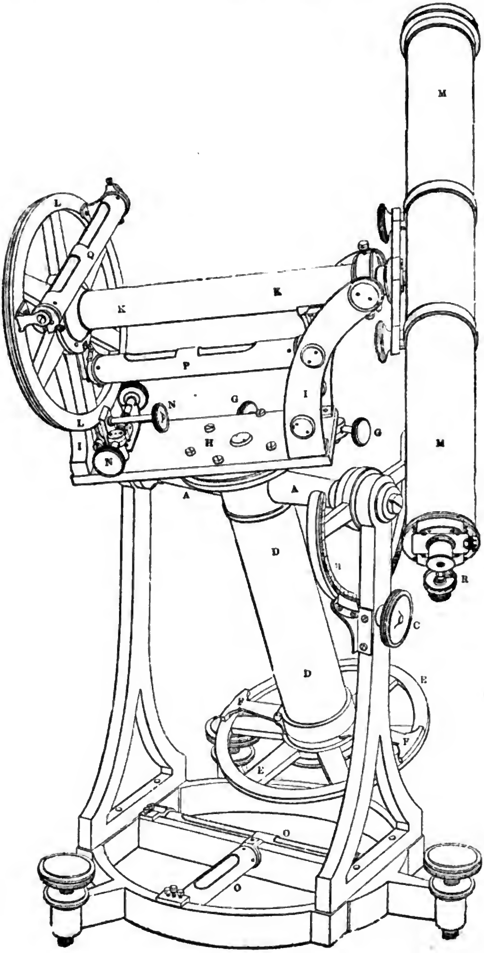
It seems scarcely necessary to caution any person into whose hands such observations may come, against relying upon intersections which are made at very acute or very obtuse angles. If, for instance, we were to attempt to deduce the place of p as to azimuth by a pair of observations near the meridian, or its place as to altitude by observations near the 6 hour meridian, we should only have our own folly to blame for the inaccuracy of the result. From the nature of the case, the unavoidable errors of observation would be multiplied by the process, and a result of any kind might be obtained, just as by observing the sun near noon for time and near the prime vertical for latitude, a sailor might cause his sextant to be guilty of any assignable error. This is evident from the form of the analytical equation, but any non-algebraist may satisfy himself by drawing lines P S and P S′, making an angle of 5° or 10°, and by finding what the effect of an error of 10″ in the observations will be on the position of p. If three observations of stars without reversion should be employed, and the index error of the declination circle be deduced at the same time, the blunder will be complete.

Though the errors of an unadjusted equatorial may be detected and the corrections rigorously computed, it would be an abuse of time and calculation to do so. In two of the ordinary constructions of the instrument and probably in the third, the instrumental errors are not and cannot be expected to be accurately the same in all positions of the instrument. In those equatorials of Ramsden's construction which have five feet telescopes and declination circles of three feet diameter, variations of adjustment between the meridian and six hours from it may be expected to amount to 10″ or 20″, and in the largest equatorials, which are necessarily more imperfect, discrepancies of 1 or even 2′ may arise. We shall now point out the rational mode of using an equatorial instrument, when the object is to determine the place of any phenomenon in the heavens.

The first thing is to adjust the instrument with great care, and especially to make the pole of the instrument agree with the celestial pole. The permanence of this adjustment depends solely upon the steadiness of the upper and lower supports, which should therefore be fixed very solidly. This being done, suppose a comet is to be determined. Turn the telescope upon it, and having clamped the hour circle very firmly, note the transit of the comet over the vertical wires, bisecting it at the same time in N.P.D. by the horizontal wire. Wait till some other star passes over the field, note its transit, and bisect it in N.P.D. by moving the micrometer screw only. In this case the declination circle is supposed to be firmly clamped between the observations. Then the difference of the times of observation gives the difference of R.A. between the comet and star, and the difference in declination is taken from the micrometer. It is the same thing, of course, whether the star precedes or succeeds the comet. Observations of this kind are amongst the most perfect which can be made, for the errors of the instrument being the same in each case, and the refraction almost the same, no error can creep in except that of noting the phænomenon. The star which is sometimes called the determining star, or the star of comparison, is afterwards observed by meridian instruments, and then the place of the comet is deduced with the greatest accuracy. Frequently, however, there is a dearth of stars of comparison, and the time before a proper star enters the field is too long for the patience of the observer, or he may not have a micrometer. In this case the instrument is kept clamped in R.A., and after observing the comet, the telescope is moved up or down a little, and stars above and below the comet are observed, in

R.A. by noting the clock, and in declination by reading the circle. The instrument should then be turned half round in R.A., and the operation repeated. By combining both sets, as good a place of the comet will be deduced as the division of the declination circle will allow. The stars of comparison are taken above and below, so that the mean of the instrumental errors at the stars may be pretty nearly equal to that at the comet, and as the effect in R.A. of an error of collimation or inclination is changed in sign by reversion, it is therefore eliminated from the mean. The instrument must on no account be moved in R.A. between the observation of the comet and the stars of comparison. In this way Halley's comet was observed at Greenwich and Cambridge on its late appearance, the stars of comparison were subsequently observed with the meridian instruments, and the apparent places of the comet finally settled. The details will be found in the observations of the respective observatories for the year 1835.

If the utmost accuracy be not required, it is sufficient, after careful adjustment, to note the transit of the comet over the vertical wires, and to read off the declination and hour circle, and then turning the instrument upon one or



Equatorial.

more neighbouring stars, to observe them in like manner. The nearer the stars of comparison are to the comet, the greater probability there is that there is no change, or only a slight change of instrumental error in moving from one to the other. This mode of observation however is only to be tolerated in cases of necessity, when, either from haste or uncertain weather, the observer cannot wait for stars coming to the same meridian with the comet.

Suppose the following observations to have been made of Arcturus and an unknown star or comet, after correcting each for refraction.

	Time by clock. h. m. s.	Hour Circle. h. m. s.	North Polar Dist. ° ′ ″
Arcturus	17 17 9.9	3 10 15.5	69 54 46
Comet	17 27 11.5	2 50 38.1	62 11 1

To determine the index errors of both circles by Arcturus, we have

	h. m. s.		° ′ ″
Time by clock	17 17 9.9	Inst$^{l\cdot}$ N.P.D.	69 54 46
Hour angle west	3 10 15.5	Do. Naut. Alm.	69 57 37
Instrum^{l} R.A.	14 6 54.4	Inst$^{l\cdot}$ N.P.D. *too small*	2 51
R.A. Naut. Alm. .	14 8 10.6		
Inst$^{l\cdot}$ R.A. *too small* . .	1 16.2		

Applying these corrections to the observations of the comet, we have

	h. m. s.		° ′ ″
Time by clock	17 27 11.5	Inst$^{l\cdot}$ N.P.D.	+ 62 11 1
Inst$^{l\cdot}$ hour angle	2 50 38.1	Correction	+ 2 51.
Inst$^{l\cdot}$ R.A. comet	14 36 33.4	N.P.D. .	+ 62 13 52
Correction .	+ 1 16.2		
True R.A. comet	14 37 49.6		

The star of comparison is, in this case, much too distant both in R.A. and N.P.D.; and the index error ought to be determined by stars above and below the comet, and preceding and succeeding it. Also, after the observations have been made in one position of the instrument, it ought to be turned half round and the observations repeated; but the mode of ascertaining and applying the corrections is the same, and needs no further explanation.

The accompanying figure represents the portable universal equatorial as constructed by Troughton: (a drawing and description of a similar instrument, under the title of Fayrer's Equatorial, will be found in Rees's *Cyclopædia*, article *Equatorial*). The lower part or stand rests on three foot-screws, and needs no description. The upper part is moveable on a cross axis, A A, on which it is balanced; and when the polar axis is set at the proper inclination by the latitude semicircle B, the clamp C retains it there. The polar axis consists of an outer tube, D D, forming one piece with the horizontal axis above-mentioned, and of an interior axis which turns freely within the tube as in a socket. This latter axis carries the hour circle, E E, the verniers, F F, being fixed to the tube. The clamp and tangent screw of the hour-circle are partially seen at G G. The upper plate H is fixed on the inner axis, and revolves with it. Two pieces, I I, rise from this plate, and carry the collars within which the cross or transit axis, K K, works. The declination circle, L L, and telescope, M M, are fixed to the extremities of the transit axis, the telescope being outside the collar. The declination clamp and tangent screw are seen at N N; the verniers are on the other side. These are attached to the support which rises from the plate H. Two levels are fixed on the lower part of the stand at O O, but they are only to be used for approximate adjustment. A delicate swing level, P, is hung from the transit axis, and a second level, Q, is fixed to the declination circle. The telescope has a micrometer, R, carrying wires for measuring small differences of declination.

It is evident to those who know Fraunhofer's construction, that it is identical with the upper part of this universal equatorial. The suspension and motion of the polar axis and hour circle are the same as in the equatorial made by Troughton for the University of Coimbra. The position of the telescope is that of Megnié and Nairne.

The rules we have already given will enable any one to adjust the universal equatorial; but if the direction of the meridian be known, it is a simpler plan to adjust the instrument as an altitude and azimuth circle, which it becomes when the polar axis is vertical, and then by inclining the polar axis to the latitude of the place, it becomes an equatorial. There is no provision in the instrument itself for moving the polar axis in azimuth. The whole must be turned bodily, and for this purpose some preparation should be made in the stand on which the foot-screws rest.

The following references will be useful to the reader. A clock for carrying an equatorial, constructed by Messrs. Troughton and Simms, and now in the possession of Charles Holford, Esq., of Hampstead, is described in the *Abstracts of the Proceedings of the Royal Astronomical Society*, vol. iii., No. 6, with a wood-cut. This would probably act somewhat more steadily with a horizontal fly-wheel upon the vertical axis, but its performance is very good. An account of the slipping piece and the wire micrometer to be applied to the equatorial for observing double stars, with directions for their use, is given in the appendix to the *Companion to the Maps of the Stars published by the Society*, 1836. For the mode of using an equatorial as a measuring circle, see the *Cambridge* and *Greenwich Observations* for 1835 and 1836 of Halley's Comet, of the Solar Eclipse, and of the elongation of Jupiter's fourth Satellite; and for the corrections for refraction and parallax, *the Introduction to the Greenwich Observations*, 1836, to which the reader should look if he wishes to know the best methods of making and reducing astronomical observations in general. Sir George Shuckburgh's *Memoir* already referred to contains a valuable history of the instrument, though, on consulting the authorities, we have been led occasionally to differ from him. A description of Ramsden's *refraction piece* will be found at page 19 of Shuckburgh's paper, along with a collection of tables for computing the effects of refraction and parallax in R.A. and N.P.D. from the data which this ingenious appendage affords. Pearson's *Practical Astronomy*, vol. ii. p. 517; Littrow, *Memoirs of the Astronomical Society*, vol. ii. p. 45; Kriel, *Mem. Ast. Society*, vol. iv. p. 495. We have committed an oversight by relying on Vince. Graham's astronomical sector is supported as Hooke's quadrant and Flamsteed's sextant: see Smith's *Optics*, § 885, book 3, chap. 9; but in explaining the instrument, Smith uses a figure for illustration, which Vince has copied as the actual instrument. It is now in the transit-room of the Royal Observatory.

EQUERRIES (from the French *écurie*, a stable), the name given to certain officers of the royal household in the department of the master of the horse, the first of whom is styled chief equerry and clerk-marshal. Their duties fall in rotation. When the king or queen ride abroad in state, an equerry goes in the leading coach. They formerly rode on horseback by the coach-side. Officers of the same denomination form a part of the established households of the royal dukes, &c.

EQUIANGULAR, EQUILATERAL, EQUI-CRURAL, EQUI-TANGENTIAL, &c. &c., a class of words beginning with EQUI, which, in composition forms an adjective expressive of the equality of two things spoken of. Thus equiangular means having equal angles, and so on. There is a certain liability to confusion, arising from mistaking between the application of such terms to different parts of the same figure and to different figures. Thus 'an equilateral triangle' must mean a triangle which has three sides all equal. But 'two triangles which are equilateral' may mean two triangles in which every side of the first has its equal among those of the second: the two not being separately equilateral. To avoid this, it is sometimes said that two triangles, such as have just been mentioned, are *mutually* equilateral.

EQUILI'BRIUM (*æqua libra*), a state of rest produced by the mutual counteraction of two or more forces. The science of equilibrium is STATICS.

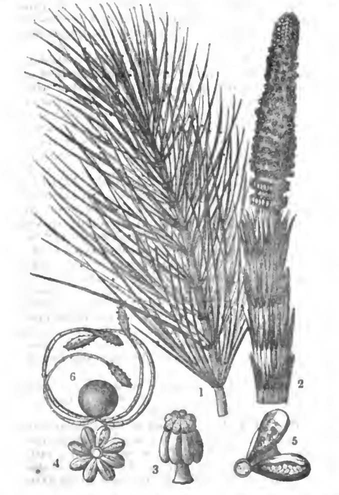
EQUIMULTIPLES, multiples in which equal numbers of times are taken. Thus *seven* times A and *seven* times B are *equi*-multiples of A and B: a league and a yard are equimultiples of a mile and a foot. The student of the fifth book of Euclid should remember that this word has no singular number: 7 A and 7 B are equimultiples, but 7 A is not therefore to be called *an* equimultiple but *one of the* equimultiples. And the same of the word equal, whether separately or in composition: A and P may be equal lines, but

A is not *an equal* line. Equality implies comparison of at least two things.

EQUINOCTIAL, a name given to the equator, from the night being equal to the day when the sun is there.

EQUINOXES, the intersections of the equator and ecliptic; the vernal equinox being that in which the sun is when about to rise into the northern hemisphere; the autumnal equinox being that in which the sun is when about to sink into the southern hemisphere. These terms are relative: for the equinox which is vernal in our hemisphere is autumnal in the southern, and *vice versâ*.

EQUISETA'CEÆ are imperfectly formed plants whose real affinity is uncertain, and the nature of whose parts of fructification is not yet understood. By Linnæus and almost all botanists they are referred to the Cryptogamic class; by a modern English botanist they are regarded as a low rudimentary form of Gymnosperms. Only one genus is known, the stems of which are employed in the shops under the name of Dutch rushes. They are hollow-stemmed leafless plants, with a cuticle composed of pure silex, which gives them the hard surface that makes them useful for the polisher's purpose. In lieu of leaves they have toothed sheaths, each of which has as many series of imperfect spiral vessels passing into fistulæ of the stem as there are toothings. Their fructification grows in terminal cones, consisting of stalked peltate scales, having on their lower side small cases wherein are lodged minute oval or round green bodies, surrounded by four elastic hygrometrical yellowish grey granulated clavate threads. By all botanists the central green body is admitted to be a seed or spore. The nature of the clavate threads is disputed; they are usually called elaters, and are compared to the elastic spiral threads bearing that name in Jungermanniaceæ; but there is no proof of such being their nature, and there is an opinion that they are rudimentary stamens. Be this as it may, the remarkable resemblance between Equisetaceæ and Casuarina, an undoubted flowering plant, the marked similarity of their cones of fructification to those of Cycadaceæ and Coniferæ, and the absence of such an evident correspondence between them and any existing or extinct forms of Cryptogamic plants, strongly inclines us to adopt the view of their being a low form of Phænogamous vegetation, bearing the same relation to Cycadaceæ as Lemna to palms and Ceratophyllum to arborescent nettles. Equisetaceæ are in English called horsetails, and are reckoned a sure sign of wet, stiff, springy soil.



1, A sterile branch of Equisetum fluviatile; 2, a fertile branch of the same in fructification; 3, one of the peltate scales; 4, the same viewed from below; 5, two of the cases very much magnified; 6, an ovule with the four supposed anthers.

EQUISE'TIC ACID, an acid discovered by Braconnot in the *equisetum fluviatile*, in which it exists combined with magnesia.

This acid may be obtained in small colourless radiating crystals; its taste is sharp, and somewhat analogous to that of tartaric acid: it is unalterable in the air. When heated, it decomposes without subliming, and yields an oily uncrystallizable acid product. It dissolves readily both in alcohol and in water: the solution gives no precipitate either with lime or barytes water, but with acetate of lead and protonitrate of mercury it gives white curdy precipitates: it precipitates the persalts, but not the protosalts of iron.

With potash and soda it yields deliquescent uncrystallizable salts; with ammonia, a crystallizable salt. With oxide of zinc, with lime, and magnesia, it forms uncrystallizable transparent compounds, which are unalterable in the air.

E'QUITES (horsemen), the name of an order in the Roman state. Their origin, according to the old tradition, was this:—Romulus having divided his subjects into three tribes, chose from each one hundred young men whom he destined to serve on horseback and act as his body-guard; this body of cavalry was called the *celeres*, and afterwards the *equites*. (Dionys., ii. 13.) Niebuhr supposes (*Hist. of Rome*, i. p. 325, transl.) that whereas *patres* and *patricii* were titles of honour for individuals, *celeres* was the name of the whole class as distinguished from the rest of the nation. The three centuries of the *celeres* were called by the same names as the three tribes of the patricians, namely, Ramnes, Tities, and Luceres. Their tribunes are spoken of as a college of priests (Dionys., ii. 64), and it appears that the tribes of the patricians had also tribunes (Dionys., ii. 7). Moreover, when it is said that Tarquinius Priscus made three new centuries, which he added to the former three, and that the whole went under the name of the Sex Suffragia, or the six equestrian centuries, we cannot doubt that the alteration which he introduced was a constitutional and not merely a military one; that in fact the centuries which he formed were, like the original three, tribes of houses; that his innovation was nothing but an extension of the political division of the inhabitants of Rome under Romulus. (Niebuhr, *Hist. of Rome*, i. p. 391.) When Servius Tullius established the comitia of the centuries, he received the sex suffragia, which included all the patricians, into his first class; and to them he added twelve other equestrian centuries, made up of the richest of the plebeian order. (Niebuhr, i. p. 427.) The antient writers appear to have laboured under some great confusion with regard to this arrangement. Livy (i. 43) makes a proper distinction between the twelve equestrian centuries created by Servius and the six which existed before; but when he states (i. 36) that the cavalry in the reign of Tarquinius Priscus amounted to 1800, he appears to be antedating the origin of the eighteen equestrian centuries which formed part of the constitution of Servius. To the establishment of the comitia centuriata the creation of a body of equites, as a distinct order, seems to be due. The plan of Servius was, to a certain extent, identical with that of Solon. The object of both legislators was to break down the limits to which the old aristocracy was confined, and to set up an order of wealth by the side of the order of birth: not, however, that when a person could produce his 400,000 sesterces, he became *ipso facto* a knight, as was the case in after times. (Hor. *Ep.* i. 1, 57.) According to the Servian constitution, good birth or the sanction of the censors was necessary for gaining a place in the equestrian order. (Polyb., vi. 20: Zonaras, vii. 19.) When Cicero says (*De Republica*, ii. 20) that Tarquinius established the equestrian order on the same footing as that on which it stood in his own time, and also attributes to the same king the assigning of money to the equites for the purchase and keep of their horses, he is evidently inconsistent. In Tarquin's time, that is, before there was any plebeian order, it was natural enough that the poorer patricians, who were obliged to serve on horseback, (just as the Ἱππῆς at Athens were a poorer class than the Pentakosiomedimnoi, Plut., *Sol.* c. 18.) should be furnished with the means for doing so. But the case was different with the equites after the establishment of an order of wealth. A man might then be of equestrian rank, and yet have no horse assigned to him; thus, on the one hand, we find at the time of the siege of Veii a number of equites serving on horseback at their own expense (Liv., v. 7);

and, on the contrary, L. Tarquitius, who was a patrician, was obliged to serve on foot from his poverty. (Liv., iii. 27.) From this it appears probable that a certain sum was fixed which it was not necessary for every eques to have, but the possessor of which was obliged to serve on horseback at his own expense if no horse could be given him by the public, and that those whose fortune fell short of this were obliged to serve in the infantry under the same circumstances.

The lieutenant of the dictator was called 'the chief of the equites' (*Magister Equitum*); and although in later times he was appointed to this office by the dictator himself, it is probable, as Niebuhr conjectures (i., p. 559), that he was originally elected by the 12 centuries of Plebeian equites, just as the dictator, or *Magister Populi*, was by the *Sex Suffragia*, in other words, by the Populus or Patricians.

With regard to the functions of the equites, besides their military duties, they had to act as judices or jurymen under the Sempronian law: under the Servilian law the judices were chosen from the senate as well as from the equites: by the Glaucian law the equites alone performed the office, and so on by alternate changes till the law of Aurelius Cotta (B.C. 70), by which the judices were chosen from the senators, equites, and tribuni ærarii. The equites also farmed the public revenues. Those who were engaged in this business were called the *Publicani;* and though Cicero, who was himself of the equestrian order, speaks of these farmers as 'the flower of the Roman equites, the ornament of the state, the safeguard of the republic' (*Pro Plancio*, 9), it appears that they were a set of detestable oppressors, who made themselves odious in all the provinces by their avarice and rapacity.

The equites, as it may be inferred from what has been already said, gradually lost the marks of their distinctive origin, and became, as they were in the time of Cicero for instance, an ordo or class of persons as distinguished from the senate and the plebs. They had particular seats assigned to them in the circus and the theatre. The insignia of their rank, in addition to the horse, were, a golden ring and the angustus clavus, or narrow band, on their dress, as distinguished from the latus clavus or broad band of the senators: the two last insignia seem to have remained after the former ceased to possess its original and distinctive character.

EQUITY, according to the definition given by Aristotle, is 'the rectification of the law, when, by reason of its universality, it is deficient; for this is the reason that all things are not determined by law, because it is impossible that a law should be enacted concerning some things; so that there is need of a decree or decision; for of the indefinite the rule also is indefinite: as among Lesbian builders the rule is leaden, for the rule is altered to suit the figure of the stone, and is not fixed, and so is a decree or decision to suit the circumstances.' (*Ethics*, b. v. c. x. Oxford trans.) 'Equity,' says Blackstone, 'in its true and genuine meaning, is the soul and spirit of all law; positive law is construed and rational law is made by it. In this respect, equity is synonymous with justice; in that, to the true and sound interpretation of the rule.' According to Grotius, equity is the correction of that wherein the law, by reason of its generality, is deficient.

Until jurisprudence has become really a science based on settled principles, some such jurisdiction as our earlier law writers have attributed to the courts of equity is necessary to the due administration of justice; and it is probable that in England it deserved the humorous description given by Selden in his 'Table Talk:' 'Equity in law is the same that spirit is in religion, what every one pleases to make it; sometimes they go according to conscience, sometimes according to law, sometimes according to the rule of court. Equity is a roguish thing; for law we have a measure, know what to trust to; equity is according to the conscience of him that is chancellor, and as that is larger or narrower, so is equity. It is all one as if they should make the standard for the measure we call a foot a chancellor's foot; what an uncertain measure would this be! One chancellor has a long foot, another a short foot, a third an indifferent foot: it is the same thing in the chancellor's conscience.'

This uncertainty has however long ceased in that branch of our law which is expressed by the term Equity, and, from successive decisions, rules as strict and principles as fixed have been framed and established in our courts of equity as in our courts of law New cases, it is true, may and do arise, but they are decided upon these ascertained rules and principles, and not from the notions of the judge as to what may be reasonable or just in the particular case before him. Nothing in fact is more common than to hear the chancellor say, that whatever may be his own opinion, he is bound by the authorities, that is, by the decisions of his predecessors in office and those of the other judges in equity; that he will not shake any settled rule concerning property, &c., it being for the common good that these should be certain and known, however ill-founded the first resolution may have been.

In its enlarged sense, equity answers precisely to the definition of justice, or natural law (as it is called), as given in the 'Pandects' (lib. i. tit. 1, l. 10, 11); and it is remarkable that subsequent writers on this so-called natural law, and also the authors of modern treatises on the doctrine of equity, as administered in the English courts, have, with scarcely any exception, cited the above passage from Aristotle as a definition of equity in our peculiar sense of a separate jurisdiction. But according to this general definition every court is a court of equity, of which a familiar instance occurs in the construction of statutes, which the judges of the courts of common law constantly interpret according to the spirit, or, as it is called, the equity, not the strict letter.

It is hardly possible to define equity as now administered in this country, or to make it intelligible otherwise than by a minute enumeration of the matters cognizable in the courts in which it is administered in its restrained and qualified sense. 'It is no longer,' says Sir James Mackintosh in his life of Sir Thomas More, 'in the acceptation in which the word is used in English jurisprudence, to be confounded with that moral equity which generally corrects the unjust operation of law, and with which it seems to have been synonymous in the days of Selden and Bacon. It is a part of laws formed from usages and determinations which sometimes differ from what is called common law in its subjects, but chiefly varies from it in its mode of proof, of trial, and of relief.'

In this country the remedies for the redress of wrongs and for the enforcement of rights are distinguished into two classes, *those which are administered in courts of law*, and *those which are administered in courts of equity;* the former are called legal rights and wrongs, the latter equitable. Equity jurisdiction may therefore properly be defined as that portion of remedial justice which is administered by a court of equity as distinguished from a court of law, from which a court of equity differs mainly in the subject matters of which it takes cognizance and in its mode of procedure and remedies.

Courts of common law in this country proceed by certain prescribed forms of action alone, and give relief only according to the particular exigency of such actions, by a general and unqualified judgment for the plaintiff or the defendant. There are many cases however in which a simple judgment for either party, without qualifications or conditions, or peculiar arrangements, will not do entire justice. Some modifications of the rights of both parties may be required; some restraints on one side, or the other, or perhaps on both; some qualifications or conditions present or future, temporary or permanent, to be annexed to the exercise of rights, or the redress of injuries. To accomplish such objects the courts of law in this country have no machinery: according to their present constitution they can only adjudicate by a simple judgment between the parties. Such prescribed forms of actions are not confined to our own system of laws; they were known in the civil law, and the party could apply them only to their original purposes. In other cases he had a special remedy. Courts of equity however are not so restrained; they adjudicate by decree pronounced upon a statement of his case by the plaintiff, and the answer of the defendant given in upon *oath*, and the evidence of witnesses, together, if necessary, with the evidence of all parties, also given upon oath. These decrees are so adjusted as to meet all the exigencies of the particular case, and they vary, qualify, restrain, and model the remedy so as to suit it to mutual and adverse claims, and the real and substantial rights of all the parties so far as such rights are acknowledged by the established rules of equity

The courts of equity bring before them *all* the parties interested in the subject matter of the suit, and adjust the rights of all however numerous; whereas courts of law in this country are compelled by their constitution to limit their inquiry to the litigating parties, although other persons may be interested, that is, they give a complete remedy in damages or otherwise for the particular wrong in question as between the parties to the action, though such remedy is obviously in many cases an incomplete adjudication upon the general rights of the parties to the action, and fails altogether as to other persons, not parties to the action, who yet may be interested in the result or in the subject matter in dispute.

Perhaps the most general as well as the most precise description of a court of equity is the outline given by Mr. Justice Story in the 'Encyclopædia Americana,' which he has filled up in his recent Treatise on Equity. It is this—that a court of equity has jurisdiction in cases where a plain, adequate, and complete remedy cannot be had in the common law courts. The remedy must be *plain*, for if it be doubtful and obscure at law, equity will assert a jurisdiction. It must be *adequate*, for if at law it fall short of what the party is entitled to, that founds a jurisdiction in equity; and it must be *complete*, that is, it must attain the full end and justice of the case, it must reach the whole mischief and secure the whole right of the party present and future, otherwise equity will interpose and give relief. The jurisdiction of a court of equity is sometimes concurrent with the jurisdiction of the courts of law; sometimes assistant to it; and sometimes exclusive. It exercises concurrent jurisdiction in cases where the rights are purely of a legal nature, but where other and more efficient aid is required than a court of law can afford. In some of these cases courts of law formerly refused all redress, but now will grant it. For strict law comprehending established rules, and the jurisdiction of equity being called into action when the purposes of justice rendered an exception to those rules necessary, successive exceptions on the same grounds became the foundation of a general principle, and could no longer be considered as a singular interposition. Thus law and equity are in continual progression, and the former is constantly gaining ground upon the latter. Every new and extraordinary interposition is by length of time converted into an old rule; a great part of what is now strict law was formerly considered as equity, and the equitable decisions of this age will unavoidably be ranked under the strict law of the next. (Prof. Millar's *View of the Eng. Govt.*) But the jurisdiction having been once justly acquired at a time when there was no such redress at law, it is not now relinquished by the courts of equity.

The most common exercise of the concurrent jurisdiction is in cases of account, accident, dower, fraud, mistake, partnership, and partition. In many cases which fall under these heads, and especially in some cases of fraud, mistake, and accident, courts of law cannot and do not afford any redress: in others they do, but not in so complete a manner as a court of equity.

A court of equity is also assistant to the jurisdiction of the courts of law in cases where the latter have no like authority. It will remove legal impediments to the fair decision of a question depending at law, as by restraining a party from improperly setting up, at a trial, some title or claim which would prevent the fair decision of the question in dispute; by compelling him to discover, upon his own oath, facts which are material to the right of the other party, but which a court of law cannot compel him to disclose; by perpetuating, that is, by taking and keeping in its custody, the testimony of witnesses, which is in danger of being lost before the matter can be tried; and by providing for the safety of property in dispute pending litigation. It will also counteract and controul fraudulent judgments, by restraining the parties from insisting upon them.

The exclusive jurisdiction of a court of equity is chiefly exercised in cases of merely equitable rights, that is, such rights as are not recognised in courts of law. Most cases of trust and confidence fall under this head. This exclusive jurisdiction is exercised in granting injunctions to prevent waste or irreparable injury; to secure a settled right, or to prevent vexatious litigation; in appointing receivers of property, which is in danger of being misapplied; in compelling the surrender of securities improperly obtained; in preventing a party from leaving the country in order to avoid a suit; in restraining any undue exercise of a legal right; in enforcing specific performance of contracts; in supplying the defective execution of instruments, and reforming, that is, correcting and altering them according to the real intention of the parties, when such intention can be satisfactorily proved; and in granting relief in cases where deeds and securities have been lost.

Much discussion has taken place and various opinions have been expressed upon the question whether it would or would not be best to administer the whole of remedial justice in one court or in one class of courts without any separation or distinction of suits, or of the forms or modes of procedure and relief. Lord Bacon, upon more than one occasion, has expressed his decided opinion that a separation of the administration of equity from that of the common law is wise and convenient. 'All nations,' says he, 'have equity, but some have law and equity mixed in the same court, which is worse, and some have it distinguished in several courts, which is better;' and again, 'In some states, that jurisdiction which decrees according to equity and moral right, and that which decrees according to strict right, is committed to the same court; in others, they are committed to different courts. We entirely opine for the separation of the courts; for the distinction of the cases will not long be attended to if the jurisdictions meet in the same person; and the will of the judge will then master the law.'

Lord Hardwicke held the same opinion. Lord Mansfield, it is to be presumed, thought otherwise, for he endeavoured to introduce equitable doctrines into the courts of law. The old strictness has however been restored. His successor, Lord Kenyon, made use of these expressions: 'If it had fallen to my lot to form a system of jurisprudence, whether or not I should have thought it advisable to establish different courts, with different jurisdictions, and governed by different rules, it is not necessary to say; but influenced as I am by certain prejudices that have become inveterate with those who comply with the systems they find established, I find that in these courts, proceeding by different rules, a certain combined system of jurisprudence has been framed most beneficial to the people of this country, and which I hope I may be indulged in supposing has never yet been equalled in any other country on earth. Our courts of law only consider legal rights; our courts of equity have other rules, by which they sometimes supersede strict legal rules, and in so doing they act most beneficially for the subject.' In this country the principle of separating jurisdictions has been largely acted upon. We have our courts of equity and law; our bankrupt and insolvent courts, and courts of ecclesiastical and admiralty jurisdiction; indeed until lately our several courts of law had, in principle, jurisdiction only over certain specified classes of suits. In countries governed by the civil law, the practice has in general been the other way. But whether the one opinion or the other be most correct in theory, the system adopted by every nation has been mainly influenced by the peculiarities of its own institutions, habits, and circumstances, and the forms of its remedial justice. In all such cases the separation or union of the equitable and legal jurisdiction must be a mixed question of public policy and private convenience.

In some of the American states, the administration of law and equity is perfectly distinct; in others the administration of equity is only partially committed to distinct courts; in a third class the two jurisdictions are vested in one and the same tribunal; and in a fourth there are no courts exercising an equitable jurisdiction.

In most of our colonies the governor is invested with the jurisdiction of chancellor; but in some of the greatest importance where a judicial establishment of some magnitude is maintained, the chief or supreme court is invested with the chancery jurisdiction.

This attempt at the exposition of the general principles of what in this country is called equity seems to the writer of this article to be better suited to a work of this nature than a full description of the practice of, that is, the course of proceeding in a suit in, a court of equity. The practice or procedure of any court can hardly be made intelligible to any person but one who knows something of it by experience; and any technical description of it is useless unless it is minutely and circumstantially exact. It is desirable, however, that in addition to some knowledge of the subjects which belong to the jurisdiction of a court of equity, all persons should have some clear notion of the way in which the matters in dispute between parties to a suit in equity are brought before the court, and by what kind of proof or evidence they are established. It may also be useful that persons should have a general, and so far as it goes, a correct knowledge of the different modes in which such questions of fact are put in issue, and proved in our courts of law and equity. The following short outline of the course of proceeding in a suit of chancery, taken in connection with other articles in this work, such as Chancellor, Chancery, Deposition, Evidence, and Pleading, may probably, so far as it goes, give somewhat more information on the subject of equity jurisdiction than is found in books not strictly professional.

A suit on the Equity side of the courts of chancery and exchequer is commenced by presenting a petition to the lord chancellor, or the chancellor and barons of the exchequer, containing a statement of the plaintiff's case, and praying for such relief as he may consider himself entitled to receive. This petition is technically called a Bill, and is in the nature of the declaration at common law [Declaration]; but if the suit is instituted on behalf of the crown, or a charity, or any of the objects under the peculiar protection of the crown, the petition is in the form of a narrative of the facts by the attorney-general, and is called an information. There is also a petition termed an information and bill, which is where the attorney-general, at the relation (that is, the information) of a third person (thence called the relator), informs the court of the facts which he thinks are a fit subject of inquiry. The practice which governs all these proceedings is the same. It is the practice at the end of the statement in a bill to add what is called the interrogating part, which consists of the statements of the bill thrown into the form of distinct questions, and often expressed in terms of great length and particularity. The statements in the bill are not made upon oath; and further, in order to obtain a full and complete discovery from the defendant, both as regards the complaint and the supposed defence, various allegations are made in many cases from mere conjecture, and this practice, it has been considered after much laboured discussion, tends to the due administration of justice: for though doubtless many frivolous suits are instituted, yet, from the nature of cases of fraud and concealment, the plaintiff is often ignorant of the precise nature of the case, and frames his bill in various forms so as to elicit from the defendant a full discovery of the truth. Bills of this nature are called original bills, and either may be for discovery and relief, or for discovery merely.

When the bill is placed on the records of the court it is said to be *filed*, and the writ of subpœna issues commanding the defendant to appear and answer the allegations of the bill within a certain time.

If, upon the face of the bill, it should appear that the plaintiff is not entitled to the relief prayed for as against the defendant, the defendant may demur, that is, demand the judgment of the court upon the statement made by the plaintiff, whether the suit shall proceed [Demurrer]; and if any cause, not apparent upon the bill, should exist why the suit should be either dismissed, delayed, or barred, the defendant may put in a plea, stating such matter, and demanding the judgment of the court as in the case of a demurrer. But if neither of these modes of defence are applicable, and the defendant cannot disclaim [Disclaimer], he must answer upon oath the interrogatories in the bill according to the best of his *knowledge*, *remembrance*, *information*, and *belief*. This mode of defence is styled an Answer. All or any of these several modes of defence may be used together, if applied to separate and distinct parts of the case made by the plaintiff.

In the successive stages of a suit, references as to the pleadings, and as to facts, may be made to the Masters of the court; as for instance, if any improper statements be made reflecting upon the character of either party, not necessary to the decision of the suit, the pleading may be referred to the master for scandal; if there be long and irrelevant statements, not concerning the matter in question, a reference may be made for impertinence, and the matter so complained of as scandalous or impertinent may be expunged at the expense of the party in fault. Again, if the defendant does not answer the bill with sufficient precision, the plaintiff may except to the answer for insufficiency, and this question is decided by the masters, in suits in chancery, but by the court in the exchequer. If the answer is decided to be insufficient the defendant must answer further.

It frequently happens that during the progress of the suit, from the discovery of new matter, the deaths and marriages of parties, and other causes, the pleadings become defective, and in these cases it is necessary to bring the new matter, or parties becoming interested, before the court. This is done by means of further statements, referring to the previous proceedings, and being in fact merely a continuation of them, which are called supplemental bills, bills of revivor, or bills of revivor and supplement, according to the nature of the defect which they are intended to supply. These bills are called bills not original.

There is also a third class, called bills in the nature of original bills, which are occasioned by former bills, such as cross bills, which are filed by the defendant to an original bill against the plaintiff to the same bill, touching some matter in litigation in the first bill, as where a discovery is necessary from the plaintiff in order that the defendant may obtain complete justice. There are also bills of review, to examine a decree upon the discovery of new matter, &c., and several others. Upon both these latter descriptions of bills the same pleadings and proceedings may follow as to an original bill.

Pleas and demurrers are at once argued before the court: if allowed, the suit, or so much of it as is covered by the demurrer or plea, is at an end, though the court will generally permit the plaintiff to amend his bill where it is not apparent from his own statement that he cannot make any case against the defendant; otherwise the only object attained by the demurrer or plea would be to drive the plaintiff to file a new bill, omitting or amending the objectionable part. But if the demurrer or plea is overruled, the defendant is compelled to answer fully, just as if he had not demurred or pleaded. When the answer is filed, the plaintiff, if from the disclosures made he deems it advisable, may amend his bill, that is, erase such part of his statements as he no longer considers necessary, and insert other statements which may appear necessary to sustain his case; and the defendant must answer to this new matter.

In cases where the bill is for discovery only, and in some others, the answer puts an end to the suit; and when the object of the bill is to obtain an injunction, which is granted either upon affidavits before answer or in default of an answer, the suit is also ended, unless the defendant desires to dissolve the injunction. But where a decree is necessary, the cause must come on to be heard either upon evidence taken before the examiners of the court or commissioners appointed for the purpose [Deposition, Evidence]; or where the plaintiff considers the disclosures in the answer sufficient, the cause is heard upon bill and answer alone, without further evidence, and this is at the plaintiff's discretion.

The cause is heard in its turn by the master of the rolls or the vice-chancellor, if instituted in the Court of Chancery, for the lord chancellor rarely hears causes in the first instance [Chancery]; or if the suit is in the Exchequer, by the chief baron sitting in equity, or by any other of the barons sitting for him, as now authorized by Act of Parliament. If the nature of the suit admits, a final decree is made; or if any further inquiry be necessary or any accounts are to be taken, references are made to the master for those purposes.

The master being attended by the parties or their agents, makes his report; and the cause again comes on in its turn to be heard upon further directions (as it is called), when the like principles prevail as at the hearing.

This is the form of the simplest suit in equity, and is sufficient to point out the successive steps necessary to be taken; but generally suits are of a far more complicated character. Many special applications to the court may become necessary at various stages before the cause is ripe for hearing; and when reference is made to the master, the inquiries to be prosecuted before him may be entangled in the greatest confusion; and even when he has made his report, either party may except to it, and have his exceptions argued before the court. Also when the cause is heard on further directions, other references to the master may be found to be necessary, or may arise out of the circumstances stated in his report; the subject matter of the suit may be such as to prevent an immediate and final decree; a party may be entitled for life to the interest of money, and the persons to take after him may not be born or may be infants. In these and many other cases the court makes such decree as may be necessary, and retains the suit, giving liberty to any parties interested to apply to the court for directions as may become necessary from time to time. It is impossible here to give an adequate notion of the various and complicated operations performed by decrees, by which the interests and rights of all parties are settled, and the most embarrassed affairs are arranged. A very valuable collection of decrees has been published by Mr. Seton.

Those who wish for a more accurate knowledge of the proceedings in a suit in Chancery may consult Lord Redesdale's *Treatise on Pleading;* Beames *on Pleas;* and the various books on Chancery Practice.

The principal English treatises on Equity are those of Mr. Maddock and Mr. Fonblanque: the former treats of his subject under heads devoted to the several subject matters cognizable in courts of equity; the latter considers it with reference to the jurisdiction exercised by courts of law, as concurrent, assistant, exclusive. The American treatise of Mr. Justice Story unites these two modes, and explains the subject in a masterly and scientific manner.

EQUITY OF REDEMPTION. [Mortgage.]

EQUIVALENTS, CHEMICAL. [Atomic Theory.]

EQUU'LEUS (the little horse), a constellation of Ptolemy surrounded by Pegasus, Vulpecula, Aquila, and Capricornus.

Character.	No. in Catalogue of		Magnitude.
	Flamsteed. Piazzi ().	Astron. Society.	
(ε)	1	2486	5
(λ)	2	2495	6
(ζ)	3	2500	6
	4	2503	6
γ	5	2510	4
δ	7	2515	4
α	8	2517	4
(η)	9	2527	6
β	10	2535	4
	(376)	2476	6
	(393)	2483	6

EQUU'LEUS PICTO'RIS (the painter's horse, or easel), a constellation of Lacaille, situated close to the principal star of Argo. [Canopus.] Its principal star (α) is 583 of Lacaille, and 856 in the catalogue of the Astronomical Society.

EQUUS. [Horse.]

ERA. [Æra.]

ERA'NTHEMUM, a genus of acanthaceous plants with showy purple flowers, some of whose species are occasionally seen in hot-houses in this country. It has a salver-shaped corolla with a five-cleft nearly equal limb, a four-parted equal calyx, and only two out of its four stamens fertile. Eranthemum pulchellum and bicolor are the handsomest species in cultivation, and when skilfully managed produce a very striking appearance.

ERANTHIS, a small genus cut off from the old Helleborus, in consequence of its having a deciduous calyx, stalked capsules, an involucre to the flowers, and a totally different habit. E. hyemalis, or Winter Aconite, is a small stemless, tuberous, herbaceous plant, inhabiting shady places in the midland parts of Europe, and rendering our gardens gay in the earliest spring with its cups of bright yellow. It has peltate, many-cut, pale green, smooth leaves, and a single flowered scape only a few inches high.

Another species, E. sibirica, inhabits Siberia, but has not yet found its way into our gardens.

ERASMUS was born October 28, 1467, at Rotterdam, where a fine bronze statue of him, erected in 1622, still stands, and is accounted one of the chief ornaments of the city. He was the illegitimate son of a citizen of Gouda, named Gerrit (Gerard), which, according to a pedantic fashion of the day, he translated doubly into Desiderius Erasmus; and in future years he found time to lament his carelessness in calling himself Erasmus instead of by the more accurate form Erasmius. During his father's life he was well and tenderly educated; but at the age of 14 he fell into the hands of dishonest guardians, who wasted his patrimony, and, to conceal their peculations, drove him, very unwillingly, into a monastery. He took the vows at Stein, in 1486. Fortunately his skill in Latin caused him to be employed as private secretary to the bishop of Cambrai, who, in 1496, at the end of their connection, authorized him to proceed to Paris to continue his studies, instead of returning to the monastic life, which he hated. At Paris Erasmus barely supported himself by taking pupils, in sickness and poverty. For many years he led a wandering life, relying on the bounty of those patrons who were attracted by his learning and sprightly wit, sometimes in France, sometimes in the Netherlands, sometimes in England, to which he was a frequent visitor. In England he became intimate with More, Colet dean of St. Paul's, and other learned men, of whom he has spoken in high terms of praise: and England, if any permanent establishment had been offered, would have been the home of his choice. For several years he applied himself diligently to the study of Greek, which, after ages of general neglect, was just beginning to be an object of attention. He was *autodidactos*, self-taught, he says: and one of his favourite employments was the translation of short Greek treatises into Latin, which answered the double purpose of improving himself, and furnishing him with a number of books to dedicate to his wealthy friends; for in those days the honour of a dedication was generally acknowledged by a handsome present. Careless however of economy, and not averse to pleasure, Erasmus was continually in want; and in one of his letters (xii. 21) he duns Colet for fifteen angels, promised as the price of the dedication of his treatise 'De Copia Verborum.'

In 1506 Erasmus paid his first visit to Italy, during which he obtained from Pope Julius II. a dispensation from his monastic vows. At Bologna, Venice, and Padua, he improved his knowledge of Greek under the instruction of the best Greek and Italian scholars. At Rome he met with a flattering reception, and promises of high advancement; but having engaged to return to England, he did so in 1510, in the expectation that the recent accession of Henry VIII., with whom he had for some time maintained a correspondence, would ensure to him an honourable provision. During this visit he resided for some time at Cambridge, where he was appointed Lady Margaret professor (in divinity) and also lectured on Greek; his lodging was in Queen's College, in the grounds of which Erasmus' Walk is still shown. But not finding his expectations likely to be fulfilled, he accepted an invitation from the archduke, afterwards Charles V., and went to Brabant in 1514, with the office of counsellor, and a salary of 200 florins. After this we find him resident sometimes in the Netherlands, sometimes at Basle, where the great work, in which he had been many years engaged, the first edition of the New Testament in Greek, was published in 1516, accompanied by a new Latin translation. Some amusing specimens of the objections made to this undertaking by the ignorant clergy will be found in his Letters (vi. 2).

At the dawn of the Reformation, Erasmus, who, in his witty writings had exposed many abuses of the Roman Catholic church, especially those connected with the monastic system, was much embarrassed. It is clear that at heart he went a long way with the reformers, whose tenets he cautiously abstains from censuring, even in letters to dignitaries of the church, where he speaks of Luther himself in no very friendly terms. But he was of a timid temper, disinclined to sacrifice either life or comfort to his opinions, for he says of himself, in a letter to Pace, dean of St. Paul's, 'Even if Luther had spoken everything in the most unobjectionable manner, I had no inclination to die for the sake of truth. Every man has not the courage to make a martyr: and I am afraid, if I were put to the trial, I should imitate St. Peter.' This backwardness brought on him some harsh rebukes from Luther, who nevertheless had an esteem for his person as well as a regard for his talents: and calls him, in a letter written in 1519 (vi. 3) 'Decus nostrum et spes nostra' ('our glory and our hope'). Neither did the zealots of the other side regard him with more favour. Erasmus, it was said, laid the egg, and Luther hatched it; and no doubt the pungency of his satire had its effect in opening men's eyes, and preparing for the graver warfare of the great reformer.

He removed to Basle in 1521, where, in 1522, his celebrated 'Colloquies' were published. They were composed ostensibly to supply young persons with an easy school-book in the Latin language, and at the same time to teach them religion and morals. For the purpose of teaching the Latin language this little book seems peculiarly well adapted: it was long used for this purpose in England, in the northern parts of which it was, till very lately, in use, and perhaps still is in some places. In these Colloquies, which are generally very amusing, Erasmus has made some of his smartest attacks on various superstitions of the Roman Catholic church. On this account the book was prohibited. In

1529 Erasmus removed to Freiburg, when the reformed party acquired the ascendancy in Basle: for to the last he never threw off an external adherence at least to the antient faith. But in 1535 he returned to his former place of abode, endeared as it was by the presence of his most valued friends, in hope of renovating his declining health. About this time he received testimonies of high respect from Pope Paul III., who gave him a benefice, and expressed the intention of raising him to the rank of cardinal. But these favours came too late to benefit him. He died at Basle, July 12, 1536, leaving an enduring reputation as the first wit of his age, the man of most general learning, and the most active and serviceable instrument in bringing about the revival of sound learning. Nor were his contributions small towards the success of the Reformation; he was an able sapper, though he wanted energy to storm the breach with Luther and his associates.

His Encomium Moriæ, 'Praise of Folly,' written in England in 1510, a very witty production, was meant to show that there are fools in all places, however high, even in the court of Rome. It had a great run, and Leo X. is said to have been much amused by it; but at the same time it made its author many enemies among those who loved the abuses or were too fond to see the faults of the church, and did more than any of his works, except the Colloquies, to fix the charge of heterodoxy on him. The 'Adagia' (1498), a large collection of proverbs, explained and commented upon with great learning, is another of his most interesting works. 'Enchiridion Militis Christiani' (1503) is a valuable manual of practical religion; the 'Ciceronianus' is an elegant and stinging satire on the folly of those pedants who, with a blind devotion, refused to use in their compositions any words or phrases not to be found in Cicero. Erasmus's own Latin style is clear and elegant· not always strictly classical, but like that of one who spoke and wrote Latin as readily as his mother tongue.

His Letters, comprising those of many learned men to himself, form a most valuable and amusing collection to those who are interested in the manners and literary histories of the age in which they were written; and several of them in particular are highly valuable to Englishmen as containing a picture of the manners of the English of that day.

Of his numerous works, those which we have mentioned are most likely to be read with pleasure in the present day; the rest of them consist chiefly of translations, theology, grammar, and occasional treatises addressed to his friends and patrons.

His greatest work however was the edition of the New Testament, in Greek, from manuscripts, for the first time: for though that portion of Scripture was printed in the Complutensian Polyglot so early as 1514, it was not published till 1522; while the Editio Princeps of Erasmus was published in 1516. It is much commended by Michaelis, who says, 'Natural abilities, profound learning, a readiness in detecting errors, with every qualification that is requisite to produce critical sagacity, Erasmus possessed in the highest degree; and perhaps there never existed a more able editor of the New Testament.' As an edition for common use, however, it is of course superseded, in consequence of the accumulated knowledge of later labourers, and the great improvement in biblical criticism.

Erasmus superintended the first Greek edition of the Geography of Ptolemy, which was printed at Basle by Frobenius, 1533, 4to. The edition was founded on good MS., but it contains numerous typographical errors.

There are lives of Erasmus by Knight and by Leclerc, the latter of whom published a complete edition of his works; and there are copious articles in most of the biographical dictionaries. Burigny's 'Vie d'Erasme,' 1757, 2 vols. 12mo., is strongly recommended, as containing in itself a literary history of Erasmus's time.

At Basle there is a portrait of Erasmus by Holbein (*Biog. Univ.*); there is one also in the hall of Queen's College, Cambridge, but by what artist we have not been able to learn. The last edition of the complete works of Erasmus is that of Leyden, by Leclerc, 1703, 10 vols. fol., often bound in eleven.

E'RATO. [Muses.]

ERATO'STHENES, a distinguished contemporary of Archimedes, is stated to have been born at Cyrene in the year 276 B.C. He possessed a variety of talents seldom united in the same individual, but not all in the same eminent degree; his mathematical, astronomical, and geographical labours, are those which have rescued his name from oblivion.

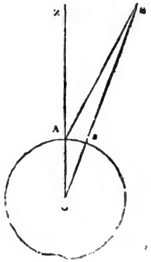
The Alexandrian school of sciences, which flourished under the first Ptolemies, had already produced Timocharés and Aristyllus, whose solsticial observations, made probably by the shadows of a gnomon, and by the armillary circles imitative of those of the celestial vault, retained considerable credit for centuries afterwards, though from these methods of observation they must have been extremely rude and imperfect.

Eratosthenes had not only the advantages arising from the instruments and observations of his predecessors, but the great Alexandrian library, which probably contained all the Phœnician, Chaldaic, Egyptian, and Greek learning of the time, was entrusted to his superintendence by the third Ptolemy (Euergetes), who invited him to Alexandria; and we have proof in the scattered fragments which remain to us of this great man, that these advantages were duly cultivated to his own happiness and the progress of infant astronomy.

The only work attributed to Eratosthenes which has come down to us entire, is entitled 'Catasterismi,' and is merely a catalogue of the names of forty-four constellations, and the situations in each constellation of the principal stars, of which he enumerates nearly five hundred, but without one reference to astronomical measurement: we find Hipparchus quoted in it, and mention made of the motion of the pole, that of the polar star having been recognised by Pytheas. These circumstances, taken in conjunction with the vagueness of the descriptions, render its genuineness extremely doubtful; at all events it is a work of little value. It may be seen in the Oxford edition of 'Aratus,' and was republished by Shaubach, with notes by Heyne (Gött., 1795). A more correct edition of the text was published by F. K. Matthiæ, in his edition of Aratus, Frankfort, 1817, 8vo.

If Eratosthenes be really the author of the treatise 'Catasterismi,' it must have been composed merely as a 'vade me-cum,' for we find him engaged in astronomical researches far more exact and more worthy of his genius. By his observations he determined that the distance between the tropics, that is, twice the obliquity of the ecliptic, was $\frac{11}{83}$ of an entire circumference, or 47° 42′ 39″, which makes the obliquity to be 23° 51′ 19″.5, nearly the same as that supposed by Hipparchus and Ptolemy. As the means of observation were at that time very imperfect, the instruments divided only to intervals of 10′, and corrections for the greater refraction at the winter solstice, for the diameter of the solar disc, &c., then unknown, we must regard this conclusion as highly creditable to Eratosthenes.

His next achievement was to measure the circumference of the earth. He knew that at Syene (now Assouan) the sun was vertical at noon in the summer solstice; while at Alexandria, at the same moment, it was below the zenith by the fiftieth part of a circumference: the two places are nearly on the same meridian (error 2°); neglecting the solar parallax, he concluded that the distance from Alexandria to Syene is the fiftieth part of the circumference of the earth; this distance he estimated at 5000 stadia, which gives 250,000 stadia for the circumference; the following diagram will explain the principle of this admeasurement.



C the centre of the earth, A Alexandria, *s* Syene, S the sun, $\angle$ ZAS the $\frac{1}{50}$ of four right angles, $\angle$ ASC the sun's parallax, which is very small: $\therefore \angle$ ACS is very nearly = ZAS; therefore distance A*s*C = $\frac{1}{50}$ of circumference of earth.

Thus Eratosthenes has the merit of pointing out a method for finding the circumference of the earth. But his data were not sufficiently exact, nor had he the means of measuring the distance A*s* with sufficient precision.

Eratosthenes has been called a poet, and Scaliger, in his commentary on Manilius, gives some fragments of a poem attributed to him, entitled 'Hermes, or de Zonis,' one of which is a description of the terrestrial zones: it is not improbable that these are authentic: the chroniclers as well as philosophers of all nations, in a state of incipient civilization, have called in the aid of metre to popularize their labours. Eratosthenes is therefore entitled to the name of a versifier rather than a poet, like his precursor Manetho, who wrote 'Αποτελεσματικά (effects or influences), a mixture of astrology and astronomy; one of whose lines, containing the names of the sun and planets, may be taken as a specimen—

Ζεὺς Ἄρης Παφίη Μήνη Κρόνος Ἥλιος Ἑρμῆς.

The wretched doggrel arising from forcing names, scientific terms and reasonings into verse, may be judged by some ridiculous productions of the kind in our own language.

That Eratosthenes was an excellent geometer we cannot doubt, from his still extant solution of the problem of two mean proportionals, preserved by Theon, and a lost treatise quoted by Pappus, 'De Locis ad Medietates,' on which Montucla has offered some conjectures, 'Histoire des Math.,' an. vii., p. 280.

Eratosthenes appears to have been one of the first who attempted to form a system of geography. His work on this subject, intitled 'Geographica' (Γεωγραφικά), was divided into three books. The first book contained a history of geography, a critical notice of the authorities used by him, and the elements of physical geography. The second book treated of mathematical geography, and contained the method above explained, by which he determined the earth's circumference. The third book contained the political or historical geography, arranged according to the three great divisions of the known globe, Europe, Asia, and Libya. The whole work was accompanied with a map of the known world. The geography of Eratosthenes is lost; the fragments which remain have been chiefly preserved by Strabo, who was doubtless much indebted to him.

Eratosthenes also busied himself with chronology. The reader will find some remarks on his Greek chronology in Clinton's *Fasti Hellenici*; and on his list of Theban kings, by R. Rask, in his little work on the antient Egyptian chronology, German translation, Altona, 1830.

The properties of numbers attracted the attention of philosophers from the earliest period, and Eratosthenes also distinguished himself in this branch by a work which he denominated Κόσκινον, *Cribrum*, or *Sieve*, the object of which is to separate prime from composite numbers, a curious memoir on which was published by Horsley in the 'Philosophical Transactions,' 1772. The principle of the method is to reject all the multiples of the primes, tabulating first all the odd numbers; the multiples of 3 will be found with intervals of two places, those of 5 with intervals of 4, and by placing a mark over each such multiple, none but prime numbers will remain after this sifting. The same method, which is indeed indirect, but comparatively rapid in application, has been employed by Ladislaus Chernac, in forming a table of primes from 1 to 1,020,000, in a treatise published in 1811; the following example will explain the method:—

3, 5, 7, $\dot{9}$, 11, 13, $\dot{1}5$, 17, 19, $\dot{2}1$, 23, $\dot{2}5$, 27, 29, 31, $\dot{3}3$, $\dot{3}5$, 37,

$\dot{3}9$, 41, 43, $\dot{4}5$, 47, $\dot{4}9$.

By actually trying this method it will be seen how readily the composite numbers are marked out, and we may terminate the operation when our commencing number exceeds a third of the last number in the table.

Eratosthenes arrived at the age of eighty years, and ultimately becoming weary of life, died by voluntary starvation. (Suidas, *Eratosthenes*.) Montucla, with his usual naïveté, says, it would have been more philosophical to await death 'de pied ferme.'

(Montucla, *Histoire des Math.*, p. 239; Delambre, *Hist. de l'Astronomie Ancienne*, p. 86; Lalande, *Bibl. Astron.* in art.; *Sententiæ Gr. et Lat. in Poetis Mi. i., Radulphi Wintertoni*, Cambridge, 1700; *Fragmenta Gr. et Lat.*, by Shaubach, Göttingen; *Aratus*, Oxford ed., 1672; Horsley's *Tracts* and *Memoir* in *Phil. Trans.*, 1772, *Catasterismi*, Heyne; *Cribrum Arith.*, by L. Chernac; *Geographicorum Fragmenta*, 1787; Eutocius' *Commentary on Archimedes*. The last edition of the Fragments of Eratosthenes is by Bernhardy, Berlin, 1822, 8vo.: this edition does not contain the Catasterismi. See CLEOMEDES.)

ERBIL. [ARBELA.]

ERCILLA Y ZUÑIGA, ALONSO, the author of the 'Araucana,' an epic poem, mentioned with high praise by Hayley in his 'Essay on Epic Poetry,' and better known out of Spain than many other Spanish works of greater merit. Alonso was the third son of a celebrated lawyer, Fortun Garcia, lord of the castle of Ercilla, and was born at Madrid in 1533. His mother, Doña Leonor de Zuñiga, became a widow the following year, and being appointed *guarda damas* to the wife of Charles V., soon obtained for her son a place among the pages of the prince of Asturias, afterwards Philip II. At the age of fourteen, Ercilla probably had his genius awakened by attending that prince through Italy, Germany, and the Netherlands, in a pompous progress of which the chronicler of Philip II., Calvete de Estrella, has left an account, and in which he has vividly portrayed the manners and pageants of that fierce and romantic age. Following Philip in his subsequent travels, and on the occasion of his marriage with queen Mary, Ercilla came to England in 1554. While in London, he heard of a revolt of the brave Araucanians (Araucanos) against the Spaniards in Chile, and his military ardour being excited by the news, he volunteered to go to America in search of that glory which he soon acquired. It was amidst the incessant toils and dangers of a campaign against barbarians, under the canopy of heaven, with nothing to write on but small scraps of waste paper, and often only leather, struggling at once against enemies and surrounding circumstances, that, for the first time, an iron-clad poet

'Tomando ora la espada, ora la pluma,'

attempted to describe in epic strains the exploits in which he himself participated, and which he often directed. Thus did Ercilla write the first part of his 'Araucana,' so named from the war and country of Arauca, or of the *Auca* people, which means free. [ARAUCANIANS.] After numerous escapes from the dangers of the war, he was ordered to the scaffold (A.D. 1558) by a young and hasty commander, who thought he perceived a premeditated mutiny in a private quarrel which arose in the American city of Imperial, while the people were celebrating the accession of Philip II. to the crown. Ercilla, who on that occasion had to draw his swor in defence of his honour and life, was saved by the timel discovery of the injustice of the sentence which had bee passed on him. Much impaired in health, although the only in his twenty-ninth year, the poet-soldier returned t Spain, but only to experience the continued neglect an disdain of that Philip whom he had served all his life, whon he had already invoked as his Augustus, and whom he celebrated in the sequel of his poem. To exalt and propitiat his reluctant patron, he introduced into it the episodic battles of St. Quentin and Lepanto. The indignity whic he still experienced induced Ercilla to ramble for som time over different parts of Europe, where the only favo he received was from the emperor Rudolph, who ap pointed him gentleman of his bed-chamber. At last h settled at Madrid, where he lingered in retirement an penury, writing poetry till his death, the time of which not ascertained. He was however alive in 1596, for Mu quera de Figueroa, in his 'Comentario de Disciplina Militar speaks of Ercilla as then engaged in celebrating the vi tories of Don Alvaro Bazan, marques de Santa Cruz, in poem which was never published, and perhaps was left i complete. The 'Parnaso Español' contains also a sho erotic poem, written by Ercilla in his youth, and high commended by Lope de Vega in his 'Laurel de Apol But it is only the 'Araucana' which has recommended E cilla to posterity. He published the first part alone; th the first and second parts together in 1577; and the whc three parts in 1590, many editions of which have appear successively in different places. The severe censures pass on this poem by a host of biographers or compilers are fact only a long file of repetitions. Voltaire, who, by his 'Essai sur la Poésie Epique,' has made the 'Araucana' more generally known, prefers the character of Colocolo in the second canto to that of Nestor in the Iliad. He shows however, by his sweeping censure of the rest, and by his asserting that Ercilla was at the battle of St. Quentin, that he had not read so far as the seventeenth canto. The writer in the 'Biographie Universelle,' amidst some very fair and proper observations, and after placing the 'Araucana' much above the Henriade, mistakes the xxxvi. and xxxvii., or two last cantos, for its continuation, or the iv. and v. part of the 'Araucana' by Santisteban Osorio, a notion which the most hasty glance at those cantos would have dispelled. The same writer is also unlucky in his refutation of Voltaire, since the elaborate note about the possibility of Ercilla's having fought at St. Quentin contains the anachronism of fixing his return from America in 1554, the precise year in which he sailed for America from London, as above stated. The other note by the same writer about Ercilla's birth proceeds from a misunderstanding of his biographical notice in the second volume of the 'Parnaso Español.'

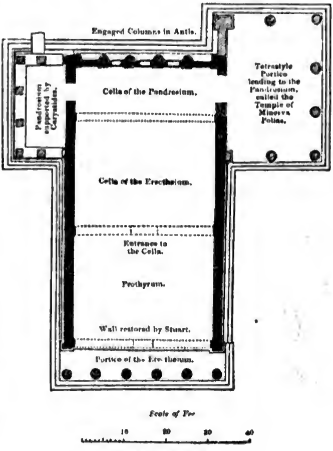
Bouterwek, after denying to the 'Araucana' the title even of a poem, bestows abruptly sundry high but just commendations on its beauties, and thus revokes, in a great measure, if not totally, his hasty sentence of condemnation. The same writer, in supposing that Ercilla relates Dido's death after Virgil, shows that he had overlooked cantos xxxii. and xxxiii., where the heroine of Carthage is, on the contrary, amply vindicated, on the authority of Justin, from the misrepresentations of the Mantuan bard, who in the words of Ercilla shamefully

'Falseo su historia y castidad preciosa.'

These inaccuracies in great authorities are noticed here in order to put readers on their guard against writers on literature in general; and our remarks on the errors of other critics must stand in the place of a criticism of our own on the poem, which within any reasonable limits would be impracticable. Nothing short of a sketch, however brief, of the 'Araucana,' could give a just idea of its plan and execution. It would however be unfair not to remind those who consider Ercilla as a second Lucan, that he undertook a much harder task than the Cordovan poet, who sung a mighty contest for the mastery of the world; while Ercilla had to contend against two features in his subject, the most unfavourable to an epic—a conquest not yet accomplished over a narrow, rocky, and unknown spot, and a brave and injured enemy struggling for their freedom. Still he succeeded in infusing an Homeric spirit into his long narration, which, independently of its other merits, is a real historical record.

ERECTHEIUM, a beautiful Ionic temple dedicated to Erectheus, built near the western brow of the Acropolis at Athens, and at the time when Stuart visited the place forming part of the modern fortress of the Acropolis. Connected with this building, and placed on one side of it at the end of the cella, is a tetrastyle pseudo-dipteral Ionic portico, in the same style as the portico of the Erectheium; and on the opposite side is a small roofed building supported by caryatides, placed on an elevated basement. [CARYATIDES.] The back wall of the cella of the Temple of Erectheus is decorated with four semi-columns in antis engaged in the wall, and of the same order as the portico, which is hexastyle, and raised on there steps, forming a basement which runs round the entire building with its adjuncts. In Stuart's 'Athens,' the prothyrum is restored, and forms a closed chamber, for which there does not appear to be sufficient authority. It is more probable that the prothyrum was open, like some other Greek temples, because, as shown on Stuart's plan, the portico from its shallowness would be of little use as a covering, and would also produce little architectural effect. In the side portico, called Minerva Polias, which was most probably constructed after the Erectheium, there was no opportunity of producing a depth of shadow by the deep recess of an open prothyrum, and the architect accordingly appears to have adopted the pseudo-dipteral portico to produce a somewhat similar effect, as well as to gain a covered space for those who officiated. It would appear from the regularity of the plan of the Temple of Erectheus, that it was constructed before the other, and of that regular parallelopipedal figure most commonly employed in these buildings; and that at a later period the Pandrosium was constructed, with the portico on the opposite side forming the entrance or vestibule to the cella of the temple, which was formed from a part of the cella of the Temple of Erectheus, cut off from the end of that cella, which was either at that time or previously lighted with windows.

The length of the Temple of Erectheus is 73 ft. 2 in. 18 from the columns of the portico to those at the back of the cella; the width is 36 ft. 6.67 in. The depth of the portico of Minerva Polias is 21 ft. 1.75 in., and the width 33 ft. 1.30 in. The Pandrosium is 18 ft. 4.45 in. wide, and 11 ft. 9.57 in. deep. (See Stuart's *Antiquities of Athens*, edited by W. Kinnard, architect.) The columns of the Erectheium are 2 ft. 3.8 in. in diameter at the base, and 1 ft. 11.2 in. at the upper diameter; and those of the Minerva Polias 2 ft. 6.9 in., and the upper 2 ft. 3.5 in.: while the intercolumniations are respectively—Erectheium 4 ft. 7.95 in., Minerva Polias 7 ft. 8.19 in., although there is a slight variation in the intercolumns, which may be the effect of time and inaccuracy in setting them out originally. The columns of the Minerva Polias are on a much lower level than those of the Erectheium. The capitals of the order of these two temples are very richly carved. If anything, the capitals of the Minerva Polias are a little richer than the Erectheium. The volutes are very graceful [COLUMN], and the spiral lines are elaborately arranged. The angular volute is ingeniously contrived. The necking of the capital is enriched with leaves, as well as with an enriched ovolo and astragals, and the volutes are connected by an enriched twisted band or guilloche ornament. The shafts are fluted. But with regard to many peculiarities in the detail, we must refer to the plates in Stuart's 'Athens.' The entablatures have several of their members enriched, and are similar in design; the bases of the columns however vary. The height of the columns of the Erectheium is 27 ft. 7.5 in., and of the Minerva Polias 25 ft. 0.85 in. The pilaster of the Erectheium is elegantly decorated, and the mouldings and decorations are continued under the architraves. The height of the entablature of the Erectheium is 4 ft. 11.3 in.; and the height of the Minerva Polias is 5 ft. 5.34 in. The rise in the pediment of the portico of the latter is 3 ft. 4.33 in. The entablature of the Pandrosium is heavy: it is decorated with dentils, and also with pateræ on the upper face of the architrave. The windows and doors diminish at the top, and the friezes of the porticos appear to have been formerly decorated, if we may judge from the remains of cramps and cramp-holes on their faces. Some details respecting this building, not published in Stuart, are


Engaged Columns in Antis.
Pandrosium supported by Caryatides.
Cella of the Pandrosium.
Tetrastyle Portico leading to the Pandrosium, called the Temple of Minerva Polias.
Cella of the Erectheium.
Entrance to the Cella.
Prothyrum.
Wall restored by Stuart.
Portico of the Erectheum.
Scale of Feet
10
20
30
40

Plan of the Erectheium.

given in the 'Erectheion,' a work on this edifice by H. W. Inwood, architect, who has imitated the Erectheium and Pandrosium in the external design of part of the New St. Pancrass Church, London. Stuart's Athens, vol. ii., contains the plans, elevations, sections, and details of this building.

ERE'TRIA. [EUBŒA.]

EREWASH. [TRENT.]

ERFURT, a province or administrative circle in Prussian Saxony, consisting of the former principalities of Erfurt, the former Imperial free towns of Mühlhausen and Nordhausen, the earldom of Hohnstein, together with the bailiwics of Langensalza and Weissensee, and several adjacent districts, as settled by the congress of Vienna. Its area is 1296 English square miles, and its population, which was 234,427 souls in 1816, and 285,874 in 1831, is at present estimated at about 298,000. About one fourth part of this population are Roman Catholics, and the remainder, with the exception of about 900 Jews, are Protestants. It is bounded on the north by Hanover and Brunswick, and on the south by Saxe Weimar, Gotha, and Schwarzburg, with the exception of the isolated districts of Henneberg, Neustadt, and parts of the Voigtland. The soil of this province is favourable for the cultivation of grain, and rather more than one half of its surface is arable land. About one-fifth of it is appropriated to meadows or pastures, and rather more than one-fourth is occupied by woods and forests. It is not watered by any streams of magnitude: the largest are the Unstrut, the Gera, Werra, Salza, Erlau, Heide, Wipper, and Saale. There are a number of mineral springs in the hilly districts. The stock of cattle in 1831 was as follows: horses 17,694, horned cattle 62,399, sheep 189,797, goats 13,242, and swine 31,909.

This province is divided into the nine circles of Erfurt, Nordhausen, Heiligenstadt, Mühlhausen, Worbis, Schleusingen, Langensalza, Weissensee, and Ziegenrück, and contains 1 fortress (Erfurt), 22 towns, among which are Erfurt, Heiligenstadt on the Leine, 3500 inhabitants, Langensalza, on the Salza, 6500; Tannstädt, on the Schambach, 3000; Mühlhausen, on the Unstrut, with ramparts and ditches, 11,000; Nordhausen, on the Zorge, at the southern extremity of the Harz mountains, 10,900; Benneckenstein, on the Harz, 3000; Ellrich, 2800; Bleichrode, on the Bode, 2500; Schleusingen, at the confluence of the Erlau and Nahe, 2660; Suhl, on the Aue or Lauter, 6500; Weissensee, on the Holbe, 2250; Gross-Sömmerdu, on the Unstrut, 2300; Worbis, near the source of the Wipper, 1600; and Ziegenrück, on the Saale, 820. The chief products of the province of Erfurt are grain, flax, safflower, tobacco, hops, oil, and salt; large flocks and herds of cattle and swine are reared; and in the circles of Weissensee and Schleusingen there are mines of iron, lead, and copper. Marble and gypsum, as well as sulphur, are also among its mineral productions. Erfurt is likewise distinguished for its manufactures of iron and steelware, tin plates, seed oil, woollen yarns, cloths, flannels, and carpets, linens, silks, cottons, stockings, paper, porcelain, glass, brandy, wooden clocks, &c. It has government establishments for the manufacture of gunpowder and fire-arms. There are mineral springs near Schleusingen and in other parts.

ERFURT, the capital of the minor circle of that name, as well as of the province, is situated on the Gera, a tributary of the Unstrut, in a richly cultivated plain in 50° 58′ N. lat., and 11° 3′ E. long. It was the antient capital of Thuringia, and is a fortress of the second order, possessing among its defences, which have been entirely renewed and much strengthened in recent times, two citadels, one the Petersburg, within the walls, and the other, Cyriaxburg, on Mount Cyriax, outside of the town. Erfurt, which has a number of gardens among its six suburbs, has six gates, five public squares, or open spaces, the largest of which is the market-place (with an obelisk of stone fifty feet high, erected by the citizens in 1802, to Charles, elector of Mentz, their then sovereign), several broad and well-built streets, and 19 churches, 11 being Roman Catholic, and 8 Protestant, of which the collegiate church of St. Mary is a fine Gothic structure: in this church there is a bell called the Maria Clara Susanna, cast in 1492, and weighing thirteen tons and upwards. There are 2 chapels, and there were several monasteries and convents, but all have been suppressed with the exception of the Ursuline nunnery, to which a female school is attached. In 1832 Erfurt contained 5 palaces, or princely residences, 73 buildings for government purposes, 47 manufacturing establishments, and 2743 dwelling-houses, with 22,000 inhabitants, exclusive of the military: in 1816 they amounted to 14,097, but in the sixteenth century they were not less than 58,000. About one fourth of the present population is of the Roman Catholic persuasion; the remainder, with the exception of about 200 Jews, are Protestants. What was once an Augustine monastery, where Luther resided from 1501 to 1508, in a cell which is still shown to visitors, is at present appropriated to the Lutheran Orphan Asylum. In this cell are a portrait of the reformer, his travelling pocket-case, and some of his books; and the following inscription stands over the doorway:—

> 'Cellula divino magnoque habitata Luthero
> Salve, vix tanto cellula digna viro.'

The suppressed Scots' monastery contains the cabinet of physics, once the property of the university of Erfurt, which was founded in 1392, and closed in 1816. The scholastic institutions in the town are—a Lutheran high school, with which a seminary for teachers is connected, a Roman Catholic gymnasium, a mechanics' school, a deaf and dumb school, a school of surgery, another of design, and a third for arts and architecture, a Sunday-school for apprentices, and 16 schools of an inferior class. Among other institutions there are one of pharmacy and chemistry, a society of the useful arts, a botanical garden, a library of about 50,000 volumes, formerly belonging to the university, an ophthalmic and blind hospital, a general hospital, and a Bible society. Erfurt is the seat of provincial administration and of the provincial tribunals. It has considerable manufactures of cottons and woollens, besides less extensive ones of linens, ribbons, leather, soap, earthenware, meal, oil extracted from seed, stockings, gloves, tobacco, &c., and it carries on a brisk trade in fruits, seeds, grocery and drugs, grain, &c. It was, between the fourteenth and sixteenth centuries, the centre of the commercial intercourse between the north and south of Germany, and belonged to the Hanseatic league. At the foot of Mount Cyriax there are three mineral springs called the 'Dreibrunnen,' in the midst of shrubberies and gardens. Erfurt and the adjacent lands, to the extent of about 294 square miles, was a domain of the electors of Mentz from 1664 to 1802, when it was transferred to Prussia by way of indemnity for certain losses; in 1807 it was annexed to the French empire under the treaty of Tilsit; in 1808 it was the place of conference between Napoleon, the emperor of Russia, the kings of Saxony and Bavaria, and other sovereign princes; and in 1815 the congress of Vienna restored it to the crown of Prussia.

ERGOT, a name bestowed upon a peculiar state of the seed of several cereal grains, but most frequently of the rye, which resembles a spur, or horn; hence, likewise, termed *secale cornutum*, or *spurred* rye. Whether this state of the grain be merely an altered condition of the pistil, or the result of the puncture of insects, or of the development of a fungus, is doubtful; but the best authorities incline to the opinion that it is a fungus. This last view is rendered probable by the investigations of Wiggers, who found by analysis that the basis of the structure of the spur is almost identical in chemical properties with the principle called *fungin*, and that the white dust sometimes found on the surface of the spurs will produce it in any plant, if sprinkled in the soil at its roots, and therefore appears to be analogous to the sporidia or spawn of the admitted fungi. (See Mr. Bauer's paper on the *Uredo fœtida*, *Supplement to Penny Magazine*, March, 1833.) De Candolle considers the fungus to be the *Sclerotium clavus*. The spur is of variable length, from a few lines to two inches, and is from two to four lines in thickness; when large, only a few grains in each ear are affected; when small, in general, all of them are diseased. In colour the exterior or husk is of a bluish-black or violet hue, with two or three streaks of dotted gray: the interior is of a dull whitish or gray tint. It is specifically lighter than water, which affords a criterion for distinguishing sound from tainted grain. When fresh it is tough and flexible, but brittle and easily pulverized when dry. The powder is apt to attract moisture, which impairs its properties. Time also completely dissipates its peculiar qualities. 'It has a disagreeable heavy smell (which, being analogous to that of many fungi, strengthens the opinion that it belongs to that class of vegetable substances), a nauseous, slightly acrid taste, and imparts both its taste and smell to water and alcohol. Bread which contains it is defective in firmness, liable to become moist, and cracks and crumbles soon after being taken from the oven.' The most recent chemical analysis is that of Wiggers, who found it to contain a heavy-smelling fixed oil, fungin, albumen, osmazôme, waxy matter, and an extractive substance of a strong peculiar taste and smell, in which, from experiments on animals, he was led to infer that its active properties reside. To this he gave the name of *ergotine*. Dr. Christison found Wiggers's statements to be correct in most points, except that what he procured as ergotine was destitute of marked taste or smell. Willdenow is of opinion that there are two varieties of the spur, and that only one of them is possessed of active properties.

Spurred rye occurs more frequently in some countries and districts than in others, and more abundantly in some seasons than in others. Rye raised in poor soil, and in a humid close air, such as that of the district of Sologne in France, is most liable to be infected; but, according to the experiments of Wildenow, it may be brought on at any time, by sowing the rye in a rich damp soil, and watering the plants freely in warm weather. A very rainy season, such as was that of 1816, is apt to produce it.

Bread prepared from grain which has a large admixture of the spur, occasions very distressing and often fatal effects, which are shown more or less rapidly according to the quantity present in the food, and the circumstances in which those who use it are placed. They have been observed to be most serious in seasons of scarcity, when various causes concur to produce disease. The symptoms which result from spurred grain, when used for a considerable time, are of two distinct kinds, one of a nervous nature characterized by violent spasmodic convulsions, the other a disordered state of the constitution, which terminates in the peculiar disease called gangræna ustilaginea, or dry gangrene. A single dose of the spur, not diluted by admixture with sound flour, excites effects which vary according to the quantity taken and the state of the person, and are chiefly limited to the stomach and intestinal canal, if the dose be small; but if so much as two drachms be taken, it causes giddiness, headache, flushed face, pain and spasms in the stomach, nausea and vomiting, with colic, purging, and a sense of weariness and weight in the limbs. In the case of parturient females, when given at a certain stage of the labour, it is admitted by most practitioners and writers to produce specific effects, and to expedite the labour in a very marked manner. It is by some persons alleged to produce hurtful effects upon the child; but such consequences probably occur only when it has been used at an improper stage of the labour; or when it ought not to have been employed under any circumstances. The rules for its employment are given in works devoted to obstetrics, to which we refer. It has likewise been recommended in menorrhagia and in leucorrœha, but its utility rests upon less decisive evidence than in the case already stated.

The nervous symptoms arising from the use of bread formed of spurred rye may in general be cured by emetics, laxatives, and frequent small doses of opium, provided this treatment be adopted in reasonable time, and the unwholesome food completely withdrawn.

The tendency to dry gangrene is to be combated by the use of cinchona and cordials, with local applications to the part threatened. The noxious food must be completely relinquished. (Christison *on Poisons*.)

ERGOT, botanically considered, is a fungus belonging to the Gymnomycetous division, and constituting one of two species of Spermoëdia admitted by Fries. He calls it *S. clavus*, and separates it from the genus *Sclerotium*, to which it had previously been referred, on account of its growing in the inside of other plants, and having no proper fructification. He defines the genus *Spermoëdia* as follows: 'Variable, rounded, entophytal, rootless, of a fleshy mealy homogeneous texture, with a rind concrete, scaly, or somewhat pruinose. Proper fructification none.' And then he adds 'that it is only a morbid condition of the grain of corn, not propagated by seed, but generated by a particular combination of external influences (*cosmica momenta*).' Endlicher takes the same view of the nature of ergot, only with more consistency he does not admit it as a real fungus, but only enumerates it as a diseased state of the seed of grasses, swelling into a fungoid body, and covered externally with powder. The same opinion is also very generally entertained. Nevertheless, we regard the question as being far from settled. The definite form assumed by ergot is unfavourable to the idea of its being a mere disease; the powdery efflorescence proceeding from its surface requires to be more particularly examined; and the microscopical anatomy of the production in different states must be far more exactly studied than it has yet been before the true nature of ergot can be positively determined. De Candolle is clearly of opinion that it is a peculiar fungus which attacks the ovary of grasses, destroying them when young, and protruding from them in a lengthened form, in rye and other European grasses: and Fontana asserts that it may be propagated by contact; the latter statement has however been contradicted.

The ergot of rye is not confined to that kind of grass, but attacks many other species. Fries distinguishes it by the lengthened form and white interior from Spermoëdia Paspali, a Carolina ergot, which is globose and somewhat compressed, scaly and rough externally, pale brown and yellowish inside. A third species, not yet registered by botanists, attacks Indian corn in Columbia, and has a pear-shaped figure.

ERGYNE. [ISOPODA.]

ERI'CA, one of the most extensive and beautiful genera known in the vegetable kingdom, belonging to the natural order that bears its name [ERICACEÆ], and therein distinguished by its calyx being four-leaved, its corolla four-toothed, and its fruit a dry, four or eight-celled, many-seeded capsule, opening into valves with the dissepiments projecting from their middle.

Under this character is included a great variety of species having very narrow linear leaves arranged in whorls, and so little different in their vegetation in most cases, that when out of flower they are often not easily distinguished from each other; but exhibiting a surprising diversity in their flowers, in which their great beauty resides. The richness of colour, the elegance and variety of form, the delicacy of texture, or the minute microscopic perfection of their corolla, are such as no words can describe. Lovely as even our wild moorland heaths are, they rank among the lowest in point of beauty in this extraordinary genus, in which all the hues of red, pink, and purple, vie with each other in the most brilliant manner, assuming every tint but blue, and fading into the purest and most transparent white. Some of the species have the corolla as much as two inches long, in others it is not bigger than a peppercorn; in some it is long and slender, in others inflated like a flask, or dilated like a vase of the purest form, or as round as an air-bubble; and there are many in which it is split almost to its base, and immersed in a calyx whose texture and colours are even more brilliant than its own. Here we have a species the surface of whose corolla rivals in evenness and polish the finest porcelain; there another appears covered all over with hairs, exuding a glutinous secretion, which glitters upon its sides like solid crystals; and some again have their colours so dimmed by a loose shaggy coat, that their real tint can hardly be ascertained. There are even some in which the corolla assumes the very colour of the leaves, only clearer, brighter, and richer. This great difference in the structure of the flowers of different species is accompanied by distinctions in their anthers, which are either *muticous* (destitute of appendages), *cristate* (furnished with two little broad projecting membranes), or *aristate* (that is having a couple of bristle-shaped processes proceeding from their base). It has lately been proposed to take advantage of these and similar differences for breaking up the genus Erica, now consisting of between 300 and 400 supposed species, into a number of new genera; and accordingly in Don's 'General System of Gardening and Botany,' we find no fewer than twenty new groups formed at the expense of Erica. There can however be no reasonable doubt of this having been an injudicious measure, and that the greater part of these new genera are little better than fresh contributions to the confusion that already reigns in the nomenclature of garden plants. Dr. Klotzsch in particular, the present conservator of the Royal Herbarium at Berlin, by whom the order Ericaceæ has been made a subject of special study, objects to them in unmeasured terms; and it must be admitted that he possesses a much more correct acquaintance with Erica than any other author. For his views concerning the real importance of the differences observable in the organization of heaths, and the commencement of his still unfinished but very careful revision and reconstruction of the genus, the reader is referred to the 'Linnæa,' vol. ix., p. 612. The best arrangement in any work published in this country is to be found in the second edition of the 'Hortus Kewensis:' an enumeration with brief characters of 294 species, illustrated with a considerable number of good wood-cuts, is published in Loudon's 'Encyclopædia of Plants;' the 'Botanical Cabinet,' 'Botanical Repository,' and 'Botanical Magazine,' contain coloured figures of numerous species; and there are separate works upon the subject, also with coloured plates, one by Mr. Andrews, and the other by the gardener to the duke of Bedford.

The genus is confined to the old world. A few species occur in the north of Europe, and others in the countries bordering on the Mediterranean. In Great Britain, heather (Erica or Calluna vulgaris) covers large tracts of waste land and is used to thatch houses, to make brooms, and even beds, in the northern parts of the island. There is a double variety of this species which is extremely beautiful. All our British heaths are improved by cultivation, and are general favourites where the climate and soil are suited to them. They will not however thrive in hot dry places and in any common soil, but require sandy peat earth, and a situation where they are moderately shaded from the sun. Erica carnea, one of the few plants whose flowers bid defiance to the rigour of winter, and appear as the earliest harbingers of spring, is found wild in Germany and generally on the mountains of middle Europe. E. Australis, arborea, Mediterranea, and codonodes, adorn the rocks of the south of Europe.

But it is at the Cape of Good Hope that the principal part of the species is found; indeed the whole of those which are cultivated in greenhouses. In their native country they are by no means so handsome as when cultivated, but form scraggy shrubby bushes, with so little beauty, that the colonist boors have not vouchsafed to give them even a name.

On account of the great beauty of Cape heaths and the property which so few plants possess in common with them of producing their blossoms the whole year round, they have become universal favourites with all those who have a greenhouse at command. But an impression that there is great difficulty in cultivating them, and in fact the want of success that often attends their management, has deterred so many from attempting to grow them, and thus has robbed our gardens to such a degree of their very greatest exotic ornament, that we shall take this opportunity of stating at some length what precautions are really requisite in cultivating heaths, and of pointing out to what causes failure is generally to be attributed. We are the more induced to do so because the taste for this tribe of plants is reviving in this country, and because the supposed difficulty of keeping them in health has no foundation; for with a little care, and less expense than is required to grow pelargoniums, they may be brought to the highest state of perfection.

No man has ever given such excellent practical directions for the whole management of heaths from their first stage of a seedling or a cutting to their last of a noble full grown bush, as Mr. M'Nab of Edinburgh, of whose experience we of course avail ourselves in the succeeding statement; referring our readers to it for further information as one of the very best practical horticultural papers in any language. (*Treatise on the Propagation, Cultivation, and general Treatment of Cape Heaths*, by Wm. M'Nab, Edinburgh, 1832.)

If new varieties are wanted, the only way is to raise them from seed, but when this is not the object, by far the best method of propagating is from cuttings. Much of the success which attends the striking of cuttings depends upon the state they are in when taken from the plant; for example, if they are too young they are liable to damp off, and on the other hand, if they are too old, they do not emit roots freely; therefore the best is a middle course, which is not liable to either of these objections.

The leaves of the cutting must be stript off to about one-half of its length, and its end cut with a sharp knife: in this state it is fit for the cutting-pot. In preparing the pot, it is necessary to be particular about the draining, and for that purpose it should be filled to within about two inches of its top with broken pots, rough ashes, or something of this description; the remainder must be filled with sand, which should be procured as free from ferruginous matter as possible. Between the sand and draining, it is a good plan to have a thin layer of decayed turf or rough peat soil, otherwise the water will carry down the particles of sand, and render the drainage of little or no use.

Some cultivators press the sand very hard, water it well, and then put in the cuttings; others do not press it at all, nor give it any water until the cuttings are introduced; the last method is perhaps the best, at least the intended effect is best produced by it; for while the water which is given afterwards, in the former case renders the cuttings more loose, in the latter they always become more firm; and it will be found, that those which have not been pressed at all, in a few days will be more firmly fixed than those which have been treated in a different manner.

Bell-glasses are frequently put over heath cuttings, but these are in most cases unnecessary, unless where the cuttings are exposed to a current of air, and where evaporation goes on rapidly. If bell-glasses are used at all, it is of the greatest importance to look over and wipe them occasionally, otherwise the moisture which is deposited upon the glass will prove very injurious to the young cuttings.

Heaths may be propagated at any season of the year when the young wood can be obtained in a firm but not hardened state, but the spring is the best time for performing this operation, because the young plants get rooted before the commencement of the dull and damp winter season, in which heaths are apt to suffer, if injudiciously treated.

If it is winter when the cuttings are put in they will require a little artificial heat, and may be placed in a stove; but, if in the end of spring or summer when the weather is warm, a cool greenhouse or frame is quite sufficient to insure their growth.

After the cuttings are sufficiently well rooted, which is easily known by their beginning to grow freely, they must then be potted off, in pots of the smallest size, and regularly shifted into larger as they require it.

With regard to the soil in which it is most advisable to grow them, as very different statements are to be found in books, we quote Mr. M'Nab's words.

'The soil,' he says, 'for the first potting should be one half peat and one half sand, always taking care to drain the pots well with small pieces of broken pots or cinders.' 'The soil for the second potting should be about two-thirds peat and one-third sand, and in all the after-pottings the soil should be the same as will hereafter be recommended.'

In the same part of his work he says, 'The soil which I have found Cape heaths thrive best in is a black peat soil taken from a dry heath or common which is never overflowed with water. In general it should not be taken off more than five or six inches deep. This, however, must partly depend upon the subsoil: for, in some cases, I have seen at twelve or fourteen inches deep the soil quite as good as at the surface. Whatever heath or other vegetable production is on the surface, should be taken along with the peat earth to the compost ground, and there laid up in a heap till wanted. It frequently happens that peat earth taken from such situations as I have mentioned has sand intermixed with it in its original state; but when this is not the case a quantity of coarse white sand should be procured and mixed with the earth in the compost ground. This should be at least to the extent of one-fourth or one-fifth of the whole, and although a little excess of sand is used, it will never be found injurious to the health of the plant.'

Mr. M'Nab, in shifting his heaths, has always at hand some fragments of soft freestone, which he introduces amongst the soil around the ball of the plant; the size of these stones i regulated by the width of the pots or tubs into which the are put. His reason for introducing stone shows how fa his mode of cultivation is from quackery, and that he recommends nothing for adoption for which a sound physiological reason cannot be assigned.

'When stones are introduced among the earth in the wa I have recommended, heaths will never suffer so much i the summer from occasional neglect to water them as the would do if the stones were not introduced; because thes stones retain the moisture longer than the earth, and i winter they allow a freer circulation through the mass o any superabundant moisture which may be given.'

The same successful cultivator recommends the plants t be raised a little higher in the pot at each shifting tha they were before; and after several shiftings the old bal around the stem will be raised two or three inches abov the level of the edge of the pot or tub; always taking car however, to leave sufficient room to hold enough of wat between the base of the cone of earth and the rim of the pot

This is an excellent plan, and one which cannot be too highly recommended, for there is scarcely a chance of the plant suffering from too much water being given it, even in winter; and if by chance it should receive too much, it can only be round the sides of the pot or tub, and at the extremity of the roots, whence it is carried off by the quantity of draining below. Moreover, and this is a most essential point, the water percolating through the earth next the sides of the pot ensures the tips of the roots being always kept damp and cool, a precaution absolutely indispensable to preserving heaths alive. It will generally be found that the sudden death so common among these plants is owing to the sides of the pot having become accidentally dried and heated. On this account a low pit, in which the pots can be so arranged that their sides are always in the shade, will be found a convenient place to grow them in during summer.

By treating Cape heaths in this way, they may be brought to a state of perfection quite unknown in their native country. From a list of some of the larger specimens grown in the Royal Botanic Garden, Edinburgh, it appears that they have attained the height of six, seven, and eight feet, and from ten to twenty-six feet in circumference. (*Arboretum et Fruticetum Britannicum.*)

The degree of cold which these plants will bear without injury is much greater than is generally imagined; at the same time experience shows that some are far more hardy than others. We learn from Mr. M'Nab that 'many of them will be much injured when the thermometer (Fahrenheit) falls eight or ten degrees below freezing; many others will require ten or twelve degrees below freezing to produce the same effect.' 'On the 20th of January, 1829, we had twenty-nine species of heaths planted out, which remained without injury till the 21st and 22nd of January the same season. The thermometer then fell fourteen degrees one night, and seventeen degrees the other below the freezing point, when they were all totally destroyed. The frost before had never been more than nine degrees below freezing.'

As the means of cultivating these beautiful plants are extremely different in different places, the following lists will be found useful to those who are only able to give a few of them room in their collections. They are borrowed from Mr. M'Nab, and therefore may be implicitly relied upon.

1. List of Cape heaths which will stand in the open air in autumn or middle of winter without protection, with the thermometer seven or eight degrees below freezing, without suffering in any way from such a degree of cold:—

Erica acuminata
aggregata
campanulata
cerinthoides superba
comosa alba
conferta
congesta
coridifolia
cruenta
——— superba
curviflora
cupressina
Ewerana pilosa
expansa
exudans
ferruginea
flaccida
globosa
glomerata
gracilis
grandiflora
hispidula
hyacinthoides
ignescens
intertexta
leucanthera

Erica longiflora
longipedunculata
lucida
mammosa
margaritacea
montana
nigrita
pendula
perlata
physodes
pubescens-minor
ramentacea
rosea
serpyllifolia
setacea
Sparmannia
splendens
tenella
tenuiflora
tetragona
transparens
triflora
ventricosa
viridescens
verticillata

2. Heaths which are tenderer than those mentioned in the preceding list, and which, when exposed to the same degree of cold, will be injured by it, but will not suffer although fully exposed to a temperature four or five degrees below freezing:—

Erica abietina
albens
articularis
assurgens
baccans
barbata
Blæria
Bonplandia
caffra
calycina
cerinthoides-alba
comosa-rubra
colorans
concinna
Coventryana
cubica-minor
cylindrica
daphnæflora
decora
depressa
discolor
divaricata
elata
Ewerana
gelida
halicacaba
incarnata
Linneana

Erica Linneana-superba
Linneoides
mollissima
nudiflora
mundula
pellucida
persoluta
perspicua
prægnans
propendens
pubescens-major
quadriflora
radiata
reflexa-ruora
rubens
Sebana
—— aurantiaca
simpliciflora
sessiliflora
spicata
spuria
triceps
trivialis
tubiflora
urceolaris
vestita-rosea
viscaria

3. A list of the most ornamental heaths which will flower in succession at all times of the year.

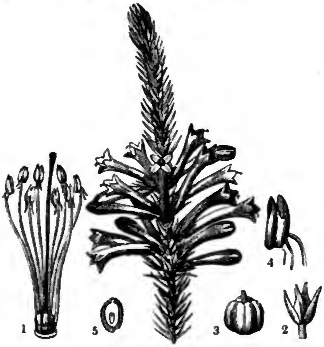
	Time of flowering.
Erica abietina	Sept.—Mar.
acuminata	Mar.—June
aitoniana	June—Oct.
ampullacea	June—Aug.
andromedæflora	Apr.—June
ardens	Apr.—June
aristata	May—July
Blandfordiana	Mar.—June
Bonplandia	Apr.—June
Bowieana	Mar.—Sept.
bruniades	Apr.—Aug.
bucciniformis	May—Aug.
carneola	May—Aug.
cerinthoides	Sep.—June
Cliffordiana	Sept.—Feb.
colorans	Oct.—June
Coventryana	Mar.—June
cubica	Apr.—July
Cussonia	Jan.—Mar.
depressa	Jan.—Aug.
echiiflora	Apr.—June
Ewerana	July—Aug.
elegans	Apr.—July
exsurgens	Aug.—Nov.
expansa	Mar.—July
erosa	June—Aug.
florida	May—Aug.
fascicularis	Feb.—May
glauca	May—July
gracilis	Mar.—June
grandiflora	May—Sept.
grandinosa	May—Sept.
hyacinthoides	June—Aug.
inflata	June—Sep.
Irbyana	July—Sept.
Jasminiflora	July—Oct.
Kalmiiflora	Aug.—Feb.
Lambertiana	Aug.—Apr.
Linneana	Jan.—May
——— superba	Mar.—May
Linneoides	Nov.—May
magnifica	June—Nov.
mammosa	Sept.—Mar.
Erica melastoma	April—July
metulæflora	April—Sep.
Monsoniana	Oct.—May
mundula	Mar.—July
mucronata	Apr—Aug.
mutabilis	all the year
nigrita	Mar.—Aug.
odorata	Apr.—July
Parmentierana	June—Aug.
Pattersonia	Mar.—July
perspicua	May—Aug.
picta	Mar.—June
prægnans	May—July
primuloides	May—July
princeps	Apr.—July
propendens	May—July
pubescens	Mar.—Nov.
pyramidalis	Feb.—May
quadriflora	Mar.—Aug.
radiata	May—Aug.
reflexa	May—Oct.
resinosa	Feb.—Aug.
retorta	July—Aug.
Savillea	July—Aug.
scabriuscula	May—July
Sebana	Mar.—June
Shannoniana	July—Sept.
Solandra	all the year
spuria	May—Aug.
sulphurea	Mar.—June
taxifolia	June—Dec.
Templea	May—Aug.
Thunbergia	June—Aug
togata	June—Aug.
tricolor	June—Sep.
tubiflora	April—July
tumida	July—Sept.
ventricosa	June—Sep.
ventricosa coccinea	. .
stelliflora	. .
carnea	.
alba	. .
superba	. .
erecta	. .
verticillata	Sept.—Mar
vestita coccinea	Apr.—Nov.
aba	. .
purpurea	. .

Those who have not the convenience of a green-house or heath-house to grow Cape heaths in may nevertheless form beautiful clumps in their flower gardens by a judicious selection of hardy sorts (some of which have been already named), and by attending to the principles which have been laid down, namely, draining the ground, removing the soil where it is not suitable for their growth, and filling the space with a mixture of peat soil and sand, and at the same time introducing a quantity of freestone to equalize the moisture of the soil.

ERICA'CEÆ, a natural order of exogens, deriving their name from the extensive genus that forms the subject of the last article. It is readily known from all other orders by its anthers bursting by pores at their apex, the stamens being hypogynous, the corolla monopetalous, and the ovary containing more cells than two. By this character are combined with the genus Erica the fragrant richly-coloured Azalea, the shady evergreen Rhododendron, and the delicate irritable Kalmia, together with Arbutus, Andromedas, Gaultherias, and many others equally beautiful; in fact it is probable that if it were necessary for a botanist to name some one natural order as pre-eminent for beauty, this would be the one selected. It is therefore not a little curious that it should also be an order of poisonous plants; for one would hardly expect danger to lurk beneath forms so fair. Nevertheless Rhododendron ponticum, Azalea pontica, and various Kalmias and Andromedas are notoriously deleterious, and even the Arbutus berries are in no inconsiderable degree narcotic.

The order is unknown in very hot countries, except at considerable elevations; it appears generally to love exposed situations, and, with the exception of Erica itself, to follow mountain chains, as it advances from the cool plains of the temperate zone to equinoctial regions. Hence, although we find Befarias, Gaylussaccias, Andromedas, and others in Peru, Brazil, Ceylon, Java, Madagascar, and elsewhere, it is only upon the tops of lofty mountains or upon their sides.

Ericaceæ are frequently polypetalous, and give rise, along with other similar cases, to a suspicion that the usual division of exogens into polypetalous, monopetalous, and incomplete sub-classes, is essentially bad. [EXOGENS.]



Erica longiflora.

1, Stamens and pistil; 2, calyx; 3, ovary; 4, anther; 5, section of seed, showing the embryo.

ERICHTHUS, Latreille's name for a genus of deep-sea crustaceans, and placed by M. Milne Edwards between the genera *Squillerichthus* and *Alima*. The last-named author makes the tribe Erichthians (*Erichthiens*) belong to the family of Unicuirassiated Stomapods (*Stomapodes Unicuirassés*), the general characters of the tribe being an undivided carapace and a styliform rostrum; no moveable rostral plate; and branchiæ, in general, rudimentary.

The tribe, according to M. Milne Edwards, is composed of a certain number of small crustaceans approximating to the *Squillæ*, but which have in general only rudimentary branchiæ, and are often completely deprived of them. They are easily distinguished by their carapace, which is large lamellar, generally transparent, without longitudinal furrows or distinct lobes, and always armed with a styliform rostrum, which advances above the ophthalmic and antennular rings. These two first rings of the head are less distinct than they are in *Squilla*, but have very nearly the same conformation, and move upon the succeeding cephalic segment. The *Internal antennæ* are inserted below and behind the ocular peduncles; they are rather distant from each other, and their slender and cylindrical peduncles are composed of three joints, and carry at their extremity three multiarticulate filaments. The *External antennæ* are inserted at some distance behind the preceding, and are directed outwards; their peduncle is large and formed of two joints, of which the first gives origin, by the anterior border of its extremity, to a slender and short stem (tige), composed of two peduncular joints and a multiarticulate filament, the second carrying at its extremity a large oval-shaped blade or lamina with ciliated edges. The *Epistome* is not projecting and swollen as in *Squilla*, and the mouth resembles a pear-shaped tubercle, situated near the middle or towards the posterior third of the lower surface of the carapace. The *Upper Lip* has the form of a triangle, with a rounded base which is directed backwards. The *Mandibles* are vertical, swollen at their base, and armed with two branches with dentilated borders, the upper of which raises itself into the interior of the pharynx; their palpiform stem (tige) is either rudimentary or null. The *Lower Lip* is large and composed of two swollen lobes. The *Jaws* are small and of the same conformation as those of *Squilla*, excepting that those of the second pair are narrower. The members which represent the anterior jaw-feet, the prehensile feet (*pates ravisseuses*), the three pairs of subcheliform feet applied against the mouth, and the three pairs of natatory feet, which terminate the series of thoracic members, are formed and disposed in the same manner as they are in *Squilla*. It is only to be remarked that often the three pairs of subcheliform feet are less approximated to the mouth than they are in the *Squillæ*, and that those of the three last pairs are sometimes rudimentary. The *carapace* is prolonged more or less far beyond the last rings of the thorax, or even beyond the first segments of the abdomen, but without adhering thereto. The abdomen is elongated; its last segment is very large, and entirely covers the appendages of the preceding ring, which are short, but formed like those of the *Squillæ*. Finally, the false feet suspended from the five first rings of the abdomen are more slender and more elongated than in the other division of the family, and, as has already been noticed, present in general only the vestiges of branchiæ.

Geographical Distribution.—The *Erichthians* have as yet occurred hardly any where else than in the ocean (haute mer), and have hitherto been found only in tropical regions

Genera: Squillerichthus.

Carapace armed with spiniform prolongations and covering the base of the internal antennæ, but posteriorly it does not overpass (not comprising the spines) the last ring of the thorax. The rostrum is styliform and very long. The eyes are large, pear-shaped, and articulated on a very slender and rather long cylindrical peduncle. The ophthalmic ring is not distinct from the antennular ring, as in the *Squillidæ*, but the mode of insertion of the antennæ is the same as in those animals and in the *Erichthi*. The *antennæ* of the first pair are directed forwards, and present nothing remarkable. The external antennæ are directed outwards, as in the *Erichthi*, and present also a large peduncle, carrying at its extremity a large oval-shaped lamina ciliated all round, and giving insertion, by its anterior border, to a very short stemlet (tigelle), composed of two peduncular joints and a terminal filament. The *mouth* is little distant from the base of the antennæ, and situated towards the middle of the carapace. The *upper lip* is large, demicircular, and projecting. The *mandibles* are directed downwards as in the *Squillæ*, and there is a large denticulated tooth and a prolongation equally dentilated on its edge, which mounts towards the stomach, but the palpiform stem is null or rudimentary. Behind the mandibles are found a large inferior bilobated lip; and then two pairs of *jaws*, the form of which is the same as in the *Squillidæ*. The appendages that correspond to the *jaw-feet* of the first pair present nothing remarkable; they have the form of a long and slender stem, and, as in the other crustaceans of this family, do not seem to form a part of the buccal apparatus. The members of the following pair are very large and constitute *prehensile feet* (pates ravisseuses), exactly similar to those of the *Squillæ;* their penultimate articulation is enlarged and spinous towards the base, and their terminal claw is short and armed with spiniform teeth on the prehensile edge. The feet of the three following pairs are inserted on a transverse curved line immediately behind the prehensile feet, and are habitually applied against the mouth exactly as in the *Squillidæ;* each of these carries at its base a flattened disk-like vesicle, and is terminated by an oval cheliferous *manus*. The three last thoracic rings are complete, and free below the carapace, which covers the two first. The three pairs of corresponding feet are of moderate size, and formed as they are in the *Squillidæ*, only their last joint is not setiferous. The abdomen is large, and much resembles that of the *Squillæ*, except that the last segment is much larger and habitually covers the members of the penultimate ring. These last organs are composed, as in the *Squillæ*, of a peduncular joint, which prolongs itself inferiorly into a great lamina, and carries two appendages inserted on its edges near its base. The internal appendage consists of a great ciliated lamina, and the external one is composed of two joints, of which the last is oval, and the penultimate joint armed with spines on the external border. The *false feet* suspended from the five first rings of the abdomen are large and formed of a nearly square peduncular joint and of two great oval laminæ with ciliated edges; the internal lamina bears on its internal edge a small rudimentary appendage, and the external gives insertion, near its base, to a large ramose *branchia*.

Place in the series.—M. Milne Edwards, who founded this genus, and whose description we have above given, considers that *Squillerichthus* forms the passage between the *Squillæ* and the *Erichthi*.

Locality.—The form has only been found as yet in the Asiatic seas.

The species (two only are recorded) are small. Example, *Squillerichthus typus.*

Description.—Rostrum advancing beyond the peduncle of the internal antennæ; a great horizontal spine on the middle of the posterior border of the carapace; and, on each side, another and longer spiniform elongation, springing from the angle of the carapace; finally, a rather strong point towards the middle of the lateral border of the carapace, and another above the base of the external antennæ. Claws of the prehensile feet, armed with four teeth (including the terminal point). The last thoracic ring is not covered with the carapace, and the abdomen is very large. Its last segment is much longer than it is wide, and armed with three pair of marginal teeth. Length about 15 lines. Found in the seas of Asia. (Milne Edwards.) The other species recorded by M. Milne Edwards, *S. spinosus*, was taken by M. Dussumier in the gulf of Bengal.

Erichthus.

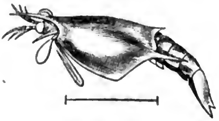
Carapace very large, convex, and armed with spiniform elongations. It entirely covers the base of the ocular peduncles, as well as of the antennæ, and extends backwards more or less far beyond and above the abdomen, which is short and large. The *eyes* are large, pear-shaped, and are not carried on a slender and elongated stem, as in the *Squillerichthi* and *Alimæ*. The *antennæ* present nothing remarkable, except that the stemlet (tigelle) of those of the second pair is often rudimentary, and that those of the first pair are rather short. The mouth is formed in the same manner as it is in the *Squillerichthi*, only the external jaws are extremely small and narrower. The *jaw-feet* of the first pair are extremely slender and of moderate length; they are slightly enlarged towards the extremity and have a rudimentary nail or claw at the end. The *prehensile feet* are but little developed: their claw is nearly straight and without dentilations, and the penultimate joint is slender, elongated, straight, and devoid of spines. The feet of the three following pairs are formed in the same manner as they are in *Squillerichthus*, but they are inserted one after the other; the flattened vesicle fixed at the base of each of these organs, as well as of the members of the two preceding pairs, is very large. The thoracic feet of the three last pairs are formed in the same manner as in *Squilla* and *Squillerichthus*, but are little developed, and sometimes want the styliform appendage; at other times they are entirely rudimentary, and are only composed of a small peduncle, terminated by two articulations, nearly like the false abdominal feet, but much smaller. The *abdomen* is wide and short: the caudal fin which terminates it is disposed as in *Squillerichthus*, and the false feet of the first pair are large and terminated by two great oval laminæ, on one of which is a rudimentary *branchia*.

M. Milne Edwards, who gives the above characters, divides the nine species into the following sections:—

α

Species whose rostrum is very long and passes sensibly beyond the internal antennæ.

Example, *Erichthus vitreus* (*Smerdis vulgaris*, Leach). Locality, the Southern Atlantic Ocean.



Erichthus vitreus.

β

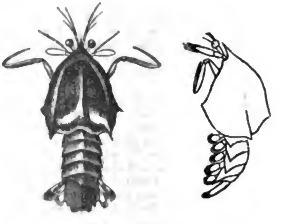
Species whose rostrum is of moderate length, and passes beyond the peduncle of the internal antennæ without attaining to the extremity of those appendages.

Example, *Erichthus armatus* (*Smerdis armata*, Leach) Locality, Coasts of Africa.

γ

Species having the rostrum extremely short (not passing beyond the peduncle of the internal antennæ).

Example, *Erichthus Duvaucellii.* Locality, Gulf of Bengal.



Erichthus Duvaucellii.

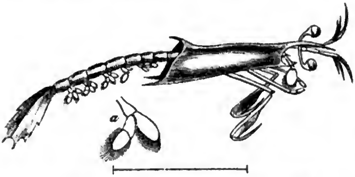
Alima.

Carapace narrow, straight above, if not altogether so behind, where it often presents a sudden roof-like elevation; *rostrum* straight and styliform. The anterior angles of the carapace constitute two acute spines directed forwards; the posterior angles are also prolonged into the form of points directed backwards on each side of the abdomen. Finally, the lateral borders of the carapace are nearly straight. The ophthalmic and antennular rings are not hidden under the carapace as in *Erichthus*, but are seen uncovered under the rostrum. The *eyes* are carried on slender, long, cylindrical peduncles directed outwards. There is nothing particular about the *antennæ*. The *mouth* is situated very far from the front, towards the posterior third of the lower surface of the carapace; the *upper-lip*, the *mandibles*, the *lower-lip*, and the two pairs of *jaws* have the same form as in *Erichthus* and *Squillerichthus*. The thoracic *feet* are formed also in the same manner as in *Erichthus*, but the three pairs of members which follow the prehensile feet are more approximated to the mouth, as in the *Squillæ*. The posterior border of the carapace is ordinarily notched, so as to leave uncovered the two last thoracic rings, and the *abdomen* is narrow and elongated. The false feet are large, but are, in general, completely devoid of branchiæ: sometimes vestiges of these organs are found upon the abdominal members of the first pair, and at other times they are represented by a small pediculated tubercle fixed to the external blade of these appendages. Finally, the conformation of the species of caudal fin formed by the last abdominal segment and the false feet of the sixth ring are entirely the same as in *Erichthus*. M. Milne Edwards, whose description we have given, states that the *Alimæ* bear an extremely strong resemblance to the *Erichthi*, but always have the body more elongated. Their manners, he adds, are not known, and he divides the five species into the following sections:—

a

Species which have the hand of the prehensile feet unarmed with spines.

Example, *Alima hyalina* (Leach). Locality, Cape Verd.



Alima hyalina. *a*. Natatory ventral appendage magnified.

β

Species which have the hand of the prehensile feet armed with teeth or spines on the prehensile border.

Example, *Alima laticauda*. Locality, New Guinea. (Quoy and Gaimard.)

M. Milne Edwards observes that the species figured by M. Guerin under the name of *Alima triacanthura*, belongs to this division, and seems to be distinguished from the other species by the brevity of the rostrum, the shortness of the lateral blades of the caudal fin, &c.

Alima longirostris of the same naturalist has not, according to M. Edwards, been described, but seems to approach very nearly to the preceding species.

ERICHT, LOCH. [INVERNESS-SHIRE.]

ERICK, in Swedish, is synonymous with the German Heinrich, and the English Henry, and is the name of many kings of Sweden and of Denmark. Of the earlier kings of this name little is known, for the history of the Scandinavian nations previous to the ninth or tenth centuries of our æra is very confused. Messenius, in his 'Scandia Illustrata,' ridicules the accounts given by Johannes Magnus and other Swedish historians, who, he says, have striven to outdo the Danish chronicler, Saxo Grammaticus, in his fabulous legends. Another respectable authority, Puffendorf, expresses himself as follows: 'The names and deeds of the early kings of Sweden and the periods of their reigns cannot be easily determined, as the lists which have been published are by no means authenticated, and the traditions of those times have been derived chiefly from the antient songs and fabulous legends, or out of the allegorical traditions of the antient Scalds or poets, which have been perhaps wrongly interpreted.' (*Introduction to the History of Sweden.*) In the earlier centuries of our æra the country now called Sweden was divided into several kingdoms or states, of which Sweden Proper and Gothia were the two principal. Sweden Proper comprised the central part of present Sweden, and included the provinces of Upland, Sudermanland, Westmanland, Nerike, and part of Dalecarlia. The kingdom of Gothia comprised the southern part of the great Scandinavian peninsula, including the provinces of Ostrogothia and Westrogothia, divided by the Wetter Lake, Smäland, Bohusland, Skane, and Blekingen, with the isles of Gothland and Oeland. But the most southern provinces, especially Skane, were for a long time a subject of contention with the Danes, who frequently occupied them.

There was also the kingdom of Wärmeland, north and west of the great Wener Lake, extending to the borders of Norway, and the kingdom of Halsingland, north of Sweden Proper, which included the provinces of Angermanland, Jämteland, East and West Bothnia, up to the wilderness of Lapland. Most of these provinces had each its separate chief or king, something like the earlier Saxon kingdoms in England; but the king of Sweden Proper, or of Upsal, as he was also called, was considered in ordinary times as the head of the whole, like the Bretwalda of the Saxon Heptarchy. Odin or Wodin, the conqueror of Scandinavia in the century previous to our æra, is said to have kept Sweden for himself, allowing his relatives or companions to settle in the rest of Scandinavia as his vassals; and this superiority of Sweden was acknowledged for several centuries after, so that at the great general meetings of the Scandinavian nations the king of Denmark used to hold the bridle and the king of Norway the stirrup of the king of Sweden's horse. (Puffendorf.)

Among the earlier kings of Sweden, in the fifth and sixth centuries, we find several Ericks, of whom little or nothing is known. One of these reigned together with his brother Alrick as kings of Upsal, from about A.D. 465 to A.D. 485. Another Erick and his brother Jorund, being the sons of Yngue Alrickson, were following the then common profession of sea-kings, or pirates, when a vacancy on the throne of Sweden, to which they had some family claim, recalled them home about A.D. 525. They were opposed by the usurper Haco, when Erick was killed, and Jorund was obliged to escape. In the ninth century we find Erick Biörnson reigning together with his father Biörn Järnside, about A.D. 864. Biörn died in 870, and Erick reigned alone till 874, when he died abroad in some expedition. He was succeeded by his son Biörn and his nephew Erick, the son of Refil the Sea King, who reigned together for a time. The two kings went with a host to join their Norman friends at the siege of Paris, A.D. 886, when Charles the Fat was obliged to conclude a dishonourable peace. Biörn appears to have died at the siege, and Erick Refilson returned home and died some years after. He was succeeded by Erick, son of the late Biörn, who reigned together with his brother Biörn, called of Höga, from the place of his residence. After his death, Erick Emundson, a grandson of Erick Refilson, was proclaimed king about A.D. 910, under the guardianship of his great uncle Biörn of Höga. Biörn died in 925, and Erick remained sole king of Upsal. He sustained a war agains Harald Harfager, king of Norway, and at his death wa succeeded by his son, Biörn IV.

Erick Segersäll or 'the victorious' reigned from 970 t 994. He retook Skane and Halland from the Danes and at last drove away their king, Sweno, from Denmar itself. He also defeated the Norwegians and Finnlanders and conquered Livonia, Esthonia, and Courland. Eric was succeeded by his son Olaf, or Olaus, who is mentione as the first Christian king of Sweden.

In the year 1155, after the death of Swerker Kolson, th Othogothians chose his son Charles for their king, but th Swedes at their general assembly at Upsal elected Eric Jadwardson, a nobleman connected by alliance with bot the royal families of Sweden and Denmark. He is style Erick IX. by most chronologists, and he is also called Eric the Pious, or St. Erick. After some demur the Gothian agreed that he should reign over both kingdoms, but tha after his death Charles Swerkerson should succeed him Erick brought back the Halsingers and the Jämmtlande to the Swedish allegiance. In 1157 he proceeded wit troops to Finnland, in order to subdue the natives and co vert them to the Christian faith, and the bishop of Ups accompanied him on this expedition. The Finnlande were defeated, many of them were slain, and the rest we baptized. Christian churches were founded by the bisho who remained in the country, while Erick returned Sweden, where he employed himself in compiling a code laws out of the antient constitutions of the kingdom. Th compilation is known by the name of St. Erick's law. Eri is remembered in history as a good king. In 1161, on t 11th May, as he was in the neighbourhood of Upsal, a par of Danes who had landed on the coast under Prince Ma nus, surprised and killed him after a brave defence on part. Magnus had his head cut off, and afterwards p claimed himself king; but the Swedes and Gothia uniting under Charles Swerkerson fell upon the Danes a killed them all, together with their prince, and out of t spoil they built a church on the spot. Charles was then knowledged as king of the Swedes and the Goths, the title which the kings of Sweden bear to this day.

Charles was killed by Knut, St. Erick's son, about 1168, who succeeded him, but after Knut's death, A.D. 1192, the crown was again disputed between Erick Knutson and Swerker the son of Charles, who was supported by the Gothians. After a long war, Swerker was killed in battle A.D. 1210, and left Erick Knutson in quiet possession of the throne. St. Erick's convention was then renewed, and John, the son of Swerker, was constituted heir to the throne, which was afterwards to return to Erick's descendants. Erick died in 1219 at Wisingsoe, which was the usual place of residence of the Swedish kings in those days.

Erick Erickson, son of the preceding, succeeded John in 1222 according to the convention, and reigned till 1250. His reign was at first distracted by civil war. The powerful family of Tolekunger, who were allied to the king by marriage, revolted against him; but they were defeated, and two of the leaders were put to death. Under this king Gulielmus Sabinensis, the Pope's Legate, first forbade marriage to the Swedish priests. Erick made war upon the Finnlanders, who had revolted, and built several fortresses on their frontiers. He died at Wisingsoe without issue, and was succeeded by Waldemar I., his sister's son.

Erick, son of king Magnus, and of Blanche, daughter of the Flemish Earl of Namur, was made colleague to his father by a powerful party of the nobility in 1344. A war broke out between father and son in 1357, and at last the kingdom was divided between them, Erick having the whole southern part, including Skane, East Gothia, Smäland, &c. Erick was shortly after poisoned at an interview with his father, and, it was reported, by the agency of his own mother.

Erick, styled XIII., Duke of Pomerania and nephew to Queen Margaret of Waldemar, who had united Sweden, Norway, and Denmark under her sceptre, was appointed by the General States of the three kingdoms assembled at Calmar in 1396 to be her successor. He married in 1410 Philippa, daughter of Henry IV. of England, and in 1412, after Margaret's death, he assumed the reins of government. But he soon gave proofs of incapacity, and his capricious and tyrannical sway disgusted the Swedes, to whom he preferred his Danish subjects. Becoming entangled in a tedious war with the Dukes of Holstein and Mecklenburg and the Hanse Towns, in order to carry it on he loaded his subjects with taxes, while their commerce was ruined. He violated the articles of the Calmar union, stripped Sweden of its archives, which he took with him to Denmark, and filled most military and civil offices in Sweden with Danes and other foreigners. The Dalecarlians were the first to revolt, being led by a nobleman of the name of Englebrecht. They were joined by the North Hallanders and others, and at last they obliged the senate of the kingdom assembled at Wadstena to renounce its allegiance to Erick. Erick made a hasty peace with the Hanse Towns, collected a fleet with troops on board, and sailed for Stockholm. After repeated attempts, he was obliged to make a convention with the insurgents, by which the king retained garrisons in the three castles of Stockholm, Calmar, and Nykoping; all other situations in the kingdom being filled by Swedish natives. At the same time he promised to respect the articles of the Calmar union, and returned to Denmark. But his bad faith kept alive the discontent, and in 1438 the leaders of the Swedes entered into secret negotiations with the chief men in Denmark, who were likewise dissatisfied with Erick, and a general revolt ensued. Erick had already withdrawn from Denmark into the island of Gothland with his treasures. The Danes chose for their king Christopher, Duke of Bavaria, king Erick's sister's son, and the Swedish Diet assembled at Arboga offered him likewise their crown under the stipulations of the Calmar union. Erick was allowed by Christopher to retain possession of the island of Gothland; but after Christopher's death in 1448 Charles Knutson, who succeeded to the throne of Sweden, besieged Erick in the town of Wisby. Erick escaped into Pomerania, with the assistance of Christian, king of Denmark, who sent him to the island of Rugen, where he ended his days. (Dalin's *Svea Rikes Historia*, Stockholm, 1747; Puffendorf's *Introduction to the History of Sweden;* and Geijer *Svea Rikes Häfder*, 1825.)

ERICK XIV. of Sweden, the son of Gustavus Vasa, was acknowledged, by a diet held at Westeraas in 1544, as heir to the throne, while he was in his eleventh year: he succeeded his father in 1559. He began by showing a considerable degree of jealousy towards his brothers John, Magnus, and Charles, whom their father had made dukes of Finnland, East Gothia, and Sudermanland, as feudatories of the crown. He was also engaged in war with the Liffanders or Livonians, who had placed themselves under the protection of Denmark and of Poland; but the Esthlanders remaining attached to Sweden, Erick sent an army to Reval for their protection, and successfully defended that place against the Poles. Erick had at one time, before he was king, asked the hand of Elizabeth of England, who gave no positive answer, and after his accession to the throne he embarked to pursue his addresses in person. A violent tempest however having driven him back to Sweden, Erick, who was superstitious and a believer in astrology, gave up all thoughts of the match, and turned his attentions to Mary, queen of Scotland, but with no better result. His brother John having married Catharine, daughter of Sigismund, king of Poland, without Erick's consent, Erick besieged him in the castle of Abo, made him prisoner, and kept him and his wife in close confinement, until the remonstrances of the people obliged him to release them. At the same time a war broke out between Denmark and Sweden, in which the Swedes had the advantage in several sea-fights. Meantime King Erick gave himself up entirely to his mistresses, and entrusted the care of the kingdom to his favourite Joram Peerson, an unprincipled man, by whose advice and that of Dionysius Burræus, a Frenchman by birth and his former tutor, he put to death several noblemen, among others the Stures, father and son, who belonged to a powerful Swedish family of Nils Sture: one of them was stabbed by the king with his own hand. Erick even went so far as to concert a scheme to put to death his brothers at a great festival to be given at Stockholm, but having been apprized of it, they conspired against him, seized upon several castles, collected a force, and marched upon the capital. Erick, after some defence, was obliged to surrender; the assembly of the states deposed him in 1568, and he was kept a close prisoner in the castle of Gripsholm, where he was treated very severely. His brother John was proclaimed king of Sweden. After nine years' confinement, Erick was put to death by poison by order of his brother in 1577. (Celsius, *Könung Erick den Fiortondes Historia*, 1795.)

ERICK I. of Denmark reigned about the ninth century. He is commonly reckoned as the first Christian king of Denmark, and it was under his reign that Ansgarius, bishop of Bremen, preached Christianity both in Denmark and in Sweden.

ERICK II. succeeded his brother Olaf or Olaus IV. about the year 1095. He made war in Pomerania, and took Jutin, then a considerable town of that country. He greatly favoured the Christian religion, and obtained of the pope the establishment of the archbishopric of Laud in Scania, which then belonged to Denmark. Erick visited Rome, and died in the island of Cyprus about 1103, while on a pilgrimage to the Holy Land.

ERICK III., son of the preceding, made war against the Wendes or Vandals, who were carrying on piracy in the Baltic. He died about 1138, and was succeeded by

ERICK IV., his son, called 'the Lamb,' who turned monk at Odensee, in 1147.

ERICK V. succeeded his father Waldemar II. in 1241, and was murdered by his brother Abel, in 1250, who succeeded him on the throne.

ERICK VI. succeeded his father Christopher I. in 1259, was engaged in war against the king of Norway, and was involved in disputes with his own nobles, who, at a Diet held at Wyborg in 1282, obliged him to sign an act defining their privileges and the limits of the royal authority. He was taken prisoner in battle by Erick, duke of Holstein, and cruelly murdered in 1286.

ERICK VII. succeeded his father Erick VI., and continued the war against the king of Norway. He reigned till 1319, and was succeeded by his brother Christopher II.

ERICK VIII., styled by some VII., is the same as Erick XIII. of Sweden, the nephew and successor of Margaret of Waldemar. [ERICK XIII.]

ERI'DANUS. [Po.]

ERI'DANUS (the river Eridanus), a constellation first mentioned by Aratus, who calls it Eridanus. Hyginus states it to have been named from the Nile, and assigns a reason [Canopus]; but the scholiast on Aratus states this to have been peculiar to the Egyptians. In the heavens it is a winding stream, not very well marked by stars, extending from a bright star (α) of the first magnitude, called Achernes, and situated near the southern part of Phœnix, past the feet of Cetus, and ending at the star Rigel in Orion. Its principal stars are as follows:—

Character.	No. in Catalogue of		Magnitude.	Character.	No. in Catalogue of		Magnitude.
	Flamsteed Piazzi (). Bradley []. Lacaille C.	Astron. Society.			Flamsteed Piazzi (). Bradley []. Lacaille C.	Astron. Society.	
τ^1	1	297	4	ν	48	530	4
τ^2	2	311	4	(k^3)	49	532	5½
η	3	316	3	c	51	535	4
	4	320	6	υ^2 *	52	534	3
(Z^1)	5	323	6		53	539	3½
	6	321	6		54	545	3½
ρ^1	8	330	6	μ	57	551	4
ρ^2	9	335	5		58	554	5½
ρ^3	10	339	5		59	557	6
(E)*	11	336	3½		60	562	6
	12	353	3	ω	61	566	5
ζ	13	355	3	b	62	576	6
	14	356	6		63	583	6
	15	361	6		64	584	6
τ^4 †	16	363	4	ψ	65	586	5
	17	380	4½		66	599	6
ι	18	385	3½	β	67	603	3
(f^2) ‡	19	386	4		68	606	6
(F)	20	389	5½	λ	69	607	4
	21	391	6	(e)	(47)	368	4
	22	397	5½	(υ^2)	(68)	493	6
δ	23	406	3½		(70)	641	6
π	26	415	5	(z)	(88)	382	5
(m^1) ¶	27	421	4	(y)	(113)	394	5
m^2 ¶	28	424	5¾		(138)	407	6
	30	431	5½	(h)	(149)	411	5
	32	432	4½		(157)	542	6
(l) **	33	434	4½		(158)	285	5
γ^1	34	440	2	ι	(159)	288	4½
	35	445	5	(P)	(167)	546	6
(k) ††	36	444	4½		(183)	426	5
	37	460	6	(g)	(189)	428	5
υ	38	464	4		(197)	553	6
A	39	470	5	(i)	(202)	437	5
d	40	472	5	θ^1	(238)	325	4½
(X) ¶¶	41	482	3¾		(251)	456	6
ξ	42	495	6		[633]	526	6
υ^3	43	506	5	α	102 C	182	1
(k^1)	44	513	5½	χ	127 C	210	4
(k^2)	45	521	5½	φ	154 C	241	4
	46	524	5	κ	168 C	256	4½
	47	527	5				

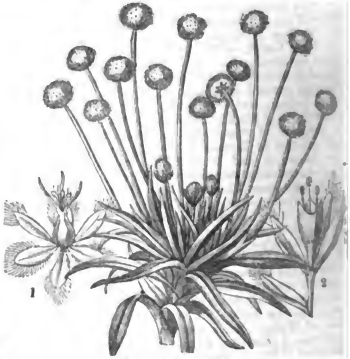
ERIE, LAKE. [Canada.]

ERI'GENA, JOANNES SCOTUS, a native of Ireland, from whence his appellation of Erigena is derived, that of Scotus being synonymous with it, as the Irish were still called in foreign countries Scots in those times, flourished about the middle of the ninth century, and was a celebrated scholar of that age. He resided chiefly in France, at the court of Charles the Bald, who seems to have been very partial to him. His writings on theological matters were considered as heterodox, and his treatise on the Eucharist was condemned to be burnt by the council of Rome A.D. 1059. [Berenger.] His treatise on predestination is found in the *Vindiciæ Prædestinationis et Gratiæ*, 2 vols., 4to., 1650. In his work 'Dialogus de Divisione Naturæ' he displays a wonderful information for the times he lived in, and an intimate acquaintance with the Greek language. He gives large extracts from the Greek fathers, and also quotes Aristotle, Plato, Cicero, Pliny, and other antient philosophers, and he gives the opinions of Pythagoras and Eratosthenes on some astronomical topics. In another part he inserts a very elaborate discussion on arithmetic, which, he says, he had learnt from his infancy. Turner, in his history of the Anglo-Saxons, has given an account of this singular work of this writer. Erigena also translated from the Greek certain theological works attributed to Dionysius Areopagita. To the writings and translations of Erigena is attributed by some the introduction of the later Platonism of the Alexandrian school into the theology and metaphysics of Europe. Erigena is believed to have died in France about the year 875. He must not be confounded with Joannes Duns Scotus, who lived in the thirteenth century. [Duns Scotus.]

ERINA'CEUS. [Hedgehog.]

ERINNA, a poetess and the friend of Sappho, flourished about the year 595 B.C. All that is known of her is contained in the following words of Eustathius (ad Iliad. ii., p. 327.) 'Erinna was born in Lesbos, or in Rhodes, or in Teos, or in Telos, the little island near Cnidos. She was a poetess, and wrote a poem called 'The Distaff,' in the Æolic and Doric dialect: it consisted of 300 hexameter lines. She was the friend of Sappho, and died unmarried. It was thought that her verses rivalled those of Homer. She was only 19 years old when she died.' Another poetess of this name is mentioned by Eusebius under the year 354 B.C. This appears to be the same person who is mentioned by Pliny (*Hist. Nat.* xxxiv. 8) as having celebrated Myro in her poems. We possess no fragments of either of these poetesses.

ERIOCAULO'NEÆ, a group of endogenous plants subordinate to Restiaceæ, for the most part inhabiting swampy or marshy places, or the bottom of lakes, and having the flowers collected into dense heads. The sexes are separated; the perianth consists of from two to six divisions immersed in soft bracts; there are from two to six stamens; the styles are two or three; the cells of the ovary are the same number, and the seeds solitary, with lines of hairs upon their surface. The embryo is placed on the outside of the albumen at the apex of the seed. The flowers are always very small, and difficult to examine on account of the thinness and delicacy of their texture. Eriocaulon itself is the principal genus, consisting of about one hundred and twenty known species, ninety-four or ninety-five of which are met with in the equinoctial parts of America, and one solitary instance, E. septangulare, in the Isle of Skye. Mr. Bongard, who has written a monograph of the South American species, states, that in that part of the world, although they prefer marshy and inundated places, yet some are found upon damp sand, others among grass, and some in dry and stony places; they



Eriocaulon dendroideum.

1. A female flower with six segments to its perianth, the three oute of which are broadest and fringed with long hairs. The ovary has three stigma exterior to which are three horn like appendages. 2. A male flower; a bra at the base, the three outer divisions of the perianth separate, the three inn united into a three-toothed cup, and three stamens within its border.

---

* Mr. Baily marks this τ^3.

† So marked by Mr. Baily.

‡ Mr. Baily marks this τ^5.

¶ Mr. Baily marks these τ^6 and τ^7.

* υ^7 in Mr. Baily's Catalogue.

** τ^8 in Mr. Baily's work.

†† Mr. Baily marks this τ^9.

¶¶ Marked υ^4 by Mr. Baily.

are also frequently met with in alpine situations, some as high as 5590 feet above the sea on the summit of Mount Itambé. The preceding figure of Eriocaulon dendroideum gives a correct notion of the appearance of these plants.

ERIO'PHORUM, the systematic name of the sedge-like plant which is called in this country wild cotton, or cotton-grass, in consequence of the long cottony tufts which wave upon its stalks in marshy and sedgy heaths and wastes in all parts of this country. The appearance is owing to the hypogynous scales, which, in this glumaceous genus, represent the calyx, being extended into long numerous white hairs, which project far beyond the scales of the flower head. It is not a little curious that while, in most of the species, these hairs are indefinitely numerous, they should in one, E. alpinum, be reduced to the regular number, six, which is the general proportion of floral envelopes belonging to endogens. Professor Kunth enumerates twelve species, all inhabiting the colder parts of the northern hemisphere.

ERI'PHIA, Latreille's name for a genus of Brachyurous or short-tailed Crustaceans.

Carapace less wide, and more quadrilateral than in the other Cancerians; length two-thirds more than the breadth; the fronto-orbital border occupies more than one-half, and sometimes more than three-fourths of its breadth; and the latero-anterior borders, directed nearly right backwards, only describe a slight curvature, and prolong themselves but little. *Orbits*, as in the genus *Ruppellia;* but the space which separates their edges from the basilary joint of the external antennæ is very considerable; this joint is but little developed, and does not occupy a fourth of the space comprised between the antennary fossette and the internal canthus of the eyes; on the contrary, the moveable stem of the external antennæ is much more developed than in the *Ruppelliæ*, and is inserted at a small distance from the antennary fossette. For the rest, not differing from the other Cancerians.

M. Milne Edwards, whose description we have given, says, that the *Eriphiæ*, which he places among the Quadrilateral Crustaceans, approach the *Ruppelliæ* nearly, but that the general form of the body of *Eriphia* tends to establish a passage towards the *Thelphusæ*. He divides the species into the following sections.

a.

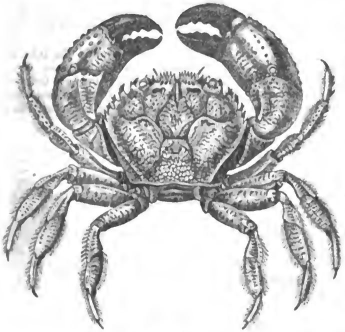
Species having the hands (manus) tuberculous.

*

Front armed with spines.

Example. — *Eriphia spinifrons* (*Cancer spinifrons*, Herbst).

Locality.—Inhabits all seas (Milne Edwards).



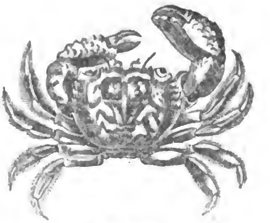
Eriphia spinifrons.

* *

Front devoid of spines.

Example.—*Eriphia gonagra* (*Cancer gonagra*, Fabricius).

Locality.—Coasts of South America.



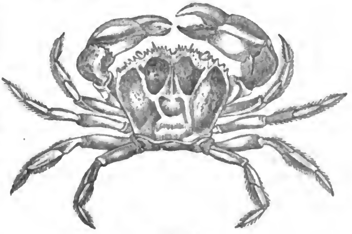
Eriphia gonagra.

β.

Species having the hands (manus) smooth, not tuberculous.

Example.—*Eriphia lævimana.*

Locality.—Isle of France.



Eriphia lævimana.

M. Milne Edwards observes, that the *Eriphia* figured by Savigny (*Egyp.*, pl. 5, fig. 1), and referred with doubt by M. Audouin to *E. spinifrons*, appears to him (Edwards) to be a distinct species; and that *Eriphia prismatica* of Risso has not been described with sufficient details to justify its reference to this genus with certainty. *Cancer eurynome* (Herbst) appears to M. Edwards to be an *Eriphia.*

ERIVAN is a town in the Russian government of Georgia, or Grusia, situated about 40° N. lat., and 44° 30′ E. long., at no great distance from the place where the boundary lines of Russia, Persia, and Turkey meet. The country in which it lies once belonged to the kingdom of Armenia, and in later times to the Persian province of Azerbijan, but was given to Russia by the peace of Turkmantshai in 1828. The town is situated on the banks of a considerable river, named Zanga, or Zengin, which flows from the lake of Erivan, or Gouksha, and falls into the river Aras; the river is crossed at the town by a handsome stone bridge of several arches. The town is built partly on a hill and fortified, besides being defended by a fort, which is of an elliptical form, upwards of 6000 yards in circuit, and surrounded by two strong walls flanked with towers. The town is of considerable extent, but probably does not contain more than 10,000 or 12,000 inhabitants, the greatest part of its area being occupied by gardens. The base of Mount Ararat is only about six or eight miles from the town.

ERLANGEN, or CHRISTIAN'S ERLANGEN, the principal town of the bailiwic of Erlangen, in the Bavarian circle of the Retzat, and the only Protestant university in the kingdom of Bavaria, is situated in a sandy but well cultivated plain, in 49° 35′ N. lat., and 11° 4′ E. long., within a short distance of the confluence of the Regnitz and Schwabach. It is divided into the Old and New Town, the latter of which was founded by Christian, Markgrave of Bayreuth, in the year 1686, and first inhabited by some French colonists: from that prince it takes the name of Christian's Erlangen. It is surrounded by walls, has seven gates, and its population is about 10,000, of whom about 600 are Roman Catholics. The New Town is handsome, and regularly built. Erlangen has three Lutheran and two Reformed Lutheran churches, a Roman Catholic place of worship, an orphan asylum, and infirmary, and a military hospital. The palace, which was partially destroyed by fire in 1814, has been fitted up for the use of the university, which was founded by Frederic, Markgrave of Bayreuth, in 1743. The establishments now connected with it are—an equestrian academy, a gymnasium, an ecclesiastical seminary, a polytechnic school, an academy of morals and the fine arts, a fine chemical laboratory, a botanical garden, a philological seminary, an anatomical school, museums of natural history, the fine arts, and experimental philosophy, a library of upwards of 100,000 volumes, and a clinical institute. The average yearly number of students attending this university is about 350. The Leopold-Caroline academy of naturalists, which was established in the year 1666 simultaneously with the Parisian academy of sciences, has its seat here, and is the first learned society that was instituted in Germany. There are also a society of medicine and natural philosophy, and a general society for domestic and rural economy. The town has factories for weaving and printing cotton goods, and also manufactures stockings and hats on a large scale, gloves, leather, tobacco, looking glasses, linen, toys, &c. Erlangen, together with the principality of Bayreuth, became an appendage of the Bavarian crown by the treaty of 1809.

ERLAU (in Hungarian **EGER**, and in antient records **AGRIA**) is the chief town of the county of Heves, in Upper Hungary. It is situated in a beautiful valley in the midst of richly cultivated lands, skirted by mountains crowned by woods and vineyards; in 47° 53′ N. lat., and 20° 23′ E. long. The Erlaubach divides it into two parts, which are surrounded by fortifications about seven miles in circuit, through which there are six gates; the number of houses is about 2900, and of inhabitants about 18,400, but the majority dwell in the suburbs outside the walls. Erlau was founded by Stephen, king of Hungary, who resided in it about 800 years ago, and made it the seat of a bishop; of late years it has become that of an archbishop. It contains four Roman Catholic churches, two monasteries, and a Greek and a Protestant church. The houses in the town are large, and built in a neat style; the principal ornament is the Lyceum, a very handsome and spacious edifice, begun by Count Charles Eszterházy in 1760, and finished in 1775, at a cost of upwards of 160,000*l.*; there is an observatory 172 feet high, a handsome chapel, and a very spacious examination hall and library attached to the institution. The Lyceum has two faculties, philosophy and jurisprudence, conducted by sixteen professors, and is very numerously attended. Opposite the Lyceum stands the cathedral church, which has nothing remarkable about it; but the neighbouring church of the Minorites is a splendid structure. The archbishop's palace is a fine building situated on a hill. Erlau has a county hall, a high school, an ecclesiastical seminary, an asylum for decayed clergymen, a school for educating teachers, several libraries, an hospital, and two mineral springs much used by invalids. The town has an extensive traffic in red wines, the produce of the vineyards in the vicinity, which is estimated at 1,197,000 gallons per annum. The manufactures consist of linens, woollens, hats, &c.

ERMINE, or **ERMIN**, one of the furs in heraldry, so called from the ***mustela erminia***, whose skin furnishes it. It is represented white, with black spots or tufts. The black spots in ermine are not of any determinate number, but are left to the discretion of the herald-painter.

ERMINE. [MUSTELA.]

ERNE, LOUGH, lies almost entirely in the county of Fermanagh, which it traverses from one end to the other. The limits are considered to extend from Beleek on the north-west to Belturbet on the south-east, a length of forty English miles; but for some distance within these two towns, as well as about Enniskillen, it is so narrow as to form more properly part of the river Erne. It offers the greatest extent of inland navigation, though somewhat obstructed by shallows, of any of the Irish lakes; but Lough Neagh, from being more free from islands, contains a greater surface of water. The waters of Lough Erne do not possess the petrifying qualities of that lake, but they have a harsh and unpleasant taste, and are unwholesome to drink, particularly at the season for gathering the flax, which is laid to soak along its shores.

The lake abounds in fish—such as trout, salmon, pike, perch, bream, eels, and smaller fish: there are also great quantities of wild duck, and during the winter it is visited by flocks of geese and various marine birds. There is not one village immediately on its shores along the whole extent, and the country is but thinly populated. There are several ruins of antient castles along the shores, and on the island of Devenish is a round tower in excellent preservation. Several large rivers empty themselves into the lake, which are navigable for boats from two to three miles up. On account of the numerous shoals and fords that occur in the narrow parts, the boats employed on the lake are chiefly flat-bottomed, and of a very rude construction: they are called 'cots,' and are principally used in supplying the town of Enniskillen with turf.

Lough Erne is usually considered as divided into two, the Upper and Lower Lakes, with a distance of six or seven miles between them, consisting of a narrow channel, which may more properly be called part of the river Erne. The Lower Lake is by far the larger and deeper, having in some places from 200 to 230 feet of water, but the depth is very irregular, and its surface is thickly studded with islands. Although within four miles of the sea, it stands at an elevation of 148 feet above low-water spring-tides in the dry season, and rises from 6 to 8 feet in the winter, according to the season. The first fall occurs at the village of Beleek, from which point to Ballyshannon there is a constant succession of falls. There is in this lake an expanse of water, about ten miles in length and five in breadth, tolerably clear of islands.

In the Upper Lake the most open part is not above a mile and a half in each direction, and in this space are several small islands. Its depth seldom exceeds 20 feet, the greatest that occurs being 75. Its level ranges from 11 inches to 2 feet 10 inches above the Lower Lake, the mean difference being about 20 inches.

The general features of the shores around the lake are rounded isolated limestone hills of moderate height, rarely rising to 600 feet above its surface, except towards the western extreme, where the Poola Fooka range of table-land reaches 1000 feet. The prevailing nature of the bottom is a bluish clay.

END OF VOLUME THE NINTH.

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PENNY CYCLOPÆDIA

OF

THE SOCIETY

FOR THE

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THE PENNY CYCLOPÆDIA

OF

THE SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE.

ERNESTI, JOHN AUGUSTUS, was born at Tennstadt, in the Thüringer Wald, on the 4th August, 1707. He was educated at Wittenberg and Leipzig, and became conrector of the school of St. Thomas, in the latter city, in the year 1731. He succeeded J. M. Gessner as rector in 1734. While engaged in this situation he acquired a great reputation as a classical scholar; so much so, that in 1742 the University of Leipzig violated its own rule of never electing to any professorship the master of a school, and appointed him professor extraordinary of antient literature. He was made professor of eloquence in 1756, and professor of theology, with the degree of Dr., in 1758: he held the two last named professorships together till 1770, when he gave up the former to his nephew, Augustus William. He died on the 11th September, 1781. Ernesti was a man of considerable abilities, and especially of a very methodical mind, to which are due the great improvements in the system of teaching introduced by him, and still, to a certain extent, adopted in the German universities. He was well acquainted with the classics, and no mean proficient in theological learning. His Latin style is very elegant for a German, little inferior indeed to that of Ruhnken, and fully equal to that of Wyttenbach: a good specimen of his Latinity may be seen in A. Matthiä's *Eloquentia Latina*. His knowledge of Greek, though less accurate, was still very respectable. The work for which he is best known is his edition of Cicero, which has been made the basis of all subsequent ones. The third and last edition of this author published by him was printed at Halle in 1775. His *Clavis Ciceroniana*, or Index of words and subjects to Cicero's works, is still in general use. Besides his Cicero, Ernesti's *Initia Doctrinæ Solidioris* and *Institutio Interpretis Novi Testamenti* are much esteemed by students at the present day; the latter has been recently translated into English. The edition of Homer which Ernesti published in 1759-65 is merely an improved reprint of the hackneyed edition by Dr. Clark. It was republished by Dindorf in 1824. His edition of Callimachus, which appeared in 1761, is suspected to have owed a good deal of what is valuable in it to the contributions of Ruhnken. An account of it is given in the 'Museum Criticum,' vol. ii., p. 151. Ernesti's editions of Polybius, Tacitus, and Suetonius, have been quite superseded by those of Schweighäuser, Bekker, and F. A. Wolf.

ERNESTI, AUGUSTUS WILLIAM, nephew of the preceding, was born at Frohndorf, near Tennstadt, the 26th November, 1733. He was a pupil of his uncle at Leipzig, was made professor of philosophy there in 1765, and, as has been mentioned, succeeded, on his uncle's resignation, to the professorship of eloquence (in 1770). He died of apoplexy on the 29th July, 1801. He was principally distinguished as a very good Latin scholar. His best known work is an edition of Livy, with a very copious glossary, which was reprinted twice in his lifetime; the third edition was in the press when he died, and was completed by Schäfer.

ERNESTI, JOHN CHRISTIAN THEOPHILUS, also a nephew of John Augustus, was born at Arnstadt, in the Thüringer Wald, in 1756. He was professor of philosophy in the University of Leipzig from 1782 to 1801, when he succeeded his cousin, Augustus William, as professor of eloquence. He died on the 5th June in the following year. This scholar published editions of Silius Italicus and Æsop; *Lexicon Technologiæ Græcæ Rhetoricæ*, Lips. 1795; *Lex. Techn. Romanorum Rhetoricæ*, Lips., 1797 (both very useful works); *Hesychii Glossæ Sacræ*, 1785; *Suidæ et Phavorini Glossæ Sacræ*, 1786; a translation into German of Dumesnil's Latin Synonyms, and a German version of the principal works of Cicero. (Cicero's *Geist* and *Kern*, 1799-1802.)

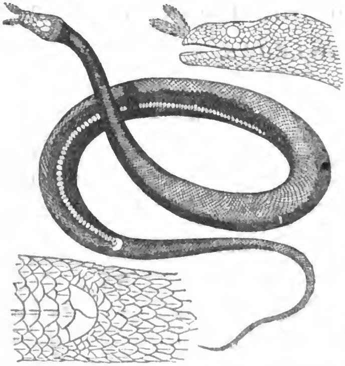
ERPE'NIUS. The celebrated orientalist, Thomas Erpenius, or Thomas van Erpen, was born at Gorcum, on the 7th of September, 1584. At the age of ten years he was sent to Leyden, where he received his education; and in 1608 he took the degree of Master of Arts in the university of that town. He had studied chiefly theology and oriental literature, and after the termination of his academic education, he undertook a tour to England, France, Italy, and Germany, for the farther prosecution of his favourite pursuits. At Paris he became acquainted with Isaac Casaubonus, and availed himself of the Arabic instructions of a learned Maronite, Joseph Barbatus, then a resident in the French capital. Erpenius returned to his native country in 1612, and was in the following year appointed professor of Oriental languages in the university of Leyden, an office to which was added subsequently that of Arabic interpreter to the Netherlands. On two occasions, in 1620 and 1621, he was sent to Paris on business of the university of Leyden. With these interruptions he seems to have devoted himself exclusively to the cultivation of Oriental literature. He established an Arabic press at his own house, and employed himself in editing a number of works, which have been of the greatest utility in promoting the cause of Oriental learning. He died of a contagious disease at the age of forty, November 13th, 1624. The work which has contributed most to give celebrity to the name of Erpenius is his 'Grammatica Arabica, quinque Libris methodice explicata,' published at Leyden in 1613, 4to. It has often been re-edited with additions and alterations, and has become the foundation of nearly every subsequent Arabic grammar printed in Europe down to that of Silvestre de Sacy. The most remarkable of Erpenius's other publications are the following: 'Proverbiorum Arabicorum centuriæ duæ,' Leyden, 1614 and 1623, 8vo.; 'Locmani Sapientis Fabulæ et selecta quædam Arabum Adagia,' Leyden, 1615, 8vo.; an edition of an Arabic version of the New Testament and of the Pentateuch, the former published in 1616, the latter in 1622; an edition of the chronicle of Elmakin, with a

Latin translation, published after his death, under the title of 'Historia Saracenica,' Leyden, 1625, fol.; two original treatises on Arabic grammar, bearing the title, 'Grammatica Arabica, dicta Giarumia, et libellus centum Regentium,' Leyden, 1617, 4to.; and a Hebrew Grammar, 'Grammatica Ebræa generalis,' Leyden, 1621, 8vo.

ERPETOLOGY. [HERPETOLOGY.]

E'RPETON, Lacépède's name for a genus of serpents placed by Cuvier next to *Eryx*. The name should be written *Herpeton*.

The genus is furnished with two soft prominences, covered with scales, on the muzzle. The head is protected by large plates; those beneath the belly are not large, and those beneath the tail scarcely differ from the other scales. The tail however is very long and pointed. Cuvier, who speaks of the priority of Lacépède, who first described the genus under the name of *Erpeton*, remarks that Merrem has changed the name to *Rhinopirus*.



Herpeton tentaculatus.

ERRATIC BLOCKS are those weather-worn and more or less rounded fragments of the harder rocks which are found very widely scattered over the surface of the earth, and at great distances from the places whence they are supposed to be derived.

In size they vary from ten thousand cubical feet and upwards to a few inches. M. Brongniart has proposed to designate the several sizes by particular names, as gigantic, metric, cephallary, pugillary, &c. But in England we generally confine the term erratic blocks to the larger masses, calling those of middling size boulders, and arranging the smaller along with gravel: this is, however, too vague. The nature of erratic blocks is not less various than their size. Every species of rock seems to have contributed a portion of its substance towards the mass, though the harder, being better capable of resisting the disintegrating and corroding influence of atmospheric causes, are found in the greatest abundance, such as quartz, petrosilex, greenstone, granite, porphyry, syenite, gneiss, primitive and transition limestone, dolomite, serpentine, siliceous pudding-stones, siliceous sandstones, &c.

The distribution and situation of these blocks are also very different. Seldom isolated, they are generally found in patches or groups, as in the environs of Geneva, the plains of Westphalia, in Sweden, &c.; or in long bands or trains, as in the north of Mecklenberg Strelitz, where they run in a direction west-north-west and east-south-east; or widely spread over considerable tracts, as between Warsaw and Grodno, between St. Petersburg and Moscow, in East Prussia, &c. Sometimes they cover horizontal plains, as in the north of Germany; sometimes they rest on the sloping sides of mountains, as in the Alps and the Jura, and occasionally on the very tops of lofty eminences, as on the summits of the calcareous mountains of Rettwick, of Rædaberg, and of Osmund, about 6000 feet above the level of the sea. Sometimes they are seen in greatest abundance at the bottom of valleys where they open into the plains, and in other instances they are found collected in the largest quantity in the high and narrow parts of the valleys, as is observed at Detmold and east of Lemgo. At times they are so abundant as to be accumulated into hills of a particular form, as is the case in Smaland, in Sweden; and sometimes they form even mountains of considerable height, as may be seen near Quedlie, in Norway; and what is remarkable, the larger blocks are at the top, the others diminishing gradually towards the bottom.

Though generally superficially disposed, erratic blocks are however in some places found imbedded in a fine sand which has nothing in common with their nature or origin, as in the plains of Westphalia. Some blocks (and this may depend either on their own particular nature, or the greater or less friction to which they have been subjected, the length of time they have been exposed to atmospheric influence, or the nature of the climate,) have their angles and edges as sharp as though they were just detached from their native mountains, as is the case in the neighbourhood of Groningen.

When the erratic blocks are not at any great distance from the spots whence they come, they may be easily traced up to their origin. Thus those which are in the basin of the Rhine come from the Grisons; those of the valley of the lake of Zürich and of the Limmat have been detached from the mountains of Glaris; those of the basin of the Reuss come from the rocks at the source of this river; and those of the Aar and the Jura from the lofty mountains in the canton of Berne. Even those which cover the widely extended tract from Holland on the west, to St. Petersburg and Tver on the east, are supposed by Von Buch, Hausmann, Brugmans, Alex. Brongniart, &c., to be traceable to Scandinavia. It is however remarkable that, contrary to what is generally observed of transported debris, the blocks are frequently largest as they are farthest removed from the place whence they came, diminishing gradually in size as they approach the parent rock; thus the blocks found in Mecklenberg and Seeland, which are ascertained to be derived from the Scandinavian peninsula, are larger than the blocks of the same rocks in Scania and East Gothland, and they disappear altogether close to the primordial mountains whence they were derived.

In certain places the blocks are almost exclusively of a particular kind, while in others they vary greatly in their mineral character, proving, together with the ascertained situation of the same rocks in situ, that they must have been assembled from various quarters. This is the case with the erratic blocks of Yorkshire, and with those of Lithuania, for though the greater part, perhaps, of those in the latter locality may be similar to the rocks in Sweden and Norway, there are many evidently derived from other places.

As for the direction in which the bands of erratic blocks seem to lie, and the quarter whence they seem to have come, they are very various. We have just seen that in the north of Mecklenberg the trains are in a line west-north-west and east-south-east. Count Rasoumorski observes that, when many blocks are accumulated they form parallel lines with a direction from north-east to south-west. Brongniart says they have a general direction north and south. Sir James Hall speaks of those in the neighbourhood of Edinburgh as coming from the west. We have said that those on the north of the Alps come from the south.

If any thing further were necessary to complicate the problem of erratic blocks, it is the immense distance at which they are sometimes found from the nearest rocks of similar composition; thus blocks of granite are found on the mountains of Potosi, while the nearest granite rocks are in Tucuman, about four hundred leagues off. Nor is distance all; the detached blocks are found separated from their parent rocks by intervening hills, broad and deep valleys, as that of the Aar, and even by straits and seas: thus in the north of Cumberland there are boulders which have been transported across the Solway Frith from Dumfries, and the blocks on the low plains of Germany are separated from their parent rocks by the Baltic.

England, as well as the continent of Europe, has many spots covered with erratic rocks, some of which seem to be derived from Norway, while others are evidently the debris of our own mountains. For details we refer the reader to the observations and works of Sedgwick, Conybeare, Lyell, Buckland, Phillips, Hibbert, &c.

Erratic blocks are also common in America and other parts of the world.

From what has been already said, and from the circumstance of erratic blocks lying on some of the most modern formations, it will be easily conceived that they present one of the most inexplicable of geological phenomena. The blocks on the Jura, and from the Alps generally, having first attracted notice, have given rise to a great variety of hypotheses, the most remarkable of which are the following:—1. De Luc was of opinion that these blocks had been projected into the air by the same force which upheaved the Alps, and that they had fallen at greater or lesser distances, according to the strength and direction of that force. 2. Von Buch, Escher, &c., attribute their existence to an immense débacle which swept down the blocks from the Alps to the foot of the Jura, up the slope of which they were forced by the impulse they had received, in the same way as a ball rolled along with force rises up a hillock. 3. Others, as Daubuisson, have thought that these blocks, which are almost wholly of transition rocks, were the remains of a mantle of these rocks, of later formation than the limestone of the Jura, and consequently much more recent than is generally admitted, and which, having been destroyed, left nothing but these testimonials of their former existence. 4. Dolomieu supposed that the summits of the Alps were formerly connected with those of the Jura by an inclined plane, which has been destroyed by the same revolution that precipitated the blocks from the summit of the Alps to the plateau, and into the valleys of the Jura. 5. Venturi has attempted to explain the passage of the blocks from the Alps into the basin of the Po, by floating them down on rafts of ice. 6. Others have upheaved the Jura, which they suppose to have been formerly on a level with the base of the Alps, and with it the blocks which had rolled down upon this calcareous plain. 7. Finally, Von Buch, extending his general theory to the particular phenomenon, thinks that the dispersion of the blocks is the result of an upraising of the Alps posterior to the formation of the tertiary rocks.

M. Brongniart very justly observes that these hypotheses leave many difficulties unexplained: he conceives that as the phenomenon of erratic blocks is a very general one, it is presumable that the cause also is general. Certain it is that even if it were possible satisfactorily to assign a cause for the erratic blocks found upon the Jura, the same reasoning would hardly be applicable to other cases; and in the utter impossibility of discovering any single cause competent to the production of such different effects, we must have recourse to the more probable conjecture of M. Larivière, that the dispersion and disposition of erratic blocks have been effected in different ways. The more powerful cause however he conceives to be the transporting power of icemeers and icebergs, in which opinion he is followed by Mr. Lyell and others.

Erratic blocks, like other phenomena, are attended with their peculiar advantages: thus on hot and dry soils, and when not in too great abundance, they keep the soil cool and moist, sheltering it from the direct rays of the sun in the day, and thus diminishing the evaporation of its moisture. On cold soils they tend to maintain an equable warmth by diminishing radiation at night. In some countries they are the only building-stones, as in East Friesland and the neighbourhood of Groningen. In others they supply the necessary lime, as at Königsberg, Revel, &c. Those of a convenient size are used in Russia and Poland for paving the towns: when broken they are exceedingly well adapted for the repairs of roads.

ERRHINES (from *en* (ἐν), and *rhin* (ῥίν), 'the nose'), medicines which are applied to the nostrils, and which cause an increased flow of the secretion of the membrane which lines them, and often of the contiguous cavities and sinuses; frequently also occasioning sneezing, and an unusual secretion of tears. Snuffs of different kinds are familiar examples of this class of substances, and these generally cause sneezing, at least when first employed; but others, such as the turpeth mineral, merely produce increased secretion of the membrane. Where sneezing ensues, a considerable shock is felt over the whole frame, and of this effect advantage is sometimes taken to change the action of the system, or to remove morbid impressions, as when certain fits are impending, or for more limited purposes, such as dislodging any foreign body from the nose. The secondary effect of errhines is more frequently desired to give relief to the loaded vessels, by exciting them to increased secretion. Hence they are used in various diseased conditions of the organ of smell, and even of the neighbouring organs, being supposed to influence the vessels of the eye, and even of the brain. Some affections of the eye, and also of the head, are certainly relieved by such means, and their occasional use may be permitted; but the habitual use of errhines is in most cases objectionable, and followed by hurtful consequences. The membrane of the nose becomes thickened, its sensibility impaired, and the power of discriminating odours greatly lessened; while, if the substance be possessed at the same time of narcotic qualities, such as snuff procured from tobacco, the palate, the stomach, and other organs concerned in digestion likewise suffer, and loss of appetite with other symptoms of indigestion result.

ERRINA. [MILLEPORIDÆ.]

ERROR (in law), a fault in the pleadings or in the process, or in the judgment, upon which a writ, called a writ of error (breve de errore corrigendo), is brought. It is the ordinary mode of appeal from a court of record, and is in the nature of a commission to the judges of a court superior to that in which the judgment was given, by which they are authorized to examine the record, and on such examination to affirm or reverse the judgment according to law. For the cases in which this writ is issued, and the courts to which it is directed, see Bac. *Abr.* tit. *Error*.

ERSKINE, THOMAS LORD, was the third and youngest son of David earl of Buchan. He was born, according to some authorities, in January, 1748, and received the rudiments of his education partly in the high-school of Edinburgh, and partly at the University of St. Andrews. In 1764 he entered the navy as a midshipman, but not thinking his prospects of promotion in that service sufficiently good, he accepted a commission in the first regiment of foot in 1768. In 1770 he married Frances, daughter of Daniel Moore, M. P. for Marlow, and soon after went with his regiment to Minorca. Upon his return to England, in 1772, he appears to have become remarkable for the brilliancy of his conversational talents. (Wraxall's *Memoirs*, vol. i. p. 152, and Boswell's *Life of Johnson*, vol. ii. p. 170, ed. 1799.) In 1775, at the pressing solicitation of his mother, but it is said against his own judgment, he commenced the study of the law, and entered himself a student of Lincoln's Inn, and also as a fellow commoner of Trinity College, Cambridge, but only for the purpose of obtaining a degree, and thereby saving the additional term of two years, during which his name must otherwise have remained on the books of Lincoln's Inn. He became the pupil of Mr. Buller, and afterwards of Mr. Wood, both of whom were subsequently raised to the Bench. In Trinity term, 1778, Mr. Erskine was called to the bar, where his success was as rapid as it was brilliant. In the same term he was employed as one of the counsel for Capt. Baillie, lieutenant-governor of Greenwich Hospital, who was prosecuted for an alleged libel on the other officers of that establishment. The prosecution was in fact instituted by Lord Sandwich, then at the head of the admiralty, who, it appeared, had abused the charity by appointing landsmen as pensioners to serve his own electioneering purposes. Mr. Erskine's eloquent and indignant speech at once established his reputation; such indeed was its instantaneous effect, that thirty retainers were presented to him before he left the court. His practice and reputation increased so rapidly, that in 1783, when he had been scarcely five years at the bar, he received a patent of precedence at the suggestion of Lord Mansfield, who then presided in the court of King Bench. In the same year Mr. Erskine was returned member for Portsmouth, through the interest of Mr. Fox, with the immediate view of supporting that minister's famous India Bill. In the House of Commons however his success by no means equalled the expectations which his friends had formed, though his parliamentary speeches would appear to have been far above mediocrity. In the same year also he was made attorney-general to the prince of Wales, an appointment which, to the disgrace of the advisers of the crown, he was called upon to resign in 1792, in consequence of his refusing to abandon the defence of Thos. Paine when he was prosecuted for his publication 'The Rights of Man.' In 1802 he was made chancellor of the Duchy of Cornwall; and in 1806, on the formation of the Grenville ministry, he was appointed lord chancellor, and raised to the peerage by the title of Baron Erskine, of Restormel Castle, in Cornwall. His tenure of office was however brief, for on the dissolution of the ministry in 1807, he retired from public life. After this period Lord Erskine seldom appeared in his place in the House of Lords, but in 1820 he took a prominent part on the occasion of the trial of Queen Caroline.

In the later years of his life he was harassed by pecuniary embarrassments, arising from the loss of his large professional income, and an unfortunate investment of the fruits of his industry in land. His first wife died in 1805, and an ill-assorted second marriage increased his domestic disquietudes, injured his reputation, and gave pain to his friends. He died Nov. 17, 1823.

Lord Erskine's talents were peculiarly those of an accomplished and dexterous advocate: his eloquence formed an æra at the bar, and his addresses to juries captivated their understandings, their imaginations, and their passions; they were not marked by beauty of diction, richness of ornament, or felicity of illustration, but by strength, vigour, and simplicity, and a perfect freedom from colloquial vulgarisms. A remarkable feature in his speeches is an exact and sedulous adherence to some one great principle which he laid down, and to which all his efforts were referrible and subsidiary. As the principle thus proposed was founded on truth and justice, whatever might be his ingenuity in applying it to the particular case, it naturally gave to his address an air of honesty and sincerity which had great influence with the jury.

His extraordinary talent was developed by the times in which he lived; his indignant eloquence was called forth in defence of those individuals in whose persons the court and the government attacked the liberty of the press and constitutional freedom. The public mind was in a state of ferment from the recent events of the French revolution; and the government, in their hatred of the great principles of liberty then being established, forgot that actions, not principles, are the proper subjects for prosecution. As counsel for the defendants in these political prosecutions, Lord Erskine made his noblest and most successful efforts; fearless and zealous in the cause of his client, he spoke home truths without using unnecessary violence or low invective.

Lord Erskine has left few productions in writing; the principal are the Preface to Fox's Speeches, the political romance called 'Armata,' and a pamphlet entitled 'View of the Causes and Consequences of the War with France,' which passed through 48 editions. His speeches have been published in 5 vols. 8vo. Lord Erskine is not to be considered as a literary man; but it is one of the many singularities in his history, that with a scanty stock of what is usually called literature, he should have been one of our purest classical speakers and writers. His study was confined to a few of the greatest models, and these he almost knew by heart. He greatly admired the writings of Burke, and frequently quoted them in his speeches.

Scanty notices of the life of Lord Erskine are published in Lardner's *Cyclopædia* ('Lives of British Lawyers') and the 3rd vol. of the *Gallery of Portraits*, from which this account has been taken. There are some remarks upon the style of his eloquence in Butler's *Reminiscences*, vol. i. p. 70. His statue is in Lincoln's Inn Hall.

ERUCI'VORA. (Zoology.) [LANIADÆ.]

ERUPTION. [VOLCANO.]

ERWIN. [STRASBURG.]

ERYCI'NA. [VENERIDÆ.]

E'RYON, Desmarest's name for a macrourous crustacean, only known in a fossil state.

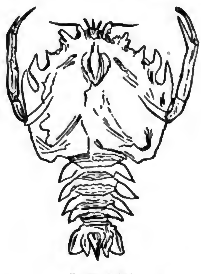
External *antennæ* short (one-eighth of the total length of the body including the tail), setaceous, provided at their base with a rather large scale, which is ovoid and strongly notched on the internal side; *intermediate antennæ* setaceous, bifid, much shorter than the external ones, and having their filaments equal. *Feet* of the first pair nearly as long as the body, slender, linear, not spinous, terminated by very long and narrow chelæ, with fingers little bent, but slightly inflected inwards; *carpus* short; feet of the other pairs also slender, and those of the second and third pair terminated with pincers, like the feet of the crawfishes (écrevisses). *Carapace* very much depressed, wide, nearly square, but little advanced anteriorly, profoundly notched on its latero-anterior borders. *Abdomen* rather short, formed of six articulations, of which the four intermediate ones have their lateral borders prolonged in angles, well detached, as in the crawfishes. Caudal-fin formed of five pieces, of which the two lateral are entire, rather large, a little rounded on the internal side, and the three middle ones triangular and elongated, especially the intermediate one.

Locality.—Lithographic limestone of Pappenheim and Aichtedt in the Margraviat of Anspach. (Desmarest.)

M. Desmarest observes that this genus is entirely anomalous, and ought, in a natural classification, to form a section by itself. According to the method of Dr. Leach, it would belong, 1st, to the order *Macroura;* 2nd, to the second section, which includes those *Macroura* which are provided with a caudal flabelliform fin; 3rd, to the subsection B, which have the peduncles of the internal antennæ moderately elongated; 4th to the 5th division, which have the natatory blades of the extremity of the tail formed of a single piece, the second articulation of the abdomen not dilated, and rounded anteriorly and posteriorly on each side; and finally, feet to the number of ten.

M. Desmarest goes on to say that it is to the *Callianassæ*, the *Thalassinæ*, the *Gebiæ*, and the *Axii*, that *Eryon* bears relation. Nevertheless it has not, he observes, the habit of any of them. Its short depressed carapace, and its little elongated abdomen approximate it to *Scyllarus*, but its internal antennæ with short peduncles, its external setaceous antennæ and its great anterior didactylous feet, widely separate it from that genus. It cannot be confounded with *Palinurus*, which has the external antennæ and the peduncles of the internal ones so long, and whose feet are all monodactylous; and, finally, it cannot be referred to the crawfishes or lobsters (*Astacus*), whose shell is differently formed, and which have the external natatory blades of the tail composed of two pieces; but Desmarest thinks that it is to the last-named genus that *Eryon* most approximates, taking into consideration its general character. He regrets that he has not been able to satisfy himself whether the four antennæ are inserted on the same horizontal line or not, a fact which would have assisted him in his comparison with other genera.

Example.—*Eryon Cuvieri.* Carapace finely granulated above, marked by two deep and narrow notches on the two latero-anterior borders, and finely crenilated on the latero-posterior borders. Length, four to five inches French.



Eryon Cuvieri.

The fossil was noticed by Richter, Knorr, and others, before M. Desmarest, as, indeed, he states.

ERYSI'PELAS (*Ignis Sacer, the Rose, St. Anthony's Fire*), an inflammation of the skin, occasioning a spreading redness, which occupies a broad surface, on which are formed vesicles or blisters, preceded by and accompanied with fever. The whole of the inflamed surface is painful, but the pain is not acute; it is rather a sensation of burning or stinging than of severe pain. The redness is not intense like that produced by phlegmon or boil, but is of a pale rose colour. There is always considerable tumefaction; the tumor is not surrounded by a definite boundary, but is diffuse, irregularly circumscribed, and unattended with a sensation of throbbing. The tumor is often soft and boggy. It is characterized by the vesications which form upon it.

The proper seat of erysipelas is the skin, but the appearance of the disease is somewhat modified according to the part of the skin which is more especially inflamed. If the rete mucosum, or the part of the skin which is placed immediately beneath the cuticle [Skin] be the principal seat of the inflammation, the vesication is remarkable; there is commonly a considerable discharge from the vesicles, and a free exfoliation of the cuticle: if, on the contrary, the inflammation be chiefly seated in the cutis vera, or the true skin, namely, that portion of the skin which lies immediately beneath the rete mucosum, the cellular tissue beneath the skin is always more or less involved in the inflammation, and then the tumefaction is considerable on account of the infiltration of the cellular tissue with serum poured out from the blood by the inflamed cuticle.

Erysipelatous inflammation is characterized by its tendency to spread, and thereby to cover a considerable portion of the external surface of the body. It creeps on in succession from one part of the skin to another until it extends to a great distance from the part originally attacked, the inflammation often disappearing from the former as it becomes established in the latter. Sometimes the inflammation appears to pass from the external surface to the internal organs, and occasionally the disease quits the surface as it attacks the internal organs, although more commonly the external and internal inflammation go on simultaneously, greatly increasing the severity and danger of the attack.

Erysipelas most commonly attacks the face, but it sometimes seizes on one of the extremities: the disease is always more severe when it attacks the head than when it is seated in any other part of the body.

The inflammation which appears on the external surface of the body in erysipelas is not the primary and essential part of the disease, but a remote event depending on a preceding state of disease affecting the whole system. This is proved by the fact that constitutional disturbance always precedes, commonly for the space of two or three days, the appearance of the local affection.

An attack of erysipelas comes on either with chills or a distinct cold shivering, attended with a sense of lassitude, aching in the limbs, restlessness, and that disordered state of the skin which has been expressively termed febrile uneasiness. There is from the beginning uneasiness or confusion in the head, which soon amounts to decided pain. This is accompanied with such a degree of drowsiness, that the attack may sometimes be predicted long before there is any appearance of redness or swelling in the face, from the inability of the patient to keep himself awake. The chilliness is soon succeeded by heat of skin; the appetite fails, the bowels are constipated, the tongue is dry and parched, there is sometimes nausea and vomiting; the pulse is always frequent, sometimes full, soft, and compressible, but occasionally hard and tense.

After these symptoms have continued some time, always one, generally two, and sometimes three days, there appears on some part of the face a redness, attended with burning heat and tingling. Commonly a red spot appears on one cheek; after a short time a similar spot appears on the other cheek; often the redness spreads successively from one cheek to the other across the nose, which is completely involved in the affection: from the nose it extends to the forehead, and thence over the whole scalp. Soon after the redness appears the face begins to swell; and by the second night, or the morning of the third day from the commencement of the fever, the eyes are completely closed, the eyelids exceedingly prominent, the nose distended, and the ears tumid, red, shining, and burning. On the fourth or fifth day the vesications appear on the inflamed surface, which break on the fifth or sixth, when the redness changes to a yellowish hue. The whole face is now so turgid that the form and expression of the features are completely lost, and the patient could not possibly be recognized by his most intimate friend.

The surface of the skin in the blistered places becomes covered with a brownish or dark coloured scab, which often gives a livid or blackish appearance to the part; but this livid colour seldom goes deeper than the surface, and does not proceed from any degree of gangrene affecting the skin. On the parts of the face not affected with blisters the cuticle is destroyed, and desquamates, a new cuticle being formed beneath it. Though the face, in general, however intensely inflamed, seldom goes into suppuration, yet it is by no means uncommon for matter to form in the tumid eyelids.

Occasionally, though not often, when erysipelas attacks the face, it extends to the mouth and fauces, and even to the pharynx and larynx, at the same time that it covers the neck and chest externally. Dr. Copland mentions a case in which the enormous tumefaction of the neck and throat with the affection of the larynx and trachea, increased by the constriction produced by the integuments surrounding the neck and throat, caused suffocation in a few hours. When the inflammation extends to the fauces, throat, and larynx, it sometimes produces a species of croup.

On whatever part of the body the inflammation appears in erysipelas, even when it is strictly confined to the skin, its appearance is not attended with any remission of the fever which preceded it: on the contrary, the fever generally increases with the augmentation and extension of the inflammation.

The progress of the disease is more or less rapid, and its duration longer or shorter, according to the age, the temperament, and the vigour of the individual. In the young, the sanguine, and the robust, the tumefaction is sometimes fully formed on the second day, and the whole terminates on the sixth or seventh, while in the aged and the less vigorous it may be protracted to the tenth or twelfth, and the disquamation may not be completed before the fourteenth day. The average duration of the disease may be stated to be from eight to ten days.

When the fever and inflammation are intense, delirium comes on, which sometimes rapidly passes into coma. These are most alarming symptoms, indicating a severe and too often a mortal inflammation of the brain. In such cases death frequently takes place, with many of the symptoms of apoplexy on the seventh, ninth, or eleventh day of the disease. 'In such cases,' says Dr. Cullen, 'it has been commonly supposed that the disease is translated from the external to the internal parts. But I have not seen any instance in which it did not appear to me that the affection of the brain was merely a communication of the external affection, as this continued increasing at the same time with the internal.

'When the fatal event does not take place, the inflammation, after having affected a part, commonly the whole of the face, and perhaps the other external parts of the head, ceases. With the inflammation the fever also ceases; and, without any evident crisis, the patient returns to his ordinary state of health.'

In the cases which prove fatal, on the examination of the body after death, the inflamed skin is found infiltrated with serum, which is sometimes mixed with pus, and occasionally portions of the skin are found disorganized, and in a state of gangrene. It is remarkable that the blood in the large vessels and in the cavities of the heart is semifluid, and that the veins which proceed from the inflamed parts are in a state of inflammation, and contain pus, more especially when the inflammation has extended from the skin to the cellular tissue and has passed into suppuration. In the cases attended with delirium and coma the membranes of the brain, and especially the arachnoid, are thickened and opaque with the effusion of serum between the membranes and into the ventricles. If the disease has been complicated with inflammation of the fauces, pharynx, œsophagus, trachea, and bronchi, these organs present the ordinary signs of inflammation; and the same is true with regard to the mucous membrane of the stomach and intestines; but in all these cases the signs of inflammation are much more closely allied to those which occur in fever than to those which are proper to pure inflammation.

There is a peculiar condition of the skin which seems to predispose to erysipelas connected with the irritable or bilious temperament, and a plethoric habit of the body. The occurrence of the disease once renders the skin peculiarly susceptible to its recurrence. Unwholesome and indigestible food, the excessive use of spirituous liquors, the suppression of the excretions, and more especially the suppression of the perspiration, of the bile, and of the catamenial discharge, predispose to erysipelas.

The exciting causes are exposure to cold and moist air after the body has been previously heated; exposure to sudden and great alternations of temperature; exposure to great heat however produced, whether by the direct rays of the sun or by a fire; intemperance; unwholesome articles of diet, as shell-fish, or stale and rancid fish; rich, oily, fat, or smoked meats; impure states of the atmosphere; an impure state of the body, arising from a morbid condition of the blood, in consequence of the suppression of its depurating processes, whence the frequent occurrence of the disease in the advanced stages of fever, greatly complicating the state of fever and exhausting the little remaining strength of the patient. Violent emotion of mind has also been observed to be an exciting cause of erysipelas in those powerfully predisposed to the disease; in whom also local irritants often induce it, as wounds or punctures in the skin, the bites of leeches, the stings of insects, inoculation with variolous or vaccine matter. Instances are on record in which both variolous and vaccine matter have produced in children of irritable habits, two or three days after inoculation, an erysipelatous inflammation which has proved fatal.

It is a point much disputed whether erysipelas be capable of being propagated by contagion. 'The disease,' says Dr. Bateman, 'has been noticed in several hospitals to prevail in certain wards, among patients admitted with different complaints; but has seldom been known to spread in private houses. Dr. Wells, indeed, has collected several examples of the apparent communication of erysipelas by contagion, which occurred in private families. But such are at all events extremely rare, and perhaps never happened in well ventilated and cleanly houses. From the Royal Infirmary, at Edinburgh, this disease, like the puerperal fever, was banished by ventilation, white-washing, and other means of purification; and it has not occurred in any hospital of late years, since a better system has been adopted in these respects. Other diseases, not infectious in themselves, appear to become united with typhus, or contagious fever, under similar circumstances, and thus to be propagated in their double form; the dysentery, for example, the peritonitis of women in child-bed, ulcerated sore throat, &c. The simple phlegmonous erysipelas, at all events, was never seen to spread like an infectious disease.'

The danger of erysipelas is in proportion to the intensity of the inflammation, and the severity of the affection of the brain. The danger is also imminent when there is great tumefaction of the throat, or when the inflammation spreads to the respiratory passages and the respiratory organs. As long as the inflammation is confined to the external surface, and the fever remains moderate, the brain not much affected, and the heart's action not inordinate, a favourable termination of the malady may be expected. The different varieties or species of the disease are also attended with very different degrees of danger. Authors usually describe four species, namely, the phlegmonous, the œdematous, the gangrenous, and the erratic. The phlegmonous is that form of the disease in which the inflammatory state of the system is the most distinctly marked. In the œdematous the fever and inflammation are less intense; but the tumefaction is so great that the appearance of the face resembles that of a bladder distended with water. This form of the malady most commonly affects persons of debilitated constitutions, who have been previously attacked or are simultaneously affected with dropsy, or some other chronic disease, incident to a cachectic state of the system, and induced commonly by habitual intemperance. It is always attended with considerable danger, for the disorder of some internal function increases with the advancement of the external disease. Very frequently delirium and coma come on at the height of the disease, and terminate fatally on the seventh or eighth day; or, in other cases, the symptoms continue undiminished, and death occurs at a later period. When this form of the disease attacks one of the extremities, it is attended with but little danger.

In the gangrenous form of the disease the colour of the affected part is of a dark red, and scattered vesicles with a livid base appear upon the surface, which frequently terminate in gangrenous ulcerations. Suppuration and gangrene of the muscles, tendons, and cellular tissue often take place, producing little caverns and sinuses, which contain an ill-conditioned pus, together with sloughs of the mortified parts, which are ultimately evacuated from the ulcers. It is accompanied with symptoms of low fever, in the progress of which delirium comes on, soon followed by coma. It is always a tedious and precarious and often a fatal form of the disease.

In the erratic species the inflamed patches appear one after another in different parts of the body, thus travelling in succession from the face to the neck and trunk, and from the trunk to the extremities. It often happens that each accession of the complaint is less and less severe as it recedes to a greater distance from the part first affected, and this form of the disease commonly terminates favourably in a week or ten days.

In the phlegmonous species, characterized by the presence of inflammatory fever, the method of treatment must be widely different from that proper to the œdematous and gangrenous, in which there is the very opposite state of the system. In the young, the plethoric, the sanguine, and the robust, at the commencement of the attack, when there is much pain in the head, when the heat of the skin is intense, and the pulse is full and strong, the remedies proper in any other case of inflammatory fever are required; namely, bleeding to the extent of the subdual of the inflammatory condition of the system. In such a case there is danger that the disease will terminate in fatal inflammation of the brain, unless there be a free abstraction of blood. But it must be borne in mind that erysipelas does not ordinarily occur in the youthful and vigorous constitution; that it is not often accompanied with the signs of acute inflammation; that blood-letting is required only when acute inflammation is present, and that the extent of the bleeding must be strictly regulated by the degree of the inflammatory action. In an ordinary attack of phlegmonoid erysipelas, general bleeding is not necessary, at least in the constitutions commonly found in a crowded city. Moderate purging, diaphoretic and saline medicines, strict confinement to bed in a cool apartment, with the diet appropriate to febrile diseases, are all the remedies required. If local bleeding and blistering appear to be indicated, care must be taken not to apply the leeches or the blister near the inflamed surface. Various applications to the inflamed surface have been recommended, the most common of which is flour, or some other absorbent powder, to imbibe the fluid which oozes from the vesications. The utility of such applications is doubtful. 'The application of powdery substances,' says Dr. Bateman, 'has commonly, according to my own observation, augmented the heat and irritation in the commencement; and afterwards, when the fluid of the vesications oozes out, such substances produce additional irritation, by forming, with the concreting fluid, hard crusts upon the tender surface. In order to allay the irritation produced by the acrid discharge from the broken vesications, Dr. Willan recommends us to foment or wash the parts affected, from time to time, with milk, bran, and water, thin gruel, or a decoction of elder-flowers and poppy-heads. In the early state of the inflammation, when the local heat and redness are great, moderate tepid washing, or the application of a cool but slightly stimulant lotion, such as the diluted liquor ammoniæ acetatis, has appeared to me to afford considerable relief.'

In the œdematous species, when it occurs in broken-down constitutions, the result of habitual intemperance, even purgatives must be very cautiously administered; the strength must be sustained by mild nutritive diet, and tonics, as cinchona or quinine, and even stimulants, as camphor, wine, or the beverage to which the patient has been habituated, are required. The aperients employed should be mild alterative mercurials, with equal parts of castor-oil and the spirit of turpentine administered perhaps every alternate morning.

In the gangrenous species, quinine in considerable doses through the whole course of the disease, opium, camphor, the mineral acids, wine, brandy, and the general regimen adapted to gangrenous affections occurring under other circumstances, must be freely employed. The remedies indispensable in the phlegmonoid species would be fatal in this form of the disease, while the remedies which afford the only chance of saving life in the latter would produce fatal inflammation of the brain if administered in the former.

ERYTHACA (Zoology). [Blue Bird, vol. v. p. 17; Sylviadæ.]

ERYTHEMA, a superficial redness of some portion of the skin, varying in extent and form, attended with disorder of the constitution, without vesications, and uninfectious. It is distinguished from erysipelas by the slight degree of constitutional disorder, by the slight degree of local pain, by the more uniformly favourable termination of the disease, and by the absence of tumefaction and vesication.

Authors describe several species of this affection, namely

1. The fugacious (*Erythema fugax*), consisting of red patches of an irregular form, resembling the redness produced by pressure. These patches appear successively on the arms, neck, breast, and face. This affection is gene-

rally indicative of, and produced by, some disorder of the digestive organs.

2. The shining (*Erythema læve*), exhibits a uniformly smooth shining surface, and chiefly appears on the lower extremities in confluent patches. It is sometimes symptomatic of disorder of the digestive organs; occasionally attends the catamenia in delicate and irritable females, but most commonly accompanies anasarca or œdematous swellings. Under whatever circumstances anasarca occurs, so as greatly to stretch the skin, this Erythema is liable to be produced, and is often checkered with patches and streaks of a dark red and purple hue. It commonly terminates in extensive disquamation of the skin, and may be considered as merely a modification of œdematous erysipelas.

3. Marginated (*Erythema marginatum*) occurs in patches which are bounded on one side by a hard elevated tortuous red border, in some places obscurely papulated; but the redness has no regular boundary on the open side. The patches appear on the extremities and loins in old people, and remain for an uncertain time, without producing any irritation in the skin. They are connected with some internal disorder, and may be considered as indicative of serious and dangerous diseases.

4. Papulated (*Erythema papulatum*) appears chiefly on the arms, neck, and breast, in irregular extensive patches, and most frequently in females and young persons. The patches are of a bright red hue, often slightly elevated; and for a day or two before the colour becomes vivid they are rough or imperfectly papulated. The redness afterwards continues for several days; and, as it declines, assumes, in the central parts, a bluish or pale purple tinge. This variety is generally attended by a tingling sensation, passing to soreness as the colour changes; and sometimes with much constitutional disturbance,— with a frequent small pulse, loss of appetite, depression of strength and spirits, watchfulness, and pains or tenderness of the limbs, but the general disorder is trifling.

5. Tuberculated (*Erythema tuberculatum*) is merely a slight modification of the advanced stage of the papulated.

6. Nodose (*Erythema nodosum*) consists of large oval patches on the fore part of the legs; the long diameter of the patch is parallel with the tibia; these patches slowly rise into hard and painful protuberances, and as regularly soften and subside in the course of nine or ten days. The red colour turns bluish on the eighth or ninth day, as if the leg had been bruised. It chiefly affects children, and particularly females, and is very seldom observed in boys. It is preceded by slight febrile symptoms for a week or more, which generally abate when the erythema appears. It is sometimes connected with the approach of the catamenia, and its premature disappearance is not unfrequently succeeded by dangerous internal disease, as inflammation of the lungs.

The primary causes of erythema are the friction of contiguous parts, especially in fat persons; the accumulation of morbid secretions and excretions on the skin, as the matter of the perspiration, of the leucorrhœal discharge, of the catamenia, and of the alvine and urinary evacuations, in the adult in the course of other diseases, and in the infant in consequence of a want of proper ablution. It is also constantly produced by irritating articles of food and drink, and is the sign and the result of a disordered state of the digestive organs.

In most cases the affection disappears soon after the removal of the cause which produces it—by free ablution where it is the result of irritating matters on the skin, and its disappearance is assisted sometimes by the application of an absorbent powder to the inflamed surface, and at other times by the use of a gently stimulating lotion, as the spirit wash. When the disease is dependent on a disorder of the digestive organs, it can be removed only by the remedies proper for the removal of the stomachic, the hepatic, or the intestinal derangement. For the restoration of these organs to their sound condition, the most appropriate remedies are light diet, diaphoretics, the mercurial alteratives in combination with gentle aperients, and the mineral acids as tonics. (Bateman's *Practical Synopsis of Cutaneous Diseases;* Copland's *Dictionary of Practical Medicine.*)

ERYTHRÆA, a pretty genus of annual plants, belonging to the natural order Gentianaceæ, and inhabiting dry sandy places in Great Britain and other parts of Europe, especially near the sea. The species have small oval sessile ribbed radical leaves, diminishing in breadth as they ascend the stem; a corymbose stem, a five-cleft calyx, pink funnel-shaped flowers, with a short five-lobed limb, five stamens, spiral anthers, two roundish stigmas, and a linear capsule. They are all extremely bitter, and are collected by country people, under the name of centaury, as a substitute for gentian, in domestic medicine. English botanists reckon four supposed species.

ERYTHRÆA CENTAURIUM, Lesser Centaury, an indigenous plant, common by way-sides and edges of fields, flowering in August, at which time it is to be collected. The whole plant is taken up; it has a square stem, with opposite entire three-nerved leaves. It is devoid of odour; the taste is strongly bitter, but not unpleasant: 100 parts of the fresh herb dry into 47; 10 pounds of the dry herb yield by a single coction 3 pounds of extract.

It contains a principle called Centaurin, which at present is known only as a dark brown extract-like mass; but which, united with hydrochloric acid, furnishes an excellent febrifuge medicine. As a bitter, it suits irritable systems better than any article of that class of medicines, and is therefore to be preferred. In other respects it has the general properties of bitter tonics.

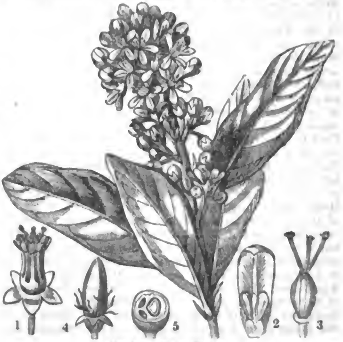
ERYTHRIC ACID, a substance obtained by Bragnatelli from the mutual action of nitric and uric acids; by spontaneous evaporation rhombic crystals are obtained, which have first a sharp and afterwards a sweetish taste, redden litmus, become of a rose colour, and effloresce in the air. Instead of being a peculiar acid, Dr. Prout regards it as a compound of nitric and purpuric acid and ammonia.

ERYTHRI'NA, a leguminous genus of tropical trees and tuberous herbs, with ternate leaves, and clusters of very large long flowers, which are usually of the brightest red; whence the species have gained the name of coral-trees. Frequently their stem is defended by stiff prickles. They occur in the warmer parts of the Old and New World. An Indian species, E. monosperma, is said to yield gum-lac. De Candolle mentions thirty-two species; of which E. crista galli is commonly cultivated in greenhouses for the sake of its splendid blossoms.

ERYTHROGEN, a neutral crystalline fatty matter found by M. Bizio in bile altered by disease.

ERYTHRO'NIUM (Dens Canis), a pretty little bulbous plant, whose name, English dog's-tooth violet, is derived from the form of its long slender white bulbs, is a native of woody subalpine places among bushes and stones, in Croatia, Idria, and about Laybach; it also occurs in Switzerland, but more seldom, and is also met with in the north of Italy. It is not mentioned in the Floras of the south of Europe. Two or three varieties are known in gardens as gay hardy flowers appearing early in the spring; one with purple, a second with white flowers, and a third, elevated by some into a species, with a somewhat stronger habit of growth.

ERYTHROXY'LEÆ, a group of exogenous plants, con-

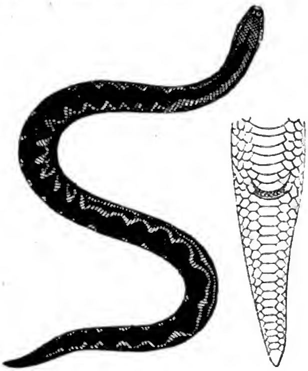


Erythroxylon laurifolium.

1. A calyx with the monadelphous stamens; 2, a petal with its appendages; 3, the ovary, with the three styles; 4, a half-ripe fruit; 5, a transverse section of the same, showing that one only of the seeds comes to perfection, the two others being abortive.

sidered by some as a distinct natural order; by others as a subordinate division of Malpighiaceæ. They have alternate stipulate leaves, and small pallid flowers. The calyx is five-lobed; the petals are five, with a remarkable appendage at their base, which afford one of the marks of distinction between Erythroxyleæ and Malpighiaceæ; the stamens are ten, slightly monadelphous. The ovary is superior, three-celled, with three styles, and solitary pendulous ovules. The fruit is drupaceous. Some of the species of Erythroxylon, the only genus, have a bright red wood, occasionally used for dyeing; but the most extraordinary species is the Erythroxylon coca, of whose inebriating effects a full account has already been given. [COCA.]

ERYX or **ERIX**, a genus of serpents separated by Daudin from *Boa*, and differing from it in having a very short obtuse tail, and the ventral plates narrower. The head of *Eryx* is short, and the characters generally would approximate the form to *Tortrix*, did not the conformation of the jaws place it at a distance from the last-named genus. The head, besides, is covered with small scales only. *Eryx* has no hooks at the vent.



Eryx Bengalensis.

ERZERU'M, ERZ-RU'M, or **ARZRU'M**, a town in Turkish Armenia, in 39° 57′ N. lat., and about 41° 15′ E. long., towards the eastern extremity of an extensive and fertile plain between 30 and 40 miles in length and from 15 to 20 miles in its greatest breadth. This plain is watered by the Karà Sù, or western branch of the Euphrates, which rises at its eastern extremity, and from whose banks the town is three or four miles distant. The town is very large, and is partly surrounded by an old castellated wall, with a ditch, and on its southern skirts stands a citadel encircled by a double wall flanked with towers very close to each other, and with a ditch: it has four gates, and incloses the palace of the pacha and nearly the whole of the Turkish population. But a large portion of Erzerum is unwalled, and contains the principal bazaars and khans. The houses for the most part are low, and built of wood, but the bazaars are extensive, and well supplied with provisions. Erzerum has nearly forty mosques, a Greek church, and a large Armenian chapel. In the beginning of this century the population was estimated at 100,000 individuals; and in 1827 at 130,000. But being soon afterwards occupied by the Russians, the greatest part of the inhabitants abandoned the town, the Armenians emigrating to Russia, and the Turks retiring to the adjacent parts of Asia Minor. Since its restoration to the Turks by the peace of Adrianople the place is slowly rising from its state of decay, but in 1835 its population did not exceed 15,000. We do not know if any of its numerous manufactures have been revived. Before the Russian invasion considerable quantities of silk and cotton cloth were made here, and much leather tanned; there were also some manufactures of copper vessels.

Erzerum is important as a commercial town. Besides the produce of its manufactures it exports the excellent grain which is grown in the plain. But it derives other commercial advantages from its being situated on one of the most frequented caravan roads of Western Asia, which leads from Persia and Georgia to the great commercial towns of Asia Minor. This renders Erzerum an important place also in a political and military point of view. It is the seat of a pasha, and the pashalik yields only in rank and extent to that of Bagdad. (Kinneir; Brant, in *London Geogr. Journal*, vi.)

ERZGEBIRGISCHE-KREIS (circle of the Ore Mountains), a large province of the kingdom of Saxony, which takes its name from the mountains which bound it on the south and separate it from the kingdom of Bohemia. On the north it is bounded by the circle of Leipzig and by the duchy of Saxe-Altenburg; on the west by the grand duchy of Saxe-Weimar, the principality of Reuss, and the circle of Voigtland; and on the east by the circle of Meissen. It is the largest and most populous province in the kingdom, and contains an area of about 1747 square miles, on which there are 58 towns, 13 market villages, and above 700 villages and hamlets. In 1829 the population was 488,863, and it is at present estimated at about 506,000. The surface rises gradually from the borders of the Leipzig and Meissen circles, until it reaches the southern frontier and the lofty summits of the Ore Mountains. The province is intersected in all directions by offsets from those mountains, and presents a constant succession of hills and valleys. The loftiest heights in it are the Fichtelberg, at the southernmost extremity of the province, which is 3968 feet, and the Auersberg, about eleven miles north-west of the Fichtelberg, which is 3132 feet above the level of the sea. The Freiberg or Eastern Mulde, the largest river in the province, flows through its eastern districts, and the Schneeberg or Western Mulde through the western districts; the centre is irrigated by the Zschoppau, Flöhe, Pöhl, Selm, Bockau, Chemnitz, and other streams; the Weiseritz or Westritz partially traverses the most easterly part, and the Pleisse the most westerly. There are no inland waters deserving the name of lakes, but there are a number of mineral springs, chiefly used for bathing, at Wolkenstein, Wiesa, near Annaberg, &c. The province is full of woods and forests, particularly its most elevated parts, such as the vicinity of Schwarzenberg. The average height of the Erzgebirgische Kreis above the level of the sea is estimated at 1200 feet.

In consequence of the rugged character of the surface, the hard, stony soil, and the rawness of the climate, neither agriculture nor horticulture are pursued on a scale of sufficient extent to supply the wants of the province. Oats, rye, linseed, potatoes, and a small quantity of wheat, are cultivated; these articles are also imported from Bohemia and the adjoining circle of Leipzig. There are fine and extensive pastures, particularly in the vicinity of Zwickau, Chemnitz, Augustusberg, Freiberg, and Nossen, where large flocks of sheep are kept; but cattle-breeding, on the whole, is not so actively carried on as it might be. The province is well known for its large trout, its salmon, carp, and other fresh water fish.

The very name of this part of Saxony, 'the circle of the Ore Mountains,' indicates the peculiar character of its natural riches. It abounds in mines of silver, tin, lead, iron, cobalt, &c., the first working of which is said to have taken place in the middle of the twelfth century. Their most flourishing state was in the fifteenth, when the silver mines of Schneeberg and Annaberg and the tin mines of Altenberg were discovered and opened. At the present day they afford employment, either directly or indirectly, to upwards of 200,000 persons. The largest silver mines are in the neighbourhood of Freiberg, of which the Erbisdorf alone produced 3,048,500 ounces of silver between 1769 and 1818: their number is about 200, with 540 pits (zechen); they occupy 4800 hands, and their present produce is from 375,000 to 450,000 ounces annually. The other silver mines are at Schneeberg, Schwarzenberg, Annaberg, Marienberg, &c. The most considerable tin mines are at Altenberg and Geier; others at Schneeberg, &c. No mines in Saxony produce so much iron as those of Johann-Georgenstadt: this metal is also obtained at Schneeberg, Altenberg, &c. Near Aue and Bockau, to the south of Schneeberg, in what is called the 'Saxon Siberia,' lie the largest cobalt mines, and smalts, or blue-colour works in Germany; of these smalts the yearly produce is between 9000 and 10,000 cwts., besides large quantities of arsenic, &c. The white porcelain-earth used in the royal china manufactory at Meissen is procured and prepared in this district. Much sulphur and vitriol are made at and near Beierfeld and Geier: magnesia and porcelain earth are obtained at Elterlein; and there are coal mines of importance at Planitz, and other spots near Zwickau. The value of all the silver sold in 1833 was 862,764 dollars (122,200*l.*); and in 1834 about 1,000,000 dollars (141,600*l.*). The cobalt and blue colour (smalts) produced 321,724 dollars, or about 45,500*l.* The lead mines yield annually about 500 tons; the tin about 3000 cwt.; the copper about 18 tons; and the iron between 4000 and 4500 tons.

Besides considerable manufactures of iron, tin, and copper ware, the largest of which are at Freiberg, Schwarzenberg, Wiesenthal, and Elterlein, there are extensive manufactures of thread, twist, linens, cotton goods, woollen cloths, flannel, woollen stockings, &c., at Chemnitz, Zwickau, Zschoppau, Oederan, &c. Laces and bobbinet are made at Altenberg, as well as Annaberg, where nearly a thousand hands are engaged in making tapes and ribands. Much serpentine stone is worked from the quarries of Zöblitz, and steel is made at Schedewitz near Zwickau. In the upland districts various articles in wood are manufactured.

This province also includes the independent earldom of Solm-Wildenfels, with an area of 31 square miles, the 6200 inhabitants of which are principally employed in making linen, coarse cottons, and stockings; and the possessions of the princes and counts of Schönburg, in the north-western part of the province, comprising an area of 252 square miles and a population of about 84,000, who are engaged in agriculture as well as manufactures. The chief town is Glauchau, on the Western Mulde, with 5000 inhabitants, and manufactures of woollens.

The province is divided into the 'Amtshauptmannschaftliche Bezirke' or bailiwics of Chemnitz, Zwickau, Walkenstein, and Freiberg. Chemnitz, in the north-west, contains the towns of CHEMNITZ (see vol. vii. p. 38), Frankenberg on the Zschoppau, 5200 inhabitants; Oederan, 3800; Zschoppau, on the river of that name, 3300; and in the Schönburg possessions, Lössnitz, 3450; Glauchau; Hohnstein, 3600; Waldenburg, on the western Mulde, 3000; Penig, on the same river, 3100; and St. Merane, 2300. The bailiwic of Zwickau, in the west and south-west, contains Zwickau, on the western Mulde, with 5400 inhabitants and large woollen manufactories; Werdan, on the Pleisse, 3600; Wildenfels; Schwarzenberg, on the Schwarzwasser, 1400; Wiesenthal, 1600; Johann-Georgenstadt, on the Schwarzwasser, 2700; and Schneeberg on the Schleenerbach, 5800. The bailiwic of Wolkenstein, in the south, contains the towns of ANNABERG (vol. ii. p. 40); Wolkenstein on the Zschoppau, 1600 inhabitants; Gever on the Pleisse, 1600; Zöblitz, 1100; Elterlein, 1200; and Stollberg, 3050; and the bailiwic of Freiberg, in the east, contains Freiberg, on the eastern Mulde, the chief town of the Erzgebirge circle, 11500 [FREIBERG]; Haynichen, on the Striegis, 3000; Nossen, on the eastern Mulde, 1200; Rosswein, on the same river, 3500, with woollen manufactures; Fraunstein, 800; and Altenberg, 1600.

ERZGEBIRGE (the Ore Mountains) is a mountain-range in Germany, extending along the boundary line of the kingdoms of Bohemia and Saxony. It begins about 25 miles south-east of Dresden, on the very banks of the river Elbe, and extends in a west-south-west direction to the sources of the river called the White Elster (Weisse Elster), about 12° 30′ E. long., where it is connected with the Fichtel Gebirge. The river Elbe divides its eastern extremity from the Winterberg, the most western of the mountains of Lausitz, or Lusatia. The Ore Mountains extend in length about a hundred miles, and their mean width is estimated to be more than thirty miles.

The highest part of the range, which is towards its southern border, forms partly the boundary-line between Bohemia and Saxony, but is mostly within the former kingdom. Its southern declivity, which is steep and intersected with narrow valleys, terminates in the valley of the river Eger, about 10 or 15 miles from the upper range. The valley of the Eger lowers gradually from west to east, from 1100 feet to 400 feet above the sea. The northern declivity of the range descends in more gentle slopes towards the great plain of Northern Germany; and these slopes are divided from one another by wide and open valleys. A line drawn from Pirna on the Elbe to Tharand, Freiberg, Chemnitz, Zwickau, and Reichenbach, indicates with tolerable correctness where the range on this side ceases. The undulating plain which lies contiguous to it may be from 500 to 600 feet above the level of the sea.

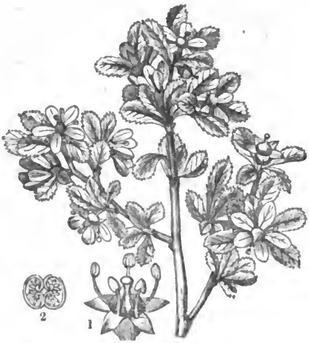
The highest portion of the range occurs on both sides of 13° E. long., but rather to the west of it. Here are the Keilberg, 4212 feet, the Fichtelberg, 3968 feet, the Schwarzberg, 3988 feet, and the Hassberg, 3248 feet above the sea. Farther east and farther west the range gradually sinks lower, the Great Chirnstein, on the banks of the Elbe, rising only to 1824 feet above the sea.

This range belongs to the primitive formation, granite and gneiss being everywhere prevalent, except along the banks of the Elbe, where sandstone almost exclusively occurs. It is rich in metals of almost every kind, from which circumstance indeed its name is derived, though it is less productive than it was some centuries ago. The working of the mines is pursued with great activity and skill, and it is stated that more than 10,000 families are dependent on them for their livelihood. Gold occurs in a few places, but is not so abundant as to pay for the labour of getting it. The silver-mines are considerable, and their annual produce amounts to 60,000 marcs, at 12 ounces to the marc; that of the iron-mines amounts to 3500 or 4000 tons. The tin-mines of Saxony are the most valuable on the European continent, and produce annually 140 tons. Copper is not abundant, and the annual produce does not exceed 30 tons; but from the lead-mines 400 or 500 tons are annually obtained; and of cobalt 600 tons and upwards. Arsenic, brimstone, and vitriol, are likewise abundant; and there is also quicksilver, antimony, calamine, bismuth, and manganese. Coal abounds in the neighbourhood of Dresden and Zwickau. One of the most remarkable mineral productions is the kaolin, or porcelain clay, which occurs in layers six feet thick at Aue, about 12 miles south-east of Zwickau, whence it is carried to Meissen, and there used in the manufacture of the fine china-ware. Several kinds of precious stones are found, as garnets, topazes, tourmalins, amethysts, beryls, jaspers, and chalcedonies.

The upper parts of the range are covered with extensive forests, which furnish fuel for the great smelting-works. The lower slopes and valleys are well cultivated, but the produce is not sufficient for the maintenance of the great population which is employed in the mines and in the numerous manufactures of cotton, silk, and linen. Great quantities of corn are annually brought from the plain which lies to the north of the range.

Six great roads pass over this range. By the two most eastern Dresden communicates with Prague. The more eastern of these two runs from the last-mentioned place to Lowositz and Aussiz, passes near Perterswalde through the pass of Zehist, and hence descends to Giesshübel and Pirna The more western goes from Lowositz to Töplitz, passes the range near Zinnwald, and descends through Altenberg and Dippoldiswalde to Dresden. The third road leads from Prague to Laun on the Eger, hence to Kommotau, passes the range by the pass of Bäsberg, and descends to Chemnitz. The fourth road runs along the Eger from Saatz to Kaaden, traverses the range by the pass of Pressnitz, and thence leads to Annaberg and Chemnitz. The fifth road leaves the valley of the Eger near Kaaden, passes the range near Gottesgab, and leads through Schneeberg to Zwickau. The sixth and most western road runs from Carlsbad to Joachimsthal, and thence over the range through Johann-Georgenstadt and Schneeberg to Zwickau.

ESCALLONIA'CEÆ, a small natural order of exogenous plants, related to the genus Ribes, in the opinion of some, but to that of Saxifraga, according to other botanists. It consists of shrubs with evergreen leaves, which often emit a powerful odour like that of melilot; their flowers are red or white, and often are quasimonopetalous, in consequence of the approximation of their petals. They have an inferior many-seeded ovary, with two large placentæ in the axis, a definite number of epigynous stamens, a single style, and minute chaffy seeds with a very small embryo lying in oily albumen. All the species inhabit South America, on the mountains, especially in alpine regions. Escallonia rubra, montevidensis, illinita, and others, have now become common in warm sheltered gardens in this country.



Escallonia Serrata.

1, A flower magnified, without the petals; 2, a transverse section of the ovary.

ESCAPEMENT. [HOROLOGY.]

ESCARP, or SCARP, in fortification, is that side of the ditch surrounding or in front of a work, and forming the exterior of the rampart. In field-works the escarp is usually formed by cutting the earth at such an inclination as will permit it to support itself, which may be at 45 degrees with the horizon or more, according to the tenacity of the soil: and, to impede the enemy in attempting an assault, fraises or inclined palisades are frequently planted on the slope. In large fortresses the escarp is the exterior surface of the revetment wall which supports the rampart, and it is frequently formed at such an inclination that its base, measured in front of a vertical plane passing through the top of the wall and in the direction of its length, is one-sixth of the height of the wall; but engineers at present recommend both the escarps and counterscarps to be vertical, from an opinion that the action of the weather upon the brick-work will thereby be diminished. [REVETMENT.]

ESCARPMENT, a precipitous side of any hill or rock. In military operations ground is frequently scarped, as it is called, or cut away nearly vertically about a position, in order to prevent an enemy from arriving at the latter. Part of the rock of Gibraltar has been rendered inaccessible in this manner; and, in the execution of the intrenchments about Lisbon, in 1810, the British troops formed an escarpment from 15 to 20 feet high, and about two miles long, on the brow of a ridge of heights extending from Alhandra to the valley of Calandrix, in order to secure the line against an attack at that part. A similar work was executed along a ridge of hills between Mafra and the mouth of the S. Lorenzo.

E'SCHARA. [POLYPARIA MEMBRANACEA.]

ESCHAROTICS (*ἐσχαρωτικὰ*, from *ἐσχαρόω*, to form a crust, or scab), are agents applied to the surface of the body, which destroy the vitality of the part which they touch and produce an eschar. This effect they occasion either by combining chemically with the animal matter, or by destroying the old affinities, and causing the elements of the part to enter into new combinations. Their action is more energetic in proportion to the degree of vitality of the part to which they are applied. They are classed under two heads, the *potential* cauterants, and the *actual* cautery: the former are chiefly chemical agents, and form new compounds with the elements of the part with which they come in contact; but some merely cause irritation and augmented absorption, and are distinguished as *erodents*. The actual cauterants are substances of an elevated temperature, which decompose the part which they touch, and completely destroy its organization.

The chief potential cauterants are strong mineral acids, such as the sulphuric or nitric, pure alkalies, and some metallic salts, especially nitrate of silver, or lunar caustic. These are used either to produce counter-irritation, or to remove fungous or morbid growths. Lunar caustic seems to possess peculiar properties, and is unquestionably the most powerful *direct* antiphlogistic agent known. If applied in the solid state to many inflamed parts it speedily checks the morbid action, and is decidedly the best application to chilblains, and in leucorrhœa. The actual cauterants are used either for their primary action, viz., the immediate destruction of the part, or for their secondary effects. The former object is rarely attempted, except to prevent the absorption of any poisonous or contagious matter, such as the venom of a snake, or bite of a mad dog. The secondary effects are more important, and more varied according to the degree of heat of the substance applied. The first effect is pain more or less severe, a flow of blood towards the part, and more rapid performance of the process of interstitial deposition and absorption, terminating in inflammation, extending to a greater or less depth, according to the intensity of the heat, or form of the body employed. This increased action has often a salutary effect, which is frequently felt through the whole frame. Torpor and paralysis of the nervous system often disappear, and neuralgia both of the neighbouring and even distant parts is removed. Atony and laxity of the muscular system vanish, and every part displays more energy and power.

The actual cautery may be applied in a variety of ways, viz., hot water, hot vapour, moxa, and heated iron. The first of these is a very ready means of causing vesications in some diseases. In phthisis pulmonalis, or consumption, where pain is often more relieved by vesication than any other means, placing a sponge in a wine-glass, and pouring boiling water on it, then suddenly inverting the glass over the part of the chest where the pain is felt, will cause immediate vesication, followed by speedy relief. The vapour of boiling water, as it issues from the spout of a kettle, is also a convenient method of applying heat in inflammations of the joints, as in gout, morbus coxarius, and other deep-seated diseases of the bones. As the red-hot iron is now seldom used, being confined to veterinary medicine, moxa affords the best substitute, and it is very convenient, as any degree of intensity or rapidity of action can be given to it. [MOXA.]

The eschar which follows the application of the potential or actual cautery generally separates in a few days. The ulcer is then to be treated with different agents, according as it is wished to heal it or keep it open, as a farther means of counter-irritation.

ESCHEAT, from the Norman French word *eschet* or *echet*, chance or accident (a word derived from *escheoir*, the old French form of the verb *échoir*, 'to fall'), is defined by Sir William Blackstone as an obstruction to the course of descent by some unforeseen contingency which consequently determines the tenure. In this case the land results back by a kind of reversion to the original grantor or lord of whom it is holden.

Escheat takes place when the tenant of lands dies intestate and without an heir: in such case the lands, if freehold, escheat to the king, or other lord of the fee; if copyhold, to the lord of the manor. Lands which have descended to the last tenant from a paternal or maternal ancestor, escheat, if there are no heirs on the part of that ancestor from whom the lands descended. Since the 1st day of January, 1834, there can be no escheat on failure of the whole blood, wherever there are persons of the half-blood capable of inheriting under 3 & 4 Will. IV., c. 106.

If a bastard dies intestate and without issue, his lands escheat to the lord of whom they are held.

Escheat also takes place upon attainder for treason and murder, by means of which the blood is in law considered to be corrupted, and the attainted owner of lands rendered incapable of holding them himself, or transferring them by descent. In consequence of this extinction of heritable blood, the lands of such felons revest in the lord, except in cases of treason, when a superior law intervenes, and they become forfeited to the crown. Previously to a recent act (3 & 4 William IV., c. 106), a person could not trace his descent through another person who had been attainted; but this may now be done, provided that other person shall have died before such descent shall have taken place. [ATTAINDER.] And by the 4 & 5 William IV., c. 23, no property vested in any trustee or mortgagee shall escheat or be forfeited by reason of the attainder or conviction for any offence of such trustee or mortgagee, except so far as such trustee or mortgagee may have a beneficial interest in such property

This doctrine of escheat consequent upon the commission of certain crimes is derived from the feudal law, by which a vassal was only permitted to hold real property upon condition of well demeaning himself.

The doctrine of escheats, with regard to extinct successions, seems to have been adopted in every civilized country to avoid the confusion which would otherwise arise from the circumstance of any property becoming common; and the sovereign power, or those who claim under it, are consequently the ultimate heirs to every inheritance to which no other title can be found.

ESCHEATOR, an antient officer appointed by the lord treasurer, and so called because his office was to look after escheats, wardships, and other casualties belonging to the crown.

There were at first only two escheators throughout England, one on this side and the other beyond the Trent; but in the reign of King Edward III. there was one appointed for every county, who was to continue in office for one year only. This office has now ceased to exist. (Blackstone's *Commentaries*; Wooddesson's *Lectures*.)

ESCHSCHO'LTZIA, a genus of beautiful yellow-flowered papaveraceous plants, inhabiting California and the north-western coast of North America, and now become extremely common in the gardens of Great Britain. They are known by the base of their calyx remaining at the base of the siliquose fruit in the form of a firm fleshy rim, by their calyx being thrown off like a calyptra when the petals unfold, and by the stamens being inserted into the edge of the permanent rim of the calyx. Otherwise they are very near our sea-shore Glaucium. Two certain species only, *E. Californica* and *E. crocea*, have yet been introduced; a third, *E. compacta*, is figured in the 'Botanical Register,' but it is probably a mule between the two first. It has been recently proposed to alter this name, which has a barbarous sound and appearance, for the more harmonious one of Chryseis, and it is hardly to be doubted that the latter will be adopted. (*Botanical Register*, t. 1948.)

ESCHWEGE. [Hesse, Lower.]

ESCUAGE, or **SCUTAGE**, a pecuniary payment, by way of commutation for knight-service, whereby the tenant was bound to follow his lord into the wars at his own charge. The term escuage or scutage is from the old French *escu*, and that from the Latin *scutum*, 'a shield;' a name also given to coins on which there was the shield or escutcheon of the sovereign.

The personal attendance in knight-service growing troublesome and inconvenient in many respects, the tenants found means of compounding for it, by first sending others in their stead, and in process of time by making a pecuniary satisfaction to the lords in lieu of it. This pecuniary satisfaction at last came to be levied by assessments, at so much for every knight's fee; and therefore this kind of tenure was called *scutagium* in Latin, or *servitium scuti;* as being a pecuniary substitute for personal service. The first time this appears to have been taken was in the 5th Hen. II., on account of his expedition to Toulouse; but it soon came to be so universal, that personal attendance fell into disuse. Hence we find in our antient histories that, from this period, when our kings went to war, they levied scutages on their tenants, that is, on all the landholders of the kingdom, to defray their expenses, and to hire troops. and these assessments, in the time of Henry II., seem to have been made arbitrarily and at the king's pleasure. This prerogative being greatly abused by his successors, it became matter of national complaint, and King John was obliged to consent, by his *magna charta* (c. 12), that no scutage should be imposed without consent of parliament. But this clause was omitted in his son Henry III.'s charter; where we only find (c. 37) that scutages or escuage should be taken as they were used to be taken in the time of Henry II.; that is, in a reasonable and moderate manner. Yet afterwards, by statute 25 Edw. I. c. 5 and 6, and many subsequent statutes, it was enacted, that the king should take no aids or tasks but by the common assent of the realm. Hence it is held in our old books, that escuage or scutage could not be levied but by consent of parliament (*Old Ten.* tit. *Escuage*), such scutages being indeed the groundwork of all succeeding subsidies, and of the land-tax of later times. (Jacob's *Law Dictionary*, in voce; Blackstone's *Comment.* vol. ii. pp. 74, 75.)

ESCULA'PIUS. [Æsculapius.]

ESCULIC ACID, a peculiar acid procured from horse-chestnuts. This acid is colourless, insoluble in water, but dissolved by alcohol, and is deposited from it in crystalline grains. It forms with bases salts termed *esculates*, but they are quite unimportant. Esculic acid consists of 8·35 hydrogen, 57·26 carbon, and 34·39 oxygen, in 100 parts.

ESCURIAL, or **ESCORIAL**, a vast edifice in the kingdom of Toledo, situated seven leagues from Madrid in a north-west direction. The term escorial is considered by some to be Arabic, meaning a place full of rocks, but by others is derived from *scoria ferri*, iron dross, from the circumstance of there having been antiently great iron works near this place. The situation is rocky and barren, devoid of all vegetable matter, except what has been conveyed there by man; and it appears to have been chosen for the advantage of procuring stone. The edifice was begun by Philip II., five years after the battle of St. Quintin, fought on the anniversary of St. Lawrence (both of which circumstances it was intended to commemorate) and was finished in twenty-two years. This extensive building is laid out, on its ground plan, in the form of a gridiron, a part (which forms the royal residence) advancing to form the handle, attached to a long rectangle forming several courts and quadrangles. This part is 640 by 580 feet, and the average height to the roof is 60 feet. At each angle is a square tower 200 feet high. The plan is divided so as to form a convent with cloisters, two colleges, one for the clergy and one for seculars, the royal palace, three chapter houses, three libraries with about 30,000 volumes and some valuable MSS., five great halls, six dormitories, three halls in the hospital, with twenty-seven other halls for various purposes, nine refectories, and five infirmaries, with apartments for artisans and mechanics. There are no less than eighty staircases. The gardens and parks, formed by art, are decorated with fountains.

The monks of the order of St. Jerome were 200 in number, and had a revenue of 12,000*l.* per annum.

The stone of which the building is constructed is white, with dark grey spots. The windows on the outside are 1110 and within 1578; of the former 200 are placed in the west front and 366 in the east. Including the out-offices, there are not less than 4000 windows. There are fourteen entrances or gateways, which have pretensions to architectural decoration, and 86 fountains.

The church is 374 feet long and 230 broad, and is divided into seven aisles. It is crowned with a dome 330 feet high from the ground, and is paved with black marble. In the church are forty chapels with their altars. In the palace and in the church there is a profusion of gilded bronze work and incrustation of marbles. There are numerous paintings by the great masters in the Escurial. It is possible however that these may have been removed to the Royal Museum at Madrid, formed by the late King Ferdinand. (*Spain Revisited*, cap. 13, vol. i.) The sculpture is said not to have any great merit. Philip IV. added a beautiful mausoleum 36 feet in diameter and incrusted with marbles: the design is in imitation of the Pantheon at Rome. The cost of the Escurial was six millions of piastres. For some curious details of the Escurial see 'The Escurial, or that wonder of the world for architecture and magnificence of structure, &c., translated into English by a servant of the earl of Sandwich in his extraordinary embassie thither,' Lond., 1671. From the title-page it appears that there was a report in 1671 that the Escurial had been destroyed by fire. There was a similar report a few years since.

ESCUTCHEON or **ESCOCHEON**, the heraldic term for the shield, on which, under every variety of shape, arms are emblazoned. The word is derived from the French *écusson*, and that from the Latin *scutum*. The first representation of arms was, no doubt, as an ornament to the shield. The shield afterwards became the appropriate and legitimate instrument for displaying them; hence in sculpture and painting they were never separated; and when shields ceased to be employed, their form remained, and still continues to be the field on which coat-armour is invariably depicted. An *escutcheon of pretence* is the small shield in the centre of his own, on which a man carries the coat of his wife, if she is an heiress and he has issue by her. In this case the surviving issue will bear both coats quarterly.

ESNE. [Egypt, p. 312.]

ESOTERIC. [Exoteric.]

ESPALIER, a trellis for training fruit trees or bushes upon, instead of nailing them to walls.

In certain situations this kind of training is not only extremely neat but possesses peculiar advantages: the trees are more fully exposed to the influence of light, less liable to be broken by high winds, and in small gardens in particular, where room is of great importance, and where a collection of the finer sorts of fruit is always desirable, it is found highly useful, both on account of the small space which the trees occupy, and because they will bear fruit much sooner than when allowed to grow in their natural form.

In France and other parts of the Continent this kind of training is very much practised, and in the northern parts of England and in Scotland, where the borders of the kitchen-garden are frequently planted with flowers, in order to combine pleasure with utility, espaliers are trained along the back of the flower borders to prevent the vegetables being seen from the walks.

When the espalier is fastened to a wall, as is very common on the Continent, peach and nectarine trees are frequently trained upon it; but where it is detached, as it is most commonly in Britain, apples and pears, and sometimes gooseberries, are the only fruits which are successfully cultivated in this way. Plums and cherries are occasionally so managed, but not so advantageously as the others.

When a common espalier is to be covered, the trees should be planted from 20 to 24 feet apart, which will allow the branches to grow 10 or 12 feet on each side: but as a considerable time would elapse before they would fill this space, a duplicate tree may be planted between each, and cut away as the others grow. Gooseberries of course require a small space; three or four feet from plant to plant is sufficient.

The training on espalier is very simple, and easily performed. When the trees are young, one shoot must be trained perpendicularly, and two others horizontally, one from each side; the two last must not be shortened, but the perpendicular shoot is to be shortened in the following year to three good buds, two of which are to form new side branches, and the other a leader as before; and so on every year until the trees have attained the desired size. The proper distance between the horizontal branches must depend upon the peculiar growth of the tree, but from six to nine inches is what is generally allowed. Trees are sometimes trained upon a double espalier which has the advantage of giving two surfaces to train upon. It consists of two trellises instead of one, about two feet apart at the bottom, and approaching at the top.

The only kind of espalier worth notice, which differs from those now mentioned is a table-rail: this, the management of which is called table training, consists of rails resembling tables, up the centre of which the tree is trained and regularly spread over the surface. It is rarely employed, and has the essential fault of exposing the blossom so much to the effect of nocturnal radiation that in this country a crop is rarely obtained from such espaliers.

The stakes which form the espalier are made of different materials, some of wood, others of wire and wood, and some of cast iron. The first of these is by far the most simple, and is composed of stakes, five or six feet in height, driven into the ground from one to two feet apart; along the top a bar, which is nailed to each, connects the whole together. It is of no use to have the stakes either so strong or so high when the trees are first planted, because they are not required, are unsightly, and will have to be renewed before the trees have attained their intended height; for this reason, stakes of a much weaker kind will at first answer quite as well. The wire and wood rail is formed by strong vertical wires, strained from two wooden horizontal rails, which are connected and held fast by wooden posts let into the ground. The iron rail is constructed upon the same plan as a common street railing.

The objection to all iron trellises is, that they cut and canker the trees; and when the cheapness of the wooden one is considered, besides the more natural appearance which it presents, it must undoubtedly have the preference.

The best wood for this purpose is young larch, the thinning of plantations.

ESPALION, a town in the department of Aveyron, in France. It is on the left or south bank of the river Lot, 17 miles from Rhodez, the capital of the department, and 339 from Paris by Fontainebleau, Briare, Nevers, Moulins, Riom, Clermont, and St. Flour. The principal street of the town is broad, and lined with well-built houses: it leads down to the bridge over the Lot. The population in 1832 was 2260 for the town, or 3545 for the whole commune. The inhabitants manufacture light woollen stuffs, and there are several tan-yards: morocco leather is manufactured Good wine is produced in the country round Espalion. The town has a subordinate court of justice (*tribunal de première instance*), a high-school, and a drawing-school.

The arrondissement of Espalion is subdivided into nine cantons or districts, under the jurisdiction of a justice of the peace, and 101 communes: it had in 1832 a population of 65,086.

ESPIRITU SANTO. [Brazil, p. 336; Cuba, p. 205.]

ESPRIT, SAINT, a suburb of Bayonne. [Bayonne.]

ESPLANADE, the ground between the fortifications of a citadel and those of the town to which it belongs. It is recommended by writers on fortification that this space should be about 300 fathoms broad, reckoning from the covered way of the citadel, that in the event of an attack on the latter the enemy may not construct batteries within breaching distance under the cover afforded by the buildings of the town.

ESQUILINE HILL. [Rome.]

ESQUIMAUX, a nation inhabiting the most northern countries of America, and, if the extent of country be considered, one of the most widely-spread nations on the globe. On the eastern coast of America they are met with as far south as 50° N. lat. on the shores of the Strait of Belle Isle, which separates Newfoundland from the mainland of America. They occupy the whole of the great peninsula of Labrador and the whole eastern coast of Hudson's Bay up to East Main River. On the western side of Hudson's Bay they inhabit the coast north of Churchill River, whence they extend northwards over the Barren Lands to the Great Fish River, or Thleweechodezeth, on both banks of which river they are found east of 100° E. long. The whole country between this river, the Great Bear Lake, the Mackenzie River, and the Arctic Ocean, is exclusively inhabited by them. The coast lying to the west of Mackenzie River is also in their possession; and they seem to be spread as far as Kotzebue Sound, on Behring's Straits. They also occupy Greenland and all the other islands between the northern coast of America and the pole, as far as they are habitable.

In stature the Esquimaux are inferior to the generality of Europeans. A person is rarely seen who exceeds 5 feet in height. Their faces are broad, and approach more to the rounded form than those of Europeans; their cheek-bones are high, their cheeks round and plump, mouth large, and lips thick. The nose is small, and, according to some authors, flat, which, however, is denied by others. Their eyes are in general of a deep black; but some are of a dark chestnut colour: they appear very small and deeply seated, owing to the eye-lids being much encumbered with fat. The hair is uniformly long, lank, and of a jet black colour. The ears are situated far back on the head. Their bodies are large, square, and robust, the chest high, and shoulders very broad. Their hands and feet are remarkably small; there is, however, no sudden diminution, both extremities appearing to taper from above downwards in a wedge-like shape. Graah, in his 'Voyage to Greenland,' observes that the inhabitants of the eastern coast have disproportionately large hands and feet. They are of a deep tawny or rather copper-coloured complexion. They are not without beard, as it has been asserted, but they pluck it out as soon as it appears. Some of them even wear long beards. They show a good deal of ingenuity in making their dresses and instruments; and some of them have attracted the attention of our travellers by their display of mental powers.

Their language is different from that spoken by the other savage nations who inhabit North America; but it seems that the same language is spoken by all the different tribes of the Esquimaux, though of course each of them has expressions which are peculiar. (Parry; Mac Keevor; Graah's *Voyage to Greenland*.)

ESQUIRE (from the French, *escuier*, or shield bearer) is the next title of dignity to that of knight. The esquire was the second in rank of the aspirants to chivalry, or knighthood, and had his name from carrying the shield of the knight, whose bachelor, or apprentice in arms, he was. The gradations of this service, or apprenticeship to arms, were, page, esquire or bachelor, and knight, who, in his turn, after the formation of degrees of knighthood, was called a knight bachelor, as aspiring to the higher honours of chivalry. The esquire was a gentleman, and had the right of bearing arms on his escutcheon or shield; he had also the right of bearing a sword, which denoted nobility or chivalry, though it was not girded by the knightly belt; he had also a particular species of defensive armour which was distinguished from the full panoply of the knight. So much for the esquire of chivalry, which order is only preserved in the almost obsolete esquires for the king's body, whom antiquaries have pronounced to be the king's esquires in chivalry (that is, his esquires, as being a knight), and in the esquires of knights of the Bath.

There was also another class, who may be called feudal esquires, and consisted of those tenants by knight's service who had a right to claim knighthood, but had never been dubbed. They were in Germany called *ritters*, or knights, but were distinguished from the actual knights, who were called dubbed knights, or *Ritter Geschlagen*, and had many of the privileges of knighthood. This distinction still exists in many of the countries which formed part of the German empire. In Hainault, Brabant, and other provinces of what was Austrian Flanders, the antient untitled nobility, or gentry as they are called in England, to this day are styled collectively the *Ordre Equestre*, or knightly order. It also existed in England until James the First had prostituted the honour of knighthood, for Camden frequently speaks of knightly families (*familias equestres*, or *familias ordinis equestris*), where the heads of them were not, at the time, actual knights. Writers on precedence make mention of esquires by creation, with investiture of a silver collar or chain of *ss*, and silver spurs: but these seem to have been only the insignia of the esquires for the king's body, which being preserved in a family as heir looms, descended with the title of esquire to the eldest sons in succession. The sons of younger sons of dukes and marquesses, the younger sons of earls, viscounts, and barons, and their eldest sons, with the eldest sons of baronets, and of knights of all the orders, are all said to be esquires by birth, though their precedence, which differs widely, is regulated by the rank of their respective ancestors. Officers of the king's court and household, and of his navy and army, down to the captain inclusive, doctors of law, barristers, and physicians, are reputed esquires. A justice of the peace is only an esquire during the time that he is in the commission of the peace, but a sheriff of a county is an esquire for life. The general assumption of this title by those who are not, in strictness, entitled to it, has virtually destroyed it as a distinct title or dignity. The heads of many old families are, however, still deemed esquires by prescription.

ESSAYISTS, BRITISH. This title is customarily confined to a certain class of periodical writers upon subjects of general interest, as morals, criticism, manners, &c. The notion of a series of papers fit for general circulation, and not including news or politics, was originated by Steele and Addison in the 'Tatler.' [ADDISON.] The 'Freeholder,' 'Craftsman,' 'Freethinker,' &c., now almost forgotten, were rather political pamphlets than essays in this sense of the word; and an interval of thirty-five years elapsed from the end of the 'Spectator' to the successful revival of this style of writing by Dr. Johnson, in the 'Rambler,' in 1750. Its great popularity led to the establishment of a number of similar periodicals during the latter half of the eighteenth century, since which time they have again gone out of fashion. We give a list of those contained in Alexander Chalmers's collective edition of British Essayists, which includes some that have little claim to a place among the standard works of our language; with the names of the principal and most celebrated contributors to each.

'Tatler'—Steele, Addison.
'Spectator'—Addison, Steele, Budgell, Pope, &c.
'Guardian'—Steele, Addison, Berkeley, Pope, Tickell, Gay, &c.
'Rambler'—Johnson, almost entirely.
'Adventurer'—Hawkesworth, Johnson, Jos. Warton, &c.
'World'—Moore, Lord Chesterfield, Horace Walpole, J. Warton, &c.
'Connoisseur'—G. Colman and Bonnel Thornton chiefly; Cowper a few.
'Idler'—Johnson; a few by Warton and others.
'Mirror'—Henry Mackenzie and others.
'Lounger'—The same.
'Observer'—Richard Cumberland, almost entirely.
'Olla Podrida'—Moore, &c.
'Microcosm'—Canning, Frere, Smith, &c.

ESSEK, ESZEK, ESSEG, or OSZEK, the chief town of the circle of Essek, and the capital of Austrian Sclavonia, is a royal free town situated in a level and marshy district on the right bank of the Drave, a little to the west of its efflux into the Danube. It lies in 45° 34′ N. lat., and 18° 42′ E. long. Its site is that of the Mursia, or Mursa of the Romans, which was founded in the year 125 by the emperor Hadrian, and afterwards became the residence of the Roman governors of Lower Pannonia. Constantine made it the seat of a bishopric in the year 335. It now consists of four quarters; the present fortress, begun under the emperor Leopold I. in 1712, and finished in 1719, is well built, contains 147 handsome and lofty houses, an arsenal and barrack, and is regularly fortified: an esplanade runs round it, and to the north-west of it stands the Felso-Varos (Upper Town), which is approached by an avenue 1100 paces long, is the residence of the merchants and dealers, and has well-attended fairs. South-east of the fortress lies the Also-Varos, or Lower Town, the site of the antient Mursa, which consists of broad and handsome streets, and has some fine churches; and in the east is the New Town, composed rather of farms and gardens than of lines of streets. The fortress and suburbs contain altogether about 1800 houses, 5 Roman Catholic churches, 4 chapels, and a church for those of the Greek persuasion, and 11,200 inhabitants. There are several handsome buildings, such as the town-hall, the house of assembly for the states of Verócz, the county in which Essek is situated, the barracks, engineers' house, officers' pavilion, and arsenal. Essek has a Roman Catholic high-school, a gymnasium, a Greek school, a military cadet academy, and a Franciscan and a Capuchin monastery. A causeway or bridge about two miles and a half in length, 55 feet in breadth, and 9 feet in height, constructed in the year 1712, leads across the Drave and the swamps on its northern bank into the Hungarian county of Baranya. With the exception of some silk-spinning there is little mechanical industry in the town. There is a considerable trade in grain, cattle, and raw hides.

ESSEN, a township in the Prussian administrative circle of Düsseldorf, consisting of the town of Essen only, which lies on the Berne, in 51° 27′ N. lat., and 7° 2′ E. long. It was the spot where the foreign princes of the Rhine and of Westphalia formerly held their diets, or 'Fürstentage.' Essen is surrounded by walls, has about 830 houses, and the population, which was 4706 in the year 1817, is now about 5700. It is the seat of mining and crown-domain boards, and has 2 Protestant and 2 Roman Catholic churches, a gymnasium, a Capuchin monastery, a Protestant orphan asylum, and a hospital. The chapel of St. Quirinus is supposed to be the first place of Christian worship erected in these parts. The manufactures consist of woollens, linens, vitriol, leather, arms, iron and steel ware, &c. The town has some trade, and there are coal-mines in the vicinity, as well as a number of iron works.

ESSENCE is derived from the Latin *essentia*, a word which is used by Cicero and Quinctilian, and formed, not as stated in Mr. Richardson's Dictionary, from *existentia*, but from *essens*, the analogous but obsolete participle of the verb *esse*, to be. The English word essence consequently signifies that which constitutes the being of a thing, or, in the words of Locke, that which makes it to be what it is. This term was the subject of many very subtle disquisitions and disputes among the scholastic logicians of the fourteenth, fifteenth, and sixteenth centuries; and the metaphysical notions of essence entertained by these logical doctors cannot be understood without reference to their discussions respecting the nature of universal ideas, as real or nominal, of abstraction, genus, species, differentia, substance, properties, accidents, &c., of all which particulars may be found in Smiglecii Logic. Disputat.; Burgersdicii Logica; Eustachii Logica; Le Grand, Institut. Logic.; Wallisii Logica; and in many other logical and philosophical treatises cited in Johnson's Quæstiones Philosophicæ, p. 168, &c. Some amusing instances of metaphysical sagacity concerning logical essence are exhibited in the scholastic work of Louis de Lesclache, 'La Philosophie, divisée en cinque Parties,' 1548. 'Il n'y a rien dans la substance qui ait moins d'essence que la substance; aussi il n'y a rien dans la substance qui soit moins substance que la substance,' &c. In the Oxford Manual of Scholastic Logic, by Dr. Aldrich, as expounded by Mr. Huyshe, it is taught, in accordance with the theory of the Nominalists, that essence is not really existent, but is merely a figment of imagination, and that the notion of it is resolvable into two parts; that which is common to other essences being called the *genus*, and that which is peculiar to one particular essence, distinguishing it from all others and constituting it what it is, being called the *differentia*. The whole essence is called the species; that is, genus + differentia = species. The qualities joined to essence are also of two kinds; those which are joined necessarily are called *properties*, and those which are joined only contingently are called *accidents*. Hence the five predicables, or only possible parts of a thing which can be the objects of assertion:—1. Species or whole essence. 2. Genus, the common or material part of the essence. 3. Differentia, the peculiar or formal part of the essence. 4. Property or quality, necessarily joined to the essence. 5. Accident, or quality contingently joined to the essence. The following statements, collected from Locke (*Essay*, book iii., c. 3 and 6), exhibit the principal points of his doctrine of essence. He considers essence to be of two kinds: 1. The real essence, which constitutes the insensible parts of a thing, and is wholly unknown to us. 2. The nominal essence, which depends on that which is real, and is the complex idea, for instance, of the properties of colour, weight, malleability, fixedness, fusibility, &c., expressed by the word gold; for nothing can be gold which has not the qualities conceived in the abstract idea to which this name is applied. In simple ideas (see book ii. c. 2), the real and nominal essence are identical, but in substances they are always different. Each of the distinct abstract ideas which men make and settle in their minds by giving them names is a distinct essence; and the names which stand for such distinct ideas are the names of things essentially different. Thus, a circle is as essentially different from an oval as a sheep from a goat; the abstract idea which is the essence of one being impossible to be communicated to the other. As essences are nothing but the abstract complex ideas to each of which has been annexed a distinct and general name, and as of such ideas there are some which correspond to no reality in nature—for instance, those of mermaids, unicorns, &c. —it is evident that there are essences of things which have no existence. In considering essence with regard to the scholastic theory of genus and species, Locke observes that we classify things by their nominal essences, having no other measure of essence and species but our abstract general ideas or mental archetypes, without reference to which we cannot intelligibly speak of essential and specific difference. The doctrine of the immutability and ingenerable incorruptible nature of essences can be founded, says Locke, only on the relation between abstract ideas and the sounds by which they are signified; that is, on the fact that the same name retains the same signification, and also on the fact that, whatever may become of individuals, as Alexander and Bucephalus, the ideas of man and horse remain unaltered. Some of these positions, as that real essences are unknown, and that species are distinguished by essences merely nominal, are disputed in Green's Philosophy and Lee's work against Locke. (See also many of the earlier scholastics; and for an exposition of the doctrine of essence, according to the transcendental theory, see Kant's 'Kritik der reinen Vernunft' and Wirgman's Logic and Metaphysics, in the 'Encyclopædia Londinensis.') Substance, as distinguished from essence, is understood to mean all the essential, with the accidental qualities; and essence (genus and differentia, or common and proper) the essential qualities alone, that is, the pure substance, or metaphysical substratum. The Greek word *oúsia* (οὐσία) has many significations applicable to the individual, genus, species, and subject (Aristotle, *Metaphys.* l. 6, c. 3); on which it is remarked by Roy Collard (*Essai sur la Psychologie*, 1826, p. 149. 246), that while the Latin and all modern languages have two distinct expressions for essence and substance, it is surprising that the Greek, which is otherwise so rich, had only one name (οὐσία) for these two ideas. The word ὑπόστασις, *hypostasis* (substance), was subsequently employed, but with similar duplicity and confusion. Hence arose many of the Trinitarian controversies, or rather logomachies, which embroiled the first ages of the church; for Athanasius, Epiphanius, and most of the other Greek fathers understood πρόσωπον, person or mode of being, as meaning the same thing as ὑπόστασις, substance; and Sabellius, Arius, Nestorius, and Eutyches understood ὑπόστασις as signifying the same thing as οὐσία, that is, essence or nature. So that Sabellius said, there is one essence or nature in God, *therefore* one substance or person. There are three substances or persons in God, said Arius, *therefore* three essences or natures. There are two essences or natures in Christ, said Nestorius, *therefore* two substances or persons. There is but one substance or person in Christ, said Eutyches, *therefore* but one essence or nature. The essay on the difference between οὐσία and ὑπόστασις, essence and substance, which is often attributed to St. Gregory, appears to belong rather to St. Basil: at least it is contained in his 43rd epistle. The epithet *essential* denotes those indispensable qualities in a thing, without which it could not be what it is; and the name *essentials*, as the essentials of logic, signifies those parts alone which are valid for general or particular uses.

ESSENES. [Hessenes.]

ESSEQUIBO. [Guiana, British.]

ESSEX, an English county, situated on the eastern coast of the island of Great Britain. It is of irregular form, approximating to the quadrant of a circle, of which the north-western point of the county may be considered as the centre; the southern, south-eastern, and eastern sides a portion of the circumference; and the northern and western sides the circumscribing radii. It is bounded on the north by the county of Suffolk (from which it is separated by the river Stour) and by the county of Cambridge (from which it is separated for a very short distance by the river Cam); on the west by the county of Herts (from which it is separated, along a part of the boundary-line, by the river Stort, a feeder of the Lea, and by the river Lea); and by the county of Middlesex (from which it is separated throughout by the Lea, which joins the Thames at the south-western extremity of the county); on the south side and on a portion of the south-east side it is bounded by the gradually widening æstuary of the Thames, by which it is separated from the county of Kent; and on the remainder of the south-east side and on the east side by the German Ocean. The length of a straight line drawn from the north-western to the north-eastern extremity of the county, is 53 miles; but the northern boundary of the county, following its turnings, is about 75 miles; the length of a line joining the north-western with the south-western extremity, is 37 miles; but the boundary-line, from its many windings, extends to 53 miles. The length of a line joining the south-western to the north-eastern extremity of the county (which would be the chord of the circumscribing arc of the quadrant) is 63 miles; but the boundary along the bank of the Thames and the coast of the ocean is about 85 miles. The area of the county is estimated at 1533 square miles; or, taking the estimated areas of the several parishes, 979,000 acres. The population, according to the return of 1831, was 317,507, giving 207 to a square mile. In magnitude it is the tenth of the English counties, being a little smaller than Kent, and a little larger than Suffolk. In absolute population it is the thirteenth, and in relative population the eighteenth, of the English counties. Chelmsford, the county-town, is on the river Chelmer, 29 miles from St. Paul's, London, in a straight line north-east by east; and the same distance from Whitechapel Church, London, by the road through Romford, Brentwood, and Ingatestone. (*Ordnance Survey.*)

Coast, Islands, &c.—The bank of the Thames and the sea-coast of Essex are marshy almost throughout. From the junction of the Lea with the Thames to Purfleet, 11 or 12 miles, the marshes extend from a mile to a mile and a half or even two miles inland, and the river is confined to its bed by an embankment. At Purfleet the hills come down to the river; and from Purfleet to Grays Thurrock, 5 miles, the marshes consist only of a very narrow strip along the river-bank; the embankment is, however, carried on, except just at Purfleet. West and East Tilbury marshes, on each side of Tilbury Fort, extend 6 miles along the river, and from one to two miles inland; but below them the breadth of the marsh land is again contracted, along that bend of the river called The Hope, 3 miles long, from the lower end of which they again widen, and extend above 9 miles along the river, and nearly 4 miles inland, being intersected by an inlet called Hole Haven, the branches of which cut off from the mainland the low marshy Isle of Canvey. The embankment of the river is carried round the inlet of Hole Haven, along the bank of the creek which separates Canvey Island from the main, and round the whole of Canvey Island; those portions of the marshland which are not comprehended within the embankment are, below Tilbury Fort, salt marshes. From the eastern end of Canvey Island the marshes cease; and about Leigh and Southend the coast rises into low cliffs. At Shoebury Ness, a low point of land at the mouth of the Thames, 6 miles from the east end of Canvey Island, where the coast turns to the north-east, the marshes reappear; and with an interval of about a mile just beyond Shoebury, they continue along the coast 11 miles, to the mouth of the river Crouch. Nearly 4 miles from Shoebury a narrow creek, with many ramifications, penetrates inland into the channel of the river Crouch, and with that river cuts off from the mainland several low flat islands, Russelys, Haven Gore, New England, Potten, Wallasea, and Foulness. The edge of this creek and its various ramifications, as well as of the Broomhill and Crouch rivers, which unite with it, are embanked, and the islands are embanked all round. The marshy tract, including the islands and the adjacent part of the mainland, is from 3 to nearly 6 miles broad; and the sand (Foulness Sand), dry at low water, which at Shoebury Ness was a mile and a quarter broad (having widened from a quarter of a mile at Hole Haven), is off Foulness Island 4 miles broad; there is a road along this sand from Kennet's Head, near Shoebury, almost to the north-eastern end of Foulness Island. From the mouth of the Crouch the coast runs nearly north and south 8 miles to the mouth of the Blackwater river. In this part of the coast the sea encroaches upon the land. The marshes (Burnham Marsh, Southminster Marsh, Dengey Marsh, Tillingham Marsh, and Bradwell Marsh) extend in the southern parts nearly 5 miles inland, but gradually become narrow to the northward to St. Peter's Chapel, where they are interrupted by the higher ground running down to the coast; the sand, which is dry at low water, has a breadth of from two miles to two miles and a half. Between the æstuaries of the Blackwater and the Colne, in the inlet formed by their junction, the mouth of which inlet, from St. Peter's Chapel to St. Osyth Point, is above 5 miles over, is the island of Mersey, separated from the main by a marshy tract and an intervening narrow channel. The outer or seaward shore of this island is skirted by a very narrow tract of marsh-land; but the marshes about St. Osyth Point are from three-quarters of a mile to a mile broad. The marshes, however, terminate 4 miles beyond St. Osyth's Point, and (with a slight interruption of a mile of marsh-land near the mouth of Holland Creek) a high broken coast extends between 9 and 10 miles to the Naze, the most eastern point of the county. This point formerly extended much farther toward the east. The ruins of buildings have been found at considerable distances from land; and a shoal called West Rock is 5 miles from shore. From the Naze to Harwich, between 5 and 6 miles in a direct line north and south, the coast forms an inlet lined by salt marshes, and occupied by Horsey Island, Holmes Island, Pewit Island, and one or two smaller islands. The sea-coast terminates at Harwich; but the æstuary of the Stour, which is in most parts more than a mile wide at high water, extends up to Catawade Bridge, above Manningtree. (*Ordnance Survey.*)

The islands have been named in the course of the foregoing description of the coast we subjoin a few particulars of the chief of them.

Canvey Island is bounded on the south-west and west by Hole Haven, and on the north by a narrow creek, which separates it from the mainland. It is entirely marsh-land, banked in all round. Its extreme length from east to west is 6 miles; its greatest breadth from north to south 2½. Its area is estimated at more than 2600 acres (*Lib. of Useful Knowledge: Geography*), chiefly appropriated to grazing sheep and cattle; or 3600 acres (Morant's *Hist. of Essex*). It is connected with the mainland by a causeway leading to the village of South Benfleet. It does not form a distinct parish, but pays tithes and rates to several parishes. From its being comprehended in so many parishes, its population cannot be ascertained from the population returns; but the 'Clerical Guide' (A.D. 1836) assigns to it a population of 216. Morant, in his 'History of Essex,' states that there were then (A.D. 1768) fifty dwellings in the island. In 1622, the land being subject to be overflowed at high water in the spring tides, the owners of lands in it entered into an agreement with Joas Croppenburgh, a Dutchman, for 'inning and recovering the island,' as Morant terms it. A timber chapel was built for the use of the Dutchmen employed in the work. This chapel has been twice rebuilt: the present chapel will hold 100 persons. The value of the perpetual curacy, to which several endowments are attached, is 58*l.*: it is in the gift of the bishop of London. There is a yearly fair on the island.

Foulness Island (so called from the Saxon Fuᵹel, a fowl, and næꞅe, a promontory, 'the Promontory of Fowls') is bounded on the north by the river Crouch, on the east and south-east by the German Ocean, on the west by the Broomhill river, which separates it from Wallasea Island, and on the south-west by a creek which communicates between this river and the sea and separates Foulness from Potten and New England Islands. Its extreme length, from north-east to south-west, is almost 6 miles; its greatest breadth 2½. Its area is given by Morant at 4500 acres, and in the 'Lib. of Useful Knowledge' at 5000; but in the Population Returns, Foulness parish, which does not, so far as we know, comprehend more than the island, is given at 8060 acres, with a population of 630, almost entirely agricultural. The soil is good, the upper part producing corn of every kind, and the lower part pasturage; the only fences are ditches, which are filled at every tide. Fruit-trees thrive ill. The water is brackish; the only fresh water is rain-water. The houses are scattered over the island, upon the different farms; they are all of wood—a material which, from some cause or other, is here liable to rapid decay. The church, also of wood, is situated near the centre of the island; it will hold 300 persons. The living is a rectory, exempt from the archdeacon's jurisdiction, of the yearly value of 300*l.*, with a glebe-house. There is a yearly fair in the island. Beds of oyster and cockle-shells have been found beneath the surface of this island, which renders it probable that it was originally formed by deposits from the sea.

Wallasea, otherwise Wallet or Wallis, so named from the sea-walls which surround it, is bounded on the north by the river Crouch, on the east and south by the Broomhill river, which separates it from Foulness and Potten Islands, and on the west and south-west by Paglesham Creek, which separates it from the mainland. There is a causeway over Paglesham Creek. Its greatest length is, from east to west, 3½ miles; its greatest breadth is 1½ miles. The water is too salt to be fit for kitchen use, and the inhabitants have to fetch fresh water from the mainland; that in the ponds is so brackish that horses do not thrive till they have been inured to it. The whole island is marsh-land; it is included in several parishes.

Potten Island, Haven Gore, New England, and Russelys or Rushley, belong to the same group as the two foregoing; they are to the south-west of Foulness and to the south of Wallasea. The whole group is in Rochford hundred. In the creeks which surround or separate these islands are fed the small oysters called Wallfleet oysters.

Mersey Island is in an inlet formed by the æstuaries of the Blackwater and the Colne. The name is derived from the Saxon Meꞃe, the sea or a marsh, and iᵹ, an island. It is bounded on the south by the æstuary of the Blackwater river, on the south-east by the German Ocean, on the east by the æstuary of the Colne, and on all other sides by a creek, which, running through the marshes on its north-west side, under the names of Mersey Channel or Pyefleet Channel, separates it from the mainland; a portion of the marsh on the north side of the island is separated from the rest by a channel called Passfleet. The greatest length of the island is, from east-north-east to west-south-west, nearly 5 miles; the breadth varies from one to two miles. The island is divided into the two parishes of East and West Mersey or Mersea, of which the former comprehends an area of 1810 acres, with a population, in 1831, of 300; the latter an area of 3020 acres, with a population of 847; together, 4830 acres and 1147 inhabitants. There is a passage from the island to the mainland over the Mersey Channel, dry at low water, called 'the Strode' or 'Stroude,' *i. e.*, a bank along the side of a creek, river, or sea. The history and antiquities of this island will be noticed with those of the county at large.

Horsey Island is in that inlet which occurs between the Naze and Harwich. Its greatest length is from north-west to south-east about two miles: its greatest breadth rather more than a mile. It consists almost entirely of salt marshes: a spot rather more elevated than the rest, about one-fourth of the whole, on the south-west side of the island, is banked in. In the marshes there is a decoy for wild fowl.

Pewit Island and Holmes Island, with one or two others are near Horsey: all these islands are separated from each other and from the main by narrow channels.

Surface, Hydrography, Communications. This county has few hills of any considerable elevation: its general slope, as determined by the watershed, is towards the south and east; the coast and the banks of the Thames present a succession of unhealthy marshes commonly known as the hundreds of Essex. High Beach, on the north-west side of Epping Forest, near Waltham Abbey (390 feet high), Langdon hill, south of Billericay (620 feet high), Danbury hill, between Chelmsford and Maldon, of nearly the same height, and Tiptrey Heath near Witham, are probably the highest parts of the county. The Chalk downs which form the continuation of the Chiltern hills just cross the north-western part of the county in their extension towards the north-east.

The rivers of Essex are—the Thames with its affluents, the Lea (into which flows the Stort), the Roding, the Bourne Brook, the Ingerburn, and some smaller streams; the Crouch with its affluent the Broom-hill; the Blackwater with its affluents the Pods Brook or Witham river; and the Chelmer (into which flow the Sandon Brook, the Ter, and some other streams); the Colne with its affluent the Roman; the Stour; and the Granta or Cam.

The Thames bounds the county on the south side. Its course, though winding, is on the whole nearly from west to east. It is a tide river, and navigable for the largest merchant ships (that is, for East Indiamen of the first class, 1400 tons burden), and for frigates and other smaller ships of war throughout that part of its course which belongs to this county. The mouth of the Thames contains numerous shoals.

The Lea bounds the county on part of its west side. It more properly belongs to Hertfordshire, in which it has a considerable part of its course. It meets the border of Essex at the point where it receives the Stort, along which the boundary previously runs and flows south past Broxbourn (Herts), Waltham Abbey, Chingford, Layton, and Stratford (all in Essex), 20 miles, into the Thames. The banks of this river are marshy; and the marshes are from half a mile to a mile wide. The stream is frequently divided and flows in several channels, and in some places cuts have been made in order to improve or shorten the navigation, which comprehends all that part of the river connected with this county. Some of the acts of parliament relating to the navigation of this river are above 400 years old.

The Stort rises in Hertfordshire, but soon enters Essex, through which it flows for some miles, and then touches the border again, and flows sometimes on the border, sometimes in Hertfordshire, into the Lea. Its whole course is about 24 miles, for about 10 miles of which it has been made navigable. The navigation of the Stort and the Lea serves for the conveyance of corn, malt, wool, and other agricultural produce to London; and for the conveyance in return of coals, timber, deals, bricks, paving stones, groceries, cloth, and other articles of daily consumption.

The Roding rises in the western part of the county, near Easton Park, a short distance north-west of Dunmow: it flows southward about 15 miles to the neighbourhood of Chipping Ongar, where it receives the Cripsey Brook (about 9 miles long) from the north-west. From the junction of the Cripsey Brook, the Roding flows south-west in a very winding channel 14 miles past Kelvedon Hatch, Navestock, Abidge, Loughton, and Chigwell, to Woodford bridge: and from Woodford bridge it flows about 7 or 8 miles south and south by east past Ilford and Barking into the Thames. Its whole course is about 36 or 37 miles. The banks are low and marshy from the neighbourhood of Ongar. The west bank, from Ilford, and both banks from below Barking, are protected by embankments. It is navigable under the name of Barking Creek up to Ilford bridge, and serves to convey coals and other articles for the supply of Romford and the neighbourhood.

The Bourne Brook rises between the villages of Navestock and Havering-atte-Bower, and flows in a winding channel past Romford (below which it receives a small brook from Hornchurch), and between Dagenham and Hornchurch Marshes into the Thames. Its length is about 12 miles. In the lower part of its course the Bourne Brook is connected with the pool formed by Dagenham Breach. This breach was occasioned in 1707 by the blowing up of a small sluice that had been made for the drainage of the land waters: an opening was formed by the rushing in of the Thames, 300 feet wide, and in some places 20 feet deep: 1000 acres of rich land in the adjacent levels were overflowed, and the surface of nearly 120 acres was washed into the Thames, where a bank was formed nearly a mile in length, and extending halfway across the river. After various ineffectual attempts, the breach (which in course of time had been, by the force of the reflux every turn of the tide, worn into several channels like the arms of a river) was stopped, by driving dove-tailed piles and other expedients, under the direction of Captain Perry, who commenced his works in 1718. Within the embankment there is yet a pool of between 40 and 50 acres, where the soil was carried away by the tide. [Barking.] Through the upper part of this pool the Bourne Brook flows.

The Ingerburn rises near Havering-atte-Bower, not far from the source of the Bourne Brook, and flows southward, past Upminster, into the Thames. It is about 12 miles long. A stream of about the same length, which rises close to Thorndon Park near Brentwood, falls into the Thames near Purfleet.

The Crouch rises on the slope of the hills, south of Billericay, and flows east by north about 25 miles into the sea, passing the villages of Ramsden Cray, Wickford, Runwell, and much lower down, the village of Burnham. The tide flows about 13 miles up the river and is kept from overflowing the low lands on its banks by mounds. In the tideway there are many arms; and the various channels by which the river communicates with the sea form the group of Foulness, Wallasea, and the adjacent islands. Just above its mouth it receives the Broom-hill river (10 miles long), which is navigable for seven miles nearly up to Rochford.

The Blackwater, which in the upper part of its course is called the Pant, rises near the village of Wimbish, three or four miles from Saffron Walden, in the north-western part of the county. It flows first south-east and then south about 30 miles, past Redwinter, Great Sampford, Little Sampford, Great Bardfield, Weathersfield, Shalford, Panfield, Bocking, Stisted, Coggeshall, Kelvedon, Great Braxted, and Little Braxted, to the neighbourhood of Witham. Here it is joined by the Pods Brook, a stream 14 or 15 miles long, which rises near Great Bardfield and flows past Rayne, Braintree, Black Notley, White Notley, Faulkbourn, and Witham. From the junction of this stream the Blackwater flows south about 4 miles to the junction of the Chelmer; after which it flows east about 12 miles into the sea, having a course of about 46 miles. From Maldon, which is below the junction of the Chelmer, it is a tide river; and its æstuary, which is at high-water from 1¼ to 2½ miles wide, contains the islands of Northey, Osey, Ramsey, and Pewit. Lawling Creek and Goldhanger Creek are channels in the ooze or strand of this tideway.

The Chelmer rises near Debden, two or three miles south of the sources of the Blackwater, and flows south-south-east about 23 or 24 miles to the town of Chelmsford, passing Thaxted, Tiltey, Great Easton, Dunmow, Great Waltham, and Little Waltham. At Chelmsford it is joined by a stream which rises near Thorndon Park and flows northward between Billericay and Ingatestone to Widford and Writtle, and then turns east and runs into the Chelmer after a course of about 14 miles. From Chelmsford the Chelmer flows east about 10 miles till it falls into the Blackwater near Maldon. Its whole course is about 34 miles. The Sandon Brook, which rises near Stock, two miles north-east of Billericay, and has a course of about 10 miles, joins the Chelmer between Chelmsford and Maldon. The Ter rises between Felsted on the Chelmer and Rayne on the Pods Brook, and flows south-east 13 or 14 miles into the Chelmer, which it joins about two miles below the junction of the Sandon Brook. It passes Little Leighs, Great Leighs, Terling, and Hatfield Peverel.

The Colne rises in the north-western part of the county, between Great Sampford on the Pant, and Steeple Bumpstead on the Stour. It flows east about 7 miles to the neighbourhood of Great Yeldham, where it is joined by another stream of nearly the same length. From this junction it flows south-east 6 miles past Castle Hedingham and Sible Hedingham to Halsted; and from thence east-south-east about 13 miles to Colchester. Below Colchester it becomes a tidewater and flows 8 or 9 miles south-east into the sea at the north-east end of Mersey Island. Its whole course is about 35 miles.

The Roman rises about 2 miles north of Coggeshall on the Blackwater, and flows east by south about 13 miles into the tideway of the Colne, which it joins midway between Colchester and the sea. A brook eight or nine miles long from Layer Marney and Layer Breton joins the Roman about three miles above its junction with the Colne.

The Stour may be considered as equally belonging to Suffolk and Essex. Of the three springs which may claim to be its sources, one which flows past the village of Keddington is in Suffolk; a second in Cambridgeshire, and from it a stream flows by the town of Haveril in Suffolk; the third spring is in Essex, and the stream from it passes Steeple Bumpstead. From the junction of these three streams, which takes place about 6 or 8 miles from their respective sources, the river to its outfal divides the counties of Essex and Suffolk. Its course is first east about 10 miles past Wixoe, Stoke, Clare, and Cavendish in Suffolk, to the neighbourhood of Long Melford, above which it receives two small tributaries on the Suffolk bank; from thence its course is south by east about 8 miles past Sudbury in Suffolk to Bures: and from thence east 13 miles past Neyland, in Suffolk (below which it receives two considerable affluents), and Dedham in Essex to Catawade bridge, just above Manningtree. Below Catawade bridge the stream widens into a considerable æstuary, 11 or 12 miles long, and for the most part above a mile wide, which unites with the æstuary of the Orwell, a Suffolk river, and passes into the open sea between Harwich and Languard Fort. Its whole course is about 50 miles. Manningtree, Mistley, Wrabness, and Harwich are on the Essex bank of this æstuary.

The Cam rises near Debden, 4 miles from Saffron Walden, and flows first south-west for 2 miles, and then turns north and flows 8 or 9 miles past Newport, Audley Park, Littlebury, and Little and Great Chesterford, into Cambridgeshire, to which the principal part of its course belongs.

The Thames and the Lea are navigable throughout that part of their course which belongs to this county; the Stort is navigable from Bishop Stortford to its junction with the Lea; and it has been projected and acts of parliament obtained (A.D. 1812 and 1814) to make a navigable canal from Bishop Stortford along the valley of the Cam to the navigable part of that river below Cambridge, thus uniting the Thames and the Lea with the Cam and the Ouse. The tideway of the Crouch is navigable, and serves for the importation of groceries and fuel, and the exportation of agricultural produce. Near Burnham this river is a quarter of a mile wide (not three quarters of a mile, as Mr. Young states in his 'Agricultural Survey'), and has depth of water sufficient for a 98-gun ship: a 74 might go almost up to Hull bridge at the head of the tideway. The Blackwater does not appear to be navigable above the junction of the Chelmer. Vessels of considerable burden can get up to Maldon at spring tides. The Chelmer is navigable to Chelmsford. This navigation supplies Chelmsford and other places in the interior of the county with coal, deals, timber, and groceries, and serves for the exportation of agricultural produce. The navigation of the Colne, which extends to Colchester, answers the same purposes for that town and neighbourhood. The river Stour is navigable up to Sudbury, about 30 miles above Harwich. Essex has no navigable canals.

The principal roads in the county are the three roads from London to Norwich, by Ipswich, by Bury, and by Newmarket. The road by Ipswich enters the county at Bow bridge, about three miles from Whitechapel church, London, and crosses the county in nearly its greatest extent from south-west to north-east, passing through the market towns of Romford (12 miles from London), Chelmsford (29 miles), Witham (38 miles), and Colchester (51 miles), 7½ miles beyond which the road crosses the Stour at Stratford bridge and enters Suffolk. The road through Bury branches off from the Ipswich road at Chelmsford, and passes through the towns of Braintree (40½ miles from London) and Halsted (46½ miles), 8 miles beyond which the road crosses the Stour into the town of Sudbury in Suffolk. A branch from this road passes through the villages of Sible Hedingham, and Castle Hedingham, instead of through Halsted, and reunites with the main road about 2 miles before it quits the county: this branch is rather longer than the principal line. The road by Newmarket branches off from the Ipswich road a little beyond Bow bridge, crosses part of Epping Forest, and runs through the town of Epping (17 miles from London), about 7 miles beyond which it crosses the Stort into Hertfordshire: between 29 and 30 miles from London it re-crosses the same river into Essex, runs northward near but not through Saffron Walden, and finally quits the county at the village of Great Chesterford, 45 miles from London. A road which quits London by Shoreditch church enters the county at Lea bridge, and falls into this road at Snaresbrook, about 7 miles from London.

From the road by Colchester and Ipswich several roads branch off to different places on or near the bank of the Thames, or on the south and east coasts, as to Billericay (23 miles from town); to Tilbury Fort (25 or 29 miles by different roads); Southend (42 miles); and Maldon (37½ miles), from which place are roads to the villages of Bradwell (51 miles), Southminster (48 miles), and Burnham (48½ miles), in the marshes of the south-east coast. From Colchester there are roads to Harwich (71½ miles from London), at the north-east extremity of the county, and to Neyland, in Suffolk (57 miles), on the border of Essex. From the Colchester road, near Bow bridge, a road runs by Chipping Ongar (21 miles) to Dunmow (40½ miles). From the Bury road, between Braintree and Halsted, there is a road by Sible Hedingham to Haverill, in Suffolk (59 miles), on the borders of Essex. The towns in the northern part of the county are connected by a road which runs from Bishop Stortford, in Herts, on the border of Essex, through Dunmow, Braintree, and Coggeshall to Colchester. A road from Saffron Walden runs through Thaxted and Dunmow to Chelmsford; and short branches from the Colchester and Harwich roads lead respectively to Coggeshall and Manningtree.

Geological Character.—A considerable tract in the northern part of the county, stretching along the river Stour from the village of Keddington to between Sudbury and Neyland, and extending into the interior of the county bounded by a line drawn from Keddington to the village of Hempstead, six miles east of Saffron Walden, from thence to Thaxted and the village of Great Easton on the road from Thaxted to Dunmow, and from thence by the neighbourhood of Halsted (a mile or two north of that town) to the Stour, is occupied by diluvial beds, consisting of loam with fragments of chalk. The coast of the north-east part of the county is covered with the sand or gravel of the upper marine formation, which occupies a considerable part of the counties of Norfolk and Suffolk, and is locally designated 'crag.' At the headland of the Naze it constitutes about 30 feet of the upper part of the cliffs (which are about 45 feet high) resting upon the London clay south of the Naze its thickness appears to vary from 10 to 40 feet. In the projecting cliff of Harwich it includes friable masses of ferruginous sand, somewhat cemented together, and inclosing shells. The shells of this formation are in excellent preservation, commonly in a confused mixture, but at other times in patches of particular genera; and for the most part they do not appear to differ specifically from those of the neighbouring seas. Fragments of fossil bones washed out of the strata of this formation, in which they had been imbedded, are found on the beach at Walton, but occur in much greater quantities at Harwich. It is not known to what animal these belong, but a large fossil tooth, probably of the mammoth, was found, within the last few years, on the beach at Harwich. (Phillips and Conybeare, *Outlines of the Geology of England and Wales.*) In Mr. Greenough's Geological Map of England and Wales the cliffs south of the Naze are said to consist of loam, which contains the bones of the elephant, deer, horse, pig, aurochs or wild bull, and hippopotamus; and the strata along the south bank of the æstuary of the Stour are said to contain elephants' teeth.

The greater part of the county, including Epping and Hainault or Henhault Forests, is occupied by the London clay. This formation extends on the south and east to the banks of the Thames, to the coast, and to the tract occupied by the Crag: it is bounded on the inland side by a line drawn from the banks of the Stour about Boxted near Neyland to the junction of the Stort with the Lea. These may at least be taken as its approximate limits, for some of the beds of the plastic clay formation, which immediately underlies the London clay, are so similar to it, that it is difficult to trace exactly the line of demarcation. The London clay of the cliffs near Harwich contains beds of stratified limestone: the same cliffs are very productive in the fossils with which this formation abounds. South of Walton, near the Naze, abundance of septaria are found which are sent by sea to Harwich, where they are manufactured by government into a cement. The principal elevations in the county, High Beach, Langdon and Danbury Hills, and Tiptrey Heath, are formed of London clay. The surface of the vegetable mould does not commonly rest immediately on the London clay, but on alluvial beds of rich marl and loam, which often alternate with gravel and sand, and sometimes have a thickness of 30 or 40 feet.

The sands and clays of the plastic clay formation skirt the district of the London clay on the north-west. Halsted and Coggeshall, with the intermediate tract, are both on the plastic clay. The border of Essex, near Hadleigh, is the most northerly point at which this formation has been found.

The north-western extremity of the county, about Saffron Walden, consists of chalk: the great chalk district, in its extension from south-west to north-east, just crosses that part of the county. The chalk appears also at Purfleet and Gray's Thurrock, on the banks of the Thames. At the former place is an extensive chalk-pit belonging to Mr. Whitbread. Gun-flints are made at or near Purfleet. A subterranean forest underlies the marshes on the banks of the Thames.

Agriculture The climate of Essex is favourable to vegetation: the sea and the numerous æstuaries which bound it on the south and east soften the rigour of winter, and keep up a certain degree of moisture in summer. The same cause, however, produces cold fogs and exhalations in spring and autumn, which are very prejudicial to the health of those who are not inured to the climate. In consequence of this the most fertile portions of the county, which lie along the Thames and the sea coast, towards the Colne river, and which are usually called the hundreds of Essex, contain few seats of men of fortune; and notwithstanding the richness of the soil, and the great advantage of the marshes for feeding cattle, few men from other counties venture to take farms in this part of Essex. This reproach to the climate of the hundreds of Essex is rapidly diminishing, since the marshes have been better drained and the woods, which prevented the free circulation of the air and the dispersion of the fogs, have been gradually cut down, and the land brought into cultivation. The soil all along the coast, and 10 or 12 miles inland, is of a very excellent quality, being a friable loam of greater or less tenacity in different parts, but peculiarly adapted to the cultivation of wheat, beans, and oats. The Isle of Mersey, which lies at the mouth of the Colne river, has been long noted for the fertility of its soil, which is a fine alluvial loam composed of the various earths deposited from the river and the sea, like the warp lands along the Humber, or the polders in the Netherlands. The whole island is protected by a sea-wall, and produces every kind of grain which is usually cultivated; wheat, barley, oats, beans, and rape seed are the principal produce. Sir Humphry Davy found that the soil taken from Mersey Island and dried recovered its moisture from the atmosphere in less time than any other on which the experiment was tried; and this gives perhaps a better measure of fertility than any chemical analysis of its constituent parts. The best soils of Essex lie low, and require to be protected from the sea by embankments. Many marshes which formerly produced nothing but herbage, and were subject to inundations, are now converted into arable fields; and a great tract of land all along the coast, which used to be covered by the sea at high tides, is now laid dry by proper deep and broad ditches, here called fleets, and protected by high and well-constructed sea-walls, the repairs of which are a great expense to the proprietors. In some of these marshes the want of fresh water in summer was often felt severely. But lately recourse has been had to boring, which has been attended with great success, especially in the marshes at St. Osyth, where the finest springs of water have been found, which flow over the surface, and keep ample reservoirs continually full. The depth at which the water was found did not exceed fifty feet. This discovery greatly increases the value of these marshes in dry summers, such as that of 1836. The soil in the uplands along the coast consists chiefly of good loams varying in tenacity from a strong clay to a light gravel; most of it is of such a nature as to bear both turnips and beans. The stiffest soils, as well as the lightest, which form the two extremes, are more inland. The whole county has an undulating surface, which is very pleasing when fields and woods are interspersed, as is very generally the case in this county. The only level tract is that along the Thames, which extends to its mouth and along part of the south-eastern coast. The remainder consists of gentle elevations just sufficient to give a great variety of soil and aspect. The clay soils, on the whole, prevail in most parts of the county, and from this circumstance arises the modes of cultivation and the rotations of crops which are most commonly adopted. There are very few such light soils in Essex as there are in Norfolk and in Lincolnshire, and except on the borders of Hertfordshire and Cambridgeshire, chalk and marl are rare.

The cold wet clays have given rise to a mode of tillage which is minutely described by Arthur Young in his 'View of the Agriculture of this County, and held out as a pattern for the cultivation of cold wet clays. It consists of repeated ploughings in spring and summer, and exposure to frost in winter; two things, no doubt, highly beneficial to stiff land. But since the introduction of extensive under-draining and high manuring, much of the labour of the horses in ploughing and harrowing has been saved. The peculiarity of the Essex method, on stiff clays, was to work the fallows two winters for barley, during which period the land was ploughed in all directions eight or nine times, and even more, until it was sufficiently pulverized. The rotation was fallow; barley; fallow; wheat; beans: that is, two fallows in five years. The beans were frequently omitted: so that the land was alternately cropped and fallowed. No stock was kept on the farm, but a few cows for the use of the farmer, and the horses required to plough the ground; and the soil not being favourable for artificial grass, very little manure could be made except upon those farms which have marshes attached to them, which is not generally the case where the soil is the stiffest. There was consequently no sufficient manure for the land, and fallows were unavoidable to keep the soil in a moderate state of fertility. From sixteen to twenty bushels of wheat per acre, and from twenty-four to thirty of barley, was a common average produce on very good clays, which, with under-draining and proper manuring, now produce thirty-two of wheat and forty-eight of barley. The fallows at the same time are now removed to every fifth or sixth year.

The present mode of ploughing in Essex is similar to that of Norfolk and Suffolk; the ploughs most commonly in use are Suffolk wheel-ploughs, or swing-ploughs without wheels. The great manufactory of these instruments is that of Messrs. Ransom, at Ipswich, which chiefly supplies the three eastern counties. In good loams, not too stiff, two horses are driven abreast with reins, whether the plough has wheels or not. In the very heavy wet clays three horses are used, who walk one before the other in the furrow. The object is that they may tread the land less; but some very judicious agriculturists maintain that three horses treading the bottom of the furrow render it quite impervious to water, and do more harm than if they had walked abreast over the land already ploughed, where they would only have trod in small cavities. This is rather a new mode of viewing the subject, but it is worth considering, and making trials to ascertain the real effect.

After harvest the stubble is generally ploughed in, and before winter the field is laid in narrow ridges which are formed by two turns of the plough, and sometimes by four turns, or two bouts, as they are called. The ploughmen are expert in this, and lay the ridges very regularly, sometimes diagonally across the field, which has a good effect in dividing the soil more completely. In this form a greater surface is exposed to the frost and air, and in spring it is mellow and crumbling, where in autumn it rose in an unbroken furrow. If a fallow is intended to clean the land, it is ploughed at intervals, and the roots of weeds gathered and burnt; if it is not very clear of these by wheat-sowing time, it is put in ridges again till the next spring, by which time it is quite pulverized, and fit to be manured for barley and clover. If wheat is sown in autumn, the manure is put on before the last ploughing.

The most common rotation on the stiffest clays which will not bear turnips is now 1, fallow; 2, wheat or barley; 3, clover; 4, oats or wheat; 5, beans; and where manure is abundant, a second crop of wheat is taken in the sixth year before the course begins again. On the rich soils which bear turnips the usual rotation is turnips, barley, clover, wheat, beans, oats, or wheat. The manure is put on for the turnips and the beans: pease and tares are taken on part of the land, which otherwise would have had clover, and on that where the clover has failed. The mole plough has been used with good effect in many stiff soils, but the treading of the horses when the ground is soft, the only time when the mole plough can be used with effect, does a great deal of harm on such land, so that this instrument is not so generally used as it might be. The method of draining introduced of late is so superior in its effects to the mole plough, that this instrument will soon be laid aside, except in old pastures, where it may sometimes save the expense of draining. The subsoil plough is not yet generally introduced, but will, no doubt, soon be found an admirable instrument. The feeding of oxen in winter is now extensively practised by all good farmers in Essex, whether of strong or light loams. In sandy and gravelly soils sheep may be more profitable; but where turnips, especially the Swedish, or mangel wurzel can be raised, on heavy soils, the only practical plan is to draw them and give them to the cattle in yards or stalls, together with straw and oil-cake. When the soil will not allow the carts to go over the fields where the turnips are without doing harm in winter, asses with panniers are used to bring the turnips to a cart on the hard road, or at once to the yard, if it is near at hand. Asses and boys may be employed in this manner with advantage in many situations, and the expense will not exceed that of horses and carts, although they bring but a small load at a time.

In those farms which have marshes attached to them a great number of cattle is constantly kept, and all the straw is converted into manure, by which the arable land is kept in a high state of fertility. Along the Thames the salt marshes are extensive, and are profitable from the number of horses which are sent to feed there from London, after they have been over worked and require rest, or when they have met with some accident. Where there is not a sufficient number of horses taken in to stock the marshes, oxen and sheep are bought to complete the number, but the profit on these is seldom equal to that on horses agisted.

Besides the common crops usually cultivated, a considerable quantity of cole or rape seed is raised on the richer alluvial soils of the hundreds. It is a profitable crop, owing to the abundant supply of manure brought from London by the Thames. In other situations it has been found to deteriorate the succeeding crops too much, and the cultivation has been abandoned. Flax is not cultivated anywhere in the county, at least to any extent, and very little hemp is sown. A few hops are raised in the western part of the county, towards Cambridgeshire. The cultivation of this plant is spreading rapidly, and every year some new hop gardens are formed. The extent of hop ground is however inconsiderable, when compared with that in the hop-growing counties of Kent, Surrey, Hertfordshire, &c. The cultivation of caraway, coriander, and teazles, which is peculiar to this county, is described under CARAWAY.

In that part of Essex which lies within a few miles of London the cultivation of the soil partakes more of the garden culture. Vegetables, especially cabbages, are raised in great quantities, and very extensive fields are almost entirely devoted to the raising of potatoes. The ground is ploughed, and very highly manured with stable dung from London. The potatoes are usually set by hand, and moulded up with the plough. They are taken up with the common three-pronged fork, and wheat is immediately sown after the principal crop is taken up. Those which are of an early kind, and taken up in June or July, are followed by cabbages. Mangel wurzel for the London cowmen are also raised in considerable quantities. The meadows within fifteen miles of London regularly supply the Whitechapel market with hay, and every cart brings back a load of dung.

The cows and horses in Essex are chiefly reared in Suffolk, and Scotland supplies the oxen to fatten. There are a few considerable dairies about Epsom; but in general the number of cows kept on a farm is not considerable. Many calves are fatted, which are killed in the country, or go to Romford to be sold to London butchers.

Sheep are now kept in greater flocks by the Essex farmers than they used to be, and with considerable advantage. By means of draining, the land has been made capable of being folded over even in winter. It is not a sheep-breeding county, although many fine lambs are reared; but they are generally bought from the breeders in Wiltshire or Sussex in autumn, and sold fat to the butcher in the succeeding spring. The South-down breed is preferred in general; but there are also many improved Leicesters, and lately the Norfolk sheep have come into favour with some farmers, who think them hardy and profitable, and whose fences are in such a state as to repress their rambling propensities. There is no peculiar breed of horses. The Suffolk punches seem to be in general use for farm work, and it is scarcely possible to find a breed better adapted for every kind of work. When crossed with a half-bred horse of some substance and action, a Suffolk mare produces admirable carriage horses. In the marshes a good many horses are bred of various kinds, chiefly for draught. Essex has been long noted for a superior breed of pigs, which has been produced and improved by crosses with foreign breeds, chiefly the Neapolitan, which has very little hair, and the Chinese. The common Essex pigs have long ears standing upright, and thin in their texture. The best breeds are quite black, and have *wattles*, which are small appendages of skin like a long teat, hanging from the neck under the jaws. The most common Essex pigs, which are brought in great quantities to Smithfield market, are black and white, the head and rump being generally black, and the back and belly white. They fatten early, and make excellent small pork when fed on the refuse of the dairy. Lord Western's breed is in great repute, not only in Essex, but all over England.

The principal fairs in Essex are:—Billericay, August 2; October 7. Bishop Stortford, Holy Thursday; Trinity Thursday; October 10. Barking, October 22. Braintree, May 8; October 2 and 3. Chelmsford, May 12; October 12. Coggeshall, Whit Tuesday and Wednesday. Colchester, July 5, 23; October 20. Dunmow, May 6; November 8. Epping, Whit Tuesday; November 13. Grays, May 23; October 20. Halsted, May 6; October 29. Harlow, May 13; September 9; November 28. Lachinden, near Maldon, August 27. Maldon, May 1, 2; September 13, 14. Romford, June 24. Saffron Walden, day before Mid-lent Sunday; November 1. Stansted, May 12. Stebbing, July 9. Thaxted, Monday before Whit Monday. Waltham Abbey, May 14; September 25.

Divisions, Towns, &c.—Essex is divided into twenty parts, of which fourteen are called hundreds, five half hundreds, and one royal liberty. We subjoin a table of these divisions, with their situation, their respective areas, and population in 1831. We have distinguished by the letters (*h*) and (*l*) the half hundreds and the liberty.

	Acres.	Inhabitants.
Barstable, S.	73,290	13,181
Becontree (*h*), S. W.	35,950	34,924
Chafford, S.	34,930	9,988
Chelmsford, Central	81,560	27,179
Clavering (*h*), N. W.	18,140	4,062
Dengey or Dengie, S. E. (including the borough of Malden.)	59,110	13,746
Dunmow, Central	54,670	12,791
Froshwell or Freshwell (*h*), N. W.	27,710	6,807
Harlow (*h*), W.	28,660	7,796
Havering (*l*), S. W.	12,550	6,812
Hinckford, N.	109,610	40,183
Lexden, N. E. (including the borough and liberty of Colchester.)	73,830	37,677
Ongar, Central	58,060	14,715
Rochford, S. E.	57,980	13,604
Tendring, N. E. (including the borough of Harwich.)	82,900	27,083
Thurstable, E.	23,640	5,942
Uttlesford or Utlesford, N. W. (including the corporate town of Saffron Walden.)	59,550	17,257
Waltham (*h*), W.	25,240	8,351
Winstree, E.	23,790	4,411
Witham, Central	37,830	10,998
	979,000	317,507

There is no city in Essex. There are nineteen market-towns: three of these are parliamentary boroughs; Colchester, on the Colne, population of the borough and liberty in 1831, 16,167; Harwich, at the mouth of the Stour, population in 1831, 4297; and Maldon, on the Pant or Blackwater, population in 1831, 3831. Chelmsford, the county town, is on the Chelmer; population in 1831, 5435. Of these places, as well as of Barking, a market-town on the Roding (population of the town ward in 1831, 3404; of the whole parish, which includes Ilford, 8036), an account is given under their respective names. Of the other towns we subjoin an account

Billericay is in the hundred of Barstable: it appears in one antient record, under the name Beleuca, which is probably a variation of the old word Baleuga or Banleuga (in French Banlieu), the territory or precinct round a manor or borough. The town stands on an eminence on the road leading from London, through Brentwood, to Rochford and Southend. In Camden's time the market was considerable, but for a long time past it has been much decayed. The town has been much improved of late years by a number of good houses, and from its situation commands a beautiful prospect over the valley which extends southward to the Thames. It is in the parish of Great Burghsted or Bursted, the church of which is about a mile and a half or two miles south of the town. There is a chapel in Billericay, supposed to have been founded in the fourteenth century: the tower, which is surmounted by a leaden spire, may be of that date, but the body of the chapel is of more modern origin. There are places of worship for Baptists, Independents, and Quakers.

The inhabitants of the parish of Great Bursted, in 1831, were 1977, of which about two-fifths were engaged in agriculture. There is a weekly market on Tuesday. There are scarcely any manufactures. The living is a vicarage, with the chapel of Billericay annexed. By the Education Returns of 1833, there were in the parish twelve day and five boarding-schools with 260 children, and two Sunday-schools with 171 children. One of the day-schools, with 49 scholars, has a small endowment. There is a parish alms-house for poor women.

At Blunts-walls, near Billericay, are some earth works, the remains of a ditch and rampart, enclosing an area of about four acres: within the area were some artificial mounds, now chiefly levelled. Some remains of Roman pottery, several Roman copper coins and two silver coins, one of Trajan and one of Adrian, have been found in the neighbourhood.

Braintree is in the hundred of Hinckford, and on the north bank of Pod's Brook; it is on the high road from London to Norwich, through Bury, 40½ miles from London and 11½ from Chelmsford, the county town. Antiently the manor of Braintree, or, as it is termed in Domesday, Raines, comprehended the neighbouring parish of Rayne as well as that of Braintree: part of the lands in it belonged to the bishops of London; it was alienated by Bishop Ridley at the time of the Reformation: the manor-house (long since destroyed) was an episcopal palace. The parish was dismembered from that of Rayne, of which it was previously a hamlet, about the time of John or Henry III., the former of whom constituted it a market-town. The growth of the place is to be ascribed to its situation on one of the high roads from London into Norfolk and Suffolk, and to the building of inns and lodging-houses for the reception of the numerous pilgrims to the shrines of St. Edmund at Bury, and our lady of Walsingham in Norfolk. At the Reformation this source of its prosperity failed; but the town, and the adjacent village of Bocking, obtained consequence by the settlement of the Flemings who fled from the tyranny of the duke of Alba and established here the manufacture of baize and other light woollens, which for some time constituted the staple manufacture of the place, and is still carried on, though not to so great an extent as formerly.

It will be desirable to consider, in connection with Braintree, the adjacent village of Bocking; for although Bocking Church and Church Street are a mile and a half from Braintree, and on the north-east bank of the Pant or Blackwater, what is termed Bocking Street is contiguous to Braintree, and the two form one continuous place, the main street of which covers two-thirds of the extent between Pod's Brook and the river Pant, and stretches about a mile. Braintree consists of this street and of some others, formed by the intersection of the road from Bishop's Stortford and Dunmow to Coggeshall and Colchester, with the Norwich road, and by the convergence at this point of bye-roads from the surrounding villages: there are some back streets or lanes. The streets are inconveniently narrow; and many of the houses are of wood, and of considerable antiquity. The church is on the right at the entrance of the town from London; it is large, built chiefly of flint, and mostly in the perpendicular style of English architecture: the tower, at the west end, is of early English, and is surmounted by a lofty shingled spire of much later date. This church was enlarged in the time of Henry VIII., the expense of the alteration being partly defrayed by the profits of three mysteries or plays performed in the church. There are places of worship for Independents, Baptists, Quakers, and Methodists. Bocking Church is remote from the town: it is spacious and handsome, and chiefly in the perpendicular style; the tower is lofty and well designed. In the neighbourhood of Braintree are the remains of an antient church, formerly the parish church. Some coins, sepulchral urns, and other Roman antiquities, have been found.

The parliamentary returns for 1831 assign to the parish of Braintree an area of 2500 acres, 708 inhabited houses, and a population of 3422, about one-sixth agricultural: to that of Bocking an area of 3800 acres, 647 inhabited houses, and a population of 3128, about one-fourth agricultural, giving an aggregate of 6300 acres, 1355 houses, and 6550 inhabitants. The woollen manufacture has been in a great degree superseded by that of silk and crape, which is carried on to a considerable extent. The market is on Wednesday for corn, eggs, poultry, and occasionally cattle and live-stock of all kinds. There are several fulling and corn mills on the Pant.

The living of Braintree is a vicarage, of the yearly value of 212*l.*, with a glebe-house, in the archdeaconry of Middlesex: that of Bocking is a rectory, of the yearly value of 923*l.*, with a glebe-house, in the peculiar jurisdiction of the archbishop of Canterbury, being subject only to his jurisdiction, or that of his commissary, who is called Dean of Bocking.

There is at Bocking an almshouse or hospital, originally for seven poor people, but now divided into nine tenements, with an endowment from the benefactions of several individuals. The returns made to parliament show that there were in the two parishes in 1833 twelve day or boarding and day-schools (two of them with 255 to 275 scholars, endowed, and three others with 340 scholars, supported by subscription), containing 813 to 833 scholars; one dame or infant school, with 60 or 70 scholars; and four Sunday-schools with 540 scholars.

Coggeshall is in Lexden hundred, on the northern bank of the river Blackwater, 44 miles from London by Chelmsford, Witham, and Kelvedon, where the Coggeshall road turns off from the Ipswich and Norwich road. It is sometimes called Great Coggeshall, to distinguish it from the adjacent hamlet of Little Coggeshall. This town has by some antiquaries been considered to be the Canonium of Antoninus; and several Roman remains have been found in and about the town, but these are not deemed by others sufficient to prove anything more than that a Romish villa existed here. Morant, the historian of Essex, ascribes the origin of Coggeshall to an abbey, founded here in 1142 by King Stephen and Maud, his queen, for Cistertian monks. To this abbey succeeding princes granted various privileges, among which was that of holding a market weekly. The yearly revenue of the abbey at the dissolution was 298*l.* 8*s.* gross, or 251*l.* 2*s.* clear. The town was formerly much engaged in the clothing trade, and was particularly famous for a white baize of superior fabric, called Coggeshall Whites. The clothing trade has much declined for many years past.

The town is irregularly laid out, and the streets are narrow and ill paved. The church, at the north-eastern end of the town, is a spacious and handsome building in the Perpendicular style of English architecture: the windows, especially the east window, are large and handsome: there is a large square tower at the west end. A small part of the abbey is yet remaining; and near it is a bridge of three arches, originally built by King Stephen over a cut made to convey the water of the river nearer to the abbey. The abbey has some good plain lancet windows, and the interior has some good groining and windows, with shafts; it is occupied as a farm-house. At Little Coggeshall, a hamlet of the town, half a mile south of it, said to have been once a distinct parish, were formerly two churches, one of them built by the monks of the abbey for their own use, the other the parish church: the former has been long demolished; the latter, or what remains of it, is now used as a barn. There are meeting-houses for Independents, Baptists, Quakers, and Methodists.

By the returns of 1831, the parish comprehended an area of 2770 acres, and had 624 inhabited houses, with a population of 3227, about two-sevenths agricultural. The silk manufacture has been introduced here, and constitutes the principal manufacture of the place; that of woollens has declined. Some of the inhabitants are engaged in toy making. The market is on Saturday for corn, butter, eggs, and poultry, and occasionally live stock.

The living is a vicarage, of the yearly value of 215*l.* with a glebe house, in the archdeaconry of Colchester.

There are three unendowed almshouses near the church, and there is an endowed school. The parliamentary returns for 1833 assign to Coggeshall eleven day, or boarding and day, or evening schools, one endowed and one Lancasterian, with 294 scholars; thirteen dame or infant schools with 189 scholars; and six Sunday-schools with 490 scholars.

Dunmow, or Great Dunmow, is in Dunmow hundred, on the south-west bank of the river Chelmer, 38 miles from London by Epping, Harlow, and Hatfield Broad Oak; 40½ by Chigwell, Abridge, and Ongar; and 42 by Chelmsford, Great Waltham, and Barnston. Great Dunmow is considered by some antiquaries to have been the Roman station Cæsaromagus, which others fix near Widford, two miles south-west of Chelmsford. A number of Roman coins, of different emperors, have been found here. It is on a Roman road, crossing the county from west to east from Hertford to Colchester.

Dunmow is pleasantly situated on an eminence, and consists principally of two streets. The market-cross in the centre of the town was erected in 1578, and repaired in 1761. The church stands a considerable distance from the main portion of the town: the houses adjacent to it form a group called Church End. It is a spacious building, with an embattled tower at the west end; it has some portions in the Decorated English, and some in the Perpendicular style. the east window, which is very fine, is of Decorated character. There are meeting-houses for Independents, Baptists, and Quakers.

The area of the parish is 7910 acres; there were in 1831, 499 inhabited houses, and 2462 inhabitants: nearly one-half of the population is agricultural. The manufacture of baize and blankets, formerly carried on, has been given up; some sacking and coarse cloth are made. The market, which according to one of our latest authorities has been discontinued, was on Saturday.

The living is a vicarage of the yearly value of 421*l.*, with a glebe-house, in the archdeaconry of Middlesex. There is an almshouse for six poor persons.

About two miles east of Great Dunmow is the village of Little Dunmow (population in 1831, 378), where was a priory of Augustine canons, founded in 1104 by the Lady Juga, sister of Ralph Baynard, the then lord of the manor. Its yearly value at the dissolution was 173*l.* 2*s.* 4*d.* gross, or 150*l.* 3*s.* 4*d.* clear. The monastic buildings are now razed, and the site partly occupied by the manor house. The priory church was a large and stately fabric, partly in the decorated English, partly in an earlier style of architecture: the roof was sustained by pillars, having capitals ornamented with oak leaves elegantly carved. Some of these remain in the part now used as the parish church. The well-known custom of the 'flitch of bacon' was connected with the manor of Little Dunmow. [DUNMOW BACON.]

Easton Lodge, the seat of Viscount Maynard, is situated on high ground in a spacious park about two miles north-west from Great Dunmow. It is a venerable pile of the Elizabethan period and style. In the returns of schools made to parliament for 1833, no account is given of those at Great Dunmow, except that there was a national school for girls, containing 103 scholars; and that a national school for boys, suspended from various causes at Christmas, 1832, had at the time of the suspension an average attendance of 75.

Epping is in the half hundred of Waltham, and on the high road from London to Norwich by Newmarket, 17 miles from London. The principal part of the town, called Epping Street, consists of a street extending more than half a mile in length, lined with irregularly built houses, and having in the centre a row of decayed mean-looking shambles. The church is situated two miles north-west of the street, and with the houses grouped round it constitutes what is distinguished as Epping Upland. The church is pleasantly situated on a rising ground: it is dedicated to All Saints, and is not distinguished by its architecture. In the 'Street' is a chapel of ease originally belonging to the abbot and monks of Waltham, to whom the great tithes had been granted, and who kept the parish in their own hands as a curacy. The chapel is now vested in trustees for the benefit of the inhabitants. It stands at the London entrance to the town, and has lately been rebuilt. There are places of worship in Epping for Quakers and Independents; but that for the Quakers, though close to the town and virtually belonging to it, is in an adjacent parish There are many inns in the place.

The parliamentary returns for 1831 assign to Epping an area of 5250 acres, 429 inhabited houses, and 2313 inhabitants, of which 83 houses and 427 inhabitants are in Epping Upland and the hamlet of Ryhill, the last in Harlow hundred. In Epping Upland four-fifths of the population is agricultural, in the whole parish about two-fifths. The neighbourhood of Epping is celebrated for butter, pork, and sausages, of which articles it furnishes a considerable supply to the metropolis. The market is on Friday. In the spring great numbers of suckling calves are brought to Epping market from Suffolk, and those parts of Essex where dairy farms are numerous.

The living of Epping is a vicarage 'in the peculiar jurisdiction of the Court of the Commissary of London, concurrently with the Consistorial Episcopal Court.' (Lewis's *Top. Dictionary.*) Its yearly value is 729*l.*, with a glebe-house: the chapelry is of the yearly value of 120*l.*, arising from endowments.

The returns made to parliament in 1833 assign to the parish of Epping four infant or dame schools, with 50 children, eight boarding or day schools (one of them a charity school), with 343 scholars, and one Sunday school, with 70 boys. About 70 girls from this parish attend the national school of Thoydon Garnon or Theydon Gernon (two miles south-east of Epping Street), to which the parishioners of Epping contribute largely.

In the parish of Epping is Copped Hall, a mansion erected near the site of an older structure raised by the monks of Waltham Abbey when they had possession of the manor; it was built near a century ago, and has since been much improved. It is one of the finest seats in the county. Near it are the remains of an antient camp, probably British, now overgrown with trees, called Ambreys, or Ambersbury banks.

Epping gives title to Epping Forest, a considerable tract of waste land in the south-west part of the county. This forest was formerly called the forest of Essex, being the only forest in that county, the whole of which was antiently comprehended in it. By a charter of king John, dated 25th of March, in the fifth year of his reign, and confirmed in the eighth of Edward IV., all that part of the forest which lay to the north of the highway from Stortford to Colchester (very distant from the present boundaries) was disafforested. The forest was further reduced by a perambulation made in the twenty-ninth of Edward I., in pursuance of the Charta de Foresta; but the metes and bounds of it were finally determined by an inquisition and perambulation taken on the 8th of September, 1640, by virtue of a commission under the great seal of England, in pursuance of an act of the 16th of Charles I., for settling the bounds of the forests. The boundaries as thus settled include the whole of the eleven parishes of Wansted, Leyton, Walthamstow, Woodford, Loughton, Chigwell, Lambourne, Stapleford Abbotts, Waltham Holy Cross, Epping, and Nazing, and parts of the ten parishes of Chingford, Stratford, East Ham, West Ham, Little Ilford, Great Ilford, Barking, Dagenham, Haverstock, and Theydon Bois. The extent of the forest is estimated at 60,000 acres, of which 48,000 acres are estimated to be enclosed and private property; the remaining 12,000 acres are the unenclosed wastes and woods. What is called Henhault, or Hainault forest, is a part of this waste. (*Fifteenth Report of the Commissioners of Land Revenue*, quoted in Young's *Agriculture of Essex.*) Tendring hundred had been disafforested by king Stephen before the grant of John mentioned above. (Morant's *History of Essex.*) Epping forest is much resorted to by Londoners in what are termed 'gipsy parties;' and on the first Friday in July a kind of fair is held round the spot once occupied by an enormous oak called Fairlop oak. The fair retains the title of Fairlop Fair. On Easter Monday there is a stag-hunt much patronized by the inhabitants of London. The kennel for the hounds and the building belonging to the hunt were rebuilt several years ago at an expense of many thousand pounds.

Grays Thurrock is in the hundred of Chafford; it is on the bank of the Thames, 24 miles from London through

Romford, Upminster, and Stifford. This little town consists chiefly of one irregular street on a creek of the Thames, accessible to hoys and other small vessels. The church, near the north end of the town, is built in the form of a cross, with a tower on the north side.

The area of the parish is 1570 acres; the number of inhabited houses by the census of 1831 was 243, the population (including that of the liberty of Lee, in East Tilbury parish, Barstable hundred), 1248. The population had greatly increased before the census, owing to the number of labourers employed in brick-making. The market is on Thursday, and is chiefly for the sale of corn; it is much frequented: there is one yearly fair.

The living is a vicarage of the yearly value of 160*l.*, with a glebe-house: it is in the archdeaconry of Essex.

There were in 1833 eight day-schools, with 138 scholars, 20 of whom (boys) were educated from the proceeds of an endowment; and two Sunday-schools, with 202 children.

There are two villages near this town which also bear the name of Thurrock: Little Thurrock, to the east of the town (population 302), and West Thurrock, to the west of the town (population 804). The chalk-quarries of Purfleet are in the parish of West Thurrock. In Little Thurrock parish, and in Chadwell parish, which adjoins it, are some remarkable caverns or holes in the chalk, to which tradition has assigned the name of 'Cunobelin's gold-mines.' It has been conjectured that they were granaries of the antient Britons. They are also called 'Dane holes,' from having been used by those invaders as lurking-places or receptacles for plunder.

Halsted is in Hinckford hundred, on the north-east bank of the river Colne, and on the road from London by Bury to Norwich, 46½ miles from London, and 17½ from Chelmsford. It is supposed that a market was established here in the Saxon times: a hill at the upper end of the town, on which for several centuries it was held, retains the name of Cheping hill.

The town stands on the slope of a gravelly eminence, rising from the river, and consists of the main street along the Norwich road, and some other streets. The church is near the centre of the town. It is a large edifice, capable of accommodating 1200 persons, and consisting of a nave, chancel, and side-aisles, chiefly in the Perpendicular English style: the chancel is in the Decorated style, with a good window of five lights, and others of two lights. There is a tower at the west end surmounted by a wooden spire, the third that has been erected on the same tower, two previous ones having been destroyed by lightning. There are places of worship for Independents, Baptists, and Quakers. There is a house of correction at Halsted.

The parish comprehends an area of 6230 acres; and had, in 1831, 989 inhabited houses, and 4637 inhabitants: about three-eighths of the population was agricultural. The silk manufacture is carried on to a considerable extent: the manufacture of baize and other light woollens has been discontinued. There is a market on Friday, one of the principal in the county for corn and occasionally for cattle and other live stock. Some hops are grown round the town.

The living is a vicarage, of the yearly value of 390*l.*, with a glebe-house, in the gift of the bishop of London: the minor canons of St. Paul's are the impropriators. There was a college of priests at Halsted before the Reformation; the foundation was for eight, but it is doubtful there was ever the full number. The revenue at the dissolution was 26*l.* 5*s.* 8*d.* per annum gross, or 23*l.* 16*s.* 5*d.* clear.

There were in Halsted, according to the returns made to parliament for 1833, ten infant or dame schools, with 150 scholars; four day-schools, one supported by voluntary contributions, containing 40 children, and three others with 100 children; and four Sunday-schools, with 695 scholars. There is a grammar-school, founded by Dame Mary Ramsey, for 40 poor children of Halsted and Colne Engaine (a neighbouring parish), which is not distinctly mentioned in the return.

'At a house in this parish is a Greek inscription, brought from a village near Smyrna, where it was erected one hundred and fifty years before Christ, to the honour of Crato, a musician.' (*Beauties of England and Wales*, 1803.)

Near Halsted are the remains of the antient manor-house of Stansted Hall.

Manningtree is in the hundred of Tendring, on the stuary of the Stour, 60 miles from London, through Chelmsford and Colchester. This place was antiently known by the name of Sciddinchou; the origin of its present appellation, formerly written Many-Tree, is not known. It is a small place, irregularly laid out. The church or chapel, built out of the ruins of a more antient one, which stood on a site not far removed from that of the present building, was formerly very small, but has been lately enlarged. There are meeting-houses for Independents, Quakers, and Methodists.

The parish, or rather the chapelry, by the return of 1831, comprehended only 30 acres, and had 241 inhabited houses, and a population of 1237, a very small proportion of which was agricultural. Manningtree appears to be the residence of an unusual proportion of genteel families. A considerable trade in malt is carried on; and corn, coal, deals, iron, and fish are imported. The market is on Thursday.

The living is a perpetual curacy, united with the rectory of Mistley (of which parish the chapelry of Manningtree is a dependency) and the vicarage of Bradfield. The whole are of the yearly value of 698*l.*, with a glebe-house. They are in the archdeaconry of Colchester.

The chapelry contained, in 1833, one national school, containing 223 children; and one Sunday-school, with 60 children.

Mistley is adjacent to Harwich. Mistley Hall, the seat of the Rigby family, is on a pleasant eminence in the midst of gardens and plantations elegantly laid out. On the bank of the Stour is a quay with warehouses, at which considerable trade in corn, malt, and coal is carried on. These belong to the proprietor of the mansion.

Ongar, distinguished as Chipping Ongar from another parish of the same name (High Ongar), is in Ongar hundred, near the right or west bank of the Roding, and the left or east bank of the Cripsey brook, just above the junction of these two streams: it is 21 miles from London by Woodford bridge, Chigwell, and Abridge; or 24 miles by Epping.

A castle was built here by Richard de Lucy, one of the principal nobles of the time of Henry II.: the keep stood on the summit of a lofty artificial mound. The castle having become very ruinous, was, in the time of Queen Elizabeth, pulled down, and a brick house was built by the then owner of the place on the site of the keep. This house was demolished in 1744, and a large summer-house, of castellated architecture, built in its room. The moat which surrounded the keep, and other earthworks of the castle, still remain. The sides of the mound are planted with trees and shrubs.

The town chiefly consists of one long and wide street, extending from the bridge over the Cripsey brook, up the slope and along the brow of a hill. The church, which is in a central situation, is a small neat structure: the windows are remarkably small, so as to resemble the loop-holes of a castle. The church contains a monument of Jane, one of the daughters of Oliver Cromwell. Many Roman bricks have been worked into the building, and the foundations of Roman buildings are said to have been dug up in the churchyard. The principal road from Londinium (London) to Camulodunum (Colchester) is supposed by some to have passed this way, though others make it pass near or through Romford and Chelmsford. The town is within the area of an antient entrenchment, which may still be traced on its different sides. It was antiently called Ongar ad Castrum, perhaps with reference to this entrenchment. There is an Independent meeting-house.

The area of the parish is 480 acres: the number of inhabited houses in 1831 was 134, and the population 798, of which a small proportion is agricultural. The market is on Saturday.

The living is a rectory in the archdeaconry of Essex, of the yearly value of 127*l.*, with a glebe-house.

There were in 1833 nine boarding or day-schools, with 140 scholars; and two Sunday-schools, containing 95 children. One of the day-schools is endowed.

High Ongar, which is on the other side of the Roding, is a much larger parish than Chipping Ongar, and had, in 1831, a population of 1205, chiefly agricultural.

Rochford is in Rochford hundred, on the Broomhill river, which is navigable to within about a mile of the town, 40 miles from London through Romford, Brentwood, and Billericay. The town consists principally of two streets running one into the other in the form of the letter T: the houses are ill built the market-house, which is of timber, stands near the centre of the town, and has on it the date 1707: it is not used as a market-house now. There are two bridges over the river, which close to the town is an inconsiderable brook. The church, which is a little removed from the town, is a good-sized building, consisting of nave, chancel, and side aisles, with a lofty brick tower at the west end. There is an Independent meeting-house. At the lower end of the town are a row of brick almshouses for six poor people, founded and endowed by Robert Rich, earl of Warwick, in the early part of the seventeenth century.

The parish comprehends an area of 1240 acres: it had, in 1831, 271 inhabited houses, and a population of 1526, of which more than a third was agricultural. The chief trade is in corn. The market is on Thursday.

The living is a rectory, in the archdeaconry of Essex, of the yearly value of 570*l.*, with a glebe-house.

There were in the parish, in 1833, a Lancasterian school, with 70 boys; a national school, with 64 children (rather more on Sunday); seven other day-schools, with 158 scholars; and one Sunday-school, with 100 children: to the Sunday-school a lending library is attached.

Romford is in the liberty of Havering atte Bower, on the Bourne brook: it is a great thoroughfare, being on the high road from London to Chelmsford, Colchester, Ipswich, Bury, Norwich, Yarmouth, and other large towns in Essex, Suffolk, and Norfolk; between 11 and 12 miles from London. The derivation of the name has been much disputed, some contending that it is derived from Roman ford, others from two Saxon words signifying 'broad ford.' This place, or some spot in the neighbourhood, is supposed to be the site of the Durolitum of the Itinerary of Antoninus

The town consists almost entirely of one long wide street, near the centre of which is the market-house and town-hall, which was repaired in 1768 at the expense of the crown. The houses are tolerably good, and the street is paved and lighted. The chapel, situated at the entrance to the town from London, on the left hand, is a tolerably large building, erected in the early part of the fifteenth century: it is dedicated to the Virgin Mary and St. Edward the Confessor, and consists of a chancel, nave, and north aisle, with a square tower at the west end. In the east window is a figure of Edward the Confessor in stained glass, the arms of that king, and another coat of arms. The Independents have a meeting-house at Collier's Row, a hamlet of the parochial chapelry of Romford, about two miles north-west of the town; a house for the pastor and a small endowment are connected with it. There is also a Methodist meeting. An almshouse for five poor men was founded and well endowed by Roger Reed near the end of the fifteenth century. There were formerly cavalry barracks at the London entrance to the town: they were of wood, and have since been pulled down.

The parish comprehends an area of 3340 acres, and had, in 1831, 766 inhabited houses, and a population of 4294, of which less than one-third is agricultural. The general market is on Wednesday: there is a market on Monday for calves, and on Tuesday for hogs. In spring and summer great numbers of suckling calves are brought to market from Suffolk and the dairy districts of Essex.

This parish, with those of Hornchurch and Havering, form the liberty of Havering atte Bower, the quarter sessions for which are held at Romford. Commissions for trying felons within this liberty may be obtained by a small payment to the crown, but no commission has been applied for for many years. (Lysons' *Environs of London.*)

The living is a chapelry originally included in the parish of Hornchurch, the limits of which were once coextensive with those of Havering liberty, but separated from it by act of parliament, A.D. 1658. The living is of the annual value of 800*l.*, with a glebe-house, in the patronage of New College, at Oxford: it is in the archdeaconry of Essex. There were, before the Reformation, a chantry and a small guild attached to Romford chapel, the lands of which were valued at 4*l.* 10*s.* 2*d.* per annum.

There were, in 1833, in the parish, one endowed day-school with 121 scholars, six other day-schools with 172 scholars, and two Sunday-schools with 143 scholars.

Walden or Saffron Walden is in the hundred of Uttlesford, which occupies the north-western extremity of the county: it is near the Cam, and a little to the right of the road from London to Newmarket and Norwich, 42 miles from London. It was conjectured by Doctor Stukely, but without sufficient authority, that this was a Roman station. Its name is derived from two Saxon words, Weald, a wood, and den, a valley: its epithet 'Saffron' is derived from the great quantity of that plant formerly cultivated in the neighbourhood: this cultivation has been long abandoned. At the period of the Domesday survey the lordship of Walden was possessed by a Norman, Geoffrey de Magnaville, one of the companions of the Conqueror. This nobleman erected at Walden a castle, which, judging from the remains of it, must have been of great strength. The remains occupy the highest part of the town, and consist of some parts of the walls and towers, built with flint bound together by a very hard cement. Geoffrey, the grandson of the founder of the castle, having deserted the party of Stephen for that of the Empress Maud, obtained of her permission to remove the market from the neighbouring town of Newport (now a village) to Walden. Having been however seized by Stephen, he could only obtain his freedom by the delivery of his castles, Walden being one of them, to the king. The same nobleman founded here in 1136 a Benedictine priory, which was some years later raised to the rank of an abbey: this abbey obtained several valuable benefactions, and had, at the time of the dissolution, a yearly revenue of 406*l.* 15*s.* 11*d.* gross, or 372*l.* 18*s.* 1*d.* clear. The site was granted to Sir Thomas Audley, lord chancellor, and the title of Lord Audley of Walden was conferred upon him. On the site and grounds of the monastery, enlarged by a subsequent addition of 200 acres, stand the present mansion and park of Audley End.

The town is irregularly laid out, and the houses are many of them of considerable antiquity. The church is 'a large and very elegant specimen of the late Perpendicular style. It has a nave and aisles, large south porch, and chancel and aisles. The clerestory windows of the nave are very large and of six lights; those of the chancel, which has a lower roof, are much smaller, and two in each arch. The eastern end of the nave is finished by two octagonal turrets with crocketted ogee heads. The windows of the aisles are very large, filling up the spaces close to the buttresses, and they are mostly square-headed. The tower has bold buttresses, crowned with octagonal turrets, and very long plain pinnacles. These pinnacles and the spire, which is of wood covered with lead, appear to be of later date than the church. The interior of this church is very fine, the piers being remarkably light and elegant.' Rickman's *Essay on Gothic Architecture.* Since the above extracted account was written the wooden spire has been replaced by one of stone more in character with the rest of the building. There are two places of worship for Calvinistic or Particular Baptists, and one for Arminian or General Baptists, and one each for Independents, Quakers, and Wesleyan Methodists. The town-hall is a neat building in the market-place, which is spacious. There are a cattle-market and a handsome range of almshouses lately built in the place of a former range founded and endowed by Edward VI. for 16 decayed housekeepers of each sex. There is also a neat building lately erected near the ruins of the castle for a museum, and for the meetings of a literary society established in the town. Audley House, or as it is usually termed, Audley End, the seat of Lord Braybrooke, is a noble mansion erected by the Earl of Suffolk, who in the time of James I., had inherited the estate of the Lord Chancellor Audley. The grounds are beautiful, and the Cam, which flows through them, though here an inconsiderable stream, expands so as to form a considerable sheet of water in front of the house. The mansion, originally more extensive than at present, is still one of the finest in the county; it is said to have cost at its erection 190,000*l.* The house contains some interesting portraits and other pictures. On a green near the town is a singular remain of antiquity called the Maze. It consists of a series of concentric circles with four outworks cut in the chalk, which here rises to the surface. Its origin and use are unknown: Dr. Stukely conjectures that it was a British cursus or place of exercise for the soldiery. A short distance from the town are the remains of an antient encampment of an oblong form called Pell Ditches or Repel Ditches. The south bank is 730 feet long, 20 high, and 50 broad at the base, and 6 or 8 wide at the top: the west bank is 588 feet long: both banks and ditches are extremely bold and well preserved.

The parish of Saffron Walden contains 7380 acres, and had in 1831 941 inhabited houses and a population of 4762, of which about one-fourth was agricultural: there are many genteel families in the town. The chief trade is in barley and malt: the market is on Saturday. Walden is a municipal though not a parliamentary borough. By the Municipal Reform Act the corporation consists of a mayor, four aldermen, and twelve councillors. The borough is coextensive with the parish.

The living is a vicarage in the archdeaconry of Colchester, of the annual value of 237*l.*, with a glebe-house. Lord Braybrooke is patron and impropriator.

There were in Walden in 1833 one infant school with 70 children: two national schools, containing 124 boys and 106 girls (with the addition of 10 boys on Sundays); a school for 25 boys and as many girls, chiefly supported by Lord Braybrooke; and six other day-schools with 212 children; and two Sunday-schools with 289 children.

Waltham Abbey, or Holy Cross, is in the half-hundred of Waltham, 12½ miles from London, a little to the right of the road to Ware, Royston, and Huntingdon. It is on the river Lea (which is here separated into several channels, some of which flow through the town) near the junction of the Cobbin brook, which flows a short distance from the town on the east and south.

The first notice of Waltham occurs in the reign of Canute, whose standard-bearer, Tovi, founded here a religious house with two priests, probably secular canons of St. Augustine. The place derived sanctity and name (Holy Cross) from a cross with the figure of Christ upon it found at Montacute and transferred here, to which miraculous powers were ascribed. Harold, afterwards king of England, enlarged the foundation of Tovi, A.D. 1062, furnished it with ample endowments, increased the number of canons to 12, one of whom had the rank of dean, rebuilt the church, and established such a school of learning as the state of the age admitted. When the unfortunate Harold fell in the battle of Hastings, A.D. 1066, his body, which had been given up to his mother, was brought to Waltham for interment and his tomb erected. William the Conqueror treated the religious of Waltham harshly, and deprived them of their moveable valuables, but left their lands untouched or nearly so. In the reign of Henry II. (A.D. 1177) regular canons were substituted for seculars, the number enlarged to 16, the endowments of the establishment augmented, and the dignity of abbot conferred upon the head of it. Subsequent monarchs favoured the establishment: Henry III. frequently resided in the abbey, and granted to the inhabitants of the village the privilege of a market and a fair. Some accounts make the market more antient. In the reign of this king, A.D. 1242, the conventual church was again solemnly dedicated, the king and several of his nobles being present. The yearly revenues of the abbey at the dissolution were 1079*l.* 12*s.* 1*d.* gross, or 900*l.* 4*s.* 3*d.* clear.

The town consists principally of one main street, running nearly east and west. The church, formerly part of the conventual church, is on the north side of the main street, near the centre of the town. As the conventual church it was very extensive, consisting of nave, transept, choir, and chapels. At the intersection of the transept, which may still be traced, rose the great tower, which contained a ring of five bells. Part of this tower having fallen in, the remainder was blown up by underminers, and the whole choir, tower, transept, and east chapel demolished. The nave and some adjacent chapels alone remained: the nave, with its side-aisles, forms the body of the present church. The extent of the original fabric may be estimated by the fact, that Harold's tomb, which was in the choir or in a chapel beyond it, stood about 120 feet eastward from the termination of the present building. The church is about 90 feet in length, and in breadth, including the side-aisles, 48 feet: it is in the Norman style, with round massive piers (some of which have indents of wave and zig-zag lines), dividing the nave from the side-aisles; semicircular arches, and zigzag enrichments. The great arch of the cross, now walled up, is a very fine one. Above the arches dividing the nave from the side-aisles are two other ranges or tiers of arches: those of the second tier correspond in width to those of the lower, but are not of equal height; the arches of the third tier are three to each arch of the lower tiers, with a window pierced in the middle arch of the three. The roof is modern, and little ornamented. The side-aisles are surmounted with galleries, erected about half a century ago. At the west end of the church is a heavy square embattled stone tower, 86 feet high, bearing the date 1558. From the south side of the church projects the Lady Chapel, now used as a vestry and school-room, under which is a fine crypt. Another little chapel, at the south-east end of the church, is now a repository for rubbish. These chapels have some beautiful and well-executed portions in the Decorated English style. There are in the church various inserted windows of different dates. The font is apparently very antient, and there is a fine wooden screen. The building has been much injured and its beauty deformed by dilapidation and alterations, but it is still well worthy of attention.

Exclusive of the nave of the abbey church, the remains of the abbey are but few. They consist of an entrance-gateway, and bridge across an arm of the Lea, which bounds the enclosure of the abbey on the west side; some walls, and a few vaulted arches in a garden belonging to the abbey farm. The refectory is reported to have stood eastward of the church; and what is now the abbey farm is said to have been antiently the stables. The gateway is in a much later style of architecture than the church. In the gardens formerly belonging to the abbey, now occupied as a nursery-ground, is a tulip tree, reported to be the largest in England. There are at Waltham Abbey meeting-houses for Baptists and Wesleyan Methodists.

The parish of Waltham Abbey is extensive, comprehending 11,870 acres: it had, in 1831, 760 inhabited houses, and a population of 4194; but of these 344 houses and 1902 inhabitants were in the three hamlets of Holyfield, Sewardstone, and Upshire; leaving for that part of the parish which contains the town 416 houses and 2202 inhabitants; only a small proportion of the population of the town division is agricultural; but the greater part of the population of the hamlets is so. The powder-mills belonging to government employ many hands: many are engaged in the printing of silk handkerchiefs, and some in the manufacture of pins: some also, though not in the town division, are engaged in throwing and spinning silk. The market is on Tuesday.

The living is a donative curacy, in the peculiar jurisdiction of the bishop of London: it is of the annual value of 237*l.* There is an almshouse for eight poor widows.

There were in the year 1833 one infant school, with 135 children: three day-schools, viz., one endowed for 20 boys and 20 girls, one national school for 60 girls, and a school with 24 boys at High Beach, besides many small private day-schools; one evening-school, supported by voluntary contributions, with 42 boys; and four Sunday-schools, with 310 children.

Witham is in the hundred of Witham, and on the high road from London to Norwich by Ipswich, 38 miles from London. It is on Pod's Brook, just above the junction of that stream with the Blackwater.

This town is generally reputed to have been built by Edward the Elder, but it is questionable if that prince did more than restore a place that bears marks of having been a Roman station. On Cheping Hill or Chipping Hill are the remains of a circular camp, with a double vallum. A quantity of Roman bricks are worked up in the tower and body of the church, and one or two Roman coins were discovered in levelling the fortifications of the above-mentioned camp. From these indications it has been supposed that Witham was the Canonium of Antoninus, which is placed by others near Kelvedon.

The town consists of two portions: the larger portion consists of one main street along the high road and a short street or two branching from it: the other portion, in which is the church, is situated half a mile to the north of the principal part, on Cheping Hill, mentioned above. There is no kind of manufacture carried on; but the trade of the place arises from the wants of the neighbourhood, and its situation on a great public thoroughfare. Several genteel families reside in the town; and a mineral spring, Witham Spa, attracted some years since, and perhaps still attracts, visitors in the summer. The church is a tolerably large building, containing some antient monuments. There are places of worship for Independents, Baptists, Quakers, and Catholics; and several almshouses, but none very extensive or richly endowed.

The parish comprehends an area of 3280 acres; and had, in 1831, 552 inhabited houses, and a population of 2735, of which less than a fifth was agricultural. The market is on Tuesday.

The living is a vicarage, in the archdeaconry of Colchester, of the yearly value of 473*l.*, with a glebe-house, in the gift of the bishop of London.

There were, in 1833, fifteen day-schools with 361 children; two boarding-schools with 40 girls; and one Sunday-school with 200 children, and a lending library attached. Of the day-schools, one (for 100 boys and 50 girls) is partly supported by an endowment; another (for 70 girls) partly by voluntary contributions.

Faulkbourn hall, not far from Witham, is an antient manor-house, different parts of which have been erected at very different periods. A tower gateway of curious architecture is supposed to be as old as the time of Stephen.

Beside the above market-towns, there are several villages which are of sufficient importance to call for notice. The following were formerly market-towns, and some of them still retain their place as market-towns in many of our common maps:—Great Bardfield, Brentwood, Dedham, Harlow, Hatfield, Horndon, Ingatestone, Leigh, Thaxted, and Rayleigh.

Great Bardfield is in the half hundred of Froshwell or Freshwell, on the south bank of the Pant or Blackwater, over which it has a strong brick bridge. In the south aisle of the church are some coats of mail, &c., said to have belonged to the Lumley family. The population, in 1831, was 1029, about half of them agricultural. The market has been long given up.

Brentwood is on the road to Chelmsford and Colchester, 18 miles from London and 11 from Chelmsford. Some Roman antiquities have been found in the neighbourhood. The assizes for the county were formerly held here. The place consists chiefly of one main street along the high road, with irregular and mean houses: from its situation on a great thoroughfare, it has many public-houses and inns. There are the remains of the old prison and town-hall, the tenants of which are bound to put them in repair if ever the assizes should be held in the place again. There is an antient chapel in the town (for Brentwood is only a chapelry in the parish of South Weald, and the living a perpetual curacy, worth 124*l.* a year, with a glebe-house, in the archdeaconry of Essex), founded about the year 1227, by the prior of the monastery of St. Osyth, for the tenants of a manor belonging to that monastery: this chapel is a small building, dedicated to St. Thomas à Becket, of whom it contains a rude image carved in wood. There is an endowed school: races are held in the neighbourhood; and at Warley, not far off, are cavalry barracks. The area of the chapelry is 730 acres: the population, in 1831, was 1642. The market has not been discontinued many years. There are two yearly fairs, at which a great number of cattle are usually sold: it is one of the fairs from which the farmers of 'the hundreds' obtain their live stock.

Dedham is in Lexden hundred, on the south bank of the river Stour, just on the right hand of the road to Ipswich and Norwich, about 58 miles from London. In the reign of Richard II. this place was famous as one of the seats of the clothing trade. It is situated in a picturesque valley, and is a small place, consisting chiefly of one street. The church is a large building in the Perpendicular style of English architecture; it has a fine tower at the west end with octagonal turrets crowned with rich pinnacles. There is a bridge over the Stour. The population of the parish, in 1831, was 1770, about half agricultural: many genteel families reside in the place. There is an endowed free grammar school for 40 boys; and an English school, partly endowed, with more than 60 scholars; and a number of private schools. The living is a vicarage worth 170*l.* per annum, with a glebe-house: the rectorial tithes form the foundation of a lectureship connected with the church. The Rev. W. Burkitt, author of a well-known commentary on the New Testament, was lecturer here.

Harlow is in the half hundred of Harlow, just beside the road by Newmarket to Norwich, rather more than 23 miles from town. The village is about a mile from the river Stort. It was formerly the seat of a large woollen manufacture and of a considerable trade. The church is in a central situation, and is of tolerable size: it was originally in the form of a cross, with a central tower rising from the intersection of the transepts: this church was much injured by fire in 1711, and upon its restoration a cupola was substituted for the tower: the church is adorned with much painted glass. There is a place of worship for Baptists, several almshouses, and a charity school.

At Harlow Bury, a mile north of the village, is a large antient chapel, used as a barn or farm-office. It has a fine semicircular-headed door, the shafts of which have sma capitals like those of the Galilee at Durham. There are some small windows with round heads and others with pointed heads.

The parish of Harlow contains 4490 acres, and had in 1831 a population of 2101, above half agricultural. There are three considerable fairs in the year for horses and cattle; the second, held on Harlowbush Common, two or three miles south of the village, is the most frequented; horses for all purposes, black cattle and other live stock, and wool, are brought for sale, and the fair attracts a concourse of people for fifteen or twenty miles round, and even from the metropolis. The living is a vicarage, of the yearly value of 383*l.*, with a glebe-house, in the archdeaconry of London.

A large sum of money (8000*l.*), bequeathed by Mr. Geo. Fawbert, has been vested in trustees for the establishment of a day school and library at Harlow, and for apprenticing or otherwise advancing in the world those educated at the school.

Hatfield is in the half hundred of Harlow, on the road from London by Harlow to Dunmow, 30 miles from town: it is on the Pincey brook, which flows into the Stort. This place was formerly part of the royal demesne, from which circumstance it obtained one of its distinguishing epithets, Hatfield Regis: its other designation of Hatfield Broad Oak it obtained from a large oak supposed to have flourished here in the Saxon times. A portion of this tree (if we may trust the accuracy of Mr. Arthur Young's statement) was yet remaining in Hatfield Forest, a mile or two north of the town, when that gentleman published his agricultural survey of Essex, in which an engraving of this venerable tree is given. Aubrey de Vere founded, A.D. 1135, a Benedictine priory at Hatfield, supposed to have been at first a cell of the abbey of St. Melanius Redonensis, at Rennes or Rédon, in Bretagne, but subsequently rendered independent. The possessions of this priory at the suppression were estimated at the yearly value of 157*l.* 3*s.* 2*d.* gross, or 122*l.* 13*s.* 2*d.* clear. The parish, which is very large, had in 1831 a population of 1825, chiefly agricultural. The church has a western tower and a large porch in the Perpendicular style, and other parts are of a character betokening a more antient date. The Methodists have a place of worship. The living is a vicarage, worth 210*l.* a year, with a glebe-house, in the archdeaconry of Middlesex.

Horndon, distinguished from two other parishes of the same name by the epithet 'on the hill,' is in Barstable hundred, and is situated, as its name imports, on an eminence, from whence there is a fine view. The church is in the middle of the town; it has a stone tower, embattled. The parish had in 1831 a population of 511, chiefly agricultural. The market, when Morant published his history of Essex (1768), was very small; it has been since given up. There is one fair in the year, chiefly for wool. It is 27¼ miles from London through Brentwood.

Ingatestone is in the hundred of Chelmsford, and on the road from London to Chelmsford, 23 miles from London. It is supposed to have derived its name from a Roman milliary stone, and from the Saxon word Ing, a meadow; thus, Ing-atte-stone. The village, which extends into the adjoining parish of Fryerning, consists of a long street along the high road, and a smaller street running out of this to the south-east. From its situation on so great a thoroughfare it abounds with inns. It had formerly a large cattle market, but this is now discontinued: there is a large cattle fair The church is in the middle of the town, and contains several monuments of the Petre family. There is an almshouse and an Independent meeting-house. Ingatestone Hall, a little way south of the town, was once the seat of the Petre family: it is a very antient and irregular pile. The grounds are well stored with fish-ponds, and the whole was formerly surrounded by a park. The population of the parish, which is small, was in 1831 789, chiefly agricultural; to these we may add perhaps 300 for that part of the village which is in Fryerning parish. It may be observed that the syllable Ing (or Ging, which appears to be a variety of it), which enters into the name Ingatestone, is found in the names of several other parishes or manors in this neighbourhood, as Fryern-ing, Margarett-ing, Mountneys-ing, Ginges-joiberd (commonly called Buttsbury), Ingrave or Ging-ralph, and Trestl-ing or Thrustl-ing; to which we may add Bark-ing.

Raleigh or Rayleigh is in Rochford hundred, 34 miles from London. It was, at the time of the Domesday survey, one of the numerous lordships of Snene, who, having joined the Conqueror at an early period, was allowed to retain his possessions. He built a castle here, of which some earthworks yet remain, consisting of a mound with an oval base, surrounded by a double ditch and embankments. The village stands on an eminence, and has, at the upper end, the church, an edifice principally in the Perpendicular style, with some portions of an earlier date: the tower has a short spire and a staircase turret battlemented. The Baptists have a place of worship here. When Morant wrote, a weekly market was held at Rayleigh: it is now given up. There is a cattle fair. The population of the parish in 1831 was 1339, chiefly agricultural. The living is a rectory of the yearly value of 774*l.*, with a glebe-house, in the archdeaconry of Essex.

Thaxted is in the hundred of Dunmow, 44 miles from London by Harlow, Hatfield Broad Oak, and Dunmow. This is a very antient place, and probably existed in the time of the Saxons. It was incorporated by charter of Philip and Mary, and its government vested in a mayor, bailiffs, and chief burgesses; but the corporation became extinct in the time of James II., the corporate officers having retired from their offices on being served with a *Quo Warranto*. The town is irregularly laid out; its chief ornament is the church, which is in the centre of the town, and is one of the finest in the county. It is mostly in the Perpendicular English style, and consists of a nave and chancel with side aisles, transept, and tower at the west end. The nave is not so wide as either of the side aisles, from which it is separated by eight clustered pillars on each side with pointed arches. The windows are mostly large, and many of them are ornamented with tracery and painted glass, but the latter is much broken and otherwise defaced. The north and south porches are richly ornamented with sculpture. The tower is sustained by buttresses, and is embattled, and terminated with a very rich crocketted spire, supported by flying buttresses. Most of the buttresses of the aisles have fine pinnacles, and are enriched with panneling. The height of the tower and spire is 183 feet, which is also the length of the church: the breadth of the church is 87 feet. It is supposed to have been built in the fourteenth century. There are at Thaxted meeting-houses for Quakers, Independents, and Baptists. There is a free grammar-school, which contained, in 1833, 30 boys on the foundation and 30 others whose education was paid for by their parents. Upon the same foundation 20 girls were educated at another school.

The population of Thaxted parish (which comprehends 5890 acres) was, in 1831, 2293, more than half agricultural. The living is a vicarage, in the archdeaconry of Middlesex, of the yearly value of 450*l.*, with a glebe-house. The market, which had been long disused, was revived about the close of the last century, but was not much attended, and has since been again discontinued. There are two fairs in the year. There are several almshouses in the place, and the benefactions to the poor have been very considerable. Near Thaxted is the antient hall, Horeham-hall, the seat of Sir William Smith: it is a castellated gothic mansion partly covered with ivy.

Beside the above, which have been market towns, there are several other villages which, from their importance, call for notice.

Ashdon, the parish of which, including the hamlet of Bartlow End, had, in 1831, a population of 1103, is in the half hundred of Freshwell, three miles from Saffron Walden. It is supposed by some to have been the scene of a dreadful battle fought between Edmund Ironside and Canute; but the battle was more probably fought at Assingdon in the hundred of Rochford. At Bartlow hills, in the parish of Bartlow, Cambridgeshire, two miles north of Bartlow church, four contiguous barrows have been regarded as the tumuli raised over those who were slain in this battle, but this rests on tradition only.

Brightlingsey (population in 1831 1784) is on the æstuary of the Colne, in Tendring hundred. The inhabitants are engaged in the oyster fishery. The parish forms a peninsula, surrounded by the marshes of the Colne and its inlets, except on the north-east side, where is the only entrance to the parish, except by a ford. The church is near this entrance, the village is a mile distant nearer the sea. Morant speaks of an establishment for preparing copperas here, and the 'copperas house' is marked in the Ordnance Survey. Brightlingsey is a member of Sandwich in Kent, one of the Cinque Ports. The population has nearly doubled within the present century.

Burnham is in Dengie hundred, on the north bank of the æstuary of the Crouch, which has here a depth of water sufficient for a ninety-gun ship. It had a good street towards the river and a commodious quay. The church is nearly a mile from the village. The population, in 1831, was 1393: the inhabitants are engaged in the oyster fishery.

Chigwell lies between Epping and Henhault forests: from Chigwell Row, on the border of the latter, a most extensive view is obtained over the south of Essex and the Thames into Kent. There is an endowed grammar-school which, in 1833, had six scholars, and another endowed school with sixty boys. Population in 1831, 1815.

The Hams are in Becontree hundred, and in the immediate neighbourhood of London. West Ham parish occupies the south-west corner of the county, and is bounded by the Thames and the Lea, by which it is respectively separated from the counties of Kent and Middlesex. It is divided into four wards: All Saints, Church Street, Plaistow, and Stratford. West Ham had formerly a market, the charter for which was procured in the thirteenth century. There was formerly at Stratford Langthorn, in this parish, an abbey for Cistertian monks. The abbey having become dilapidated from the flooding of the marshes, amid which it was built, the monks were removed to Burgestede (now Burstead), near Billericay, until 'one of the Richards, kings of England,' (probably Richard II.) repaired the abbey and brought the monks into it again. In 1307 the abbot was summoned to parliament. At the dissolution the yearly revenues of this house were estimated at 573*l.* 15*s.* 6*d.* gross, or 511*l.* 16*s.* 3*d.* clear. The chief remains now existing of the conventual buildings are a brick gateway, the entrance to the precincts, and an ornamented arch in the Early English style, which appears to have been the entrance to the chapel: they are nearly half a mile south-west of the church. The site of the precincts was moated and contained about sixteen acres. West Ham church consists of a nave and chancel, and side aisles to both: it is large, but not distinguished for its architecture.

Stratford, which is one of the wards of this parish, lies along the road to Romford, Chelmsford, &c., and may be regarded as a prolongation of the suburbs of the metropolis, being joined to it by an almost continuous line of buildings, constituting the village of Bow, and the hamlet of Mile End in Middlesex. A new church has been lately erected here. The Newmarket road branches off from the Chelmsford and Colchester road at Stratford.

The population of West Ham parish was in 1831 11,580, of which less than one-sixth was agricultural. A considerable number of the inhabitants are labourers, employed in the East and West India docks at Poplar and Blackwall. Calico and silk dyeing and printing are extensively carried on: chemicals are manufactured, and porter is brewed. The West Ham water-works supply the eastern suburbs of the metropolis with water. Several of the wealthier inhabitants of London have residences at West Ham.

The living of West Ham is a vicarage, in the archdeaconry of Essex, and in the gift of the crown: its yearly value is 875*l.* There are several dissenting meeting-houses.

There were in this parish in 1833 two infant schools, partly supported by contributions, with 150 children; three endowed day-schools, with 257 children, some of whom were clothed; a national school, partly supported by endowment and subscription, with 50 boys; a school with 40 children, supported by contribution by Roman Catholics; another of 10 children, supported by Dissenters; and another school of 120 children, partly supported by contributions; and four Sunday-schools, with 390 children. There were also many private boarding and day schools, containing 488 children.

East Ham parish joins that of West Ham. The church consists of a nave with two chancels; the upper chancel, which forms the eastern extremity of the church, is semicircular at the east end, and has narrow pointed windows. Part of the walls of the nave and lower chancel are in the Norman style, as is the lower part of the tower; but the windows of the nave are of later date, and some of them modern. In the church is a monument of Edmund Nevill, Lord Latimer. Dr. Stukely, the antiquary, is buried in the churchyard, but, at his own desire, without any monument. At Green Street, a hamlet of this parish, is an antient mansion, supposed to have been the residence of the Nevill family. The population of East Ham in 1831 was 1543, chiefly agricultural. There is an almshouse for three poor men, and a place of worship for Wesleyan Methodists.

The Hedinghams are in Hinckford hundred, and on a road branching off from the Bury and Norwich road at High Garrett, two or three miles beyond Braintree, and reuniting with it at Bulmer Tye, a little before it quits this county for Suffolk. They formerly constituted one parish: from the time of Henry III. they appear as two; Sible Hedingham, on the south-west bank of the Colne, 48 miles from town; and Castle Hedingham, on the north east bank of the river, one mile farther. We subjoin the following particulars respecting them.

Sible Hedingham, area 5490 acres. Population in 1831 2194. Living, a rectory in the jurisdiction of the Commissary of Essex and Herts, concurrently with the consistorial court of the bishop of London, of the yearly value of 905*l*., with a glebe-house. Castle Hedingham, area 2600 acres. Population in 1831 1220. Living, a donative in the archdeaconry of Middlesex, of the yearly value of 129*l*. The population of these places is more than half agricultural.

Sible Hedingham church is a neat and tolerably spacious building, supposed to have been erected in the reign of Edward III. There was formerly a chantry here, founded by the executors of Sir John Hawkwood, whose monument, now demolished, stood in the church: the house of the chantry priest is still standing; it had been originally built for the reception and entertainment of devout pilgrims, and still retains the name of the hostage. The castle, which gives name to the parish in which it stands, was built by the De Veres, to which family the lordship of Hedingham was given by the Conqueror. Its architecture, which is very similar to that of Rochester Castle, leads to the supposition that it was erected about the same time as that fortress, viz., towards the close of the eleventh or the beginning of the twelfth century. Maud, wife of king Stephen, is said to have died here. In the civil wars of the reign of John, it was held by Robert de Vere, earl of Oxford, for the barons, and was taken A.D. 1216 by the king: it was retaken in the beginning of the reign of Henry III. by Louis, dauphin of France, but recovered by the earl of Pembroke, governor to the young king. In the reign of Henry VII. that prince was sumptuously entertained here by John de Vere, earl of Oxford, who had suffered severely for his attachment to the Lancastrian cause, and had been one of the chief instruments in placing the crown on Henry's head. As the king was departing, he observed that the earl, to do him honour, had put liveries on his retainers, and in return for his hospitality compelled him to compound by a fine of 15,000 marks for breaking a statute, recently passed, forbidding such a practice. The De Veres retained the castle until A.D. 1625. It has since passed through various hands. The keep is the only part remaining; it is one of the finest and best preserved Norman keeps in the kingdom. The walls are above 100 feet high, and from 11½ to 12½ feet thick at the bottom, and from 9¼ to 10 feet thick at the top: the eastern wall is at least a foot thicker than the others, having been so built, it is conjectured, in order to withstand the violent eastorly winds. The building is a parallelogram, of 55 feet on the east and west sides, and 62 feet on the north and south. At each angle on the top there was formerly an embattled turret; two of the turrets are remaining: the parapet, now destroyed, was also embattled. The castle is built with irregular flints or stones, imbedded in grouting or fluid mortar, and is cased on the outside with squared stone very neatly and regularly put together. It has five stories, including the ground-floor and platform: the principal entrance is on the first story, and on the west side, with a flight of stairs leading up to it: entrances to the ground-floor were made with great labour in 1720 by the proprietor, who wished to convert that floor into an outhouse. The whole building is worthy of attention; it has some fine Norman enrichments in the interior. Castle Hedingham church is an antient fabric of stone with brick battlements, partly in the Norman and partly in the Early English style: the tower is of much later date. In the chancel is a superb, but somewhat mutilated monument of John de Vere, earl of Oxford, who died A.D. 1539. A Benedictine nunnery was founded here by the first earl of Oxford and his wife, A.D. 1190. Its revenues at the dissolution were valued at 29*l*. 12*s*. 10*d*. The nunnery, long since converted into a farm-house, and part of the chapel belonging to it, are yet standing. There was also an hospital for the sick and decrepit poor at Hedingham, attached to which were two or three chaplains with a clerk and servant. This hospital has long been destroyed: it was on the south-east side of the castle.

Leigh is in the hundred of Rochford, about 36 miles from London. The houses are principally arranged in one street running along the foot of an eminence and on the bank of the Thames. The summit of the eminence commands a fine prospect, and is crowned by the church with its ivy-mantled tower, and the manor-house. The population (1254 in 1831) consists chiefly of fishermen. The place has some trade, and there is a small customhouse here. The Wesleyan Methodists have a meeting-house. Some Roman coins have been discovered at Leigh.

Leyton, or Low Leyton, derives its name from the river Lea, near to which it is situated; it is in Becontree hundred, about 5 miles from London. It had in 1831 a population of 3323, of which less than one-third was agricultural. The village contains several residences of London merchants and tradesmen. The church is pleasantly situated, overlooking the marshy valley of the Lea, but possesses no beauty of architecture. Among the tombs in the chancel is that of the historian and antiquary John Strype, who was vicar of the parish for nearly seventy years. Leytonstone is a hamlet of this parish. It was supposed by Camden that Leyton was a Roman station, the Durolitum of Antoninus; but though the name as interpreted by some (according to whom Durolitum signifies 'the water of Ley') gives countenance to the supposition, it does not accord with the distances of the *Itinerary*. Roman and other antiquities have been however found at Leyton in considerable number: such as the foundations of buildings; Roman intermingled with other bricks; a subterranean arched gateway, and steps leading down to it; urns with bones and ashes; wells; a quantity of oak timber mortised together like a floor, grown very hard and black, and of uncertain extent; Roman silver and brass coins, consular and imperial, and some silver coins with Saxon characters. At Ruckholts, or Rockholts, a manor in this parish, are some remains of antient entrenchments, a square double embankment, with an intervening ditch, enclosing a circular embankment, thirty-three yards in diameter, surrounded by a moat; both are much obscured by trees.

St. Osyth is in the hundred of Tendring, 62 miles from London and 11 from Colchester, on the marshy coast at the north-eastern side of the mouth of the Colne. A small creek, or arm of that river is navigable for small boats up to the quays in this parish. The population in 1831 was 1583, chiefly engaged in agriculture. The original name of the place was Chich, and it took its name of St. Osyth from a virgin said to be of royal blood, but whose history involves too glaring an anachronism to be worthy of credit, who founded here a nunnery, afterwards destroyed by the Danes. An abbey for the canons of St. Augustin was subsequently founded here in or before the year 1118, in honour of St. Peter, St. Paul, and the above-mentioned St. Osyth. The yearly value of the revenues of this abbey at the dissolution was 758*l*. 5*s*. 8*d*. gross, or 677*l*. 1*s*. 2*d*. clear. The quadrangle of the antient monastic buildings is almost entire, excepting on part of the north side, where it has been replaced by modern apartments; the entrance is by a beautiful gateway of hewn stone mixed with flint, having two towers and two posterns: the stables and offices on the east and west sides of the court bear marks of great antiquity, and among the ivy-grown ruins of the garden is a pier with a Latin inscription describing the antient magnificence of the place. There are a battery, or martello tower, on the coast in this parish, and a signal station. The church contains several monuments of the D'Arcy family.

Prittlewell is in Rochford hundred, 39 miles from London, on the northern shore of the æstuary of the Thames. Milton, now a hamlet of this parish, is said to have been antiently a distinct parish; part of it has been swallowed up by the sea gaining on the land. Morant, writing near the middle of the last century, says, 'it had a church, or chapel of ease, the remains of which were visible not long ago at low-water mark.' The village consists of two streets, on the slope of a hill, forming a right angle with each other, and having the church at the vertex on the summit of the hill. The church has a nave and chancel, a side aisle running the whole length of the building, and of nearly equal breadth with the nave. There is a fine western tower (in the Perpendicular English style) embattled, with strong buttresses and rich pinnacles: from its height and lofty situation it is a good sea-mark. There was once a priory of Cluniac monks here, cell to an alien priory of the same order at Lewes, in Sussex, but afterwards made independent: its yearly revenue at the dissolution was 194*l.* 14*s.* 3*d.* gross, or 155*l.* 11*s.* 2*d.* clear.

Southend is a hamlet of Prittlewell. It is pleasantly situated on the side of a wooded hill, and is in some repute as a bathing-place. The terrace, in what is commonly called New Southend, or the upper town, is a handsome range of buildings. There are a good hotel, an assembly-room (beside one at the hotel), a theatre, and a library, the last somewhat in the Gothic style. There is an Independent meeting-house. The population of the whole parish of Prittlewell was, in 1831, 2266; nearly half agricultural.

Stansted Montfichet is 32½ miles from London, on the Newmarket road, partly in Clavering half hundred, and partly in Uttlesford hundred. It consists mainly of a long straggling street. The name, Stansted, is supposed to be corrupted from Stone Street, the name of a Roman way, on or near which it stood; the epithet Montfichet was the surname of William Gernon, to whose father the lordship had been given by the Conqueror, and who built a castle here; the artificial mound on which the keep was built yet remains. It may be doubted whether the place took its name from the builder of the castle, or *vice versâ*: population in 1831, 1560.

The Sokens, including Kirby le Soken, Thorpe le Soken, and Walton le Soken, are in Tendring hundred: these parishes are for ecclesiastical purposes consolidated, and form a benefice in the diocese of London (exempt from the archdeacon's jurisdiction), of the annual value of 513*l.*, with a glebe-house. The word Soken is derived from the Saxon Soc, or Soca, signifying a peculiar power to administer justice within itself, and likewise the circuit within which such power was exercised. These villages possess some peculiar immunities, to which they owe their designation. They comprehend the promontory of the Naze, which formerly extended much farther to the west, but has been contracted by the encroachment of the sea. Ruins of buildings have been discovered under the water, particularly on a shoal called the West Rocks, nearly five miles from the shore, which is left dry at great ebbs The spot where the ruins are found is distinguished by the name of The Town. The wall thrown up to keep out the sea gave name to Walton parish. There is a church in each parish; that at Thorpe is the largest. There is also a Baptist meeting at Thorpe, and a customary market is held there on Wednesday evening. Walton having the recommendation of a firm and extensive beach, has been resorted to for bathing by invalids from the eastern parts of Essex. The population of the three parishes in 1831 was as follows:—Kirby 972, Thorpe 1173, Walton 469; total 2614.

Walthamstow, is in Becontree hundred, a little to the left of the Newmarket road, about 6 miles from London, between the marshes of the Lea and Epping Forest. It contains a number of good houses usually occupied by persons engaged in business in London; but Walthamstow is not so much resorted to by these as formerly: its population has therefore diminished. The population in 1831 was 4258; above a third were employed in agriculture. The church possesses no architectural beauty. There are copper and oil mills in the parish. Wanstead, in the same neighbourhood, is a village occupied, like Walthamstow, by persons doing business in London; it is much smaller however, containing in 1831 only 1403 inhabitants. Wanstead House, formerly the seat of Earl Tylney, was one of the finest residences in the county of Essex. It was pulled down a few years since, and the materials sold. The park is let out in portions for grazing of cattle. A tesselated pavement of considerable dimensions, and several other Roman antiquities, were dug up in the year 1735.

Wivenhoe is in Lexden hundred, 4 miles from Colchester and 55 from London. It is on the north-east bank of the river Colne, just at the junction of the Roman. The village is on the slope of a hill, and commands a pleasant prospect down the river. Wivenhoe has a commodious quay and a custom-house; it may be considered as the port of Colchester. The population of the parish in 1831 was 1714, of which about one-fourth was agricultural. The living is a rectory, of the yearly value of 371*l.*, with a glebe-house.

Woodford is in Becontree hundred, 8 miles from London on the Newmarket road. It is a long straggling place with a number of good houses, inhabited by merchants and tradesmen from London. The population in 1831 was 2548, of which about one-fourth was agricultural; the number of inhabitants had materially diminished since the previous census. The church is a modern erection, but in the antient English style. A group of houses about a mile north from the main part of the village takes the name of Woodford Wells, from a mineral spring, now in little repute.

Writtle is a large village, in Chelmsford hundred, about 3 miles west from the town of Chelmsford. It was formerly a market-town, but dwindled as Chelmsford rose into importance. Morant was inclined to place the Cæsaromagus of the *Itineraries* here; but there is no proof of its having ever been a Roman station. King John is said to have had a palace here, and a square plot of ground, with a moat round it, in which the foundations of a building were dug up about the middle of the last century, is thought to have been the site of it. The church contains a number of monuments, some of them elaborate and elegant. There was, before the Reformation, a hermitage in this parish, attached to St. John's Abbey, Colchester. The population in 1831 was 2348, nearly two-thirds agricultural.

There are several large villages in Essex beside those already noticed. Four (Dagenham, Finchingfield, Hornchurch, and Great Waltham) had, in 1831, above 2000 inhabitants; five others had above 1500; and nineteen others had more than 1000.

Divisions for Ecclesiastical and Legal Purposes.—Essex constitutes the largest part of the diocese of London, which is in the ecclesiastical province of Canterbury; and is divided between the three archdeaconries of Colchester, Essex, and Middlesex. The office of rural dean has been disused for many years; the county is, however, still divided into deaneries, which are thus arranged.

The deaneries of Colchester, Lexden, Tendring, Newport, and Sandford constitute the archdeaconry of Colchester. The deaneries of Barstable, Barking, Chafford, Chelmsford, Dengie, Ongar, and Rochford constitute the archdeaconry of Essex. The deaneries of Dunmow, Harlow, and Hedingham constitute part of the archdeaconry of Middlesex, which extends beyond this county.

The number of benefices we cannot exactly give. The Population Returns for 1831 contain the names of 409 parishes and 4 district chapelries (Basildon, Brentwood, Canvey Island, and Epping), together 413 benefices; but of these three (Bures, Haverhill, and Keddington or Kitton) are mostly in Suffolk; and Ballingdon or Brundon (antiently Berington) is for ecclesiastical purposes united to the parish of All Saints, in Sudbury. The parishes of Bocking, Stisted, Latchingdon-with-Lawling, and Southchurch are in the peculiar jurisdiction of the archbishop of Canterbury. Of the above parishes, 16 are in the borough and liberties of Colchester, 2 in the borough of Harwich, and 3 in that of Maldon.

Morant, in his History of Essex, gives the following as the number of churches and chapels. In the archdeaconry of Colchester, 161; in that of Essex, 175; in that of Middlesex, 83; peculiars 4; total, 423: but this, no doubt, includes chapels of ease, or non-parochial chapels. In Gorton's Dictionary the number of parishes is given at 405, which agrees with the number in the Population Returns, deducting the three which are mostly in Suffolk, and that of Ballingdon, which is ecclesiastically united to a Suffolk parish. Lewis's Dictionary gives the number of parishes at 400, of which 250 are rectories, 134 vicarages, and the remainder perpetual curacies.

Dissenters are numerous in Essex, especially the Independents; nearly all the towns and many of the villages have congregations of this persuasion, and some of the congregations are very large. The Baptists have also many meeting-houses; the Wesleyans, we believe, not so many, the Quakers have places of worship in several of the large towns.

Essex is in the home circuit. The assizes and quarter-sessions are held at Chelmsford, where is the shire-hall, an elegant structure, and the old county-gaol and house of correction. The new county-gaol is at Springfield, a village about a mile from Chelmsford, on the road to Colchester.

For the election of members of parliament the county was, by the Reform and Boundary Acts, divided into two parts, each returning two members. The northern division comprehends the hundreds or half hundreds of Clavering, Dunmow, Freshwell, Hinckford, Lexden, Tendring, Thurstable, Uttlesford, Winstree, and Witham. Braintree is the chief place of election, and the polling-stations are Braintree, Colchester, Saffron Walden, and Thorpe-le-Soken. The southern division comprehends the hundreds or half hundreds of Barstable, Becontree, Chafford, Chelmsford, Dengie, Harlow, Ongar, Rochford, Waltham, and the liberty of Havering. The chief place of election is Chelmsford, and the polling-places are Chelmsford, Billericay, Romford, Epping, Rochford, and Maldon. The boroughs of Colchester, Harwich, and Maldon continue to return two members each, as before the Reform Act. By the Boundary Act an addition (the parish of Heybridge) was added to Maldon. The boundaries of the other boroughs remain as before. None of the old parliamentary boroughs disfranchised or the new ones created by the Reform Act are in this county. The only change in the number of representatives made by that act was by the division of the county and the consequent addition of two representatives.

History and Antiquities.—In the earliest dawn of the authentic history of our island, Essex was inhabited by the Trinobantes (Τρινοαντες), a powerful tribe whose dominions perhaps extended across the Stort and the Lea into Hertfordshire and Middlesex. At the time of Julius Cæsar's invasion (B.C. 55 and 54), Imanuentius, as he is called in Latin, prince of the Trinobantes, had been slain by Cassivellaunus, the predominating chieftain of a neighbouring tribe, and his son, Mandubratius, had been driven into exile, and had gone as a suppliant to Cæsar in Gaul. Cæsar's success induced the Trinobantes to implore of him the restoration of their native prince; and Cæsar, acting upon the usual policy of the Romans, which was to secure allies in or near the countries which were the objects of their attack, complied with their request. Mandubratius was restored, and afterwards secured in the possession of his throne by an express stipulation in the treaty between Cæsar and his British opponents. The alliance of Rome seems to have promoted the aggrandizement of the Trinobantes: Cunobelin, king of that tribe, was potentate of considerable name, and some coins of his yet extant attest the commencement of civilization and the arts in this county. [BRITANNIA.] Catarâtacus (Καμαράτακος, Dion.), or, as he is commonly called (after Tacitus), Caractaeus and Togódumnus (Τογόδουμνος, Dion.), sons of Cunobelin, succeeded to their father's power, and had to bear up against the weight of Roman hostility when the invasion was renewed in the reign of Claudius (A.D. 43). After sustaining several severe defeats, the Britons retired into the marshes of Essex, and fighting with the vigour of despair, were enabled for a time to repel their assailants, though with the loss of Togódumnus, one of their leaders. But the arrival of the Emperor Claudius was the signal for the renewal of the attack. The Trinobantes were subdued, and their capital, Camulodunum (Καμουλοδουνον, Dion. Καμουνδολανον, Ptol.), was taken, and subsequently made the seat of a Roman colony, which was however destroyed in the revolt of the Britons under Boadicea, and the Roman garrison slaughtered. The defeat of the ninth legion, which was coming to the relief of the colony, under the command of Cerealis, who escaped with his cavalry to his camp and there stood a siege, added to the exultation of the Britons, who captured Londinium and Verulamium and massacred the inhabitants: but the bloody overthrow of Boadicea by Suetonius (A.D. 61) put an end to their revolts, and decided, though it did not complete, the reduction of South Britain. Several of these events occurred in this county. In the Roman division of Britain, Essex was included in Flavia Cæsariensis.

Mr. Lethieullier (Morant's *Essex*) places the final defeat of Boadicea 'somewhere between Epping and Waltham, near which a fine camp remains;' but others place it in the fields immediately north of London. [BRITANNIA.]

Several Roman stations were in Essex. Of these the most important is Camulodunum, upon the determination of the site of which depends that of the others. Three sites in this county have been proposed, Walden, Maldon, and Colchestor. One antiquary (N. Salmon) places it at Castle Camps, in Cambridgeshire; other opinions, which place it in Yorkshire or in Scotland, may be dismissed at once. For Walden little seems to be urged but the pleasantness of the situation, an attribute which Tacitus ascribes to Camulodunum; for Maldon there appears to be little evidence, except the resemblance of the name and the opinion of Camden; while abundance of Roman antiquities, the pleasantness of its situation, the agreement of its distance from London with that given in the *Itinerary* of Antoninus, and the termination of its name—chester—a usual indication of a Roman station, agree in supporting the claim of Colchester. Perhaps the first part of its name also may be taken as evidence; for although the names of our waters are commonly of British origin, we may suppose that the Colne (whence Colchester) obtained its designation from the Roman *colonia*, which graced its banks.

The two Iters of the Antonine *Itinerary* which connect Camulodunum with Londinium are thus given:—

Iter IX. à Camuloduno.		Iter V. à Londinio.	
Canonio	M.P. IX.	Cæsaromago	M.P. XXVIII.
Cæsaromago	M.P. XII.	Colonia	M.P. XXIV.
Durolito	M.P. XVI.		
Londinio	M.P. XV.		M.P. LII.
	M.P. LII.		

It will be observed that although the distances between Cæsaromagus (the only intermediate station mentioned in both Iters) and Londinium and Camulodunum respectively do not agree, the total distance between the two extremes is the same in both, viz., Millia Passuum LII, about equal to 48 English miles, which is nearly the distance of Colchester from London in a straight line, and it is known that the Roman roads were commonly straight. The distances given in Iter IX, which we take to be the most correct, will agree tolerably well with the positions assigned to the other stations in the map of antient Britain, published by the Society for the Diffusion of Useful Knowledge, viz., Durolitum, near Romford; Cæsaromagus, near Widford, a village about a mile south-west of Chelmsford; and Canonium, near Kelvedon. If these positions are fixed with tolerable approximation to accuracy, the Roman road must nearly have coincided with the modern road from London to Colchester, which is probable.

It is supposed however to have crossed the Lea at Oldford, not Stratford; but this seems doubtful; possibly there were two branches of the road, one passing at each place. The positions assigned to these stations in Morant's *Essex* agree with those in the Society's map, except that Durolitum is placed below Brentwood, and Cæsaromagus at Chelmsford, or rather Writtle, which is a mile or two west of it, and not far from Widford. Another station of the Antonine *Itinerary*, Ad Ansam, was probably on the border of the county, perhaps at Stratford, just across the Stour, in Suffolk. It is given as distant from Camulodunum M.P. VI, which accords very well with Stratford.

A Roman road, the line of which is still visible in many places, crossed the county from Bishop Stortford, in Herts, by Dunmow, Raine Hall, Coggeshall, and other places, to Colchester. A record of the time of John describes this as 'calcea quæ tendit de Sterteford versus Colcestr.'

Roman antiquities have been dug up in many parts of the county, but especially at Colchester, where urns, pavements, and medals have been found in great abundance, and almost every antient building shows a greater or less proportion of Roman materials worked up in its walls. Round Colchester are the remains of intrenchments and other military works. Tesselated pavements and other antiquities have been discovered on Mersey Island, which Morant supposes to have been the residence of a Roman functionary, the 'Comes Littoris Saxonici,' or count of the Saxon shore. Roman remains have also been found at Wanstead; at Canewdon, not far from Rochford; at Coggeshall; at Toppesfield, not far from the Hodinghams; at Ridgwell, in the same part of the county, near which a

Roman road was formerly visible; at Watsoe bridge, between Birdbrook and Steeple Bumpstead parishes, near the Stour, where is a Roman camp; and at Great Chesterford (near Saffron Walden), which was undoubtedly the site of a Roman station. Antiquaries have sought to identify this station with the Camboricum or Iciani of Antoninus; but it is very difficult to reconcile its site with the distances of the Iter v. of Antoninus, in which it is mentioned.

Colchester appears to have been, in the latter period of the Roman dominion, the seat of a bishop's see. Adelfius, the bishop of Colon or Colchester, assisted at the councils of Arles, A.D. 314; Sardica, A.D. 347; and Ariminum, A.D. 359.

When the Saxons established themselves in Britain, Essex, with some parts of Hertfordshire and Middlesex, constituted a small kingdom, the possessors of which were, from their relative situation, called the East Saxons; from them the county has derived its present designation. Middlesex also, it may be observed, owes its name to its situation between the East and West Saxons; although it never had the rank of an independent kingdom.

Essex, according to Morant, was part of the territory extorted from Vortigern or Gwrtheyrn (A.D. 477) by Hengist, a chieftain whose fame, like that of other heroes in semi-fabulous periods, seems to have been augmented by the achievements and acquisitions of others of inferior reputation. Mr. Turner (*Hist. of Anglo-Saxons*), with better judgment refers the foundation of the kingdom of Essex to a later period (A.D. 530), and to a leader, whose name he does not give, but who is elsewhere called Erchenwin. Morant supposes this Erchenwin to have revolted from under the weak government of Octa, king of Kent, without, so far as appears, any reason except that he had originally included Essex in the conquests of Hengist, and therefore in the kingdom of Kent. This kingdom of Essex gradually extended across the Lea into Middlesex and Hertfordshire, and comprehended London, then a flourishing trading place, and which appears to have become the capital of the East Saxon kingdom. The successor of Erchenwin was Sledda, and the successor of Sledda Saebyrht or Sabert. The latter was the nephew of Æthelbyrht or Ethelbert, king of Kent, the first of the Saxon princes that embraced Christianity, and was in subjection to his uncle, at that time the most powerful of the Anglo-Saxon kings. Saebyrht embraced Christianity; the episcopal church of St. Paul in London was founded by Æthelbyrht, and Mellitus, who had been sent from Rome to assist the missionary St. Augustin in evangelizing England, was appointed bishop of Essex, into which kingdom he had been sent as missionary by Augustin. Saebyrht himself founded the abbey and church of Thorney, afterwards called, from its situation with respect to St. Paul's, West Minster (A.D. 604-611). We notice these events because, though not immediately connected with the county of Essex, they are among the most important occurrences in the scanty annals of the East Saxon kingdom.

Upon the death of Saebyrht (A.D. 616), Saxred, Siward, and Sigebriht ascended the throne, and reigned conjointly: they restored Paganism and persecuted Christianity, and appear to have been killed together about A.D. 623. Sigebriht the Little reigned after them from A.D. 623 to 653; and after him reigned Sigebriht or Sigeberht the Good, who, being converted by his friend Oswy, king of Northumberland, whom he used frequently to visit, and baptized by Finan, bishop of Lindisfarne, restored Christianity in Essex, and sent for some Northumbrian monks to come and instruct his subjects. Cedd, one of these, was consecrated bishop of the East Saxons (A.D. 653). Sigebriht was assassinated two years afterwards (A.D. 655). The subsequent kings of Essex were as follows:—Swithelm, Sibbi, and Sighere; the latter died A.D. 683, and Sibbi turned monk A.D. 694: Sigehard and Senfrid: Offa, who went to Rome, and turned monk, A.D. 707: Suebricht, called Selred by some, but erroneously: Swithred was reigning A.D. 758. There were a few others, whose very names are unknown. The dates are from Morant chiefly, but in so uncertain and confused a period they cannot be relied on as very exact.

In A.D. 823, Egbert of Wessex, who had just gained over Beornwulf of Mercia that victory which established the permanent supremacy of Wessex over the other kingdoms of the Octarchy, despatched his son Ethelwulf and the warlike statesman Ealstan or Alstan, bishop of Sherbourne into Kent and Essex; and these kingdoms, which had sunk into mere dependencies of Mercia, were subdued, and probably united under the designation of the kingdom of Kent, occupied by Ethelwulf as subordinate to his father, and of which mention is occasionally made in the history of Ethelwulf and his sons, until the reign of Alfred, by whom the Saxon kingdoms were finally incorporated; and England, with the exception of those parts which were occupied by the Danes or retained by the Britons, was consolidated under one sceptre.

When Alfred, after the recovery of his throne, assigned to the piratical Northmen, or Danes, a settlement in and about East Anglia (A.D. 878), Essex was included in the ceded territory. One or two of the naval conflicts between the ships of Alfred and those of the piratical Danes who continued to infest the coast, were fought off the Essex shore. Thirteen or sixteen sail of Danish vessels were destroyed in the mouth of the Stour, near Harwich (A.D. 884); but the victorious fleet was destroyed near the Thames mouth by some ships fitted out by the colonists of East Anglia in violation of their engagements with the king. On the death of Godrun (A.D. 890) Essex returned under the government of Alfred, who appointed Bertheolf earl of the county. When Hastings invaded England, A.D. 894, and the main part of his army had been defeated at Farnham, in Surrey (A.D. 894), part of the fugitives escaped over the Thames and marched across Middlesex and Essex pursued by Alfred, until they crossed the Colne and found refuge either in Mersey Island (Turner), or more probably in the peninsula of Brightlingsea (Brcklesey, Speed, Morant), where some of their ships had come, and where the king had not any navy at the time to press the siege. Alfred in person, and afterwards when he was called away, his generals, maintained a close blockade on the land side, and at last the Danes sued for peace and agreed to retire from England; but instead of doing so, they hastened to join Hastings, who, with another part of his forces had, in the mean time, landed at South Bemfleet, or Benfleet, in Essex, on the æstuary of the Thames, and built a fort there. In the absence of Hastings, the Londoners and the troops who had blockaded Mersey, stormed his fort, took his wife and two of his children prisoners, recovered a quantity of plunder, and broke up and burned many of his ships, or carried them away to London and Rochester. The wife and children of Hastings were loaded with presents by Alfred and sent back to the piratic chief; but his hostility was not thereby softened. He erected another fortress (of which large traces appear still to remain) at South Shoebury, in Essex, a few miles from his former one. With his main army he crossed the island to the Severn; but was compelled to return with baffled and weakened forces. Before the winter came on he assembled another army, and marched to Chester and into North Wales; but being every where watched by the vigilance of Alfred, he marched back through Northumberland and Mercia to Mersey Island, in Essex, the coast of which he always chose for his strongholds, and in which he seems to have wished to establish a kingdom. Ultimately the Danish chief was compelled to abandon England after three years of incessant hostility (A.D. 894—896), and Essex returned peaceably under the West Saxon sway.

After the death of Alfred (A.D. 901), and the choice of Edward the Elder as his successor, Æthelwald, or Ethelwold, son of Ethelbriht or Ethelbert, Alfred's elder brother, claimed the throne, and having taken to a piratical life, and obtained foreign aid, returned and subdued Essex. The subsequent death of the invader in battle (A.D. 905) put an end to the strife, and restored Essex to the sway of Edward, who subsequently rebuilt or fortified Witham (A.D. 913), in order to bridle the rebellious temper of the Danish colonists; and some years after (A.D. 920) fortified Maldon. In A.D. 921 he took by storm Colchester, which the Danes, with whom he was now at war, had held, and strengthened the place by repairing the fortifications; he also defeated an attack of the Danes upon Maldon.

In A.D. 991, in the reign of Ethelred II., Essex was again the object of Danish attack. A large force landed and attacked Ipswich, in Suffolk, and marching from thence to Maldon, defeated and slew the governor, or earl of the county, who had collected some forces to oppose them; they were bought off by the payment of a large sum. In

A.D. 994 the coast of this county was ravaged by them; they were again bought off. Essex was one of the counties ceded by Ethelred to Svein, king of Denmark, by treaty A.D. 1010 or 1011.

In A.D. 1016 Essex was the scene of a fierce battle between Canute and Edmund Ironside, who had succeeded to the thrones and the hostility of their respective fathers, Svein and Ethelred. Canute, by the treachery of Edric (brother-in-law and foster-father to Edmund), obtained the victory. The battle was fought at Assandun, which some suppose to be Ashdon, in the north-western part of the county, near Saffron Walden; others, with more probability, fix the scene of conflict at Assingdon, or Ashingdon, in the hundred of Rochford. At Canewdon (the name of which is probably derived from that of the victor), a parish which adjoins Assingdon on the east, are the remains of a camp, supposed to have been that of the Danes; its form is oblong, and it comprehends an area of about six acres: the vallum has been levelled, but the fosse is yet visible. (*Beauties of England and Wales.*)

The history of the county is not marked by any particular event until the civil war between king John and his barons. In A.D. 1215 the earl of Winchester, one of the confederated lords, with an army of foreigners whom he had brought into the country, besieged Colchester castle, but withdrew upon hearing that relief was coming from London. However, he or some of his party soon afterwards took it and plundered the town. The king however retook it after a few days' siege. During the minority of Henry III. Colchester fell into the hands of the Dauphin Louis (A.D. 1218), who had been invited over by the discontented nobles. At the siege of Calais by Edward III. Colchester furnished five ships and 170 mariners.

In the reign of Richard II. occurred the arrest of Thomas of Woodstock, duke of Gloucester, the king's uncle, who was at the time residing at his castle of Pleshy in Essex, about 6 miles north-west of Chelmsford. There the king visited him, and at the close of his visit invited him to return to town. At Stratford the king had placed in ambush the earl marshal and his followers, who arrested the duke on a charge of high treason. he was subsequently smothered at Calais, and his body being brought to England was buried in the church of Pleshy, which he had himself founded.

Of the troubled period to which the above incidents may be referred Essex contains several memorials in the encampments, castles, and other ruins which are found in it. Various camps may yet be traced referrible to the British, Roman or Saxon periods, as that which incloses the village of Danbury (Danes-byrig), on a high hill between Chelmsford and Maldon; those at Maldon (probably the work of Edward the Elder), at Witham, at Ambresbury banks, near Epping, at Ruckholt, near Barking, at South Weald, near Brentwood, at Canewdon, and at Blunt's walls near Billericay. Many of these have been already mentioned. Of the castles of the Norman period there are also several remains. Those at Colchester, Hedingham, Walden, Ongar, and Raleigh, have been noticed in this article or under their respective heads. Pleshy was the site of a Roman camp or station, and some Roman antiquities have been found at it. The castle was probably built by William de Magnaville, to whose father, Geoffrey de Magnaville, the place had been granted by the usurper Stephen. The keep with the moat which surrounded it were within the Roman intrenchment: the mound on which the donjon was built, and the bridge which led to it over the surrounding moat, are all that remain of the once proud structure. Of Hadleigh Castle, near Raleigh, dilapidated portions of two towers yet remain, forming picturesque masses of ruin. At Clavering in the north-west part of the county are the mound on which the keep stood and the moat of a castle, long since destroyed.

Of the halls and manor-houses which succeeded the Norman castles and gave indication of a quieter period, though showing by their massive strength that the nation had not quite settled into peaceful security, may be mentioned Heron Hall, near East Horndon, Nether Hall, near the confluence of the Lea and the Stort, Tolleshunt Beckingham or Tolleshunt Magna, between Maldon and Colchester, Layer Marney Hall, in the same neighbourhood, Belhus or Bellas House, near Purfleet, Covet or Covell Hall, near White Roding, Eastbury, near Barking, Danbury Place, between Chelmsford and Maldon, New Hall, near Chelmsford, and Toppinghoe Hall, between Chelmsford and Witham. Of Heron Hall two picturesque round towers remain; and of Nether Hall, a vast gateway with two half hexagon towers, one on each side, so massive as to prevent their destruction when the rest of the mansion was pulled down, about A.D. 1773. Of Tolleshunt manor-house there remains an antient brick gateway, with four embattled turrets. Of Layer Marney Hall, the gateway and part of the south side are yet standing, and are converted into a farm-house and offices: it was originally a large quadrangular building, inclosing a spacious court, to which the existing gateway was the principal entrance. Of Covet Hall there remains a gateway of brick, much ornamented. The other houses are, we believe, entire, except New Hall, of which however a large portion remains, formerly occupied by some English nuns from Liege, who took refuge in England from the French Republican armies. Other antient houses have been already noticed in the course of this article, and we have only further to mention Gosfield Hall, near Halsted, which belongs to the duke of Buckingham, and is probably of the time of Henry VII. This mansion is of brick, and incloses a quadrangular court, into which all the lower tier of windows formerly opened. There were no outside windows on the ground-floor, and those of the upper story were strongly barricaded, so as to give to the place considerable strength. The house as originally built consisted of only one room in thickness, and there was no communication round the inside but by passing through every room; but various improvements and additions have been made in modern times. There are a few good pictures, the rest have been removed to Stow, another mansion of the duke. The park is extensive.

At the Reformation Essex possessed several religious houses, of which there are some remains. There were at the time of the Suppression seven of the greater monasteries, that is, of those which according to the valuation of their lands and endowments possessed a clear yearly revenue of above 200*l.*; they were as follows:—

Place.	Description.	Yearly revenue.							
Berking (Barking)	Abbey for Benedictine nuns .	£1094	6	2	gross	£862	12	5	clear
Chich (or St. Osyth)	Abbey for Augustin canons .	758	5	8	„	677	1	2	„
Coggeshall . .	Abbey for Cistertian monks .	298	8	0	„	251	2	0	„
Colchester . .	Benedictine Abbey	..			„	523	17	0	„
Stratford Langthorne	Abbey for Cistertian monks .	573	15	6	„	511	16	3	„
Walden . .	Abbey for Benedictine monks	406	15	11	„	372	18	1	„
Waltham . .	Abbey for Augustin canons .	1079	12	1	„	900	4	3	„

For any further particulars of these see above, or in the articles BARKING and COLCHESTER.

Of the smaller religious houses, the following remains may be noticed in addition to such as have been already mentioned.

The remains of Bileigh or Beleigh Abbey, near Maldon, have been converted into a farm-house and offices; the chapel, the most perfect portion, having been used as a hog-sty. It is small, 36 feet long by 18 broad, formed of a fine-grained limestone, and has groined arches, supported by three slender Purbeck columns. These ruins are chiefly in the Perpendicular style, with some portions of earlier date.

Of Tiltey priory, between Dunmow and Thaxted, the east end of the church remains, and is now used as the parish church: there are also a few of the cloisters yet standing. The church is a remarkably fine specimen of decorated work, with bold buttresses at the eastern angles, and two rich niches for statues. The east window is very fine, ornamented with tracery, and in the interior of the church are some rich stalls.

Of Bycknacre Priory, between Chelmsford and Maldon, the central arches of the church and a small portion of the antient wall remain. They are of very late Norman or Early English character. Of Latton Priory, near Harlow, there are some remains used as a barn; they show that the building contained some good Decorated work. Of Lees Priory, between Chelmsford and Braintree, there is a gate-house, with an embattled octangular tower at each corner, of Perpendicular character. Of Thoby Priory, between Brentwood and Ingatestone, there are some slight remains. The churches of Blakemore or Blackmore Priory, between

Ingatestone and Ongar, and of Hatfield Peverel Priory, between Chelmsford and Witham, have been made parochial: the latter has been much altered; it retains a good Norman door, with zigzag mouldings.

Of the early churches, beside those which we have already had occasion to mention, the following deserve notice:— Greenstead church, near Ongar, is a very curious edifice, and one of the most antient in the kingdom: it seems probable that it was built as a sort of shrine for lodging the body of St. Edmund, king of East Anglia, on its being taken back from London to Bury St. Edmund's, in the early part of the eleventh century; and that it was afterwards enlarged to serve as a parish church. The nave is entirely composed of wood, the sides being formed of the trunks of large chestnut-trees (or oaks) split or sawn asunder, and set upright close to one another. They are let into a wooden sill at bottom, and into a plate at top, and secured with wooden pins: two vacancies are filled up with plaster. There is a boarded tower at the west end, but this does not appear to be so antient as the nave: also a wooden porch on the south side of the nave. The chancel is partly of brick, and the nave is strengthened by brick buttresses. The entire length of the original or wooden part of the church is 29 feet long by 14 broad, and 5½ high to the spring of the roof, which is tiled, and not so antient as the sides. 'Little Maplestead church (near Halsted) is a building of great interest, being the latest of the few round churches in the kingdom; it is of pure Decorated character, and its details plain, but very good.' The chancel end of this church is also semicircular, and is probably the latest erection of that form in England. The diameter of the circular part is about 26 feet (or 30 feet according to others); it has a peristyle of six clustered columns, supporting pointed arches: the whole length of church and chancel is about 60 feet. South Ockendon church, near the Thurrocks, has a round tower, such as may be commonly seen in Norfolk, but not much elsewhere: it has an elaborately and variously enriched Norman door: Corringham and some other churches have Norman portions.

When the Catholic religion regained a temporary predominance over the Reformation under Mary I., the persecution was very severe in Essex. Seventeen persons (five of them women) were burnt at Colchester, and one died in prison; and two persons (one a woman) were burnt at Stratford.

The year 1571 was remarkable for the settlement of the Flemish refugees at Colchester; they introduced the woollen manufacture into that and several other towns in Essex.

When the Spaniards were expected to attack England with their Invincible Armada (A.D. 1588), a camp was formed at Tilbury, where a body of more than 18,000 men, under the earl of Leicester, was posted. Tilbury Fort was then a block-house, which had been built by Henry VIII. to defend the passage of the river; it was at a subsequent period (upon the alarm caused by the Dutch sailing up the Medway, A.D. 1667, and burning the ships at Chatham), enlarged and made a regular fortification, as it is at present. The camp at Tilbury was visited by Elizabeth, whose presence increased the general enthusiasm. Colchester on this occasion furnished two ships and a pinnace to the English fleet. In 1595 the same town furnished three ships for the expedition to Cadiz.

In the war with Spain at the beginning of the reign of Charles I., a Spanish fleet caused alarm by appearing off Harwich; but they made no attempt to land (A.D. 1625). In the civil war at the close of the same reign, Essex was almost entirely in the interest of the parliament, and joined in an association for mutual aid and succour with the other eastern counties of Norfolk, Suffolk, Cambridge, and Herts; this was called the Eastern Association. The towns of Essex and Suffolk, upon a requisition from the committee of both houses, raised 2000 men for the service of the parliament, besides large supplies both of men and money which they sent to the parliament at other times. The county appears to have been exempt from the immediate sufferings of the civil war during the continuance of the main contest; but in the year 1648 it was the scene of one of those isolated and abortive attempts of the royalists, the narratives of which form so many episodes in the great history of the war. A part of the royalist forces, which had been raised in Kent under Goring, earl of Norwich, and Sir William Waller, and were pressed by Fairfax and the parliamentary army, crossed the Thames into Middlesex, and retreating thence into Essex, were joined by the royalists of that county (who had previously seized the parliamentary committee at Chelmsford) and by some royalist gentlemen from Hertfordshire. Their leaders were the earl of Norwich, Lords Loughborough and Capel, Sir Charles Lucas, Sir George Lisle, Sir Bernard Gascoigne, Sir William Campian, Sir William Compton, Sir William Leyton, Sir Richard Hastings, and many other officers and gentlemen. They retired first to Chelmsford, from thence to Braintree, taking in their way Lees House, the seat of the earl of Warwick, and from thence to Colchester, which they entered by convention, after a slight skirmish with the townsmen. To this place Fairfax with his army advanced in pursuit of them, and made a desperate attempt to storm the town. The royalists repulsed him, but with the loss of one of their men of note, Sir William Campian, and nearly 200 men killed and wounded. The Parliamentarians' loss was probably nearly 1000 killed, wounded, and taken. Fairfax now laid close siege to the town, which was blocked up on every side; and two small frigates of ten and eleven guns, which lay in the river to assist the king's party, were taken by some parliamentary vessels from Harwich. After a siege of between two and three months and several severe actions, the royalists were forced to surrender at discretion. The parliamentary general, deeming it necessary to make an example of the leaders of this rising, and being sanctioned by the determination of a council of war, ordered Sir Charles Lucas, Sir George Lisle, Sir Bernard Gascoigne, and Colonel Farre to be executed the day the town was given up. Farre had escaped; Gascoigne, who was a Florentine, was reprieved; but the other two were shot under the walls of Colchester Castle.

In A.D. 1665 and 1666 Colchester suffered severely from the plague. In the abovenamed years 4731 persons died of it: nearly 200 of them in one week. In A.D. 1684 the charter of Colchester was surrendered to the crown, and a new charter granted the same year, which was remodelled by James II. A.D. 1688; but after the Revolution the original charter was restored.

The history of the county presents no later events of any interest.

(Morant's *History of Essex*; *Beauties of England and Wales*; *Ordnance Survey of Essex*; Conybeare and Phillips's *Outlines of the Geology of England and Wales*: Young's *Agriculture of Essex*; Rickman's *Gothic Architecture*; Turner's *Anglo-Saxons*; *Excursions in Essex*; *Parliamentary Papers*, &c.)

STATISTICS.

Population.—Essex is an agricultural county, and but few of its inhabitants are engaged in manufactures. Of 79,023 males twenty years of age and upwards, living in the county in 1831, 43,683 were engaged in agricultural pursuits, and only 871 in manufactures or in making manufacturing machinery. Of these latter 500 were employed in the manufacture of silk goods, principally at Braintree, Great and Little Coggeshall, and Bocking; at Halsted there were 59 silk-machine makers; about 30 men were engaged in the manufacture of gunpowder at the government establishment at Waltham Abbey. At West Ham, in the vicinity of the metropolis, operative chemistry gives employment to several of the inhabitants. Essex ranks the eighth on the list of agricultural counties, and in this respect retains the same position as in 1811.

The population of this county at each of the four periods in which the census was taken during the present century was:—

	Males.	Females.	Total.	Incr. per cent
1801	111,356	115,081	226,437	
1811	124,839	127,634	252,473	11.49
1821	144,909	144,515	289,424	14.63
1831	159,015	158,492	317,507	9.50

Showing an increase between the first and last periods of 91,070, or a little more than 40 per cent., which is 17 per cent. below the whole rate of increase throughout England.

The following table is a summary of the population, &c., of every hundred as taken in 1831:—

HUNDREDS, &c.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Building.	Uninhabited.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.	Males twenty years of age.
Barstable	2,247	2,614	4	59	1,815	502	297	7,019	6,162	13,181	3,521
Becontree	6,118	7,197	51	358	2,312	2,239	2,646	16,609	18,315	34,924	8,020
Chafford	1,784	1,992	13	40	959	603	400	5,092	4,896	9,988	2,726
Chelmsford	4,916	5,648	32	138	2,892	1,838	918	13,900	13,279	27,179	7,156
Clavering	809	870	8	17	612	149	109	2,044	2,018	4,062	1,013
Dengie	1,609	1,949	6	36	1,345	404	200	5,184	4,731	9,915	2,608
Dunmow	2,367	2,663	7	36	1,781	521	361	6,538	6,253	12,791	3,307
Freshwell	1,332	1,488	19	21	1,079	266	143	3,445	3,362	6,807	1,761
Harlow	1,365	1,682	1	26	1,052	333	297	3,933	3,863	7,796	1,974
Havering-atte-Bower (Liberty)	1,217	1,383	5	63	594	484	305	3,381	3,431	6,812	1,805
Hinckford	7,887	8,500	41	224	5,032	2,301	1,167	19,896	20,287	40,183	9,647
Lexden	3,550	4,375	21	72	2,631	1,054	690	10,852	10,658	21,510	5,393
Ongar	2,414	2,795	7	79	1,787	615	393	7,572	7,143	14,715	3,714
Rochford	2,274	2,617	13	87	1,582	621	414	7,120	6,484	13,604	3,616
Tendring	3,955	4,726	15	92	2,901	1,092	733	11,479	11,307	22,786	5,668
Thurstable	1,166	1,212	3	41	749	290	173	3,051	2,891	5,942	1,463
Uttlesford	2,210	2,647	5	35	1,870	467	310	6,417	6,078	12,495	3,088
Waltham	1,581	1,666	11	108	732	559	375	4,172	4,179	8,351	2,154
Winstree	735	907	.	5	655	185	67	2,271	2,140	4,411	1,165
Witham	2,128	2,346	20	60	1,221	625	500	5,494	5,504	10,998	2,742
Colchester (borough & liberty)	3,216	3,488	25	119	490	2,079	919	7,471	8,696	16,167	3,745
Harwich (borough)	660	830	5	78	75	215	540	1,899	2,398	4,297	791
Maldon (borough)	671	724	9	48	122	306	296	1,859	1,972	3,831	830
Saffron-Walden (town)	941	1,000	33	18	271	534	195	2,317	2,445	4,762	1,116
Totals	57,152	65,319	354	1,860	34,589	18,282	12,448	159,015	158,492	317,507	79,023

County Expenses, Crime, &c.—The sums expended for the relief of the poor at the four dates of

	£.		£	s.	d.	
1801 were	137,140,	being		12	1	for each inhabitant.
1811 „	312,230	„	1	4	8	„
1821 „	254,837	„		17	7	„
1831 „	272,593	„		17	2	„

The sum expended for the same purpose in the year ending March, 1836, was 185,394*l.* 17*s.*; and assuming that the population had increased at the same rate of per centage since 1831 as in the ten preceding years, the above sum gives an average of 11*s.* for each inhabitant. These averages are above those for the whole of England and Wales.

The sum raised in Essex for poor-rate, county-rate, and other local purposes, in the year ending the 25th of March, 1833, was 311,961*l.* 18*s.*, and was levied upon the various descriptions of property as follows:—

	£.	s.
On land	251,571	18
Dwelling-houses	52,157	2
Mills, factories, &c.	6,859	2
Manorial profits, navigation, &c.	1,373	16

The amount expended was:—

	£	s.
For the relief of the poor	265,629	6
In suits of law, removal of paupers, &c.	8,190	5
For other purposes	39,928	3
	313,747	14

In the returns made up for subsequent years, the descriptions of property assessed are not specified. In the years 1834, 1835, and 1836 there were raised 291,010*l.* 2*s.*, 260,424*l.* 5*s.*, and 228,811*l.* 19*s.*, respectively, and the expenditure of each year was as follows:—

	1834.		1835.		1836.	
For the relief of the poor	£239,946	7	£210,045	16	£185,394	17
In suits of law, removals, &c.	6,898	3	7,318	13	5,444	9
Payment towards the county-rate	39,484	9	18,253	14	17,470	10
For all other purposes			23,716	5	20,700	7
Total money expended	£286,328	19	259,334	8	229,010	3

The saving effected in the whole sum expended in 1836, as compared with that expended in 1834, was therefore about 20 per cent.; and the saving effected on the sum expended for the relief of the poor was not quite 23 per cent. in 1836, as compared with the expenditure in 1834.

The number of turnpike trusts in Essex, as ascertained in 1834, is 11; the number of miles of road under their charge is 249; the annual income in 1834, arising from the tolls and parish composition, was 34,504*l.* 15*l.* 1*d.*, and the annual expenditure 39,557*l.* 12*s.* 4*d.*

The county expenditure in 1834, exclusive of that for the relief of the poor, was 18,847*l.* 10*s.* 6*d.*, disbursed as follows:—

	£.	s.	d.
Bridges, buildings, and repairs, &c.	728	2	0
Gaols, houses of correction, &c., and maintaining prisoners, &c.	10,311	17	2
Shire halls and courts of justice—building, repairing, &c.	245	9	8
Prosecutions	2,382	13	8
Clerk of the peace	1,385	7	4
Conveyance of prisoners before trial	758	5	1
„ of transports	297	7	0
Vagrants—apprehending and conveying	315	18	0
Constables—high and special	552	5	2
Coroner	345	17	6
Miscellaneous	1,524	7	11
Total	18,847	10	6

The number of persons charged with criminal offences, in the three septennial periods ending with 1820, 1827, and 1834, were 1908, 2686, and 3837 respectively; making an average of 273 annually in the first period, of 384 in the second period, and of 578 in the third period. The number of persons tried at quarter-sessions, in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county-rates, were 386, 351, and 398 respectively. Among the persons charged with offences, there were committed for—

	1831.	1832.	1833.
Felonies	293	319	321
Misdemeanors	93	32	77

The total number of committals in each of the same years was 407, 445, and 460 respectively.

	1831.	1832.	1833.
The number convicted was	323	315	337
„ acquitted	52	59	72
Discharged by proclamation	32	71	51

In 1836 at the assizes and sessions 619 persons were charged with crimes in Essex. Of these 49 were charged with offences against the person, 31 of which were for common assaults; there were 74 offences against property, committed with violence; and 442 committed without violence; 1 for sending threatening letters; 8 for forging and uttering false money; 1 for killing cattle; 2 for deer stealing; and 42 for riot. Of the whole number of offenders, 446 were convicted, 123 were acquitted, and against 51 no bill was found, or no prosecution ensued. Of those convicted, 20 were condemned to death, none of whom were executed, 17 had their sentence commuted for transportation, and three for imprisonment; 133 were sentenced to transportation for various periods; 279 to imprisonment, 235 of whom for only six months or under; 2 were whipped; 5 were fined, and 6 discharged on sureties. Of the number of offenders, 547 were males and 72 females; 293 could neither read nor write: 283 could read and write imperfectly; 31 could read and write well, and only 1 had received superior instruction; the state of instruction of the remaining 11 could not be ascertained.

The number of persons qualified to vote for the county members of Essex is 11,119, being 1 in 29 of the whole population, and 1 in 7 of the male population, twenty years of age and upwards, as taken in 1831. The expenses of the last election of county members to parliament were to the inhabitants of the county 159*l.* 5*s.* 9*d.*, and were paid out of the general county-rate.

There are fifteen savings' banks in Essex. The number of depositors and amount of deposits on the 20th of November were:—

	1832.	1833.	1834.	1835.	18[illegible]
Number of depositors	8086	8535	9051	9390	9827
Amount of deposits .	£268,333	277,754	289,767	302,061	312,386

The various sums placed in the savings' banks in 1835 and 1836 were distributed as under:—

	1835.		1836.	
	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	5734	£37,301	5388	£38,307
,, 50	2375	73,299	2495	76,480
,, 100	1150	78,931	1204	83,189
, 150	416	50,139	406	49,270
,, 200	221	37,734	243	41,534
Above 200	94	24,657	91	23,606
	9390	302,061	9827	312,386

Education.—The following summary is taken from the parliamentary returns on education, made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	88		
Number of infants at such schools; ages from 2 to 7 years:—			
Males		684	
Females		756	
Sex not specified		932	
			2,372
Daily schools	1075		
Number of children at such schools; ages from 4 to 14 years:—			
Males . . .		13,559	
Females . . .		12,993	
Sex not specified		4,053	
			30,605
Schools . .	1163		
Total of children under daily instruction			32,977
Sunday schools	438		
Number of children at such schools; ages from 4 to 15 and 16 years:—			
Males . . .		12,594	
Females . . .		13,354	
Sex not specified		3,712	
			29,660

If we assume that the population between the ages of 2 and 15 has increased in the same proportion as the whole population since 1821; and that the whole population has increased in the same ratio since 1831 as during the ten years preceding that period, we find that the number of children between the ages of 2 and 15 residing in Essex in 1834 was 109,011

Thirty-seven Sunday-schools are returned from places where no other schools exist, and the children (1513 in number) who are instructed therein cannot be supposed to attend any other school; at all other places Sunday-school children have opportunity of resorting to other schools also, but in what number or in what proportion duplicate entry of the same children is thus produced must remain uncertain. Seventy-seven schools, containing 5250 children which are both daily and Sunday-schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. At a few of the Sunday-schools some scholars are 16 and 17 years of age. Making allowance for these two causes therefore, it appears that perhaps not more than one-half of the children between the ages of 2 and 15 are receiving instruction in this county.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	5	252	65	1,030	18	1090
Daily Schools	97	3476	112	5,690	767	15,673	99	5766
Sunday Schools	22	1359	383	25,293	..	..	33	3008
Total.....	119	4835	500	31,235	832	16,703	150	9864

The schools established by Dissenters included in the above statement are:—

	Schools.	Scholars.
Infant schools . .	..	..
Daily . . .	31	1235
Sunday . . .	91	7600—8835

The schools established since 1818 are:—

		Scholars.
Infant and other daily schools	647, containing	18,533
Sunday-schools . .	230, containing	18,581

One hundred and one boarding-schools are included in the number of daily schools given above. No school in the county appears to be confined to the children of parents of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists, together with schools for children of Roman Catholic parents.

Lending libraries of books are attached to forty-five schools in this county.

ESSEX, EARLS OF. WALTER DEVEREUX, first earl of Essex, the son of Sir Richard Devereux and Dorothy, daughter of George, earl of Huntingdon, was born in Caermarthenshire, at the castle of his grandfather, Walter Viscount Hereford, about the year 1540. He succeeded to the titles of Viscount Hereford and Lord Ferrers of Chartley in his nineteenth year, and was early married to Lettice, daughter of Sir Francis Knolles. When the rebellion, headed by the earls of Northumberland and Westmorland, broke out in 1569, he raised a considerable body of troops, and, in conjunction with other forces, compelled the rebels to retreat into Scotland. The courage that he displayed during this warfare recommended him to Queen Elizabeth, who had ever esteemed his loyalty and superior intelligence: in gratitude for the service that he had rendered her, she conferred on him the order of the Garter, and created him earl of Essex (1572). He now became so great a favourite with the queen, that Leicester and others about the court, jealous of his increasing influence, encouraged Essex to enter upon a scheme for subduing and colonizing a district of the province of Ulster. He had for some time contemplated such an expedition, and having been persuaded to take the command, embarked from Liverpool in August, 1573, in company with Lord Darcy, Lord Rich, and other persons of distinction. He contracted to furnish one half of the expense of the undertaking, in consideration of which he was to have one half of the colony as soon as it was established. His arms at the outset met with various success; but after a time his English friends deserted him, and their loss, together with the enmity of many courtiers at home, soon multiplied difficulties round him. He was obliged to resume the government of Ulster, which he had previously resigned; and he was compelled to make peace with O'Neil when his pursuit of the rebels under that leader gave every prospect of success. He was required to give up his command when he had nearly dispossessed the Scots, who had invaded the western islands in his territory, and with no higher title than that of captain was made to serve at the head of a small body of 300 men. Feeling himself harassed and oppressed, he returned to England; but having received, with the title of Earl Marshal of Ireland, promises that he should have greater liberty of action allowed him if he would go back to that country, he consented to return to his post. The improvement of his situation, however, was so small that his spirits were affected; the effects of grief were soon visible in his constitution; a dysentery attacked him, and, after a month's pain and misery, he died at Dublin, on the 22nd of September, 1576: his body was removed for interment to the parish church at Caermarthen. The sudden failure of his health gave rise to a suspicion of his having been poisoned; but no evidence whatever could be adduced to prove the fact. The speedy marriage of the Countess of Essex to Leicester, who was charged with the murder of her late husband, did not tend to throw discredit on the report. Essex left two sons and two daughters. Of the sons we subjoin a further account. Of the daughters, Penelope first married Robert Lord Rich, afterwards Charles Blount, earl of Devonshire; and Dorothy first Sir Thomas Perrot, and afterwards Henry Percy, earl of Northumberland. (*Biog. Britan.*; *Criminal Trials*, vol. i.)

Robert Devereux, earl of Essex, the son of the preceding Walter Devereux and Lettice Knolles, was born at Netherwood, in Herefordshire, in November, 1567, and was educated, according to his father's wish, under the superintendence of Lord Burleigh, by whose direction he was sent to Trinity College, Cambridge, in 1577, and remained there four years. Upon leaving the university, he retired for some time to his estate in South Wales, and did not appear at court till 1584. His station, his agreeable manners, handsome person, and vigorous mind soon brought him into notice. He was reconciled to Leicester, now his father-in-law, who had been suspected of causing his father's death; and received the appointment of Master of the Horse from the hands of the queen, who also made him a Knight of the Garter. Elizabeth at the same time remitted the debt to the exchequer incurred by his father; and when Leicester went with an army into the Netherlands in 1587, she gave to Essex, who accompanied him, the responsible commission of a captain-general of the cavalry. On the death of Leicester in 1588, Essex became her chief favourite. In 1589 he suddenly joined the expedition of Drake and Norris, who had undertaken to restore Antonio to the throne of Portugal. The queen, exasperated at his departure from court without giving her notice, despatched the earl of Huntingdon to Plymouth with a peremptory order for his return. The messenger was too late; Essex had sailed. He joined the expedition on the coast of Portugal, marched to Lisbon as a volunteer, behaved himself thoughout the enterprise with great gallantry and humanity, and on his return to England found that, in spite of his disobedience, he retained beyond all comparison the first place in the queen's favour. His chief rivals in her esteem were Sir Walter Raleigh, whose removal from court by the means of an appointment in Ireland has been attributed to the contrivance of Essex, and Sir Charles Blount, of whom he was so jealous, that upon the queen's bestowing a trifling mark of favour upon him at a tilting match, Essex used such insulting expressions to him that a duel ensued, in which the earl was wounded in the knee. In 1591 (a year after he had married a daughter of Sir Francis Walsingham, the widow of Sir Philip Sidney, whom the queen angrily declared to be in all respects unworthy of him), Essex was despatched to assist Henry the Fourth of France in his resistance of the king of Spain, who sought to obtain possession of the duchy of Brittany. He encamped under Rouen, and here, as at Lisbon, idly challenged the governor to a duel. The expedition was wholly unsuccessful, and the earl lost, by a musket-shot, his only brother Walter Devereux, to whom he was greatly attached.

In 1594, Essex, who had once before come into collision with the Cecils respecting the appointment of the queen's secretary, became a second time at variance with them. Having, as he conceived, discovered a plot in which Lopez and others had resolved to murder the queen, he apprised her majesty of his suspicions; but Lord Burleigh and Sir Robert Cecil, who, at the queen's desire, had examined into the case, declared the accusation to be unfounded, so that the queen severely rebuked Essex. Mortified both at this rebuke and at the conduct of his rivals, he renewed the inquiry, and eventually elicited evidence upon which Lopez and his confederates were executed. The opposition of the Cecils to the counsels of the earl of Essex was renewed in 1596. Lord Howard, then lord admiral, advised the queen again to invade Spain, a proposal which Essex warmly seconded; Burleigh, on the contrary, denounced the scheme as impolitic and imprudent. The queen gave her consent to the expedition: Howard and Essex sailed; Cadiz was taken, plundered, and burned; fifty-seven Spanish ships of war and merchantmen were taken or destroyed; and the Spanish government suffered considerable loss. But though the enterprise was successful, and commanded with the greatest gallantry, the benefits resulting to the English government were hardly equivalent to the expense incurred. After some trifling attacks upon the coast of Spain, the fleet, which had been absent little more than two months, returned to England. The enemies of Essex had endeavoured, during his absence, to poison the mind of the queen to his prejudice, but his publication of the 'Censure of the Omissions in the Expedition to Cadiz' completely reinstated him in her favour. He continued to meet with disappointments in his endeavour to obtain official situations for his friends, but was himself created Master of the Ordnance. In July, 1597, Essex, as commander-in-chief, with Lord Thomas Howard as vice-admiral, and Sir Walter Raleigh as rear-admiral, sailed against the Spanish fleet, with a view also of making conquests among the Azores. The English ships, shattered and crippled by a storm, were immediately driven back to Plymouth. In August they again set sail, and though they could not burn the Spanish ships which they now found in harbour, they succeeded in making captures to the amount of 100,000*l.*, with which booty they returned to England in October. The queen received Essex with reproaches and discontent, and the expedition was generally deemed a failure. He now retired to Wanstead, angry on several accounts: the chief of these was the elevation of the lord admiral to the earldom of Nottingham, by which he thought himself doubly affronted; first, because Lord Howard's services at Cadiz were recited, and, in the second place, because, by his new title, Lord Howard gained precedence of him according to a regulation made in the reign of Henry VIII. He was pacified by being appointed hereditary Earl Marshal, which by the same regulation restored him to his rank. In 1598 a quarrel occurred between the queen and Essex, who, having differed from her respecting an Irish appointment, angrily and contemptuously turned his back upon her in the presence of several of the ministers. The queen, unable to bear the affront, gave him a box on the ear, and bade him 'go and be hanged.' Essex immediately seized his sword, and the lord admiral stepping in between, he swore 'that he neither could nor would put up with an affront of that nature, nor would he have taken it at the hands of Henry the Eighth himself.' He withdrew from the court, and some months passed before he would make any submission, or suffer a reconciliation to be effected. His friends dated his ruin from this unfortunate circumstance. It was hastened by the death of Burleigh, which was on the whole a great misfortune to Essex. Had Burleigh lived, Essex might not have undertaken the unfortunate Irish expedition on which he at this time entered (1599). The province of Ulster was in a state of rebellion; and with the hope that his rank and military popularity and power might prevail in that country, he accepted the commission of lord lieutenant of Ireland. His government in that country was inconsiderate and ill-advised; and his opposition to the queen's wishes in the nomination of Lord Southampton to the generalship of the horse, which he was peremptorily ordered to revoke, gave great offence. His delay in sending troops to Ulster, the loss of men and money consequent on the delay, and the ultimate failure of the expedition, were the causes of many and loud reproaches. Essex returned to England in September: at their first interview the queen received him in a friendly manner, but on the following day he was put into 'free custody,' and detained a prisoner in his house. In June, 1600, he was denied the privileges and authority of his offices; and it was not until the 26th of August that he was liberated. The queen still denied him access to court, and refused the renewal of a valuable patent for the monopoly of sweet wines, which his friends used all their endeavours to procure, declaring that 'in order to manage an ungovernable beast, he must be stinted in his provender.'

The weight of these grievances upon his haughty and impetuous mind told the more heavily from the knowledge that his general popularity was undiminished. So deep was his impression of resentment against those whom he conceived to have biassed the queen against him, that he listened to the rash and desperate advice of Cuffe, his secretary, to remove Cecil, Cobham, and Raleigh by force from the queen's councils. In order to strengthen his interest, the gates of Essex House were thrown open to all persons who were discontented with the queen or her advisers. With the same view, he courted both the Roman Catholics and Puritans, and a concourse met daily to hear sermons in his house. The multitude that attended the delivery of these discourses could not fail to attract the attention of the vigilant government. Essex was warned to be careful of his safety, and his attendance was required before the council. At this summons he took alarm, fearing a renewal of his imprisonment, and consequently the defeat of his scheme. He determined therefore to commence his proceedings on the following morning (Sunday, February 8, 1600-1); and during the night messengers were sent in all directions to acquaint Essex's friends that his life was threatened by Raleigh and Lord Cobham. In consequence of this intelligence, Lords Sandys and Monteagle, the earls of Rutland and Southampton, with nearly 300 other gentlemen, assembled at Essex House, where it was divulged that Essex had resolved at once to rid himself of his enemies by forcing his way to the queen, and informing her of his danger from those who had so long abused their influence with her majesty. Essex having shut up within his gates the lord keeper, the chief justice, and others whom the queen, aware of what was passing, had sent to inquire into the cause of the tumult, proceeded with his friends to the city, where, crying 'For the queen, for the queen, a plot is laid against my life,' he tried to enlist the citizens in his favour. But notwithstanding his popularity, not one man took arms. The cause of the tumult was either mistaken or unknown. At length the earl endeavoured to return home, but a party of soldiers met him at Ludgate, and a skirmish ensued, in which he was twice shot through the hat. At length he reached Essex House, but after a short defence he was compelled to surrender himself, and with Lord Southampton was committed to the Tower: the rest of the conspirators were lodged in various other prisons. He was tried for treason in Westminster-hall on the 19th of February, condemned, and executed 25th of the same month. (*Criminal Trials*, vol. i.)

A sketch of the character of Essex has lately appeared in an article in the *Edinburgh Review* (vol. lxv., p. 21), which also displays the ingratitude of Lord Bacon towards his zealous friend and patron. We extract the following remarks:—'Nothing in the political conduct of Essex entitles him to esteem; and the pity with which we regard his early and terrible end is diminished by the consideration that he put to hazard the lives and fortunes of his most attached friends, and endeavoured to throw the whole country into confusion for objects purely personal. Still it is impossible not to be deeply interested for a man so brave, high-spirited, and generous: for a man who, while he conducted himself towards his sovereign with a boldness such as was then found in no other subject, conducted himself towards his dependants with a delicacy such as has rarely been found in any other patron. Unlike the vulgar herd of benefactors, he desired to inspire not gratitude but affection. He tried to make those whom he befriended feel towards him as towards an equal.' His mind was ardent and susceptible, and naturally disposed to the admiration of all that is great and beautiful.

He left one son (of whom we give an account in the next article) and two daughters. Frances married first the earl of Hertford, and afterwards the duke of Somerset. Dorothy was the wife first of Sir Henry Shirley, and lastly of William Stafford, of Blatherwyck, in Northamptonshire.

Robert Devereux, third earl of Essex, was born in Essex House, in the Strand, in 1592. He was sent to Eton by his grandmother, who, after his father's death, received him into her house; and in 1602 he was removed to Merton College, Oxford, where the warden, Mr. (afterwards Sir Henry) Savile, who had been an intimate friend of his father, took charge of his education. He was restored to his hereditary honours in 1603, and three years afterwards was unhappily married to lady Frances Howard, a child of no more than thirteen years old. The new-married couple being too young to live together, Essex was sent to improve himself abroad; while the bride, who was celebrated for her beauty, continued with her mother. It was four years before he returned to claim his wife, and in the mean time she had contracted so great an affection for lord Rochester, afterwards earl of Somerset, that until she was compelled by her father, she could not be brought to cohabit with her husband. The union never was a happy one. Not many months after they had met, she instituted proceedings against him praying for a separation on a real or pretended charge of physical disability. A divorce was granted, and the lady was soon after married to lord Rochester. The slur thus cast upon Essex drove him to the retirement of his country-house and the pursuit of rural occupations. After some years however, a solitary life became irksome to him. Tired of inaction, he joined lord Oxford in 1620, raised a troop, and marched with the Elector Palatine in the war against Holland. In the winter he returned to England, where his opposition to the government rendered him unpopular at court; indeed the reception that he met with at home was so little agreeable that he willingly renewed his military avocations abroad during the two following summers, and in 1625 again raised a troop, with which he sailed to aid the United Provinces. His disposition and capability for military service now struck the king, and he was appointed vice-admiral of a fleet which was employed in a fruitless expedition against Spain. He engaged in another expedition in the Low Countries, and was afterwards bold enough to marry a second time. In this second choice of a wife (the daughter of Sir William Paulet) he was scarcely more fortunate than in his first. It is true indeed that the lady soon after her marriage bore a son, which Essex owned and christened after his name, but her familiarities with Mr. Uvedale gave him cause to suspect her fidelity, and after much mutual crimination, on the one side for inconstancy, on the other, a renewal of former charges, a separation took place. The child died at the age of five, and Essex never showed further inclination to matrimony. Between his journey to Ireland in 1632 and his appointment in the fleet that sailed to Holland in 1635, he spent his time either in his house at Chartley, or in London. His inclination to seek popularity among the presbyterians was evident and undisguised; nevertheless the king employed him as lieutenant-general of his troops that were sent against the Covenanters (1639). In 1640 he was one of twelve peers that signed a petition that a parliament should be called and an attempt made to settle the difficulties of the state without further bloodshed. He was also one of the commissioners sent to Ripon to treat with the Scots; and when, at the opening of the Long Parliament, the king saw that it was necessary that he should endeavour to conciliate the presbyterian party, he made Essex lord chamberlain. It was the wish of many of the royalists that Essex, whose popularity was great among the presbyterians, should also have been placed at the head of the army, but Charles, who disliked him on account of the roughness of his manner, and doubted the firmness of his attachment to him, refused to appoint him, and would yield to their requests no further than to make him lieutenant-general of his forces south of the Trent. When the Commons demanded of the king that a guard should be raised in the city of London, it was Essex whom they desired to have placed at its head. Charles, unwilling to listen to this request, left London suddenly, and called upon Essex to follow him; but Essex, indisposed to the king on account of the thankless incivility with which he had always been treated at court, refused to follow, pleading his duty to remain in attendance of parliament. Vehemently angry at this refusal, the king instantly deprived him of all his offices. Essex now became the chief favourite and leader of the parliamentary or presbyterian party. He became parliamentary general in 1642, and was in consequence proclaimed a traitor by the king. He opposed Charles in person at Edgehill (1642); he also took Reading (1643), but on account of a disease with which his troops were infected, he was obliged to abandon any further attack; at which the disappointment of the parliamentary leaders was so great, that they nearly dismissed him from his command. On the recovery and reinforcement of his soldiers he triumphantly entered Gloucester, from which he had driven the king away, surprised Cirencester, and after fighting courageously at the doubtful battle of Newbury, succeeded in covering London. As the supporters of the parliament were supposed to be numerous in Cornwall, in the hope of increasing his forces he marched to that county pursued by the royalist troops; the number of adherents however had been exaggerated, his expectations were disappointed, and as he was completely hemmed in by his pursuers, the scarcity of provisions began to be severely felt. At this crisis the king proposed a treaty; but Essex had no authority to make any agreement without the sanction of his parliamentary masters; and as the royalists, finding that he did not comply with the king's offer, continued to press their advantage, after some of his troops had abandoned him, he was obliged to escape by sea from Fowey. Having sailed from Plymouth to London, he once more collected an army, and was placed at its head, but an illness compelled him to quit his command. When he returned to London he found a state of confusion and distrust that scarce could be exceeded. At a meeting held at his house it was proposed to impeach Cromwell, but this served no other purpose than to irritate that leader. The independents soon afterwards succeeded in carrying the 'self-denying ordinance,' which forbad members of either house of parliament to hold any command in the army: thus Essex ceased to be parliamentary general. It was voted that for his services he should be raised to the rank of a duke, and be granted a pension of 10,000*l.* a year. He did not however live to enjoy these honours, being carried off by a sudden and violent illness in the fifty-fifth year of his age. He was publicly interred in Westminster Abbey.

The chief defects in his character were indecision and vacillation; when he erred it was more from want of judgment than from bad intention. His bearing was always manly, and his courage has never been impeached. At his death the title became extinct. (Hume's *History of England; Biographia Britannica; Biographie Universelle.*)

ESSLINGEN, the seat of provincial government for the Würtemberg province of the Neckar, as well as for the bailiwic of Esslingen, lies in a fine and fertile country on the banks of the Neckar, surrounded by heights crowned with forests and vineyards, in 48° 44′ N. lat., and 9° 19′ E. long. It is an old town, and was a free city of the German empire, and the favourite residence of some of the emperors. The inner town has massive walls and towers round it; and the five suburbs, one of which stands on an island in the river, while another is attached to the old burg which lies upon a hill, are also protected by stout walls. It has five churches, that of St. Mary being distinguished by its fine Gothic spire, a handsome town-hall, an hospital richly endowed with the property of some suppressed religious houses, a high school, the head seminary of the kingdom for educating teachers, an orphan asylum, several elementary schools, and a population of about 6250, of whom about 100 are Roman Catholics and 100 Jews. Esslingen has manufactures of woollens, cotton and woollen yarns, wine, lackered iron and tin ware, paper, &c., and a good trade in agricultural produce. The parish of Esslingen comprises the well-known Esslingen-Gebiet, a succession of hamlets scattered along the heights between the town and Rothenberg, and carried up to the very summit of the range.

ESSLINGEN, or ESSLING, is likewise the name of a small village of about 280 inhabitants, in the circle of the Lower Mannhartsberg, in Lower Austria, about seven miles east of Vienna. It is connected by historical recollections with the adjacent village of Aspern which lies to the west of it. The ground between these two places was the scene of a severe conflict between the French under Napoleon, and the Austrians, which begun on the 21st and terminated on the 22nd of May, 1809, when the latter remained in possession of Aspern, and the former of Esslingen. By the Austrians the conflict was therefore called that of Aspern; but by the French that of Essling, from which village Marshal Massena covered the retreat of Napoleon's forces, and afterwards derived the ducal title bestowed upon him by the French emperor.

ESSOIGNS, Latin *Essonium*, French *Essoigne*, or *Exoine* (apparently from the Latin *Exonerare*, to exonerate, but see Du Cange, in voc. *Sunnis*), is the allegation of an excuse for non-appearance by a person summoned to answer an action at law, or to perform service at a court baron. There were various causes of excuse, such as illness, falling among thieves, floods, &c.

A party might essoign himself three times by sending a substitute to explain the reasons for his non-appearances, and it formerly served as an imparlance or a craving for a longer time by a defendant to make answer in real and mixed actions

Essoign day of the Term. The first return day in every term was, properly speaking, the first day of the term (until essoigns were no longer allowed to be cast in personal actions), and on that day the courts sat to take essoigns or excuses from such as did not appear to the summons or the writ; wherefore it was called the essoign day.

The essoign or general return day is now regulated by 1 William IV., chap. 3, which enacts 'That all writs usually returnable before any of his majesty's courts of King's Bench, Common Pleas, or Exchequer, respectively, on general return days, may be made returnable on the third day exclusive, before the commencement of each term, or on any day, not being Sunday, between that day and the third day exclusive before the last day of the term; and the day for appearance shall, as heretofore, be the third day after such term.'

ESTATE, in law, signifies that title or interest which a man has in lands, tenements, hereditaments, or other effects. It is either real, comprising lands, tenements, and hereditaments held or enjoyed for an estate of freehold; or personal, comprising interests for terms of years in lands, tenements, and hereditaments, and property of every other description. Personal estate [CHATTELS] goes to the executors, and is primarily liable for payment of debts.

Real estate may be considered under three heads:—(1) the quantity of estate, *i. e.*, the amount of interest in the owner; (2) the time when that interest is to commence; and (3) the quality of estate, or the mode in which it is to be enjoyed.

1. All real estates not being of copyhold tenure [COPYHOLD], or what are called customary freeholds, are either of freehold or less than freehold. The former may be divided into two kinds; freeholds of inheritance, and freeholds not of inheritance. Freeholds of inheritance admit of a further subdivision, into inheritances absolute, called fees simple, and inheritances limited, called qualified or base fees, and fees conditional. A freehold of inheritance absolute or fee simple is the largest estate which the law allows to a subject; the owner may freely dispose of it to whom he pleases in his lifetime by deed or by will, and if he dies without making any disposition, it descends to such of his kindred as the law marks out as his heir.

A qualified or base fee has some qualification or limit annexed, which may determine the estate, as in the instance of a grant to A and his heirs *tenants of the manor of Dale.* Whenever A or his heirs cease to be tenants of that manor, their estate is entirely determined, though during its continuance the proprietor has the same rights and privileges as if he were absolute tenant in fee simple.

A conditional fee at common law was a fee restrained to some particular heirs exclusive of others, as to a man and the heirs male of his body, by which limitation his lineal heirs female and collaterals were excluded; and this is the origin of estates tail. It was held that if the donee, in the case supposed, had no heirs male of his body, or if, after a male child was born, no alienation were made, the land should revert to the donor on the failure of heirs male of the donee's body: in fact, for all purposes of alienation it was a fee simple, on condition that the donee had male issue; for it is a rule of law, that when any condition is performed it is thenceforth entirely gone, and the thing to which it was annexed becomes absolutely and wholly unconditional. The nobility however, being anxious to preserve their estates in their own families, procured the Stat. Westm. the Second, 13 Ed. I., c. 1, commonly called the Statute de Donis Conditionalibus, to be made, which enacted that the will of the donor should be observed, and that the land should go to the heirs specified, if there were any, or if none, should revert to the donor. Thus the donor acquired an estate in reversion, which could only be allowed, consistently with the nature of estates in reversion, by considering the conditional fee to be changed into a limited, or, as it is called in technical language, a particular estate. This kind of estate was called an estate *tail,* from the word *talliare,* to cut, being as it were a portion of the whole fee. Means were soon however discovered by the ingenuity of the lawyers to enable the donee and his heirs of the specified description to cut off the entail, as it was called. [CONVEYANCE, FINE, RECOVERY.]

A freehold, not of inheritance, is an estate which the owner has for his own life only, or the life of some other person, or until the happening of some uncertain event. The following are instances:—A gift to A until B returns from Rome; but if the gift had been to A and his heirs until B returns from Rome, the estate would have been a qualified or base fee: and if B had died without returning from Rome, would have become a fee simple absolute. Some freeholds not of inheritance, arise from operation of law, as tenant in tail after possibility of issue extinct, which is where an estate is limited to A and the heirs of his body to be begotten on the body of B his wife, which is called an estate tail special (as distinguished from an estate tail general, *i.e.* to A and the heirs of his body, without specifying the woman from whom they must spring). If B dies without children, A is no longer tenant in tail, but tenant in tail after possibility of issue extinct, and is regarded by the law, as to the duration of his estate, as simple tenant for life. As to tenant by courtesy and tenant in dower, see Courtesy and Dower.

Of estates less than freehold there are three kinds—estates for years, at will, and by sufferance. An estate for years (which includes an estate from year to year) is personal property, and, like other chattels [Chattels], upon the death of the owner, without having disposed of it in his lifetime, devolves upon his executors or administrators. An estate at will arises where a man lets lands to another expressly at the will of both parties or without limiting any certain estate; either party may put an end to the tenancy, though, for the sake of general convenience, the courts strive to construe them as tenancies from year to year, for the purpose of rendering a six months' notice necessary to their determination. An estate by sufferance arises where a tenant, who has entered by lawful title, continues in possession after his interest has determined: this estate may be put an end to at any time by the lawful owner, though, after acceptance of rent, the law would consider it as a tenancy from year to year, as in the case of a tenancy at will.

Neither of these two last estates confers any power of alienation. All these estates, real and personal, freehold or less than freehold, freeholds of inheritance or not of inheritance, may become subject to another qualification, and be called estates upon condition, being such whose existence depends upon the happening or not happening of some uncertain event whereby the estate may be either originally created or enlarged or finally defeated. [Condition; Mortgage.]

2. Estates are either in possession or in expectancy.

The former kind of estate requires no explanation here. The latter, involving some of the nicest and most abstruse learning in English law, are divided into estates in remainder and reversion, and by executory devise or bequest; and again, remainders are divided into estates in remainder vested or contingent. [Remainder; Reversion.] An executory devise or bequest is such a limitation of a future estate or interest in lands or chattels as the law admits in the case of a will, though contrary to the rules of limitation in conveyances at common law. It is only an indulgence allowed to a man's last will and testament, where otherwise the words of the will would be void; for wherever a future interest is so limited by a will as to fall within the rules laid down for the limitation of contingent remainders, such an interest is not an executory devise, but a contingent remainder. [Will.]

3. Estates may be enjoyed in four ways; in severalty, in joint tenancy, in coparcenary, and in common.

An estate in severalty is when one tenant holds it in his own right without any other person being joined with him.

An estate in joint tenancy is when an estate is granted to two or more persons at the same time, in which case the law construes them to be joint tenants unless the words of the grant expressly exclude such construction; they have unity of interest, of title, of time of vesting, and of possession, and upon the decease of one, his whole interest, unless disposed of by him in his lifetime, remains to the survivor or survivors.

An estate in coparcenary is when an estate of inheritance descends from the ancestor to two or more persons, who are called parceners, and amongst parceners there is no survivorship.

An estate in common is when two or more persons hold property, by distinct titles and for different interests, but by unity of possession.

All these three last-mentioned modes of joint and undivided possession may be put an end to by the parties interested, either by prescribed modes of conveyance or by partition. [Partition.]

Estates are also legal or equitable. It is a legal estate when the owner is in the actual seisin or possession, and also entitled to the beneficial interest himself or in trust for some other person. An equitable estate is when some other person, not the person who is the actual and legal owner, is entitled to the beneficial interest of the property of which that other is in possession. The power of the beneficial owner over his equitable estate is as complete as if he were possessed of the legal estate. [Trust; Equity.]

ESTE, HOUSE OF, one of the oldest historical families of modern Europe, and the oldest among those which have retained sovereign power to the present time, the house of Savoy perhaps excepted. Some chronologists, such as Pigna, have endeavoured to trace back the genealogy of the house of Este to the fifth century of our æra, when we find the names of Atius, Aurelius, and Tiberius mentioned as princes of Este, Vicenza, and Feltre. But to pretend to ascertain the lineal succession of these princes down to the ninth century is a matter at least very dubious. The more sober and judicious Muratori, in his 'Antichità Estensi,' has traced the ancestry of the Este to the dukes and marquises who governed Tuscany as a great imperial fief under the Carlovingian emperors, and who were probably, like most other great Italian feudatories at that time, of Longobard origin. Some old chroniclers, such as Mario Equicola, in his 'History of Mantua,' state positively that they were Longobards, and related to the Longobard dukes of Spoleto. The succession, however, of these marquises or dukes, among whom are registered two of the name of Adalbert, in the ninth century, is not clearly ascertained until we come to another Adalbert, who is styled marquis, but of whom little is known, and who died about A.D. 917. He left, however, two sons, Guido and Lamberto, who were stripped of their fiefs by Hugo and Lotharius, kings of Italy. A son or nephew of either Guido or Lamberto, named Oberto, took the part of Berengarius II., who was elected king of Italy about A.D. 950; and this Oberto was possessed, either by inheritance or through the favour of Berengarius, of several fiefs in Tuscany and Lunigiana. Being afterwards dissatisfied with the conduct of Berengarius, he was one of the Italian nobles who repaired to Otho of Saxony to offer him the crown of Italy. Otho, on his exaltation, appointed Oberto comes sacri palatii, which was one of the first dignities of the kingdom, and gave him in marriage his daughter Alda. Oberto died about the year 972, leaving two sons, Adalbert and Oberto II., the latter of whom was lord of Luniigiana and of the county of Obertengo in Tuscany. Oberto took the part of Hardouin, marquis of Ivrea, against Henry of Bavaria, for the crown of Italy. Oberto died about 1014, and was succeeded by his son, Alberto Azzo I., who in his turn was succeeded by his son Alberto Azzo or Albertazzo II. This Albertazzo, besides his paternal fiefs of Lunigiana and Tuscany, inherited also from his uncle Ugo the fiefs of Este, Rovigo, and Casalmaggiore, in Lombardy. In the year 1045 he was appointed by the emperor Henry III. count and governor of Milan; and soon after he married Kunitza, or Cunegonda, of the great German house of Welf, and sister to Welf III., on whom the Emperor Henry had bestowed the duchy of Carinthia and the march of Verona. Welf III., dying without issue, his inheritance fell to his sister's eldest son by Albertazzo, who took the name of Welf IV. This Welf IV. was made duke of Bavaria about 1070, and from him the line of Brunswick and Hanover, known also by the name of Este-Guelphs, is descended.

Albertazzo having lost his German wife, married Garisenda, countess of Maine in France, by whom he had two sons, Folco and Hugo. To Folco he left his Italian estates, and Hugo inherited the French property of his mother, namely, the county of Maine, which he afterwards sold. Hugo married a daughter of Robert Guiscard, the conqueror of Naples, and died without issue. Muratori transcribes a diploma of the emperor Henry IV., dated A.D. 1077, confirming the possessions of the Italian fiefs to Hugo and Folco, sons of the marquis Azzo of Este. Folco after his father's death was sued by his half-brother Welf for a share of his paternal inheritance; but after a long contention, an arrangement was made by which Folco retained the greater part of the Italian estates, including the fief of Este. Folco died in 1135, and his son Obizzo succeeded him. Like his father, he assumed the title of marquis of Este, from the town of that name, by which his house was designated ever after. The town of Este, built near the ruins of the antient Ateste, lies in the Venetian state, north of the Adige, in the province of Padua. The emperor Frederic Barbarossa, at a court held at Verona, A. D. 1184, bestowed upon Obizzo the investiture of the marquisates of Milan and Genoa, which were then merely nominal, as the two cities had become free; yet the emperors would not discontinue the prerogative of appointing the titular marquises of those former imperial jurisdictions.

In Obizzo's time the foundation of the dominion of the House of Este over Ferrara was first laid. The family of Adelardi had long been the popular leaders at Ferrara, and enjoyed the chief authority in that community. Marchesella, the last offspring of this family, was betrothed by her uncle and guardian Guglielmo on his death bed to one of the Torelli, a rival family. But the girl was carried away and compelled to marry Azzo of Este, the son of Obizzo, and from that time the Este were considered as citizens of Ferrara. 'A veil has been thrown over the whole transaction, which seems to imply that fraud or violence had been committed.' (Litta, *Famiglie celebri Italiane.*)

This Azzo, styled the Fifth, died about the end of the twelfth century, and was succeeded by his son Azzo VI., who was elected in 1208 by the citizens of Ferrara as vicar or lord of that city, with power to appoint his successor. 'This,' says Litta, 'was the first example of a free Italian city giving itself over to a lord, and the beginning of those numerous principalities into which Italy became divided.'

Aldobrandino succeeded his father Azzo VI. in 1212, and was himself succeeded by Azzo VII., called also Azzo Novello, who took part with the Pope against Frederic II.; for the Este were naturally of the Guelph party. He was mainly instrumental in the fall of the tyrant Eccelino: he favoured learning, patronized the Provençal troubadours who resorted to his court at Ferrara, and established schools in that city. He was succeeded by Rinaldo, and the latter by Obizzo in 1252. Obizzo was elected lord of Modena in 1288, and of Reggio in the following year, according to the prevailing fashion of the Italian cities at that period. These lordships of Ferrara, Modena, and Reggio, however, were not held by the Este in undisturbed possession, for they were repeatedly invaded and recovered during the frequent wars of the Italian states in the fourteenth century. While the family of Este were acquiring a princely dominion, they lost the original fief from which they derived their name. About 1293 the Paduans took possession of the town and territory of Este by conquest, and annexed it to their community. It afterwards, in 1405, passed into the hands of the Venetians. (Alessi, *Ricerche Istorico-Critiche delle Antichità di Este.*)

Nicholas, called 'the Lame,' one of the successors of Obizzo, was vicar of Ferrara from 1377 to 1389: he fought for the pope against Barnaba Visconti, duke of Milan. He was succeeded in 1389 by his brother Albert, and Albert by another Nicholas, who died in 1440, leaving two legitimate sons yet in their infancy, and several natural sons grown up, to one of whom, Lionel, he bequeathed his dominions. Lionel proved a good prince: he restored the university of Ferrara, and after nine years of a mild and liberal administration he died in 1450, leaving the government of the state to his brother Borso, who was illegitimate like himself. Borso was one of the most distinguished princes of his age. He was a patron of arts and letters, and was generous, enlightened, and just. He recalled his two legitimate brothers, Ercole and Sigismondo, from Naples, treated them with brotherly affection, and in order to secure the succession to them after his death, he abstained from marrying. In 1452 Borso received from the emperor Frederic III. the titles of duke of Modena and Reggio and count of Rovigo; and in 1471 pope Paul II. gave him the title of duke of Ferrara, upon which town the Roman see claimed a right of patronage. Borso died soon after, leaving a large and prosperous state to his brother Ercole. 'More fortunate than Lorenzo de' Medici, who lived in the same age, Borso had not to encounter the violence of parties and opinions; he ruled over a contented and submissive population, and while the conspiracies against Lorenzo were looked upon as acts of patriotism, those against Borso were considered as private plots, the result of personal envy and malice; so that when he had occasion in 1451, 1459, and 1469, to punish several conspirators with all the severity of the laws, he did not lose on that account the veneration of his subjects. He enjoyed a great reputation for uprightness, and his fame spread so far that he received presents from some Indian princes, who believed that he was king of Italy.' (Litta, *Famiglie celebri Italiane.*)

His successor Ercole I. was likewise a man of considerable talents and a patron of literature. He was also remarkable for that wary and cautious policy which has been stigmatized as peculiarly Italian, but which was in reality indispensable to the Italian princes in order to protect themselves from the overbearing violence of foreign invaders, after Ludovico Sforza through ambition committed the suicidal act of calling the French into Italy. Ercole checked the fury of Louis XII., who, after he had driven the Sforzas from Milan, was bent on exterminating all the other Italian princes. Ercole was fond of travelling: he visited the various Italian courts, and encouraged tournaments, festivals, and hunting parties. He gave the first theatrical entertainments exhibited at Ferrara, where the Menæchmi of Plautus was performed in 1486. His court was frequented by Bojardo, Collenuccio, Tibaldeo, Guarino of Verona, and other learned men of his time. He caused many Greek MSS. to be translated, and had a Hebrew press established at Ferrara in 1476.

Alfonso I., son of Ercole, succeeded him in 1505. He married the daughter of Pope Alexander VI. [BORGIA, LUCREZIA.] Alfonso had a long and troubled reign. He was attacked by Julius II. and the Venetians; he lost Modena and Reggio, and the Venetians also threatened Ferrara. The death of Julius afforded him some respite. Leo X. continued to withhold Reggio and Modena from him, and made also an attempt to surprise Ferrara. Alfonso displayed considerable abilities and great perseverance. He and his brother, Cardinal Ippolito, the patron of Ariosto, often took the field in person: their artillery was the best served in Europe; and they defeated the Venetians. After the death of Leo X., Alfonso, who had till then sided with the French, made his peace with Charles V., who by an imperial decree dated 21st April, 1531, confirmed the rights of the house of Este over Modena, Reggio, and Rubiera, upon the duke paying him 150,000 sequins; and thus Alfonso was restored to the possession of those states. Alfonso died in 1534 and was succeeded by Ercole II., and the latter by Alfonso II., who is unfavourably known by the misfortunes of Tasso, which however the poet brought upon himself. Litta is of opinion that Tasso was in love with Eleonora the duke's sister, and that her sister Lucrezia was in love with him. 'In 1575 Tasso was sent away from Ferrara, his papers were seized, and among them were found poems with such images and descriptions as ought never to have been written.' Tasso was subsequently confined to the madhouse of St. Anna, from which he was liberated after seven years, by the intercession of Vincenzo Gonzaga, prince of Mantua, who came to Ferrara for that purpose. [TASSO.] Alfonso II. dying in October 1597, without issue, Pope Clement VIII. immediately sent Cardinal Aldobrandino with troops to take possession of Ferrara as having devolved to the see of Rome, which had first invested Borso with the title of Duke. Cesare d'Este, Alfonso's cousin and heir, entrusted Lucrezia, Alfonso's sister, with full power to negotiate. Lucrezia, who had hated the Marquis of Montecchio, son of Alfonso I. and father to Cesare, on account of the share he had taken in the transactions of 1775 relative to Tasso, disliked Cesare also. Cardinal Aldobrandino having offered her the title and revenues of Duchess of Bertinoro in the Romagna, she signed a hasty convention, by which she gave up, in the name of the house of Este, Ferrara, Comacchio, and their dependencies, to the see of Rome. Cesare transferred his court to Modena, and Lucrezia died at Ferrara a few days after the entrance of the Papal troops, in February, 1598. The city of Ferrara, which, under the house of Este, had a population of 60,000 inhabitants gradually became reduced to 20,000.

Cesare, duke of Modena and Reggio, died in 1628. His son Alfonso III., who had remained as hostage at Ferrara, had shown in his youth marks of a violent disposition. In 1619 he caused Ercole Pepoli to be assassinated at Ferrara. Stung by remorse, he abdicated the ducal crown soon after his father's death, and became a Franciscan monk. He distinguished himself as a zealous preacher, and founded several convents. 'But,' says Litta, 'he could not totally change his nature. He was still a lion under the coarse tunic and hood. He was treated by the other monks with all the deference due to his rank, but was closely watched to prevent his doing mischief. He died in 1644, in a convent in the mountains of Garfagnana, which he had founded.' His son Francis I. was not much better than his father He affected a great zeal for religion, had his food scrupulously weighed on fast days, and he sentenced a relative of Marshal Gassion to be shot for want of proper respect while at church. He first separated the Jews from the rest of the population at Modena in 1630, and confined them to the Ghetto. He began the magnificent ducal palace at Modena as well as the country residence and gardens at Sassuolo. His successor, Alfonso IV., received in 1660 of the emperor Leopold the investiture of the principality of Correggio, which he had previously purchased. Alfonso loved the fine arts, and he was the founder of the Este gallery of paintings. He left at his death a son two years old, who was afterwards duke by the name of Francis II. During his minority his mother, Laura Martinozzi, Cardinal Mazarin's niece, held the government. She collected together all the bad characters in her dominions, and delivered them over to the Venetians, who employed them in the war of Candia against the Turks. Francis II. founded the university of Modena as well as the splendid library called Estense, of which Zaccaria, Muratori, and Tiraboschi were successively librarians. Francis II. dying in 1694 without issue, was succeeded by his uncle, Cardinal Rinaldo, who, after resigning his hat, married a daughter of the Duke of Brunswick Lunenburg, and sister-in-law to the emperor Joseph I. By this marriage the two branches of Este and Brunswick, which had been separated since 1070, became again connected. During the war of the Spanish succession, the Duke Rinaldo, notwithstanding his professed neutrality, was obliged by the French to quit Modena and to take shelter at Rome. The victorious Austrians, commanded by Prince Eugene of Savoy, restored him to his dominions, where he resided quietly till 1733, when the war for the succession to the crown of Poland, in which Italy had no concern whatever, but for which Italy was as usual devastated by the belligerents, obliged Rinaldo again to leave his territories, which became the theatre of war between the French and Piedmontese on one side, and the Austrians on the other. In 1736 Rinaldo returned to Modena. His repeated misfortunes affected and perhaps improved his disposition: he became serious and economical after having been inclined to pomp and magnificence. He enlarged his dominions by the purchase of the duchy of Mirandola and the county of Bagnolo. Rinaldo was succeeded in 1537 by his son Francis III., who was serving in Hungary against the Turks at the time. During the war of the Austrian succession he took part for the house of Bourbon, and commanded the Spanish armies in Italy. The peace of Aix-la-Chapelle restored him to the quiet possession of his dominions. In 1754 Duke Francis was appointed by Maria Theresa governor of Lombardy during the minority of her son the Archduke Ferdinand, who was betrothed to the duke's grand-daughter Beatrice d'Este, a child then four years old. In 1771 Francis gave up his trust to the Archduke Ferdinand, but continued to reside in Lombardy, and died at Varese in 1780. His son Ercole Rinaldo, the father of Beatrice, succeeded him as duke of Modena. His administration was peaceful and economical. He was ever watchful against the temporal interference of the court of Rome in his dominions; and he was equally averse to the remains of feudality which still lingered in his states. When the French entered Italy in 1796, the duke made a convention with Bonaparte, paid a heavy contribution, gave up some valuable paintings, but not trusting to the faith of the conqueror, he withdrew to Venice with his treasures, leaving a council of regency at Modena. An insurrection excited at Reggio by some Corsican soldiers in the French service afforded a pretext to Bonaparte to violate the convention, and to occupy the states of Modena, which were afterwards annexed to the Cisalpine republic. (Botta, *Storia d'Italia;* Paradisi, *Lettere a Carlo Botta.*) When in the following year the French occupied Venice, the duke had escaped to Trieste, but a deposit of 200,000 sequins which he had left behind was seized. Ercole Rinaldo died in the Austrian States in 1803. His daughter Maria Beatrice, the last offspring of the house of Este, lost her husband, the Archduke Ferdinand of Austria, in the year 1800, and their eldest son, Francis IV., was restored by the peace of Paris in 1814 to the dominions of his maternal ancestors, namely, the duchy of Modena, Reggio, and their dependencies, including the district of Garfagnana, on the borders of Lucca. By the death of his mother he has also inherited the duchy of Massa and Carrara, of which his grandmother, of the house of Cibo Malaspina, was the heiress. [CARRARA; MODENA.]

ESTELLA. [NAVARRE.]

ESTHER, The Book of, a canonical and historical book of the Old Testament, placed after that of Nehemiah, but coming chronologically between the 6th and 7th chapters of Ezra. It is thus denominated from the Persian name of the Jewish woman, Hadassah, whose history it relates. She was an orphan niece and adopted daughter of Mordecai, from a Benjamite family of the Babylonian captives of Nebuchadnezzar (ii. 5-7). The scene of the narration is in the city Shusan, or Susa, now Sus (not Shuster, as stated by Dr. Adam Clarke—see *Trans. Geog. Soc.*, vol. iii.), which, throughout the book, is in English mistranslated Shushan the *palace*, though, in the Septuagint version, it is rightly ἐν Σούσοις τῇ πόλει, that is, 'in Susa the city.' Augustin, Epiphanius, and Isidore supposed the author to have been Ezra. Eusebius assigns a later date. Some writers have attributed it to the high priest Joachim; others believe it to have been composed by the Jewish synagogue, to whom Esther and Mordecai wrote (ix. 20-29); but by the greater number Mordecai himself is thought to be the author, and Elias Levita, in his Mass. Hamum, asserts this to be a fact unquestionable. The original, according to Dr. Adam Clarke, was probably written in the language of antient Persia. St. Hieronymus and several other fathers regarded this book as wholly uncanonical, because the name of God or religion is not once mentioned or alluded to, and they have been followed by some modern writers, as Cajetan and De Lyra; but the Council of Trent pronounced it to be wholly canonical; and while the Protestant churches admit into the canon only what is found in the Hebrew copies, that is, as far as to the end of the third verse of chap. x., the Greek and Roman churches use as canonical the Greek version and Latin Vulgate, which contain each ten more verses of chap. x. and six additional chapters. By the Jews the book has been always considered as one of the most precious of their sacred scriptures, and as a perfectly authentic history of real events which took place about B.C. 519. They call it מגילה, Megilah, that is, *The* Volume, and hold it in the highest estimation; believing that whatever destruction may happen to the other scriptures, Esther and the Pentateuch will always be preserved by a particular Providence. Copies exist in the Hebrew, Syriac, Chaldaic, Greek, and Latin; each of which widely differs from the others, and all, especially the Greek and Chaldaic, are greatly different from the Hebrew. The Chaldaic text contains five times more than the Hebrew, and a notice of the various readings would fill a large volume. (See the London Polyglot Bible.) Commentators differ much in determining to which of the Persian and Median kings belongs the name of Ahasuerus, whose kingdom extended from India to Ethiopia over 127 provinces (i. 1). Some suppose him to be Darius Hystaspes. Scaliger and Jahn say Xerxes. By Capellus he is identified with Ochus, and by Archbishop Usher with Darius the son of Hystaspes. Dean Prideaux and Dr. Adam Clarke with greater probability take him to be Artaxerxes, who received the cognomen of Longimanus, or Longhanded. The following is a brief abstract of the book of Esther in the words of the text. This monarch (chap. i.), after having entertained all his nobles and princes with sumptuous festivity during more than six months, gave a great feast in his palace garden to all the men of Susa, great and small, while the women were separately feasted by the queen in the royal house. To the men royal wine was supplied in abundance, and the drinking was according to every man's pleasure; when, the king being, on the seventh day, merry with wine, sent his seven chamberlains with orders to bring the queen to exhibit herself (the Talmud says naked) before his guests; but Vashti (which in Persian means the beautifully fair) refusing to come, he was very wroth, and his anger burned within him. Ahasuerus however punished her by degradation and banishment, and by his royal mandate letters were despatched to the people of each province, decreeing that every man bear rule in his own house. To furnish the royal harem with the greatest means of choice there was made throughout the empire (ch. ii.) a general levy of the fairest virgins, and Esther, the beautiful young Jewess, being preferred by Hege, the keeper of the king's women, before all others of the numerous assemblage, she succeeded to the place of the banished queen Vashti. The twelve months' cosmetical purification of the maidens previous to their admission to the king (ver. 12) was required, says Dr. Clarke, 'to show if they were with child, that the monarch might not be imposed on by fathering a spurious offspring, and because many having been brought up in low life, and fed on coarse, strong, and indigestible food, they had a copious and strongly odorous perspiration, which was far from pleasant.' Esther's foster father, Mordecai the Jew (chap. iii.), having refused to do reverence to Haman, the chief minister and favourite of Ahasuerus, he, with all the other Jews from Babylon, then dispersed throughout the Persian empire, were by Haman devoted to destruction, and the royal mandate being accordingly issued 'to destroy, to kill, and to cause to perish all Jews, young and old, little children and women, in one day, and to take the spoil of them for a prey (ver. 13), the king and Haman sat down to drink;' but the fickle tyrant, influenced in the mean time by the pathetic entreaties of Esther, and by the recollection that Mordecai had discovered a conspiracy against his life, was induced to hang his favourite Haman on a gallows thirty yards high, which that minister had prepared for Mordecai. He then promoted Mordecai to the highest honours in the empire; and still yielding to the influence of the fair Jewess and of Mordecai, he hastily issued orders empowering all the Jews 'to destroy, to slay, and to cause to perish all the people that would assault them, both little ones and women, in one day, throughout all the provinces of King Ahasuerus, and to take the spoil of them for a prey' (viii. 11, 12), so that 'the Jews smote all their enemies with the sword, with slaughter and destruction, and did what they would unto those that hated them' (ch. ix. 5). By the special request of Esther, the ten sons of Haman were hanged on the gallows, and in the city of Susa the Jews massacred eight hundred of the king's Persian subjects, and in the provinces seventy-five thousand (ix. 12, 13. 15, 16). This signal revenge of Haman's intended destruction of the Jews in Persia has ever since been commemorated (ix. 21-28) on the 14th and 15th days of the month Adar, in the Jewish 'Feast of Purim,' that is, in Persian, *the lots;* with reference to those which, on this occasion, were cast before Haman (ch. iii. 7; ix. 26); and the lower class of Jews, like the similar class of Irish with respect to St. Patrick's day, consider that on these 'Days of Purim' to be drunk is a pious duty. It is here worthy of remark, that the word which in the authorized version is repeatedly translated *gallows*, should properly be *cross* or tree. Hence it was that, in the first ages of Christianity, the Jews, when celebrating this feast of Purim, were accused of deriding the Christian crucifixion, in abusing and setting fire to an effigy of Haman affixed to a lofty wooden *cross;* a custom which, on this account, was abolished in the Roman empire by the decrees of Justinian and Theodosius. It has been observed that apparently the only good moral sentiment derivable from the statements of this book, the inspired authority of which was doubted by several early fathers, is a detestation of the sensuality and cruelty of such royal despots as the king Ahasuerus. (Dr. Prideaux's *Connection of the Old and New Test.;* Horne's *Introduction to the Bible; Commentaries* by Dr. A. Clarke and others; *Lectures on the Book of Esther*, by Dr. Lawson, 1809; *Eclect. Review*, vol. iii.; Calmet's *Dict. of the Bible;* Dr. A. Clarke's *Succession of Sacred Literature.*)

ESTHONIA, or REVAL, a Russian government or province constituting one of the five provinces included in the grand subdivision of Russia in Europe, which is called the 'Baltic (East Sea) Provinces.' It is not known by this name among the native inhabitants, but by that of 'Wirova,' border-land, or 'Meie Maa,' our land. The boundaries of Esthonia are, on the north, the gulf of Finland; on the east, the government of St. Petersburg; on the south, lake Peipus and the government of Livonia; and on the west, the Baltic. It was subjugated by the Danes in 1220, and in 1346 sold by them to the Teutonic knights, whose grand master, the first duke of Livonia and Esthonia, acknowledged the king of Poland as lord paramount in 1561. After being an object of continued contest between the Russians, Poles, and Swedes, it became at length a province of Sweden in 1660. It was wrested from the Swedish crown by Peter the Great in 1710, and was ceded finally to Russia under the treaty of Nystädt in 1721. Including the islands of Dagoe, Worms, Wrangel, Nargen, the two Roogs, Odensholm, Nuckoe, Eckholm, Heft, Kranholm, and fifty-nine smaller islands, the total area of this government is 6804 square miles, of which one thirty-fifth part belongs to the seventy islands. The extent of coast is about 260 versts, or 173 miles; and the population, which was 196,285 in 1783, 227,001 in 1819, and 229,398 in 1828, is now estimated at about 240,000. The general character of the surface is level, occasionally varied by isolated hills and eminences, which the people of the country denominate mountains. The northern coast from Reval, or Revel, to Narva, is several fathoms higher than the Baltic, and strewn with masses of granite: the western coast is lower, but both are edged for some miles inland by a deep bed of sand. The soil of the interior districts of Esthonia, which are the most fertile, is a mixture of loam, sand, and clay; in all parts are large swamps, many of which are impassable, except when hardened by the frosts of winter. The proportion of the cultivated to the uncultivated and wooded soil is estimated by Bienenstamn at one part only in three.

Esthonia contains 228 small lakes, besides the northern end of lake Peipus, and the left bank of the Narove, which flows out of the Peipus into the Baltic and divides the government from that of St. Petersburg. This province has no streams, but rivulets and brooks, some of which flow under ground, and occasionally contain pearl muscles. There are sulphurous and saline springs.

Though the temperature is moderate when compared with that of the adjacent provinces, the winter is of long duration, and winds and fogs prevail throughout the year.

The soil, though deficient in fertility, yields more than sufficient for the maintenance of the population. Agriculture is the principal branch of industry, and about one-fifth of the whole surface is under the plough. The chief crops are rye, barley, and oats; some wheat, Indian corn, hemp, flax, hops, and tobacco are also raised. The whole produce of grain is estimated at 506,000 quarters, which being more than is consumed, the surplus, about 180,000, is applied to making brandy. The Weissenstein districts, in the south-east, produce much hemp and flax. As the harvest season is attended by heavy rains, the farmers have subterranean kilns in most parts, into which the moist grain is carried, for the purpose of being dried. Esthonia has large meadows, and produces abundance of hay; it has likewise good grazing grounds. Vegetables are of universal growth, but little attention is given to fruits. The woods and forests, composed of the fir, pine, elm, birch, larch, and beech, occasionally intermixed with the oak, alder, linden, crab-apple, &c., spread over an area of about 3300 square miles; they are densest in the eastern districts of Wesenberg and Weissenstein.

Next to agriculture the rearing of cattle is the most important branch of rural industry. The native horse is small in stature but strong and enduring, and the breeds called the Reval Klepper and Doppelklepper are in much esteem. The horned cattle are small, but afford much milk, and large droves of oxen from the Ukraine are fattened for the St. Petersburg market. Much has been done to improve the breed of sheep, which are of the German white or blackish species. Goats, swine, and poultry are reared in great numbers. The wild animals are the bear, wolf, fox, badger, marten, and squirrel; a few elks are to be met with in the Wesenberg forests. The fisheries along the coast and in lake Peipus are very productive. The mineral products are stone for building, potter's clay, and gypsum; there is abundance of peat.

The majority of the inhabitants are Esthonians: they are of Finnish descent, of diminutive stature, and have light-coloured hair, in general blue eyes, a small flat nose, and flattened countenance. They were sunk until late years in abject slavery. The landholders are universally of German or Danish extraction, and constitute the aristocracy of the country; and there are some Russians, and a few Swedes and Finlanders intermixed with them. In 1819, when the population amounted to 227,001, it comprised 210,240 Esthonians, and 8836 Germans. In 1830, when it amounted to 228,000, the number of births was 10,881, and deaths 7055. In 1828, when it was 229,398, the towns contained 24,063, and the rural districts 205,335; in that year also the number of males was 100,363, and females 104,972.

Esthonia contains 563 estates, which, with the exception of eight, the property of the crown, and 45 belonging to the clergy, are in the hands of the nobility. The peasants' families are estimated at 30,000. The Lutheran is the predominant religion of the province; even the Russo-Greeks have not more than eight or ten churches in it. The superintendence of all ecclesiastical affairs in the Lutheran church is vested in the provincial consistory at Reval, and the number of parishes is 134. The department of education, which includes a gymnasium at Reval, and about fifty other schools, with about 1500 pupils only, is under the control of the university of Dorpat. In 1831 the proportion of pupils to the whole population was not more than one in every 148 individuals.

The manufactures of Esthonia are extremely limited; the peasantry are clothed not only with linen but with coarse woollen cloth woven in their own houses. The only establishments of any importance are in Reval, where hats, leather, powder and starch, vinegar, and some iron ware are made. In 1830 indeed, there were but three large manufactories in the whole province, and 297 workmen attached to them. Vessels are constructed in the capital and in the islands; and brandy is made on many estates as well as in the towns, and even by the farmers themselves; the distilleries of this spirit amount to nearly 400.

Reval is the emporium of trade, but for want of water communications it is not of any great extent. The exports consist of grain, brandy, salt fish, skins and hides, butter, tallow, smoked herrings and salmon, and salt.

Though public affairs are administered on the same footing as in the other Russian governments, the country retains some vestiges of its antient constitution, among which are a provincial college or council, an inferior tribunal of justice, a consistory, and the right of making brandy without a license from the government.

Esthonia is divided into four circles, viz., North-west, Reval, or Revel, formerly Harria, chief town Reval (13,000 inh.), with the islands of Nargen (250), Wrangel (600), Rokshaer, Malus, Ramosaar, the Roogs, and Odensholm; South-west, Hapsal, formerly Wiek, chief town Hapsal (1450), with the islands of Dagoe (10,000), Worms (1100), and Nuckoe (450); South-east, Weissenstein, formerly Yerven, chief town Weissenstein (600); North-east, Wesenberg, chief town Wesenberg (400), with the islands of Eckholm, Heft, and Kranholm: besides the districts of Kunda, chief town Kunda (400), and of Laal (324 inhabitants).

ESTIENNE. [Stephens.]

ESTOPPEL, an impediment or bar to a right of action, arising from a man's own act, or the act of some person through whom he claims. There are three kinds of estoppel. 1. *By matter of record*, as letters patent, pleading, &c. Thus in an action against a patentee by his assignee, the patentee is estopped from pleading that the patent is invalid.

2. *By matter of writing*, as by deed, &c. parties and privies are estopped from alleging any thing contrary to the deed. It is frequently laid down that an indenture is more effectual in working an estoppel than a deed poll [Deed]; but from the statement in the book from whence this position is derived (*Shep. Touch*, 53) it does not appear that the fact is so, inasmuch as it is there admitted that if both parties sign and seal a deed poll, they are equally estopped as if the deed had been indented.

3. *By matter in pais* (in the country), *i. e.*, transactions between the parties not evidenced by record or writing, as livery, entry, acceptance of rent, &c. Thus after acceptance of rent a landlord cannot treat his lessee as a trespasser. The rules which govern the application of this doctrine are laid down 1 *Inst.*, 352 *b*.

ESTOVERS. Spelman, in his Law Glossary, says that this word is derived from the French *étoffe*, and that from *étoffer*, which is to supply with necessaries, and is of the same signification as the Saxon word *bote*. In legal phraseology it is the liberty which the owner of an estate for life as well as a tenant for years (in the absence of any stipulation to the contrary) possesses of taking a reasonable and necessary supply of wood from the estate for the use or furniture of his house or farm, and this, according to the use to which it was applied, was either called house bote, plough bote, cart bote, or hedge bote. *House bote* is a sufficient allowance of wood to build or repair the house, or to burn in it, which latter is also sometimes called *fire bote*; *plough bote* or *cart bote* is the wood employed in the making or repairing all instruments of husbandry, as carts and ploughs, harrows rakes, &c.; *hedge bote* or *hay bote* for repairing hedges, fences, pales, stiles, and gates, and to secure inclosures.

If a tenant takes more than is needful for these purposes he may be punished for waste, as if he cuts down wood to burn when he has sufficient dead wood upon the estate; and a tenant, although he may cut down and take sufficient wood to repair pales and fences as he found them, still he cannot do so to make new ones.

A rector may also cut down wood for the repair of his parsonage-house or the chancel, and even for any old pews which belong to the rectory; and, like other tenants for life, he is entitled to estovers for repairing the barns and out houses belonging to the parsonage.

Bracton uses the word estovers in a different sense, viz., as the sustenance, which a man committed for a felony, is to have out of his lands and goods for himself and family during his imprisonment; it also occurs in the statute 6 Ed. I. c. 3, as an allowance of meat or cloth; but the more common and usual signification by which it is known to lawyers has been already stated. (Woodfall, *Landl. and Tenant*; Comyn.)

ESTRAY, any valuable tame animals found wandering at large within any manor or lordship, and whose owner is unknown. Having been impounded, and proclaimed in the church and the two nearest market-towns on a market-day, they become, if not claimed in a year and a day, the absolute property of the king, as lord paramount of the soil, though generally the lord of the manor or liberty is the special grantee of the crown. Animals upon which the law sets no value, as a dog or a cat, or such as are of a wild nature, as a fox or a wolf, cannot be taken as estrays. Swans may be taken as estrays, but no other fowl. The king or the lord does not acquire the absolute property in the estray, until the full expiration of the year and a day, which runs from the first proclamation, and not from the seizure; therefore if it escape before the time to another manor he cannot reclaim it.

The king or the lord is bound to take care of the estray, and find it in provision; he must not use it, but is liable to an action for so doing, though he may milk a cow or the like, for that tends to the preservation of the animal, and is necessary. The owner on the other hand, if he claims within the time allowed, must pay the charges of finding keeping, and proclaiming the estray.

It may be observed, that if any person not being entitled to estrays, finds and takes care of another's property, the owner may recover it or its value without being obliged to pay for the expenses incurred in keeping it.

ESTREAT, from the Latin word *extractum*, is a true copy or note on the rolls of a court of some original writing or record, especially of fines and amerciaments which are to be levied by a bailiff or other officer. In all cases of felony or misdemeanor where persons bound by recognizance either to appear themselves, or for the attendance of any witness on trials of felonies or misdemeanors, neglect to do so, the recognizance becomes forfeited; an officer of the court, whose duty it is at the end of the assize or session, prepares a list of the defaulters, and when the same has been approved by the judge presiding, the fine or forfeiture mentioned in the recognizance is said to be estreated or certified into the Exchequer, and process is awarded for its recovery.

These fines, when levied, are paid into the Treasury, or the lords of the Treasury may, if they think fit previously to the issuing of the process, stay the execution and remit the fine.

The barons of the Exchequer were also empowered by a standing writ of privy seal to discharge, mitigate, or compound forfeitures estreated into the Exchequer from other courts; and by the 4th Geo. III., cap. 10, they are also authorized, upon affidavit and petition, to discharge estreated recognizances and forfeitures, except those incurred before justices of the peace. (*Term Reports*; Burn's *Justice.*)

The various acts of parliament which now regulate the mode in which fines are to be levied upon estreated recognizances, &c., are the 4th Geo. IV. cap. 37, with regard to those before justices of the peace; the 7th Geo. IV., cap. 64, before judges of assize, recorders, &c., and the 3rd and 4th Wm. IV., cap. 99, which relates to such only as are forfeited in the Houses of Lords and Commons.

ESTRELLA. [Portugal.]

ESTREMADU'RA, a province of Spain, bounded on the north by the province of Salamanca, on the east by New Castile, on the south by Andalusia, and on the west by

Portugal. Its length from north to south is about 180 English miles, and its average breadth is about 90 miles from east to west. Its area is reckoned at about 14,800 English square miles. Two large rivers, the Tagus and the Guadiana, both coming from Castile, cross the province from east to west, and their respective basins form the two natural divisions of the province, that of the Tagus being Northern Estremadura, called also Alta or Upper Estremadura, and that of the Guadiana forming the southern part, which is called Baja, or Lower Estremadura. A range of mountains, which is a continuation of the montañas de Toledo, in New Castile, and which, under the various names of Sierra de Guadelupe (5000 feet), Sierra Marchal, and Sierra de San Pedro crosses Estremadura in a south-west and west direction, and then joins itself to the Sierra del Portalegre, on the frontiers of Portugal, forms the division between the waters which flow into the Guadiana and those which run into the Tagus. To the north the basin of the Tagus is bounded by another and still loftier ridge, the Sierra de Gredos, a continuation of the mountains of Avila, in Old Castile, which runs westward under the names of Sierra de Francia and Sierra da Gata, along the boundaries between Estremadura and Salamanca, and afterwards entering Portugal joins the Sierra d'Estrella in the neighbourhood of Alfaiates and Penamacor. From this northern ridge several considerable streams, such as the Alagon and the Tietar, flow southwards into the Tagus. The Alagon rises in the mountains of Las Batuecas, waters the fine plain of Plasencia, passes by Coria, and enters the Tagus above Alcantara. Its whole course is about 70 miles. Of the streams which enter the Tagus, on the opposite or southern bank, the principal one is the Salor, which rises in the Sierra de San Pedro, and enters the Tagus below Alcantara. The principal towns of the northern division of Estremadura are: Plasencia, a bishop's see, with 6700 inhabitants, and a fine aqueduct: it lies in the midst of one of the finest and best cultivated territories in all Estremadura: the convent of S. Justo, in which Charles V. ended his days, lies at the foot of the Sierra de Gredos, to the east of Plasencia: Caceres, south of the Tagus, with 10,000 inhabitants, the residence of the audiencia, or upper judicial court of the province: Alcantara on the Tagus, with 3300; its handsome bridge built by Trajan was partly destroyed during the Peninsular war: Valencia de Alcantara, near the frontiers of Portugal and at the foot of the Sierra Fria, with 4700 inhabitants: Truxillo, near the borders of Castile, the birth-place of the Pizarros, with 4600 inhabitants: Coria, north of the Tagus and west of Plasencia, with 2500.

The basin of the Guadiana, or southern division of Estremadura, is bounded to the south by a continuation of the Sierra Morena, which, under the name of Sierra de Guadalcanal and Sierra de Monasterio, divides the waters of the Guadiana from those of the Guadalquivir, running westwards along the borders of the provinces of Estremadura and Seville, and then entering that part of Alentejo which is east of the Guadiana. This branch of the Sierra Morena is comparatively low, few if any summits reaching 2000 feet above the sea. The banks of the Guadiana, especially below Badajoz, are low, flat, and unhealthy. The finest districts of this part of Estremadura are those of Llerena, near the foot of the Sierra Morena, of Xeres, and la Serena. Badajoz is the capital of all Estremadura, and the residence of the captain-general. [BADAJOZ.] The other towns of the southern division are: Merida, the antient Emorita Augusta, with about 5000 inhabitants, a handsome Roman bridge on the Guadiana, restored by Philip II., a triumphal arch, the remains of a theatre, of a naumachia, and circus, and numerous other traces of its former splendour; Xeres de los Caballeros, south of Badajoz, with 9300 inhabitants; Alburquerque, north of Badajoz, and near the frontiers of Portugal, with 6700 inhabitants; Olivenza, a fortified place formerly belonging to Portugal, with 2000 inhabitants; Llerena, near the foot of the Sierra Morena, with 6500; Zafra, an industrious place, with tanneries, and manufactures of hats, &c., 7500 inhabitants; Medellin, on the south bank of the Guadiana, the birth-place of Cortes, with 1700 inhabitants.

The whole population of Estremadura is vaguely reckoned at 550,000 inhabitants, divided among seven towns, 212 villas or boroughs, and 121 aldeas or villages, mostly thinly inhabited. The ecclesiastical division consists of three bishoprics, namely, Badajoz, Plasencia, and Coria, and 415 parishes. There were also 170 convents previous to the late suppression. Estremadura is one of the least populous provinces of Spain; its depopulation dates from the expulsion of the Moors, and the subsequent establishment of the Mesta, or administration of the flocks of migrating sheep which took possession of the vast tracts which had remained abandoned. About four millions of sheep come to graze, during winter, from the other provinces on the open spontaneous pastures of Estremadura. Other tracts are covered with underwood and wild odoriferous herbs. There are also forests of oak, beech, chestnut, and pine trees, where numerous herds of swine feed: the flesh of these animals forms a considerable article of commerce with other provinces of Spain. Game of every sort is plentiful. The cultivated parts produce some wheat, oats, Indian corn, flax, hemp, and the vine, olive, mulberry, and lemon trees. Excellent honey and wax are also gathered. Many ruined and deserted villages are met with over the country, with traces of former cultivation and of a population which has disappeared.

The Estremeños, or inhabitants of Estremadura, are reckoned the most grave and taciturn of all the people of Spain. Living in a remote inland province, with few means of communication with the rest of the world, they have, generally speaking, no notion of the luxuries or even comforts of other countries, and therefore do not exert themselves to acquire them. When they have an object in view, they are capable of great exertion and perseverance: they are frank, sincere, and honourable, and robust of body, and disposed to military service, especially in the cavalry. Some of the boldest adventurers who discovered and conquered America were natives of Estremadura. The great number of emigrants who left this province for the New World during the sixteenth century has been considered, but with little reason, as one of the causes of the depopulation of the country. The name of Estremadura is said to be derived from the Latin 'extrema ora,' it being the furthest and latest conquest of Alonso IX. over the Moors in 1228.

The high post-road from Madrid to Lisbon crosses Estremadura, and is kept in good repair. The other roads are bad, and impassable for carriages in the rainy season. The posadas or inns on the roads are among the worst in Spain; provisions are scarce, and the markets few and ill supplied. On the side of Portugal, the frontier north of the Tagus between Estremadura and Beira is marked by a ridge of hills, an offset of the Sierra de Gata, which extends from Penamacor, a town within the Portuguese frontier, southwards to the Tagus, a few miles west of the bridge of Alcantara. A road leads from Plasencia across these hills by Zarza and Zibreira to Castello Branco in Portugal. South of the Tagus, the western boundary of Estremadura is much further advanced towards the west; beginning near Montalvaõ, about 35 miles west of Alcantara, it continues southwards, passing a little to the east of Castello de Vide and Campo Mayor, which are in Alentejo, down to the Guadiana, a few miles below Badajoz. From thence, for about 30 miles southwards, the Guadiana serves as a boundary, after which an ill-defined tortuous line, of about 50 miles more, first south and then south-east, marks the limits between Estremadura and Alentejo, to the foot of the Sierra Morena, which forms the north boundary of Andalusia.

Estremadura has mines of copper, lead, and iron; and one of silver at Lagrosan, near Alcocer. The manufactures are few, consisting chiefly of leather and hats at Badajoz, Zafra, and Caceres. The annual net income derived from the land belonging to lay proprietors is estimated by Miñano at 55 millions of reales vellon, or little more than half a million sterling, and that belonging to the clergy both regular and secular, before the late suppression, at 21 millions and a half, or about 210,000*l.* sterling. (Miñano, *Diccionario Geografico*, article 'Estremadura;' and also 'Statistical Tables' annexed to the art. 'España;' Ancillon; Bowles.)

ESTREMADURA, a province of Portugal, is bounded on the north by Beira, on the east partly by Beira and partly by Alentejo, on the south by Alentejo, and on the west by the Atlantic Ocean. The length of the province from north to south, from the village of Lavaos, which lies on the sea-coast south of the mouth of the Mondego, to the borders of Alentejo near Melides, south of the lagoon of Setubal, is about 140 miles, and its greatest breadth from east to west is about 85 miles. The ridge of the Estrella, which crosses part of Beira from east to west, sends off a branch to the south-west, which enters Estremadura east of Pombal, and runs obliquely through the length of the province under the various names of Serra de Louzaõ, Serra de Alberdos, Monte Junto, and Serra de Baragueda. The Sierra de Baragueda stretches to near Torres Vedras, and there meets at an oblique angle the ridge which spreads from east to west from the Tagus to the sea across the peninsula in which Lisbon is situated. This latter ridge, which is separated from the former by a narrow but deep ravine extending from Torres Vedras towards Sobral, furnished Lord Wellington in 1810 with a valuable position of defence against the French invading army under Marshal Massena. The line of hills extends from the mouth of the Zizandre, west of Torres Vedras, to the town of Alhandra on the Tagus, a distance of about thirty miles. The village of Sobral lies in front of the centre of the line.

The central ridge or continuation of the Estrella chain already mentioned divides the waters which flow into the Tagus from those streams which run direct into the ocean. Among the tributaries to the Tagus, the most considerable are—1 The Zezere, a rapid stream which has its source in the mountains of Guarda in Upper Beira, enters Estremadura near Pedrogaõ, and running southwards receives the Narvaõ from Thomar, and then enters the Tagus at Punhete below Abrantes. 2. The Azembuja, called also Rio Mayor, which rises north of the town of Rio Mayor, and flows in a tortuous course, passing near Cartaxo, and at the foot of the hill of Santarem, and enters the Tagus above Villa Franca. The streams which flow from the north-west slope of the ridge into the ocean are—1. The Lis, which rises near Alcanhede, flows by Batalha, receives the Lena near Leiria, and enters the sea south of Cape Paredes. 2. The Alcoa, which rises south of the Lis, is joined by the Baça (the two together giving the name to the town of Alcobaça), and after a short course enters the sea. 3. The Arnoya, a small stream which rises in the group of Monte Junto, passes by Obidos and Rolixa, where the first engagement between the English and the French in the Peninsula took place on the 17th of August, 1808, and then enters the lake or lagoon of Obidos which communicates with the sea. 4. Farther south towards Torres Vedras is the river Marceira, which passes by Vimieiro, and after a short course enters the sea south of Peniche Point. 5. The stream Zizandre rises below Sobral, flows through the ravine above mentioned between the Serra de Baragueda and the ridge of Torres Vedras, and enters the sea at the west extremity of the lines.

That part of Estremadura which lies north-west of the central ridge and between it and the sea is mostly flat and sandy towards the coast, and either barren or covered with forests of pines. Leiria lies in a fine valley on the Lis, at the foot of the hills which are covered with olive plantations. The country which lies to the south-east of the ridge sloping towards the Tagus is finer and better cultivated, especially the plains about Thomar and Santarem, which are very fertile, and abound with olive and other fruit-trees, and fine pasture grounds. The country about Cartaxo produces much wine. But the finest part of the whole province is that which lies to the south of the lines of Torres Vedras towards Lisbon. A second range of hills rises behind the first, extending from Mafra and Ericeira on the sea, to near Povoa on the Tagus, the high summit called Cabeça de Montachique standing in the centre; and south of these are the hills of Cintra, Queluz, Bellas, &c., which command the city of Lisbon and the banks of the Tagus down to Fort St. Julian. Between these various ranges are delightful valleys, covered with villages, convents, and quintas or country-seats, and with gardens, orchards, and vineyards, remarkably well cultivated. This pleasing exception to the generally slovenly state of agriculture over the greater part of Portugal was attributed, in the last century, and by authorities not liable to a suspicion of partiality, to the example of the English residents at Lisbon, who being partial to rural life, took pains to embellish their country-houses and gardens according to the fashion of their native country, and thus inspired the Portuguese with a taste for imitating them by availing themselves of the abundant resources which a fine soil, a favourable site, and a genial clime afford. (Du Chatelet and Bourgoing, *Voyage en Portugal.*) The vineyards of Bucellas, Carcavellas, and Collares, produce excellent wine. The neighbourhoods of Mafra, Cintra, Collares, Queluz, Cascaes, are justly celebrated for their romantic position. A pleasing sketch of these delightful spots is given in Beckford's *Recollections of Portugal*, 1835.

The southernmost part of Estremadura, which lies on th left or southern bank of the Tagus, is not so fine as tha on the right bank, being mostly low and flat, and unhealthy in several places. A range of hills which is a continuation of the Serra de Portalegre in Alentejo, which is itself joined to the mountains of Spanish Estremadura, runs from east to west at some distance south of the Tagus, enters Portuguese Estremadura north of Setubal, and terminates on the peninsula of Almada opposite to Lisbon. But the limits between Estremadura and Alentejo are not marked by this range, the line of demarcation being a tortuous and capricious one, beginning from the sea north of Cape Sines, then taking a semicircular sweep to the eastward, crossing the river Sadaõ and the range above mentioned east of Alcacer do Sal, and then turning northwards and following the course of the river Canha to the Tagus. The country inclosed within this line, the sea and the Tagus, forms the comarca or district of Setubal which is included in the province of Estremadura. But farther to the east Estremadura again encroaches upon Alentejo, extending along the left bank of the Tagus from Salvaterra up to Perales, which lies nearly opposite Abrantes and the hills called Cimes de Ourem: the limits between Estremadura and Alentejo are marked on this side by the course of the rivers Soro and Zatas, the latter of which falls into the Tagus. This part of Estremadura contains the territories of Chamusca, Almeirim, and Salvaterra, which are included in the administrative districts of Santarem and Alemquer beyond the Tagus. According to a new territorial division planned by the Cortes of 1822, the Tagus was to form the southern boundary of Estremadura, the whole left bank being considered as belonging to Alentejo. But the political convulsions that followed prevented the new plan from being put into execution.

Estremadura is divided into the following comarcas or districts:—1. Lisbon, which includes the capital and its suburbs; Belem, with its splendid monastery; Bemfica, near the fine aqueduct of Agoas Livres, which carries the water to Lisbon; Campo Grande, with an important manufactory of silks; Bellas, with 3400 inhabitants; Oeiras on the Tagus below Belem, once the residence of the marquis de Pombal. The population of the comarca of Lisbon is estimated at 360,000. 2. Torres Vedras, with the town of that name, 3400 inhabitants; and also Mafra, with 3000, and its splendid palace, church, and convent, called the Escurial of Portugal, and a vast royal park; Ericeira, near Mafra, a small fishing harbour; and the port of Cascaes, near the entrance of the Tagus. 3. Villa Franca, with the pretty town of that name on the Tagus above Lisbon, with 4000 inhabitants; and Alhandra, with 2000, a manufactory of lime, and brick kilns, which supply Lisbon with bricks. 4. Alemquer, with the town of that name, 2600 inhabitants, and a paper manufactory; and the town of Chamusca beyond the Tagus, with 3000. 5. Santarem: the town of that name stands on a steep hill rising above the Tagus, with several massive convents and other extensive buildings, and an old castle, and 7300 inhabitants. The other towns of this district are: Torres Novas, a lively place in a fine country, with about 4000 inhabitants; Golegaõ on the Tagus, where one of the principal fairs of Portugal is held; Salvaterra de Magos, on the left bank of the river, with a royal villa and hunting park, which contains wild boars. 6. Thomar, containing the town of Thomar, east of Santarem, with 4000 inhabitants, a large manufactory for spinning cotton, manufactories of hats and worsted stuffs, and a vast convent belonging to the military order of Christ. The other towns are: Abrantes, on the slope of a hill above the Tagus, with 5000 inhabitants, the fine church of St. Vincent, and a bridge of boats over the Tagus. The navigation of the river does not extend much above Abrantes, which is about 90 miles above Lisbon by the course of the river. Punhete, at the confluence of the Zezere with the Tagus, Sardoal, with 3000 inhabitants, and Pedrogaõ, at the foot of the Estrella, belong also to the district of Thomar. 7. Ourem, north-west of Thomar; the town of that name has 3000 inhabitants. 8. Leiria, containing the town of the same name, with 2000 inhabitants, with a bishop's see and a castle, on a steep rock. Near it is the village of Marinhagrande, with a glass manufactory, established by an English speculator. The other towns of this district are: Pombal, near the borders of Beira, with 4800 inhabitants. Batalha, near Leiria, with its splendid convent and church, one of the finest specimens of Norman Gothic architecture; it was built by King John I. after the victory which he gained over the Spaniards at Aljubarrota, in the neighbourhood. The church contains the tombs of the kings of Portugal. 9. Alcobaça, containing the town of Alcobaça, south-west of Leiria, with about 1300 inhabitants and a magnificent convent. The harbour of San Martinho is near Alcobaça, and farther south is the strong castle of Peniche, on a promontory facing the Berlengas Islands. 10. The district of Setubal. The town of that name, often by corruption called St. Ubes, is at the mouth of the river Sadaõ, has a good harbour and 15,000 inhabitants, and exports large quantities of salt, which is made from sea-water in the neighbourhood, and also wine and fruits, especially oranges. It is, next to Lisbon and Oporto, the most commercial place in the kingdom. The river Sadaõ rises in the Serra de Monchique, on the borders of Algarves, and is navigable for about 30 miles above Setubal. The other towns of this district are: Almada, opposite to Lisbon, with 4000 inhabitants. Aldea Gallego, higher up the river, which is the common landing-place from Lisbon to the southern provinces; it has about 4000 inhabitants, chiefly boatmen and fishermen. Cezimbra, west of Setubal, near Cape Espichel, with a small harbour and 4000 inhabitants, chiefly fishermen. Alcacer do Sal and Azeitaõ are small towns in the interior.

The whole population of Estremadura is reckoned by Miñano at 800,000 inhabitants. Its area has been variously stated; according to Antillon and Miñano it is 750 square Spanish leagues of 20 to a linear degree of latitude. The climate is generally healthy, being free from the excessive heats of Alentejo and from the cold winters of Beira. The westerly winds, which find an opening along the wide valley of the Tagus, refresh the air. The rivers, as well as the sea-coast, abound with fish. The principal products of the country are wine, oil, maize, fruits of every sort, and cattle. Wheat and oats are rather scarce; but Lisbon imports corn and flour from other countries.

ESTREMOS, one of the strongest fortresses in Portugal, agreeably situated on the Tarra in Alentejo. It consists of the upper and the lower towns; the former with the citadel standing on an eminence, the latter in the valley below. Population 6500. Here Schomberg gained a victory over the Spaniards in 1663; 38° 46′ N. lat., 7° 23′ W. long.

ESTUARY. [Æstuary.]

ETÆ'RIO is a kind of fruit consisting of achenia, or small closed up seed-like seed-vessels, placed upon a succulent receptacle. The strawberry and the raspberry are of this nature, and are very incorrectly called *berries*, in the botanical sense of the word berry. [Bacca.]

ETAMPES, a town in France, in the department of Seine and Oise, on the road from Paris to Orléans, 28 miles in a direct line south by west of Paris, or 31 miles by the road. Etampes is on the bank of two little streams, that unite just below the town with the river Juine (or, as it is sometimes called, the river Etampes), which flows into the Essone, a feeder of the Seine.

In the year 911 Etampes was burnt by the Northmen or Normans under Rollo. In the latter part of the same century, or the beginning of the next, Constance, wife of Robert, King of France, built here a castle, and Robert himself converted the Oratory of the castle into a collegiate church. The castle was held for the king in the eleventh and twelfth centuries by officers who had the titles of Prévôt, Bailli, or Vicomte. There was a Jews' synagogue at Etampes, which, on the expulsion of that people from France by Philippe Auguste, A.D. 1182, was converted into a church, that of Notre Dame, yet standing. In the fourteenth century Etampes, which had previously been a royal domain, was given by Philippe le Bel to his brother Louis, Count of Evreux. It afterwards came successively into the hands of the Dukes of Berri, Bourgogno, Bretagne, and again of Bourgogne. In the sixteenth century Etampes, with its territory or county was erected into a duchy in favour of Jean de Brosses, whose wife was mistress of Francois I. In the religious wars of France, A.D. 1562, the town was taken by the Germans brought into France by the Prince of Condé. In A.D. 1567 it was taken by assault by the Huguenots; in A.D. 1589 it was the rendezvous of the troops of the League, from whom it was taken by Henri III. In A.D. 1590 it was taken from the party of the League, into whose hands it had again fallen, by Henri IV., who caused the fortifications of the castle to be razed. The town suffered much from the exactions of the contending parties in the civil war of the Fronde.

The town is in a tolerably fertile valley, and consists principally of one street. The tower of Guinette is the only remain of the antient castle. There are at present four churches. That of Nôtre Dame has a lofty tower and spire; the semicircular arch may be observed in it. The church of St. Giles is also very antient; it has the semicircular arch, with zig-zag mouldings. There are in the town several houses built about the time of the revival of the arts, especially that of the Duchess of Etampes, mistress of Francois I. The town-hall is an antient turreted building. There is a large public granary erected recently. Etampes is surrounded by promenades planted with trees. Near the town is an antient building, probably of Roman origin, but popularly called 'the tower of Brunehaut.' A modern castle has been erected upon these ruins.

The population of Etampes in 1832 was 8109. They manufacture soap, leather, woollen yarn, cotton counterpanes, and hosiery; and trade in wool, corn, flour, and honey. There are more than forty mills of different kinds on the two brooks which water Etampes: sandstone is quarried in the neighbourhood, and much garden-stuff raised for the supply of Paris. Etampes is the capital of an arrondissement (which had in 1832 a population of 41,208), and has a subordinate court of justice (tribunal de première instance), a high school, and an agricultural society. Guittard and Geoffroy de St. Hilaire were natives of this town.

ETAWEH, a district in the province of Agra, bounded on the north by Furruckabad and Alighur, on the east by the kingdom of Oude, on the south by Cawnpore, and on the west by the district of Agra. The district of Etaweh forms part of the Doab, and was acquired by the English from the king of Oude in 1801. The principal towns are Etaweh, the antient capital, and Minpooree, the modern capital; Kanoje, Belah, and Shekoabad. The town of Etaweh stands on the east bank of the Jumna, in 26° 47′ N. lat. and 78° 53′ E. long., about 70 miles south-east from Agra. Minpooree is a large town on the banks of the Issa, in 27° 14′ N. lat. and 78° 54′ E. long., about 62 miles east from Agra. It stands in a fertile country, and is a populous place. Kanoje stands on the west side of the Ganges, in 27° 4′ N. lat. and 79° 47′ E. long., about 65 miles west-north-west from Lucknow. This is a very antient place: it was formerly of considerable extent, and at the period of the Mohammedan invasion was the capital of a powerful empire, but at present consists of only one street. It is two miles distant from the Ganges, but is connected with that river by means of a canal. Belah is about 21 miles south-south-west from Kanoje, in 26° 49′ N. lat. and 79° 27′ E. long. Shekoabad is situated in 27° 6′ N. lat. and 78° 27′ E. long., about 37 miles east-south-east from the city of Agra. The soil, productions, and climate of this district have already been described. [Agra; Doab.]

ETCHING. [Engraving.]

ETFU. [Edfu.]

ETHAL, a substance separated from spermaceti by Chevreul. It is a solid, fusible at nearly the same point as spermaceti, and on cooling crystallizes in plates. It is insoluble in water; but in alcohol at 150° Fahr. is much more soluble than spermaceti. It is susceptible of union with various bases, with which it forms salts or soaps.

ETHELBALD, king of Wessex, was the eldest surviving son of Ethelwulf, who resigned to him the throne of that state in 855 or 856. [Ethelwulf.] On the death of Ethelwulf in 857 or 858, Ethelbald married his young step-mother, Judith of France; but the vehement remonstrances of Swithin, bishop of Winchester, prevailed upon him, after some time, to abandon the incestuous connexion. Judith afterwards became the wife of Baldwin, count of Flanders, and the ancestress of Matilda, the wife of William the Conqueror, and, through her, of all the succeeding kings of England. The chroniclers speak in very favourable terms of the subsequent conduct of Ethelbald; but although he had greatly distinguished himself in the wars with the Danes in his father's time, his own reign is not marked by any military events. He died in 860, and was succeeded by his next brother, Ethelbert.

ETHELBERT, or, as the name is written by Bede, AEDILBERCT, was the fourth king of Kent in lineal descent from Hengist, through Eric or Aesc, Ocha or Ochta, and Ermeric, whom he succeeded while yet a child in the year 560. As the representative of the first leader of the Anglo-Saxons and the founder of the oldest kingdom of the Heptarchy, Ethelbert, as soon as he attained manhood, engaged in a contest for the title of Bretwalda with Ceawlin, king of Wessex, who claimed that supreme dignity as the grandson of Cerdic. [ENGLAND.] He invaded Wessex in 568; but the war was speedily ended by his defeat in a great battle fought at Wibbandune, now Wimbledon, in Surrey. This was the first instance of one of the states of the Heptarchy drawing the sword against another. Ethelbert, however, according to Bede, came to be acknowledged as bretwalda about the year 589, after the decline of the fortunes of Ceawlin, who was deposed about this time by his subjects, and ended his days a few years after. Ethelbert retained the supremacy during all the remainder of his reign, though it would seem that his title never was acknowledged by the kings of Northumbria.

The most memorable event in the reign of Ethelbert was his conversion to Christianity and the establishment of that religion in his dominions by the ministration of St. Augustine. [AUGUSTINE, ST.] Ethelbert professed himself a Christian, and was baptized on the feast of Pentecost A.D. 597. The Christian worship, however, must have been familiar to him long before this time; for he had been married to a Christian wife, Bertha, the daughter of Charibert, king of Paris, in the year 570, and she and her attendants had ever since practised their own religion under the guidance of Liudhard, a bishop who had accompanied her from France. After his conversion, Ethelbert exerted himself with zeal in the diffusion of his new faith. He founded the bishopric of Rochester about the year 604 in his own dominions, in addition to the archbishopric of Canterbury, the establishment of which is dated from the arrival of Augustine. To him also must be principally attributed the foundation, about the same time with that of Rochester, of the bishopric of London, in the state of Essex, which was at this time governed in subordination to Kent by Sebert, Seberct, Sabert, Saebryht, or Saba, a nephew of Ethelbert. Bede says that the cathedral of London, which was dedicated, like the others that have since been built on the same site, to St. Paul, was erected at the joint expense of Ethelbert and Sebert. The conversion of the king and people of Essex had previously been effected through the influence of the king of Kent. It was also through his daughter Edilberga, who married Edwin, king of Northumbria, that Christianity was introduced into that state. [EDWIN.]

Ethelbert deserves especial remembrance in English history on another account. He is the author of the earliest of our written laws, the collection of 'Dooms,' as Bede calls them, 'which he established with the consent of his witan in the days of St. Augustine.' They are written in Saxon, or English, as it is termed by Bede, although all the other Teutonic nations employed the Latin language in their codes; and they are the earliest laws that exist in any barbarous or modern tongue. There is no reason however to suppose that the regulations which they established were in general new. They relate, to quote the words of Sir F. Palgrave (*Eng. Com.* p. 44), 'only to the amount of the pecuniary fines payable for various transgressions, the offences against the church being first enumerated. These were of new introduction; but every other mulct was known before; and it is probable that the principal benefit of the law consisted in a fairer apportionment of the compensation to the crime than could be obtained according to the older customs.' The collection consists altogether of eighty-nine enactments or clauses; at least as it has come down to modern times. But the only copy of it which we possess is that contained in the volume called the 'Textus Roffensis,' which was compiled by Ernulphus, bishop of Rochester, in the early part of the twelfth century; and 'it is difficult to believe,' as Sir F. Palgrave has observed, 'that the text of an Anglo-Norman manuscript of the twelfth century exhibits an unaltered specimen of the Anglo-Saxon of the reign of Ethelbert. The language has evidently been modernized and corrupted by successive transcriptions. Some passages are quite unintelligible. . . . Neither is there any proof whatever of the integrity of the text. It cannot be asserted with any degree of confidence that we have the whole of the law. Destitute of any statutory clause or enactment, it is from the title or rubric alone that we learn the name of the legislator.' The next oldest Anglo-Saxon laws that have been preserved (those of Hlothaere and Eadric, also kings of Kent) are more than a century and a half later than Ethelbert.

Ethelbert died in 616. He appears in his old age to have married a second wife, but her name has not been recorded. All that we know of her is, that after the death of Ethelbert, her youth and beauty were sufficient to tempt his son and successor, Eadbald, to take her to his bed, and of course to renounce at the same time the profession of Christianity. After a short time however Eadbald dismissed his stepmother, and returned to the faith he had abandoned, of which he ever after continued a firm supporter. The dignity of Bretwalda went, on the death of Ethelbert, to Redwald, king of the East Angles.

ETHELBERT, king of Wessex, was the second surviving son of Ethelwulf, by whom he was made king of the subordinate state composed of Kent, Essex, Sussex, and Surrey in 852, on the death of Athelstan. [ETHELWULF.] On the death of his elder brother Ethelbald, in 860, although excluded by his father's will from the succession to the supreme crown of Wessex, he was preferred by the Witan to his younger brother Ethelred, who claimed under the will. The chronicles celebrate the courage and military talents of Ethelbert: but no events of his short reign are distinctly recorded. It appears however that the Northmen continued to make occasional descents both on the coasts of Wessex and on those of other parts of the island. All that we are told of Ethelbert is, that he died in 865 or 866. He appears to have left a son, Ethelwald, and other children; but he was succeeded on the throne of Wessex by his younger brother Ethelred.

ETHELRED I. (called also Edelred and Ethered), king of Wessex and head of the Heptarchy, was the third surviving son of King Ethelwulf, who in his will (ratified by the Witan) appointed Ethelred to succeed to the throne immediately after his eldest brother Ethelbald; he did no however succeed till after the death of his elder brothe Ethelbert in 866. (ETHELWULF and ETHELBERT of Wessex.] The reign of Ethelred was eminently disastrous both for Wessex and for the other states of England. In the las year of the preceding king, the great Danish chief, Ragna Lodbrog, had been taken prisoner while making an attac on Northumbria, and put to death with cruel tortures. I appears to have been with the purpose of avenging th loss that the various Scandinavian nations immediatel united their strength in that great expedition against England, which terminated in the conquest of half the countr The invaders, to the number of several thousands, unde the command of Inguar (or Ivar) and Ubbo (or Hubb landed on the coast of East Anglia, immediately after th accession of Ethelred to the throne of Wessex. Havin encamped and passed the winter on shore, they marche into Yorkshire in the spring of 867, took possession (1 March) of the city of York, and having there (12th Apri repulsed with great slaughter an attack of the Northumbrians under Osbert and Ella, made themselves maste of all the kingdom of Northumbria to the south of the Tyn and placed Inguar over it as king. They then marched in the kingdom of Mercia, and passed the winter of 867-8 i the town of Nottingham. Beorhed, the Mercian king, no solicited the aid of Ethelred; and the king of Wessex, a companied by his younger brother Alfred, whom he appea to have admitted to a share of the royal power, a vanced with an army against the foreigners. The Dan however did not venture to engage the allied forces of Wess and Mercia; and a treaty was made by which they agreed evacuate Nottingham and to retire to York. In that ci they remained quiet for the remainder of this year, and a the next, during which England was afflicted by a seve famine, followed by a terrible mortality both of human b ings and cattle. But, in the spring of 870, disregarding th late pacification, they resumed hostilities, carrying the arms across the Humber into Lincolnshire, which was n cluded in the dominions of Mercia. Notwithstandin some attempts to check their progress, which were made b Earl Algar, the governor of the district, they speedily ove ran all Lincoln, and pushed their way into the adjoining te ritory of East Anglia, sacking and destroying in their cours the abbeys of Croyland and Medehamstead (or Peterb rough), the town of Huntingdon, and the nunnery of El and massacring and laying waste wherever they appear with unheard-of ferocity. At a village called Hoxton, in Norfolk, they seized Edmund, the East Anglian king, and put him to death: he sustained the torments they inflicted upon him with such constancy that he was afterwards revered as a martyr, and the 20th November, the day on which he met his fate, was assigned to him in the calendar. His death made the Danes masters of East Anglia, over which they placed Godrun, one of their chiefs, as king. They now resolved to invade Wessex, the only state which they had not either conquered or rendered powerless. They entered Berkshire, under the command of Halfden and Bacseg, and took the town of Reading without encountering any resistance; but they were soon after attacked by Earl Ethelwulf at the neighbouring village of Inglefield, and driven from their ground with the loss of Sidnor, one of their most renowned captains. Four days after they were fallen upon at Reading by King Ethelred and his brother Alfred; but on this occasion the Saxons were repulsed with great loss, the brave Earl Ethelwulf being among the slain. The battle of Reading, however, was followed in four days more by another more important encounter at a place which the old writers call Aescesdun, or the Ash-tree Hill, and which has been supposed by some to be Ashbury in the west, by others Ashton in the east, of Berkshire. The Danes were here attacked with great impetuosity and valour by Alfred, and, notwithstanding their advantageous position, were, after a struggle of some length, completely defeated and put to flight. It is said that the English chased them for the whole of the night and next day over the country till they reached the town of Reading, in which they again shut themselves up. But a fortnight after the battle of Ash-tree Hill they again met the two kings of Wessex at Basing, in the north of Hampshire, and this time the English were worsted. A similar result attended the next battle, fought, about two months after, at a place called Merton, which has been variously conjectured to be Merton in Surrey, Merton in Oxfordshire, Merden in Wilts, and Morton in Berkshire. In this engagement, which must have taken place early in 871, Ethelred received a wound, of which he died soon after Easter, leaving the now almost shadowy inheritance of the crown of Wessex, and what would at a later period have been called the suzerainty of England, to his younger brother Alfred.

ETHELRED II., surnamed the Unready, king of the Anglo-Saxons, was the youngest son of King Edgar, by his second wife, the infamous Elfrida. On the murder by Elfrida of his elder brother, Edward the Martyr, in 978, he was reluctantly acknowledged as king by the Witan, in the absence of any other individual having pretensions to the crown; even Dunstan, who had steadily opposed the party of Elfrida throughout the late reign, finding himself now obliged to acquiesce in the accession of her son. He was crowned by Dunstan, at Kingston on the Thames, on the 14th of April, being at this time only a boy of ten years old. The reign of Ethelred the Unready is on the whole the most calamitous and disgraceful in English history. The feeble and distracted government that arose out of his minority and the circumstances of his accession immediately drew once more upon England the attention of the northern piratical powers, who had now remitted their attacks for nearly a century. A small body of Danes landed at Southampton in 980; and scarcely a year passed afterwards in which one part or other of the coast was not in like manner visited and ravaged, usually with impunity. At length, in 991, a much larger force than had before appeared arrived under two leaders, named Justin and Gurthmund, and after taking the town of Ipswich, proceeded to Maldon, and there encountering the English army commanded by the alderman Brithnod, obtained a complete victory, Brithnod himself being slain. On this it was resolved by the English Witan, on the advice, it is said, of Siric, who had succeeded Dunstan as the king's chief counsellor, to buy off the invaders with a sum of money. They agreed to accept 10,000 pounds of silver, which was accordingly paid to them, being raised by an impost on all the landed property in the kingdom, which from this time became a regular tax, under the name of the Danegeld, and was perhaps the first direct tax imposed in England. It was felt however that this was a very precarious expedient to trust to; and, as soon as the Danes were gone, the government proceeded to fit out a formidable fleet, which might perhaps have been of service if it had been ready to meet them when they arrived. As it was, it was no sooner afloat than it was rendered useless by treachery and mismanagement. A squadron of Danes having again appeared on the coast in 992, Alfric, the commander of the English fleet, when sent to surprise them, secretly gave them information of the intended attack, and then went over and joined them. The next year, when the Northmen made a descent upon the coast of Northumberland, and took by storm the castle of Bamborough, the leaders of the force sent against them in like manner deserted to the enemy. In 994 a much more powerful armament than had yet appeared sailed up the Thames under the command of Sweyn or Svein, king of Denmark, and Olave king of Norway; it consisted of ninety-four ships, and directed its first efforts against London, which however defended itself successfully against the assault. The invaders then overran and laid waste a great part of Essex, Kent, Sussex, and Hampshire. In the end they were again bought off by the payment of a sum of money, their demand this time rising to 16,000 pounds of silver. Olave now consented to embrace Christianity; and he faithfully kept his promise of never again molesting England. Not so the king of Denmark; his forces continued their attacks year after year; and at last, in 1001, Ethelred found himself once more compelled to rid himself of them for the moment by his old expedient. He was now obliged to pay them 24,000 pounds of silver.

For what length of time the relief which he thus purchased might have lasted it is impossible to say. Ethelred now resorted to another mode of dealing with the evil, which was of a very different character from that to which he had hitherto adhered, but combined the qualities of being at once still more unjustifiable and still less likely to prove efficacious. On the 13th November, the festival of St. Brice, in the year 1002, the English inhabitants, in obedience, it is said, to secret instructions received in every city from the government the evening before, suddenly rose in all parts of the kingdom upon the Danes who were resident among them, and put them to death, men, women, and children. There has been some dispute as to the precise extent to which the massacre was carried, and it cannot be supposed to have comprehended all the persons of Danish descent resident in the country, for in many districts it is certain that the majority of the inhabitants were of this description; but there can be no doubt that a very large number of persons perished. This atrocious and in every way unwise proceeding did not long remain without its fit punishment. The next year Sweyn, whose sister, married to an English earl, had been among the butchered, again appeared on the south coast; and from this time it may be said the kingdom had no rest. After the devastations of the invaders had been continued for four years, they were once more bought off in 1007 by a payment of 36,000 pounds of silver. The next year, by extraordinary efforts, a numerous fleet was built, and assembled at Sandwich; but a dispute arising among the captains, one of them deserted with twenty vessels, and turned pirate, and nearly all the rest were soon after destroyed by a tempest. Meanwhile, all the other forms of public calamity combined to afflict the nation. The king was an object of general hatred or contempt; the nobility were divided into hostile factions; and famines and contagious diseases vied with the swords of the invaders in destroying the miserable people. In 1009 a new Danish force arrived, under a leader named Thurchil, who for the three following years spread devastation throughout the only part of the country that had hitherto afforded an asylum from the foreigners, the fens of East Anglia. At last, after he had sacked and burned the city of Canterbury, Thurchil was bought off in 1012 by a payment of 48,000 pounds of silver, and he and his followers agreed, on being allowed to settle in the country, to become the subjects of the English king. But the next year Sweyn himself again made his appearance, now avowing his determination not to depart till he had effected the conquest of the country. Entering the Humber, he received the submission both of the Northumbrians and of the parts of Lincoln that were in like manner chiefly inhabited by a population of Danish descent. He then marched across the country to London, putting all the males to the sword as he advanced; but the capital, which was defended by Ethelred and Thurchil, resisting his assault, he turned to the west, and, compelling the nobles to make their submission to him wherever he passed, he proceeded to Bath, and there caused himself to be proclaimed king of England. Soon after this London submitted to his authority; and in the middle of January, 1014, Ethelred fled to the court of Richard duke of Normandy, whose sister Emma he had married some years before. He had previously sent thither Emma and her two children.

On the 2nd of February however Sweyn died. His son Canute was immediately proclaimed king by the army; but the English determined to recall Ethelred. He was brought back accordingly, after entering into a solemn agreement with the Witan, that he would be a good lord to them, and amend all they wished to have amended, and that all things should be forgiven which had been done or said against him, they on their parts promising that they would all turn to him without fraud, and would never again permit the Danes to have dominion in England. Canute deemed it prudent to take flight before the national enthusiasm of the moment; and it is said that another general massacre of the Danes that were left behind in the country signalized the restoration of a national government. But Canute returned the following year with a powerful fleet: he was immediately joined by Thurchil, who, till now, had remained faithful to his English allegiance; other chiefs followed Thurchil's example, and a great part of the country appears to have again speedily submitted to the Danes. Ethelred was confined to his bed by illness when Canute arrived, and he died in London on the 23rd of April, 1016, at the moment when the enemy was preparing to attack that city. He was succeeded by Edmund, surnamed Ironside, his eldest son by a lady named Elfleda, who is said to have borne him six sons and four daughters, but to whom it is doubtful if he was ever married. Edward, one of his two sons by Emma of Normandy, whom he married in 1002, also afterwards ascended the throne. [EDMUND IRONSIDE, and EDWARD THE CONFESSOR.]

ETHELWULF was the son of Egbert the Great, whom he succeeded in the throne of Wessex and the supremacy over the other states of the Heptarchy, in 836. The provinces of Kent, Essex, and Sussex, which Egbert had conquered and annexed to his dominions, and also that of Surrey, which had hitherto been included in Wessex, were at the same time formed into a separate but subordinate kingdom, and put under the government of Athelstane, whom some of the chroniclers state to have been the eldest son, others a younger brother of Ethelwulf. There is no older authority than that of Malmesbury (whose account is indisputably incorrect in several particulars and improbable in others) for the story that Ethelwulf was a monk at the time of his father's death. His early education is recorded to have been conducted first by Helmstan, bishop of Winchester, and afterwards by Swithin, whom, on coming to the throne, he advanced to the same see; and he had also served with distinction in the field in the lifetime of his father. When he succeeded to the crown he retained as his chief counsellor the able Alstan, bishop of Sherborne, who had been in great favour with Egbert. What has been preserved of the history of the first fourteen or fifteen years of the reign of Ethelwulf consists almost exclusively of the detail of a series of contests with the Danes, who now continued with incessant perseverance those descents upon the English coasts which they had commenced in the preceding reign. In 837 three squadrons of them made attacks on different points nearly at the same time. The next year they landed again in great strength in Lincolnshire, and, after defeating the troops sent to oppose them, marched across and ravaged the country down to the Thames. In 839 three hard battles are recorded to have been fought at Rochester, Canterbury, and London, besides an action at sea, near Charmouth, in which the English fleet, commanded by Ethelwulf in person, sustained a defeat. For some years after this however the Northmen, abandoning Britain, directed all their efforts against the coasts of France. But in the latter part of the year 850 a body of them landed in the Isle of Thanet, when, so ill-prepared was Ethelwulf for the attack, that the foreigners were enabled for the first time to pass the winter in the country. In the spring of 851 they were joined by great numbers of their countrymen, and the whole multitude ascending the Thames in a fleet of 350 vessels, plundered Canterbury and London. They then penetrated into Surrey; but here they were met by Ethelwulf at Okeley, and after a long and obstinate battle, were defeated with immense loss. They were soon after worsted in another battle at Wenbury, in Devonshire, and also in a sea-fight near Sandwich by Athelstane, the king of Kent. The consequence was, that the Danes did not again make any attempt on England during the reign of Ethelwulf.

In 852, on the death of Athelstane, the kingdom of Kent was assigned by Ethelwulf to his second son, Ethelbert, he himself retaining the chief sovereignty as before. The following year, at the request of Beobred, or Burhred, king of Mercia, he led an army against the Welsh, and marched through their country as far as the Isle of Anglesey, compelling them to acknowledge themselves the subjects of himself and Beohred. On the termination of this expedition he gave his daughter Ethelswitha in marriage to the king of Mercia. In 855 he undertook a journey to Rome, accompanied by his youngest son Alfred, who had been also carried to that city in the preceding year by bishop Swithin. Ethelwulf had by this time lost his first wife Osberga, a daughter of Oslac, designated the king's cup-bearer; and now, on his return through France, he fell in love with Judith, daughter of Charles the Bald, king of that country, and married her, although she had not yet reached her twelfth year. Meanwhile however his eldest son Ethelbald, taking advantage of his father's absence (whom perhaps he represented as being in his dotage), had entered into a scheme for seizing the throne. It is said that among his accomplices was the prime minister Alstan, and that he was also supported by the chief nobility, from which we may conjecture that the attempted revolution was not without some strong reasons in its favour. And although the return of Ethelwulf is said to have prevented the full success of the design, it was substantially carried into effect. It was agreed at a solemn meeting of the Witan that Ethelbald should become king of Wessex, and that Ethelwulf should reign as sovereign, with Ethelbert under him, in Kent and the other eastern provinces. It may be supposed that in his new position Ethelwulf enjoyed little more than a nominal authority. He spent the remainder of his days mostly in exercises of devotion, and died in 857 or 858. By his will, which was confirmed by the Witan, he left the kingdom of Kent to his second son Ethelbert, and that of Wessex in succession to his other sons, Ethelbald, Ethelred, and Alfred.

One of the legislative acts of the reign of Ethelwulf has given rise to much discussion, namely, the grant which he made in 854 or 855, with the consent of the Witan, in favour of the church, and which was wont to be considered as the original foundation of the right of the clergy to the tithes. The grant is recited by Ingulfus, Malmesbury, and Matthew of Westminster, but not in the same terms. Lingard observes that 'the copies are so different, and the language is so obscure, that it is difficult to ascertain its real object; whether it were to exempt from all secular services the tenth part of each manor, whoever might be the possessor, or to annex that portion of land to the possessions which had already been settled on the church.' It cannot, Turner thinks, have been the original grant of the tithes of all England. The 'words,' he observes, 'imply either that it was a liberation of the land which the clergy had before been in possession of from all the services and payments to which the Anglo-Saxon lands were generally liable, or that it was an additional gift of land, not of tithes, either of the king's private patrimony, or of some other which is not explained.' Palgrave contends that it was not a grant of tithes, but a grant of the tenth part of the land by metes and bounds, to be held free from all secular services; yet he admits that the interpretation which construes the grant into an enfranchisement of all the lands which the church then possessed, is 'not altogether void of probability.' (*Eng. Com.* p. 159.) There is a dispute also about the date of the grant. Palgrave conceives that Ethelwulf made it on his return from Rome; Turner and Lingard both place it before his journey thither. The latter adds: 'This charter was at first confined to the kingdom of Wessex; but in a council of the tributary states, held at Winchester in 855, it was extended to all the nations of the Saxons.'

ETHER. [ÆTHER.]

ETHEREGE, sometimes written **ETHERIDGE, SIR GEORGE**, born about 1636, was a distinguished wit and dramatic writer of the reign of Charles II. According to the usual routine of a gentleman's education at that time, he studied law at an inn of court and travelled. In 1664 he made his first public appearance as author of the comedy called 'Love in a Tub.' 'She Would if she Could' followed in 1668, and 'The Man of Mode, or Sir Fopling Flutter,' in 1676. All these were received with much favour by the public, but 'Sir Fopling Flutter' has been the most esteemed. They placed him, with Buckingham, Rochester, Sedley, &c., in the first rank of the wits of the day. Ease and brilliance of dialogue are their characteristic excellence; but they have an ingrained taint of licentiousness running through the whole conception as well as the language, which has long excluded them from the stage. If the characters are supposed (which is the author's best excuse) to be but highly coloured copies of the fine gentlemen and ladies of the day, we shall marvel that the name and estimation of gentlemen should ever have been sullied by such a total want of truth and honour. Sir George Etherege's verses are not numerous, and consist of occasional pieces, lampoons, songs, and short amatory poems, some of which are of a very licentious character. Their style may be guessed from his appellations of *easy Etherege* and *gentle George*. Rochester, in his 'Session of the Poets,' gives high praise to our author, in saying that

Of all men that writ,
There's none had more fancy, taste, judgment, and wit.

Fancy and wit may be allowed him: the taste and judgment suited Rochester's own. Etherege's private life may be guessed from his writings: play injured his fortune, debauchery his constitution. He repaired the former by marrying a rich widow, whose price was a title; and to win her he purchased his knighthood. He was in James II.'s household, and was afterwards employed by that king as minister to Ratisbon, where, by some accounts, he died from a fall down stairs after a convivial entertainment; but this appears uncertain. The time of his death seems to have been about the Revolution.

There is an edition of his Plays and Poems in 8vo., London, 1704, and one in 12mo., London, 1715.

ETHE'REUM, a theoretic carburetted hydrogen, consisting of 4 equivalents of carbon = 24, and 5 equivalents of hydrogen = 5: its equivalent is therefore 29. Among the various theories which have been proposed respecting the constitution of æthers, that which supposes it to contain ethereum (as it is termed by Dr. Kane, and *ethule* by Berzelius), as a base combined with oxygen, is perhaps to be preferred to all others. It is indeed true that ethereum has never been obtained in a separate state, but allowing its existence, æther may be regarded as an oxide of ethereum, alcohol a hydrated oxide of ethereum or a hydrate of æther, and sulphovinic acid may be viewed either as a hydrated bisulphate of oxide of ethereum, or a hydrated bisulphate of æther.

ETHE'RIA, Lamarck's name for a genus of Conchifers, placed by many authors among the *Chamidæ*, but separated by Deshayes and others from that family for the reasons assigned under the article CHAMACEA.

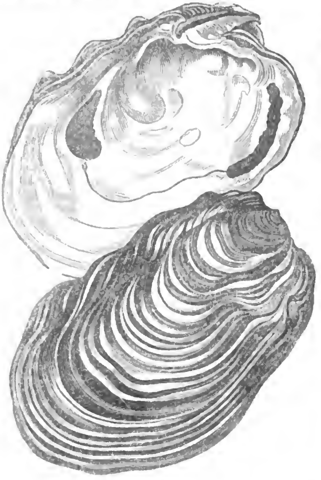
Animal closely approximating to that of *Unio*. Lobes of the mantle disunited throughout their length, and, consequently, without either tubes or syphons. Below the foot, the branchiæ of the right side unite themselves to those of the left side in the medial line, and leave below them a rather large canal, in which the vent terminates. The branchial leaflets are unequal, strongly striated and festooned on their free border. The mouth is rather large, and furnished on each side with a pair of palps like those of the *Uniones*. Finally, (and, as Deshayes observes, it is a great singularity in an animal that lives attached to foreign substances,) it is provided with a very large foot, which may be compared in regard of its form and position with that of *Unio*.

Shell adherent, thick, nacreous, very irregular, inequivalve, inequilateral; *umbones* short, thick, indistinct; *hinge* toothless, irregular, undulated, callous; *ligament* longitudinal, tortuous, external, penetrating pointedly into the interior of the shell; *muscular impressions* oval, irregular, one superior and posterior, the other inferior and anterior; pallial impression narrow and small.

Obs.—M. Deshayes observes that on examining the shells of this genus, in which the ligament is not ruptured, it appears that the ligament is not entirely internal or subinternal, like that of the oysters, but that it has completely the structure of external ligaments. It is when the shells are young that the structure of the ligament is most easily recognized. There are two muscular impressions, always very distinct in old individuals; but, in the young ones, it sometimes happens that one only can be distinguished, and it was upon an individual in this state of growth that M. de Férussac established his genus *Mulleria*, which, in the opinion of M. Deshayes, cannot be retained. With regard to the crenulations on the hinge adverted to by M. de Férussac, M. Deshayes states that he had seen on the very individual which M. de Férussac had in his hands some small fractures resulting, as it appeared to M. Deshayes, from this cause, namely, that the shell having been taken with the animal, the valves had been separated by attacking the ligament with a sharp instrument.

Geographical Distribution, Habits, &c.—Lamarck considered the genus *Etheria* to be marine, and accounted for its having escaped the notice of zoologists because it was attached to rocks at great depths in the sea. Mr. G. B. Sowerby, after noticing the locality attributed to the genus by Lamarck, remarks that two circumstances observable in the *Etheria* (*E. semilunata*), figured in his plate, would have induced him to suspect that this was a fresh-water shell, or at least an inhabitant of æstuaries at the mouths of rivers; 1st, its having an epidermis, which remains only in those parts least exposed to the action of the water, the greater part especially of the upper valve being eroded in a very irregular manner; and 2ndly, its being partly covered with the remains of those ovate vesicular bodies, supposed to be the eggs of some molluscous animals so frequently seen on fresh-water shells. M. Cailliaud was the first to make known the fact that the genus is an inhabitant of the fresh waters, and M. de Férussac (*Mémoires de la Société d'Histoire Naturelle*, vol. i.) published a paper on the subject from M. Cailliaud's materials, in which the former also made a revision of the species. M. Deshayes, in his treatise on the genus (*Encyclopédie Méthodique*), states that individuals of the same species adhere by the one or the other valve indifferently, which, he remarks, is not the case with the oysters or the *Chamæ*. That *Etheria* may be attached indifferently by either valve there is no reason to doubt after the assertion of M. Deshayes; but Mr. Broderip (*Zool. Trans.*, vol. i.) observes that the same species of *Chama* is sometimes attached by the right, sometimes by the left valve. [CHAMACEA, vol. vi., p. 470.] M. Rang, during a voyage to Senegal, made some interesting observations on *Etheriæ* which live 200 leagues from the mouth of the river in the Senegal, and, together with M. Cailliaud, who received the animal from the Nile, published a memoir (*Mémoires du Muséum d'Histoire Naturelle*) full of interest, in which the animal was described for the first time The rivers of Africa and Madagascar appear to have afforded the specimens (which are still rather scarce in cabinets) hitherto collected. M. de Férussac, in his memoirs, gives the following information from M. Cailliaud 'We first meet with *Etheriæ*,' says that zealous traveller, 'after passing the first cataract; and they do not appear to exist below; they become very abundant in the province of Rebata, beyond the peninsula of Meroë. The inhabitants collect them on the banks of the river, to ornament their tombs with them, and they say that they come from the more elevated parts of the Nile, from Saïda, where they are eaten.' M. Cailliaud found them as far as Fazoql, the most distant country into which he penetrated from the Blue River. In Sennaar, the inhabitants informed M. Cailliaud, that during the summer season, when the river was low, they took them with the animal; but notwithstanding all his endeavours, M. Cailliaud could not obtain any living specimens, the river being then always too high. They are said to be very common in the Jaboussi, a river which runs into the Blue River, and in all appearance the numerous confluent streams of this great arm of the Nile produce them also. The number found upon the tombs throughout Ethiopia is so great, that it is astonishing that Bruce and Burckhardt should not have mentioned them. (*Zool. Journ.*, vol. i.)

Lamarck recorded four species of *Etheria*, which he divided into two sections, each containing two species. The first of these consists of species which have an oblong callosity in the base of the shell; the second, of those which have no encrusted callosity at the base of the shell. These four species M. de Férussac (with justice in the opinion of M. Deshayes) reduces to two; so that the sections, as left by Lamarck, would each, in that case, consist but of one species, viz., the first of *Etheria elliptica*, and the second of *Etheria semilunata*. M. Deshayes remarks that Lamarck saw but a very small number of individuals, and not being aware of their extreme variation, established species from the form of the shell; and it is certain, he adds, that if we were to follow the same indication at the present day, we might establish a species for each individual. He notices M. Rang's judicious observation, that in the same species there are individuals armed with spines, and others devoid of those appendages, and that the shades of this character are so gradual that it is impossible to regard it as of the smallest importance. In following out this principle, M. Rang considers *Etheria tubifera* of Sowerby and *Etheria Cailliaudi* of Férussac as identical, and *E. Corteroni* of Michelin to be the same as *E. plumbea* of Férussac. It is to the last-named species that M. Deshayes thinks that the genus *Mulleria* should be referred.



Etheria semilunata.

Etheria, or, as some write it, *Ætheria*, has not yet been discovered in a fossil state. It should be remembered that Rafinesque uses the term for a genus of Macrourous Crustaceans belonging to the *Palæmonidæ*.

ETHERINE, a peculiar carburetted hydrogen, which has also been regarded as the basis of æther. It is supposed to consist of 4 equivalents each of hydrogen and carbon.

ETHERO-SULPHURIC ACID—ETHIONIC ACID. This acid is prepared by passing the vapour of anhydrous sulphuric acid slowly into absolute alcohol kept cold; by their mutual action an oleaginous fluid is formed, without the evolution of any gaseous matter. This fluid is to be mixed with water and saturated with barytes, by which a portion of sulphate is separated, and ethero-sulphate of barytes is obtained by evaporation in vacuo.

The acid in this salt is stated to consist of—

Two equiv. of sulphuric acid . .	80
One equiv. of etherine	28
One equiv. of water	9
Equiv. of ethero-sulphuric or ethionic acid	117

It may be considered either as a hydrated bisulphate of etherine, or as an anhydrous bisulphate of æther, or of oxide of ethereum.

ETHICS is the science which relates to our mental affections, not simply as phenomena, but as they are virtuous or vicious, right or wrong. (Dr. Thomas Brown's *Lectures*, p. 486, Edinb., 1830.) The term is derived from the Greek ἠθική, which, in signification, is equivalent with the Latin *mos*, *mores*, whence the adjective *moralis*, and the English word *morals*. Aristotle, in the second book of his Ethics, addressed to his son Nicomachus, says that moral science received the name of ethics from the word *éthos* (ἔθος), 'habit, use, or custom,' (ἠθικὴν, ἀπὸ τοῦ ἔθους, or ἀπὸ τῶν ἠθῶν), since it is from habitual experience, and the routine of customary conduct that moral dispositions and principles are gradually formed and changed. Cicero, in his work on moral ends (*De Finibus*, l. 1 and 5) briefly defines ethics, or morality, as the 'ars vivendi,' or 'doctrina bene vivendi,' that is, the art of living wisely. The scholastic treatises on ethics divide the practical part of the science into three departments *éthike* (ἠθική), which shows by appropriate precepts what is the duty of a good man; *œconómike* (οἰκονομική), which shows what is the duty of a good father of a family; and *politike* (πολιτική), which exhibits the duty of a good citizen, and of a good magistrate. [MORALS.]

E'THICUS, or Æ'THICUS, is conjectured to have lived about the fourth century of our æra, and is the reputed author of a Cosmography or short description of the world, being an enumeration of the seas, islands, provinces, mountains, rivers, and towns of the then known world, with a short account of the sources and course of the principal rivers. In speaking of the Tiber's course through Rome, he mentions the gate of St. Peter, that of St. Paul, and the Via Portuensis, or of 'the martyr St. Felix.' He also speaks of Rome as the mistress of the world, of the games held by the Romans, of the præfectus urbis, &c. These circumstances may serve to fix the time of the compilation of the work towards the end of the fourth century, when Rome had become completely Christian, but yet before Alaric's invasion. Æthicus and his Cosmography are mentioned by several writers of the following ages, and among others by Isidorus of Seville, who lived in the early part of the seventh century. Rabanus Maurus (*de Inventione Linguarum*), a writer of the ninth century, calls Æthicus 'a Scythian;' and Flodoardus, a writer of the following century, calls him 'Ister' from 'Istria.' (Vossius, *de Historicis Latinis*, b. iii.) At the beginning of his Cosmography Æthicus states that Julius Cæsar, during his consulship with M. Antony, by virtue of a senatus consultum, ordered a survey of the Roman world to be taken, and that the work was entrusted to three geometers, Zenodoxus for the eastern part, Polycleitus for the south, and Theodotus for the north, who completed their work under Augustus. This survey was probably the source from which the Antonine Itinerary was derived, which Itinerary in its present shape has also been attributed by some to Æthicus. [ANTONINUS, ITINERARY OF.] The Cosmography in most publications is followed by another and somewhat fuller description of the various parts and provinces of the world, apparently of the same period, entitled 'Alia totius Orbis Descriptio,' and generally attributed to Æthicus also, though there are doubts concerning his authorship. This second work is also found almost literally in Orosius, forming the second chapter of his history. It has been suggested that Orosius may have copied it from Æthicus, and the text of Orosius has certainly the appearance of a copy, as he has shortened the beginning or introductory part, and also left out the concluding sentence, in which the author of the description, as we have it separately, promises to give a continuation of his work, or an ampler description of the towns, &c., beginning from Rome, which he styles 'Caput Mundi et Domina Senatus.' (Simler's edition of Æthicus, Basil, 1575.) This last sentence promising a fuller account, which the author did not fulfil or which has been lost, would not have fitted Orosius's historical narrative, and therefore he left it out. But it is also worthy of remark that in two MSS. of Orosius in the national library at Paris, Nos. 4878 and 4882, the second chapter ends with these words, which are not found in the other MSS. and printed editions of Orosius: 'Percensui breviter ut potui provincias et insulas Orbis Universi, *quas Solinus ita descripsit*.' This would seem to attribute the work to Solinus.

To the two Cosmographies attributed to Æthicus is added, in some editions, another extract, which is styled 'Julii Honorii Oratoris Excerpta quæ ad Cosmographiam pertinent.' It is in its plan similar to the first Cosmography of Æthicus, only perhaps still dryer and more incorrect. The three have been published, together with Pomponius Mela, by Gronovius, Leyden, 1635.

ETHIO'PIA (Αἰθιοπία) was the name given by the antient geographers to the countries south of Egypt. In a more general and vague sense they called Ethiopians all the inhabitants of the south part of Africa, from the Red Sea to the Atlantic. Herodotus (iv. 197) speaks of the Ethiopians as inhabiting the whole of South Libya (Libya is with him synonymous with our Africa), as distinguished from the Libyans who inhabited the Mediterranean coast and the interior adjoining it. He also speaks of the Ethiopian Troglodytes (iv. 183) who lived to the south of the Garamantes, and tells strange stories of them; but these particular Ethiopians must be considered included under the general name. Strabo places the Hesperian Ethiopians near the Atlantic Sea, and south of the Pharusii and Negretes, who were themselves south of the Mauri. In this general sense, Ethiopians corresponded with the inhabitants of the countries south of the great desert, of which the antients knew very little. Herodotus (vii. 70) also speaks of Asiatic Ethiopians, who formed part of the great army of Xerxes; but their locality is not easily determined. The historian however observes that the Asiatic Ethiopians were black, like those of Libya, but differed from them in language, and had straight hair; whereas those of Libya had very *curly* hair, by which term some modern writers have perhaps too hastily concluded that the woolly hair of the negro is intended. But Eastern Ethiopia, properly called Ethiopia above Egypt (Herod., vii. 69), and also Ethiopia Orientalis, was a distinct and better-defined country. It included those regions which we now call by the name of Nubia and Sennaar, and perhaps part of Abyssinia, but to the south its limits were not known. Herodotus, however, it should be observed, clearly distinguishes the Ethiopians immediately south of Egypt from those whom he calls long-lived Ethiopians (iii. 17), whom he places on the shores of the southern sea. But what country we must consider as inhabited by these long-lived Ethiopians, it seems impossible to say.

Meroe, which lay above the confluence of the Astaboras (Tacazze) and the Nile, was the antient capital of Ethiopia, in the limited and more definite sense of Ethiopia above Egypt, in which sense we shall now consider the term. The Troglodytæ bordered upon Ethiopia to the east, extending along the coast of the Red Sea. To the west of Ethiopia were the Blemmyes, a barbarian tribe, of whom wonderful stories were told as having no heads, but eyes and a mouth fixed in the breast. Ethiopia was a country early reduced to a fixed social state, and was held traditionally to have been the parent of Egyptian civilization and religion. Its government was monarchical, but the monarch was subordinate to an all-powerful hierarchy, more absolute than that of Egypt. Diodorus (iii. 6) says, 'in Ethiopia, when the priests think proper, they send a message to the king with orders for him to die, the gods having so communicated their pleasure, which no mortal should dispute.'

It has been long a subject of discussion among the investigators of antiquity whether the arts of civilized life descended from Ethiopia to Egypt, or ascended from Egypt into Ethiopia. Here, as in many other contested historical points, much discrimination is required. It would appear, from tradition, that at a very remote period religious colonies came down from Meroe into Egypt. Herodotus (ii. 29) says, 'at Meroe, the great city of the Ethiopians, the people worship only Zeus and Dionysus (Ammon and Osiris), and them they honour greatly. They have an oracle of Zeus, and they make their expeditions whenever and wherever the Deity, by his oracular answers, orders them.' This shows that the priests of Meroe sent colonies into other countries, and Egypt was naturally one of the first lands to which they would resort. The worship of Ammon (the Zeus or Jupiter of the Greeks and Romans), which was carried by them down the Nile, was a simpler and purer form of worship than the absurd assemblage of deities which afterwards gained ground in Egypt. The procession of the Holy Ship, with the shrine of the ram-headed Ammon, which took place annually at Thebes, and which was carried across the Nile to the Libyan side and brought back after a few days, was in commemoration of the first advent of the god from Ethiopia by the river. This ceremony is sculptured on several Egyptian and Nubian temples, and especially on the great temple of Carnak. Homer probably alludes to it when he speaks of Jupiter's visit to the Ethiopians and his twelve days' absence. It appears also that the worship of Isis descended the Nile from the farthest regions of Ethiopia. Diodorus (iii. 3) says that 'the people above Meroe worship Isis and Pan, and besides them Hercules and Zeus, considering these deities as the chief benefactors of the human race.' Isis' heads have been found by Cailliaud at Naga, near Shendy, (about 17° N. lat.) in Upper Nubia, the sculptures bearing all the marks of an original style, though of a coarser art than that displayed in the same figures in the Egyptian temples. The head of Isis is placed above that of Typhon, as in some of the temples of Egypt. These temples of Naga however may be supposed, from their style and sculptures, to be of a later date than those at El Mecaourah, which are also in the district of Shendy, in a valley in the desert, at some distance from the Nile, and about twelve miles nearly north of Naga; they consist of eight temples, of small dimensions, the largest being only thirty-four feet long, connected by galleries and terraces, with a great number of small chambers, the whole being surrounded by a double enclosure. There are no tombs nor remains of private habitations in the neighbourhood. Traces of a large tank are seen, protected from the sand by mounds of earth all round it, the water of which served probably for religious and other purposes. The materials of the buildings are on a small scale, as well as the buildings themselves, the stones seldom exceeding one foot in length and half that in height. No sculptures or hieroglyphics adorn the walls; only on the six pillars which form the portico of the larger temple are there hieroglyphics and figures in the Egyptian style. This temple seems to be of a much later date than the rest.' (Cailliaud, *Voyage à Meroe*, and *plates*, and an article on the same in the Foreign Quarterly Review, No. 4, June, 1828.) It is supposed that this secluded enclosure may have been the sacred city of Meroe, the college of its priests, and the original seat of the oracle of Jupiter Ammon, whence issued those religious colonies which carried religion and civilization from Ethiopia as far as the Delta and the Oasis of the Libyan desert. According to the tradition of the country, the name of El Meçaourah was that of the antient fakirs or recluses who inhabited these edifices.

The ruins of Meroe itself are now believed to be those discovered by Cailliaud at Assour, above the confluence of the Atbara or Tacazze and the Nile, and its situation between the two rivers probably gave rise to the appellation of the Island of Meroe. The extent of the ruins is said to be more considerable than that of Napata, near Barkal, or of any other place yet examined in Nubia; they are also in general more dilapidated, and vast mounds of rubbish appear heaped up everywhere, as if formed by the ruins of private as well as public buildings. The latter consist, as at Napata, of temples and pyramids. Of the temples there is not one the remains of which can be traced with any certainty; the front wall of the largest appears to have been twenty-five feet thick. The pyramids stand in groups on the borders of the desert. The largest is about sixty feet at the base, but most of them are much smaller, and generally in a ruinous state. Most of the pyramids have little exterior sanctuaries attached to them, and in one of them Cailliaud found the roof arched with a key-stone, as in those of Mount Barkal.

The connection between Egypt and Ethiopia was renewed at various periods remote from each other, and under various circumstances. Herodotus says that he saw in the records of the priests of Memphis (ii. 100), 18 Ethiopian kings registered among the 330 successors of Menes, who preceded Sesostris. Whatever we may think of this scroll of kings, still it shows that a tradition existed of a very remote influence of Ethiopia over Egypt. This perhaps was the epoch when the worship of Ammon and Osiris was introduced into the latter country. Osiris, according to tradition, led a colony from Ethiopia into Egypt, which received also from the parent state the practice of deifying kings, together with hieroglyphical writing, the usage of embalming, the whole sacred ritual, and the forms of their sculptures. (Diodorus, iii. 3.) Afterwards Sesostris is said to have conquered Ethiopia; but this was probably a partial incursion, for Herodotus (ii.) says that Ethiopia was never conquered by any foreign power. We hear nothing of the intercourse between Ethiopia and Egypt for many centuries afterwards, during which the latter country made great progress in civilization and the arts, and built its stupendous monuments. In the eighth century B.C. the Ethiopian invasion of Egypt took place, and Sabakos, an Ethiopian king, reigned over both countries. Herodotus, who lived between two and three centuries later, says that Sabakos evacuated Egypt in obedience to an oracle, a fact which shows that the power of the Ethiopian hierarchy still continued in full vigour. Still we find other Ethiopian kings ruling successively over at least part of Egypt; among others, Tirhakah, mentioned in the Scriptures as having fought against Sennacherib. The commentators on the book of *Kings* (ii. 19) have considered Tirhakah to be an Arab chieftain; an error disproved, as it is considered, by the existence of his name on one of the buildings of Thebes. This period of renewed intercourse between Egypt and Ethiopia, under circumstances highly favourable to the latter, was probably the time when the improved arts of Egypt were introduced into Ethiopia, and it was probably then that the splendid structures of Mount Barkal were executed; a supposition which would be confirmed, if it be true that the name of Tirhakah is found in the hieroglyphical cartouches in the Typhonium of Barkal, according to Champollion's system. Again, under the Ptolemies there is evidence to show that Græco-Egyptian colonies found their way into the regions of the Upper Nile, and along the shores of the Red Sea, and even as far as Axum and Adule in Abyssinia [ADULE; AXUM]: these colonies or adventurers probably spread the Egyptian arts as improved by the Greeks into Ethiopia. All these vicissitudes may account for the various styles of building and sculpture found along the banks of the Upper Nile. The monuments of Assour and el Meçaourah are probably older than those of Naga, and these much older than those of Barkal, which are probably anterior to the temple of Soleb. We know from a passage of Diodorus that after the Ptolemies came to reign in Egypt a great change took place in Ethiopian politics. In the time of the second Ptolemy the Ethiopians had a king Ergamenes who had a knowledge of Greek manners and philosophy. Being weary of the yoke of the hierarchy, he went with a band of soldiors to the inaccessible place (Barkal?) which contained the golden temple of the Ethiopians, and massacred all the priests. (Heeren's work on Egypt, and the *Egyptian Antiquities in the British Museum* in the *Library of Entertaining Knowledge*.)

Of the manners of the Ethiopians we know little, except what we may infer from their monuments and the scanty records we have of their religion and institutions, as above stated. Their sacred language appears to have been the same as that of the Egyptian priests. From some sculptures at Barkal, it would seem that human sacrifices were occasionally in practice. [BARKAL.] A peculiarity in the Ethiopian institutions is, that their women sometimes went to battle, and were not excluded from the throne. Strabo (Casaub., p. 820) speaks of the Ethiopian warrior queen named Candace. (See also *Acts of the Apostles*, viii. 27.) On the propyla of one of the temples of Naga, besides the hero or king, is a female figure likewise of regal dignity, with a large knife in each hand, going to cut off the heads of a number of captives; the vulture is hovering over her head. The figures of both king and queen are remarkable for the magnificence of their dress, and though they have many characteristics of Egyptian style, they are much thicker than the Egyptian form, especially the female, which is remarkably large from the vest downwards. (See Cailliaud's Plates, 14. 16.)

After the Romans became possessed of Egypt, we read of several expeditions into Ethiopia, but of no permanent impression made by them upon that region. Caius Petronius, prefect of Egypt under Augustus, is said to have advanced as far as Napata, called Tenape by Dion, the first town of Ethiopia after Meroe. He defeated Queen Candace, who was obliged to sue for peace. But the Romans ultimately kept none of their conquests in that quarter. In subsequent times it appears that they conquered again, and retained a strip of territory along the banks of the Nile of seven days' march above the first cataract, but this was given up by Diocletian to the Nubæ or Nabatæ, on condition that they should prevent the Ethiopians and the Blemmyes from attacking Egypt. Of the vicissitudes and ultimate dismemberment of the antient kingdom of Meroe we have no information.

The early Christian historians seem to restrict the name of Ethiopians to a people occupying part of the country now called Abyssinia. Procopius and Cedrenus call the Axumites Ethiopians. [See the articles ADULE and AXUM.] From those times the name of Ethiopia has been given more particularly to Abyssinia, and the Geez or sacred language of that country has been called Ethiopian. [ABYSSINIA.]

The origin of the name 'Ethiopia' is uncertain. Salt says that Itiopjawan is the favourite term by which the Abyssinians designate themselves; but this name was probably introduced among the Abyssinians by the half Greeks of the kingdom of Axum. The word in Greek has the appearance of being significant, and is sometimes interpreted 'dark-coloured;' but like many other Greek names of nations, it is probably a native Asiatic or African term corrupted into the semblance of a genuine Greek word.

ETHIOPIAN LANGUAGES. Under the general designation of the Ethiopian languages, three different dialects are usually comprised, viz., the antient Ethiopian, or Geez, the Tigré, and the Amharic. The antient language properly called the Ethiopian is now extinct, or at least survives only as the language of books and of learned men (whence it is also called *lesana mas'haf*, or book-language); and its place is now supplied by the two other dialects, of which the Tigré approaches nearest to the Ethiopic, whilst the Amharic has more widely departed from it. [AMHARIC LANGUAGE.]

The Ethiopian belongs to the family of languages usually called the Semitic, and among them it shows the closest affinity to the Arabic. It is written from the left to the right, in a peculiar alphabet, which however appears to be of Semitic origin. (Compare the Ethiopian letters *kof*, *nahar*, *ain*, and *geml*, with the corresponding Phœnician and Punic characters in Pl. v. and vi. of Gesenius' *Palæographische Studien*, Leipzig, 1835, 4to., and Pl. i. of the same author's *Scripturæ Linguæque Phœniciæ Monumenta*, Leipzig, 1837, 4to.) The alphabet consists of twenty-six consonants and seven vowel sounds; but the latter are not expressed by distinct characters, nor by points or accents, but by slight changes in the shape of the consonants, so that each character represents an entire syllable. It is well known that the antient Devanagari alphabet of the Hindus, and the system of orthography of many of the modern languages of India, are modelled on a similar principle. Several of the Ethiopian letters are now no longer distinguished in pronunciation; there are, for instance, three *h*'s, two *s*'s, two *f*'s, and *aleph*, and *ain*, which are sounded alike, though still kept distinct in writing.

Gesenius calculates that about one-third of the roots and primitive words of the Ethiopian language exists also in Arabic; and a considerable portion of the remainder is found in Hebrew, or in the Chaldee and Syriac dialects. In the inflection of the Ethiopian verb ten conjugations are distinguished, consisting, like those of the Hebrew, Syriac, or Arabic verb, of certain modifications of the original import of the simple root, expressed according to strict analogy by modifications of the form of that root. We subjoin a paradigm showing the third person of the preterite in each of the ten conjugations with the corresponding inflections of an Arabic root. The Ethiopic verb *gabera* is used in those conjugations only to which we have added a Latin interpretation.

	Ethiopic.		Arabic.
Conj. i.	*gabera*, fecit	i.	*Kabala*
ii.	*gabbára*, fieri curavit	ii.	*Kabbala*
iii.	*gâbara*	iii.	*Kâbala*
iv.	*agbara*, coegit	iv.	*akbala*
v.	*agabara*		
vi.	*tagabera*, factus est		
vii.	*tagabbara*, opus fecit	v.	*takabbala*
viii.	*tagâbara*	vi.	*takâbala*
ix.	*angabara*	vii.	*inkabala*
x.	*astagbara*, exegit (pecuniam)	x.	*istakbala*

From any of these conjugations a passive voice may be derived by prefixing *ta-*. Each conjugation has, as in the other Semitic dialects, a preterite and a future tense, with a distinct subjunctive or optative form, similar to the apocopate future (*aoriste conditionnel* of De Sacy) in Arabic; an imperative and infinitive, but no participle. There is no separate inflection for the dual number either in the verb or noun. In the declension of nouns, cases are sometimes characterized by terminations analogous to those of the Arabic language. From masculine adjectives feminines are derived, nearly as in Arabic, by subjoining *-t*. The gender of substantives is twofold, masculine and feminine; yet the distinction of the two is but little attended to in Ethiopian writings. The plural is expressed as in Arabic, either by terminations (*-ân* in masculines, *-ât* in feminines), or by certain modifications of the vowels within the limits of the word.

The literature extant in the Ethiopian language is almost exclusively biblical and ecclesiastical. The Ethiopians possess a complete translation of the Old and New Testament, made by an unknown author from the Alexandrian text of the Greek version, probably not anterior to the fourth century; besides an apocryphal writing, peculiar to themselves, called the book of Henoch, which is supposed by De Sacy to have been written during the reign of Herod the Great, and to be the book quoted in the Epistle of St. Jude (v. 14). (See *The Book of Enoch the Prophet*, &c., translated by Richard Lawrence, Oxford, 2nd edit. 1833.) There exists moreover a translation of the Didascalia, together with 56 *canones* and 81 *constitutiones* or rules of the early Christian church, considered by the Ethiopians as apostolical; besides a collection of the decrees of the councils, extracts from the writings of the early fathers, liturgies, martyrologies, and histories of saints. Hymns are not unfrequent: they are not written in any regular metre, but sometimes show a rude sort of rhythm, and often every three or five lines end in the same consonant, which constitutes a kind of rhyme. The profane literature of the Ethiopians comprises several chronicles, which appear to be of considerable interest, but have not yet been made generally accessible. Among these the Chronicle of Axum deserves to be particularly noticed, a copy of which was brought to Europe by Bruce, and is now preserved at Chelsea College, in the possession of the family of that traveller, along with numerous other oriental manuscripts left by him.

The Ethiopians have no grammars nor a dictionary, properly so called, of their antient language, and only possess vocabularies, in which words are classed according to the subjects to which they refer. In Europe the Ethiopian language was almost unknown till Job Ludolf (or Leutholf), assisted by a native of the country, made himself master of it. His first attempt at an Ethiopic dictionary and grammar was published at London, in 1661, in 4to; a much improved and enlarged edition of both works appeared at Frankfort in 1702. Since the publication of these works, little progress has been made in our knowledge of the Ethiopian language; to them therefore we refer such of our readers as may wish for further information on the subject.

ETHIOPS, a term now obsolete, but formerly used by the old chemists to denote various dark-coloured metallic preparations; as *Ethiops Martialis*, which is black oxide of iron; *Ethiops Mineralis*, which is a black mixture of mercury and sulphur, &c.

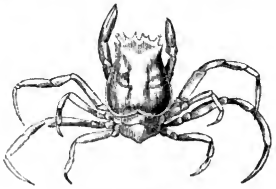
ETHULE. [ETHEREUM.]

ETHU'SA, a genus of brachyurous crustaceans (Tribe *Dorippians*), established by M. Roux at the expense of the genus *Dorippe* of Fabricius and other naturalists.

M. Milne Edwards observes that this genus is easily distinguished from *Dorippe* by the conformation of the apertures leading to the respiratory cavity, which here present the normal disposition.

Carapace, nearly quadrilateral, but rather longer than it is wide, and very much flattened; *front* large, *orbits* directed forwards, very incomplete; *eyes* carried on a rather long and very projecting peduncle; they pass beyond the external angle of the carapace, and are not retractile. The *internal antennæ* are bent back (se reploient) forwards, in fossettes placed under the front; the *external antennæ* are rather long; their first joint is cylindrical, and separates the antennary fossette from the orbit; the third is longer than the second. The buccal frame (*cadre buccal*) is triangular, and reaches to the border of the antennary fossettes; the *jaw-feet* are much shorter, and leave naked the anterior portion of the jaw-feet of the first pair, which complete forwards the canal of the respiratory cavity; the third joint of the external jaw feet is shorter than the second, nearly oval, sharply truncated forwards, and articulated with the following joint by the middle of its anterior border. The *Pterygostomian regions* are nearly quadrilateral, and are not prolonged between the base of the external jaw-foot and of the first thoracic foot, as in the Dorippes. The *Sternal Plastron* is oval. The anterior feet are short and slender in both sexes; in bending they form a double elbow, as in *Homola*. The succeeding feet are long, especially those of the third pair; those of the fourth pair are, on the contrary, extremely short, and inserted below the preceding; finally, the posterior feet, longer than the fourth pair, are inserted above and in front of them, and, like them, are terminated by a very short, hooked, and subcheliform tarsus. The *abdomen* in the male has seven distinct joints; in the female it has only five: the two first rings are directed backwards and on the same plane with the carapace.

Example, *Ethusa Mascarone* (Roux), *Cancer Mascarone*, Herbst.



Ethusa Mascarone

ETIENNE. [STEPHENS.]

ETIENNE, ST., a town in France, in the department of Loire. It is on the left or south-west bank of the Furand, a tributary of the Loire, 255 miles south-south-east of Paris in a straight line, or 317 miles by the road through Fontainebleau, Nemours, Montargis, Briare, Nevers, Moulins, Roanne, and Montbrison; or 318 miles by the road through Melun, Sens, Joigny, Auxerre, Avallon, Autun, Châlons sur Saône, Macon, and Lyon; from which last town it is distant 33 miles. It is in 45° 26′ N. lat., and 4° 23′ E. long.

St. Etienne is of comparatively modern origin. In the troubled reign of Charles VII. the townspeople obtained permission to inclose their town with walls: this was granted A.D. 1444, but the space inclosed is said to be only a tenth of that which St. Etienne now covers. The town was then called Furania: it takes its modern name from St. Etienne, a bishop of Lyon, at the beginning of the sixteenth century. The particulars which follow are chiefly from the 'Itinéraire Descriptif' of Vaysse de Villiers, Paris, A.D. 1816, corrected by some later though less ample authorities.

The site of the town may be distinguished at a distance by a dense cloud of coal-smoke. It is situated in the midst of a coal-field, and coal is the only fuel employed in the various manufactories and workshops. The town is, especially the outskirts, very dirty; in summer the streets are dusty, in winter muddy, and when it rains the black dust, washed by the rain from the roofs, converts the streams that fall from the gutters into little better than ink. The houses, both in the centre and outskirts of the town, are built of a coarse-grained grey sandstone (un gres gris à gros grains), sometimes squared, at other times unhewn, the colour of which adds to the sombre character of the place, and deprives the town of that handsome appearance which its wide and tolerably straight streets and well-built houses would otherwise give to it. The centre of the town is occupied by a large and handsome though irregularly-shaped open space or 'place,' in the middle of which is a fountain adorned with a small obelisk. From this 'place' opens a new street running above half a mile in a straight line in the direction of Roanne, and terminating in the only promenade which the town possesses: the road continues in the same line for two or three miles to the village of St. Priest, where the ruins of a Gothic castle on a hill terminate the view. There are baths, a theatre, and a town-hall; the last building is handsome.

The population of St. Etienne, in 1832, was 33,064; including the neighbourhood it may be calculated at more than 50,000. Its increase of late years has been very great. The town owes its prosperity to its situation in the coal district, which not only furnishes the inhabitants of the neighbourhood with a considerable article of export (for much coal is sent to Paris), but enables the townspeople to carry on their various manufactures. The coal is abundant and of good quality; the colliers belong rather to the neighbourhood than to the town itself. The inhabitants of the town are employed either in the manufacture of firearms (which are made here to a far greater extent than in any town of France), knives, locks, and other hardwares, or in the weaving of ribands, in which it is also pre-eminent. Whole families devote themselves to each kind of manufacture: the women work in the same factory with the men, and sometimes share with them the most laborious parts of their task. There were, a very few years since, a royal manufactory of fire-arms, forty manufactories of arms of all kinds, ten of cutlery, forty-five of hardwares, and one hundred and fifty of ribands and velvet. The waters of the Furand, which is but a small brook, are well calculated for tempering iron and steel, and also for dyeing. A railroad, more than 34 miles long, connects St. Étienne with Lyon: this work has been carried on in spite of great difficulties; hard rocks have been cut through and hollows filled up: there is a tunnel through a mountain near St. Etienne. As many as 1800 carriages are said to pass daily between the towns: stone is quarried near St. Etienne.

St. Etienne has a high school, a school for miners, a deaf and dumb school, a course of instruction in geometry and mechanics, applied to the arts, a society of agriculture and trade, and a public library.

It is the capital of an arrondissement, containing in 1832 a population of 149,189: the arrondissement is small, but there are in it several towns which are engaged in various branches of trade, similar to those carried on at St. Etienne; Chambon and Firmini, where nails and ribands are made; St. Chamond, where ribands are manufactured; and Rive de Gier, where coal is dug and iron cast. A late return assigned to the arrondissement 47,750 workmen of all kinds; of whom 3000 were colliers, 2400 engaged in iron and steel works, 3800 in manufacturing cutlery and hardwares, 2800 in making fire-arms or weapons for war or the sports of the field, 3000 in making nails, 1800 in glass works, 2900 in preparing silk, and 27,500 in the manufacture of ribands. The value of the raw materials on which these workmen were employed was estimated at 36,885,000 francs, or about 1,500,000*l.*; and it was considered that this value was doubled by the various processes of manufacture.

Before the Revolution, St. Etienne had several relgious houses.

ETI'SUS, a genus of brachyurous crustaceans (Cancerians of M. Milne Edwards).

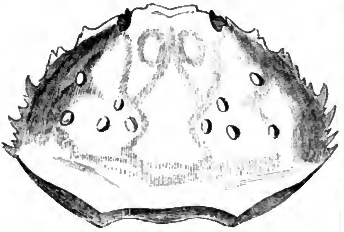
Carapace less oval and wide than in most of the Arched Cancerians (Cancériens arqués). The front is large, lamellar, and divided on the mesial line by a fissure, as in the *Xanthi;* but the two large and truncated lobes which form the principal part are separated by a deep notch of the anterior and superior angle of the orbit, which is rounded and projecting; the latero-anterior borders of the carapace are strongly toothed. The *Internal Antennæ* are bent back nearly longitudinally, and the basilary joint of the *External Antennæ*, which is very large, unites with the front, and presents on the external side a prolongation which fills the hiatus of the internal orbital angle; finally, the moveable stem of these antennæ, which is very short, is inserted completely out of this hiatus, below the front and nearer to the antennary fossette than to the orbit. The external *jaw-feet* present nothing remarkable; the *feet* of the first pair are rather large, and the *chelæ*, which are much enlarged and rounded at the end, are deeply hollowed into a spoon-shape.

M. Milne Edwards, who gives the above description, divides this small group, which he considers as forming the passage between the *Xanthi* and *Platycarcini*, into the two following sections.

a.

Carapace scarcely knobbed above.

Example, *Etisus dentatus*. Length three or four inches; colour reddish. Locality, the Indian Archipelago.



Etisus dentatus.

β.

Carapace covered with knobs, separated by deep furrows

Example, *Etisus anaglyptus;* length about an inch and a half; colour whitish? Locality, Australasia.

ETNA. [Ætna.]

ETON. [Buckinghamshire.]

ETRU'RIA was the name given by the antient Romans to a region of Italy extending in their time from the river Macra to the Tiber, and from the Apennines to the Tyrrhenian Sea, the inhabitants of which they called Tusci, and at a later time Etrusci. The natives of Etruria however called themselves Rasena. The Greeks called them Tyrrheni, confounding them, according to the opinion of some critics, with the Tyrrhenian Pelasgi, who had occupied the western coast of Italy at a more remote date, and who being driven away by the Umbri, the Etruscans, and other Italian nations, wandered back to the Grecian islands and coasts, where they became known as pirates. But the traditions of these early migrations into and from the Italian peninsula are so extremely obscure, the statements of antient writers concerning them are so conflicting and perplexing, that the investigation is become a real labyrinth, and we can only refer inquisitive readers to Niebuhr's *History of Rome*, i., p. 1—145, and to the different systems maintained by several Italian writers, and especially by Micali in the last and much improved edition of his work, *Storia degli Antichi Popoli Italiani*, 3 vols., with an Atlas, 1832, in which he examines and combats several of Niebuhr's positions. Leaving aside the question of the origin of the Tusci or Etrusci, we find this people several centuries before the time assigned for the building of Rome settled in Italy, both north and south of the Apennines, in the plains of the Po, and on the banks of the Arno. They had conquered a great part of this vast tract of country from the Umbri, one of the oldest Italian people of which history has preserved the name. The Etruscans are said by Pliny the Elder (iii. 14) to have conquered 300 towns or villages belonging to the Umbri, who, after their subjugation, appear to have become in a great measure incorporated with the conquerors, who thus extended their dominions across the centre of the Peninsula from the Adriatic to the Mediterranean. Cupra maritima, now Grottamare, in the territory of Fermo, on the Adriatic coast, and Cupra montana, which stood near the banks of Æsis, not far from the present village of Masaccio, in the province of Ancona, were Etruscan colonies. Of the great plain of the Po, the Etrusci occupied the central part, from the left bank of the Ticinus and the right bank of the Trebbia, which separated them from the Ligurians on that side to the Athesis or Adige, which divided them from the Veneti, who remained in possession of the coast of the Adriatic as far as the mouths of the Po. (Livy, v. 33.) South of the Po the Ligurians retained possession of the highlands of the Apennines as far eastward as the sources of the Arno, which river formed at first the boundary between them and the Etruscans, who afterwards extended to the Macra, where they built Luna. The Etruscan towns in the plain of the Po are said to have been twelve, like those of Middle Etruria, south of the Apennines; but Mantua and Felsina (Bologna) were the only two remaining in the time of Pliny. The others had been destroyed by the Gauls long before. The Etruscan origin of Adria has been disputed. For the names of the other Etruscan towns north of the Apennines see Mazzocchi *Catalogo alfabetico de' Luoghi compresi nell' Etruria circumpadana.*

Towards the south, Etruria is known to have extended as far as the Tiber previous to the existence of Rome. But the Etruscans at one period went also far beyond that river. There was a tradition of their having conquered the Volsci, who afterwards recovered their independence. (Servius in *Æneid.* xi. 567.) Their regular settlement in Campania, where they are said to have also built twelve towns, was however of a later date, probably in the second or third century of Rome, when the Etruscan power, south of the Apennines, was at its height, and after they had lost by the Gallic irruption all that they possessed in the plains of the Po. The Etruscan colony founded at Capua would fall, according to Cato's statement, about the year 283 of Rome. The war of the Etruscans against Cumæ, in which they were defeated by the Syracusans in a naval fight, had happened some time before. According to this calculation the Tuscan dominion in Campania did not continue long, as the country was conquered by the Samnites about the year 330 of Rome. The extent of the Etruscan possessions in

Campania, and the number of towns which they built or colonized there, is a matter of much doubt. (Niebuhr, vol. i., *On the Opicans and Ausonians*, and, for a conflicting opinion, Micali, vol. i., ch. 7.)

The permanent power of the Etruscans lay in Etruria Proper, or Etruria Media as it has also been called, which corresponds in great measure to the present Tuscany, with the addition of that part of the papal state which lies on the right bank of the Tiber. For a geographical description of the country we refer to TUSCANY. They had twelve principal cities or states, all situated between the Arno and the Tiber, for the country between the Arno and the Macra was annexed at a later period by conquest over the Ligurians. Each state formed an independent community, the twelve being bound together by a sort of loose confederacy: at times indeed very loose, for we find repeatedly one state going to war without the assistance or interference of the rest. Of these twelve towns, eight are mentioned by Livy (xxviii. 45) on the occasion of his enumerating the allies who volunteered to assist in equipping Scipio's armament against Carthage: they are Cære, Tarquinii, Populonium, Volaterræ, Arretium, Perusia, Clusium, and Rusellæ. To these must be added Veii and Vulsinii, which had been previously conquered by the Romans. The two remaining may be selected from among Cortona, Cosa, Capena, and Fesulæ. It must be observed that long before that time some of the old cities of Etruria had dwindled away, such as Vetulonia, which had disappeared before the historical age of Rome, and of which even the site is not positively ascertained. Populonium, which was originally a colony from Volaterræ, probably took the place of Vetulonia among the twelve.

Antiquities.—We may here point out those towns in which Etruscan antiquities are still found, and thus convey some general idea of what we know of the state of the arts among that people:—

1. Arretium [AREZZO] was destroyed by Sulla, and no traces of Etruscan construction now exist. The remains of the amphitheatre are of the Roman period, when the town was restored by Mæcenas. But there are numerous Etruscan inscriptions, vases, coins, and other remains in the Museum Bacci at Arezzo, and a quantity of the red embossed pottery, 'Aretina vasa,' for which Arezzo was renowned of old, and of which enormous heaps of fragments have been found in the neighbourhood. Some of the figures are most delicately formed, and may be seen in the plates to Inghirami's work: *Monumenti Etruschi o di Etrusco Nome.* Some of the moulds have also been found. 2. Perusia [PERUGIA] is said by Cato, quoted by Servius, x. 201, to have been built by the Sarsinates, an Umbrian people, before the Etruscan time. It has no remains of Etruscan structures, except the sepulchral building called la Torre di San Manno, about a mile outside of the walls, with an arched vault of large polished stones, bearing an Etruscan inscription in three lines, which is styled by Maffei 'the queen of inscriptions,' and the gate, vulgarly called Arco di Augusto, which however is believed to be of Etruscan construction. (Orsini, *Dissertazione sull' Arco Etrusco di Perugia*, 1807.) A rich collection of Etruscan antiquities however is found in the Gabinetto Archeologico, with about 80 inscriptions, one of which consists of 45 lines, the fragments of an Etruscan quadriga, described by Inghirami (vol. vi., p. 360), and some handsome painted vases, bronzes, &c. (Vermiglioli, *Saggio dei Bronzi Etruschi trovati nell' Agro Perugino*, 4to., 1813.) 3. Cortona, the antient Corytum, retains unchanged the original circuit of its Etruscan walls, though repaired in several places. (*Pianta Topografica di Cortona* in Micali's *Atlas* annexed to his *Storia dei Popoli Italiani.*) The walls are built of enormous polygonal stones, well fitted together, without cement. There are other remains of Etruscan construction, among others the substructure of the palace Laparelli. An Etruscan tomb, called by the natives Grotta di Pittagora, is seen in one of the suburbs of the town. [CORTONA.] Other hypogea have been discovered in the country around, from which the bronzes and vases have been transferred to the town museum, but they belong mostly to the Roman period. (Repetti, *Dizionario Geografico Storico della Toscana*, 1835.) The Accademia Etrusca, established in 1726, whose president is called Lucumo, has published 10 vols. 4to. of Memoirs. 4. Fesulæ, now Fiesole, one of the oldest Etruscan cities, though perhaps not one of the twelve metropolitan ones. Its massive walls are its only Etruscan structure now existing; the theatre and other remains are of the Roman time, probably of the date of Sulla's colony. (See plan and views of Fiesole, plates 5, 11, and 12 of Micali's work, and also Bandini, *Lettere Fiesolane* and *Itinerario di una Giornata d' Istruzione à Fiesole*, 1814.) 5. Clusium, Camars in antient Etruscan, now called Chiusi, the country of Porsenna, built on a hill above the valley of the Chiana, was one of the most distinguished Etruscan cities. Of its old walls there remains nothing but a fragment built of large polygonal stones behind the choir of the cathedral The present town is entirely modern. There are very rich collections of antiquities, urns, vases of old Etruscan manufacture, single coloured, and later ones, or Campano Etruscan as they have been styled, with figures of one or two colours different from the ground, gold ornaments, engraved stones, &c., in the houses Paolozzi, Sozzi, and Casuccini. The last mentioned is the richest, and a description of it by Valeriani, with above 200 plates, has been published under the title of *Museo Etrusco Chiusino*, 2 vols. 4to., 1833. 6. Volaterræ, Volterra, on a hill about twenty miles north-west of Siena, was about four miles in circumference: many parts of its walls as well as one of the gates, called Porta dell' Arco, are of old Etruscan construction, being built of large rectangular stones generally six feet in length, though some are much larger, set in horizontal layers without cement. In some places two of them alone, set side by side, form the thickness of the wall. Maffei considered the walls of Volterra as the best calculated to give a true impression of former Etruscan greatness. In the thermæ which were discovered by Guarnacci was found a mosaic, which is now in the city museum, together with numerous sepulchral monuments, statues, bassi rilievi, both in alabaster and sandstone, vases, pateræ, &c. On these monuments of the antient Etruscans we may, in some measure, read the history of their civilization and social economy, as we read those of Egypt on the monuments of that country, in default of written records. Guarnacci published a *Museum Antiquorum Monumentorum Etruscorum e Volaterranis Hypogeis Erutorum, cum Observationibus, A. F. Gori*, fol., 1744; see also Giorgi, *Dissertazione Accademica sopra un Monumento Etrusco ritrovato negli Antichi Suburbani di Volterra, l'anno* 1746, 4to., Firenze, 1752. But one of the most extensive and satisfactory works on Etruscan antiquities is the recent one of Inghirami already mentioned, *Monumenti Etruschi o di Etrusco Nome*, 5 vols. 4to. of text, with 6 vols. of plates, and 1 vol. index. Inghirami's collections represent chiefly objects found in the territory of Volterra, in the numerous hypogei discovered there; and they are intended to illustrate the state of the three fine arts among the Etruscans, for which purpose they are arranged in six classes. I. Funeral urns and cinerary vases in alabaster or sandstone, with sculptures. II. Pateræ, which Inghirami calls 'specchi mistici, or mystical mirrors, with specimens of Etruscan linear drawing. III. Bronzes of cast or chiselled workmanship. IV Specimens of Etruscan architecture, taken from their hypogei or sepulchral monuments, some of which are from Tarquinii, and other parts of antient Etruria. V Vases, some such as those of Arezzo, all of one colour, either red or bluish black, with embossed figures, others with figures of different colour from the ground. VI. A collection of monuments, most of them not Etruscan, but which serve to compare with, and form a contrast to, those of Etruscan art. Inghirami has not included in his collection the inscriptions, cameos, gems, coins, lamps, &c., which may be found in other works, and especially in Lanzi, *Saggio di Lingua Etrusca*, 3 vols., 8vo., Rome, 1789, a work much more valuable for the quantity and variety of monuments which it illustrates, than for its hypothetical and now generally rejected system of Etruscan grammar and etymology.

Among the other Etruscan towns which are now destroyed, and of which nothing but ruins remain, may be mentioned—1. Cosa or Cossa, called Ansedonia in the middle ages, on a hill east of the lake of Orbetello, the walls of which are in tolerably good preservation, with several towers, and two gates. See *Pianta Topografica di Cossa e suoi Contorni* in Micali's *Plates*. 2. Populonium, near Porto Baratto, on the coast north of Piombino. The only remains are part of the walls, which are standing. Micali has given a plan of Populonia. 3. Rusellæ, the ruins of which are on a hill above the plain of Grosseto, about three miles from Batiguano, and near the left bank of the Ombrone; the circuit of its walls, which consist of large rectangular blocks, is about two miles. Micali has given a plan of this also. 4. Saturnia, called also Aurinia, on the left bank of the river Albegna, near the foot of the mountain of Santa Fiora, and on the borders of the Papal States, shows some fragments of its walls built of polygonal stones. 5. Tarquinii, the site of which is on the left bank of the Marta, near Corneto, exhibits no remains above ground, but the great number of hypogei, forming a vast necropolis in the neighbourhood, give an idea of its former importance. They are excavated in the rock, which is of volcanic formation; some of the chambers are square, fifty feet on each side, and about six feet high; the ceiling is carved into square compartments, and is supported by square pillars of the rock itself; the sides are adorned with stuccoes and paintings, some of them allegorical of the state of the soul after death, others representing funeral processions, games, banquets, &c. A number of urns, vases, mosaics, arms, and some skeletons, have been found within these sepulchres, which may be said almost to rival, for the interest they excite, those discovered in Egypt by Belzoni. The first Tarquinian hypogei were discovered about 1780, by Cardinal Garampi, and representations of them are given in D'Agincourt's work, vol. iv., plates 10 and 11. But the greatest discoveries have been made of late years, engravings of which are given in Inghirami's and Micali's works.

Farther inland, about ten miles north of Tarquinii, near the village of Canino, Lucien Bonaparte has discovered a vast quantity of similar remains of Etruscan art, of which he has formed a valuable museum at Canino, and of which he has published a description. (*Museum Etrusque de Lucien Bonaparte, Prince de Canino*, in parts, 1829.) These discoveries have revived the question between the partizans of an original Etruscan civilization, and those who derive it from the Greeks. Probably the question might be solved by admitting various epochs of Etruscan art, one anterior and the other posterior to the intercourse which existed between the Etruscans and the Greeks about the second or third century of Rome. Even in the monuments of Tarquinii and Canino two styles are discernible. Other proprietors in the same district have made further discoveries. On the right bank of the river Fiora, in the district of Montalto, extensive remains seem to mark the site of the Etruscan Vulcia, which was conquered by the Romans at the same time as Vulsinii, about the year 473 of Rome. Here also a vast necropolis has been found, with a quantity of vases, paintings, and other antiquities. At a place called la Cucumella, a group of buildings of large rectangular stones, consisting of cells and two towers, one square and the other circular, above thirty feet high, have been found buried in an artificial mound or barrow. At the top of the towers were winged sphinxes in stone, and below some lions and griffins. Micali, plate 62, gives the plan and views of these monuments, which are one of the most curious Etruscan discoveries hitherto made. In 1832 only one-third part of the mound had been dug up, so that further structures may still be found.

The site of Cære or Agylla lay near the village of Cervetere or Cervetri, between Rome and Civitavecchia. Its port, Pyrgos, was near where the coast-tower of Santa Severa is now. No remains of either have been discovered. The antient Vulsinii has been likewise completely destroyed [Bolsena]. The site of Veii has been long a subject of dispute, but it seems now ascertained to be on a steep hill, at the foot of which two streams unite, and form the Cremera which falls into the Tiber. This hill is about a mile and a half east of the hamlet of La Storta, the last stage on the northern road to Rome. The farm called Isola Farnese occupies part of the site of antient Veii. The remains which have been discovered on the spot since 1810 belong to the Roman colony sent there by Livia. The walls of Falerii, which still exist in a desert spot near Civita Castellana, are not always numbered among the Etruscan remains, as that town is said to have been built before the Etruscan conquest. The amphitheatre cut in the rock at Sutri is attributed to the Etruscans.

History and Social State.—Varro mentions the Etruscan annals existing in his time as having been written in the eighth age of Etruria, which is supposed to correspond to the fourth century of Rome. Two Latin writers, Valerius Flaccus and Cæcina, the latter a native of Volaterræ, wrote histories of Etruria, and the emperor Claudius wrote in Greek his Tyrrhenicon or History of Etruria, in twenty books; but all these are lost, as well as the books of Dionysius, in which he treated more particularly of the Etruscans. The little we know therefore of the national history of Etruria previous to their wars with Rome, is gathered from fragments and incidental notices in Greek and Roman writers. The Etruscan power appears to have been at its height in the third century of Rome, about the beginning of the fifth century before Christ. Their dominion extended over the country of the Umbrians to the Adriatic on one side, and to the Gulf of Luni on the other. After Porsenna had dictated a humiliating peace to Rome, the Tuscans overran Latium, and conquered Campania. By sea they rivalled the Carthaginians, with whom they at first allied themselves against the Phocæans, who had settled at Aleria in Corsica, but afterwards the allies quarrelled together for the possession of the same island. They fought against the Cumans and Syracusans united about the year 279 of Rome, and were defeated. Half a century later they lost Campania to the Samnites, after which the Romans began to encroach on that part of Etruria which lay between Mount Ciminus and the Tiber. Veii was the first Etruscan city that fell by the Roman arms; Falerii and Fescennia next; Sutrium submitted: Cære and Tarquinii became the allies of Rome; and the Ciminus ridge with its haunted forests formed the boundary between Rome and Etruria. The Roman arms halted nearly a century longer before they passed that boundary. The total defeat of the confederated Etruscan forces at the lake Vadimonis, in the year 444 of Rome, opened to the Romans the access into the Etruria Transcimina. Vulsinii and Vulcia fell before the slow but sure progress of their arms; the other cities, such as Arretium, Perusia, Volaterræ, Populonium, disguised their submission under the name of allies, but Etruscan independence was gone. This appears to have been a period of general corruption of manners, when all national spirit and independence became extinct, but wealth, luxury, and internal peace remained, and sensual pleasures were the chief occupation of the people; and this was also the time when the earlier Roman writers who speak of the Etruscans, such as Plautus, Cato, and Varro, became acquainted with that people. The wars and proscriptions of Sulla gave a final blow to the existence of the Etruscans as a nation; their towns were destroyed, and their lands were given to military colonists. The proscriptions of Octavianus after the battle of Perusia, completed the desolation of Etruria. The language itself gradually became obliterated among the people, and was only known to the priests, with whom it became finally extinct, probably by the spreading of Christianity in the fourth century of our æra. It is now acknowledged by Micali, Orioli, Inghirami, as well as by Niebuhr, that the Etruscan language is lost, and that its pretended affinity to Greek, as maintained by Lanzi and others, has no foundation.

With regard to the political and social institutions of the Etruscans, we cannot do better than refer to Micali's work (vol. ii., chapters 21 to 24), in which he gives a fair and tolerably well authenticated sketch of their government, their religion and morality, and their domestic manners. We ought to bear in mind that all the accounts we have of the Etruscans were written after their subjugation to Rome, and that a nation which had a political existence of eight or ten centuries must have undergone considerable changes in its manners and institutions. Each of the twelve principal cities of Etruria ruled over the population of its respective district, which was perhaps originally a conquered race. In the city itself were two orders, the hereditary families of patricians or senators, and the commonalty. Political and religious power were in the hands of the former, who elected from their own body the annual magistrate called Lucumo. We know that the lucumo at times contrived, especially in times of war, to protract his term of office, and sometimes to retain it for life; but all attempts to make it hereditary appear to have failed. The patrician and hierarchal order appears to have maintained to the last its sway among the Etruscans, the arts of divination, of which it was in exclusive possession, being a powerful instrument in its hands, among a people so much fashioned to religious observances and rites, for repressing all attempts of the commonalty. Accordingly we hear of no struggles of the kind in Etruria, as at Rome; but we hear of revolts of slaves against their masters, as in the case of Vulsinii, for the Etruscans had numerous slaves. Their sway over the people whom they conquered, such as the Umbri, appears to have been mild: they did not destroy their towns, but surrounded them with walls, or built new ones; they taught them agriculture and other arts, they instructed them in religion and they are acknowledged to have been the civilizers of a great part of Italy. Rome derived its earlier civilization from Etruria. The art of fortifying towns with walls and towers is attributed to them. They wrought the iron which they drew from the island of Elba, they cast bronze, and they made silver vases and gold ornaments: they engraved on stone, and sculptures of primitive art are found on their oldest monuments. They are supposed by many to have been the inventors of the arch at a very remote period; Tuscan masons employed it in constructing the Cloaca Maxima of Rome. They understood hydraulics, especially the art of filling up marshes by diverting into them the course of muddy streams, which is still practised with great success in Tuscany under the name of 'colmate.' The invention of the termini, or stones fixing the limits of property, is attributed to them. The rights of property, those of paternal authority, of testamentary will, of connubia or marriages, were all fixed by law and consecrated by religious rites. Their laws concerning debtors appear to have been more humane than those of Rome, if we are to trust to a passage of Heraclides in which he speaks of the Tyrrhenians.

The Etruscans were fond of good living and of sumptuous banquets, and they are called gluttons, fat, and corpulent, by the Roman satirists. Virgil (xi. 735) accuses them of being given to all kinds of sensual pleasures. Their women seem to have had no great reputation for chastity (Plautus, *Cistell.* 2. 3. 20, and Horace, iii. *Ode* x. 11); yet we find the female sex in higher honour among them than among most nations of antiquity. The women reclined at table on the same triclinia with the men, as appears by their monuments. Their funerals were pompous, and accompanied by athletic games, but the combats of gladiators appear to have been of a late introduction, and it is believed that they originated in Campania, and from thence spread over the rest of Italy about the fifth century of Rome. From some sculptures found on their monuments it would appear as if human sacrifices were at one time in practice among them unless these representations be symbolical, as some suppose The mythology of the Etruscans was partly of native, partly of oriental invention. They believed in two principles, a good and an evil one, each having its respective agents or genii, and their paintings and sculptures are often representative of the perpetual struggle between the two. Twelve gods, six male and six female, at the head of which was Jupiter, formed the upper hierarchy; other inferior divinities presided over the various elements and phenomena of this earth, as well as over the occupations and domestic comforts of man. Cicero speaks very favourably of Etruscan theosophy, saying that they referred every thing to God, and that all their religious institutions were studiously calculated for the prosperity and security of the state. For further particulars on these subjects, see Micali, ch. 22 and 23, Bossi, *Storia d'Italia*, lib. i., chap. 6, and Müller, *die Etrusker*; Dempster, *De Etruria Regali*, with the continuation by Passeri, is also a work of much information, apart from the system and favourite hypothesis of the writers. These, with the other works already mentioned, form the best Etruscan library that can be collected.

ETRUSCAN ARCHITECTURE. We have no remains of Etruscan temples or other buildings, but we can form some idea of their style from their hypogei or sepulchral monuments, and also from some of their cinerary urns which represent a temple. (Micali, plate 72.) But the monuments which serve perhaps to throw most light on this subject are those discovered at Castel d'Asso, the Axia of Cicero (*Pro Cæcina*, 7), five miles south-west of Viterbo, where the rock forming one side of the valley facing the old castle is sculptured all along for more than a mile in the shape of so many fronts or façades of sepulchral monuments, the vaults themselves being excavated underneath. Similar sculptures on the rock are found at Norchia, about 15 miles south-west of Viterbo. (See Inghirami's *plates*.) These monuments, which represent a primitive style of Etruscan building, strike by their resemblance to the Egyptian style in its ruder and simpler form. Plate 62 of Micali represents a monument between Monte Romano and Corneto, with projecting architrave and lateral pillars. Vitruvius, although he lived in an age when Etruscan art had undergone considerable alteration, characterizes their buildings as 'baricephalæ, humiles, latæ,' low, wide, with heavy top ornaments. And this seems to be in keeping with the character of the people, grave, and more fond of internal comfort than of external show. What is now called the Tuscan or Tuscanic order appears to have been a sort of rude Doric, which they probably adopted from the Greeks. [Civil Architecture.] Vitruvius (iv. 7) gives a description of their temples with three cellæ, but they appear to have been neither large nor splendid: the ornaments, bronzes, and plastic figures appear to have been more elaborate than the structures themselves. In the time of Vitruvius the houses of the wealthy Etruscans had external porticoes or vestibula, in which the crowd of servants and clients remained in waiting. The Atrium is also supposed by some to be of Etruscan invention. [Atrium.] If not the inventors of the arch, the Etruscans were certainly acquainted with it at a very early period: it is found in their sepulchral monuments, in their gates, and they used it in constructing the Roman cloacæ. Another cloaca of similar construction has been discovered near Tarquinii. Their skill in fortifying towns with walls and towers and ditches, and leaving an open space around called Pomœrium, is attested by the Roman writers, and by the inspection of the remains of their walls. The use of large polygonal stones in the construction of walls was common to other Italian people as well as the Etruscans and primitive Greeks; and the name of Pelasgic, which has been given to these walls, appears to be incorrect, as it does not distinguish any particular class of these walls or the walls of any particular locality from other walls of the same kind. If by this term Pelasgic it is meant to assert that all such walls are really of Pelasgic origin, this is more than can be proved or presumed. In most instances, however, the Etruscans appear to have used rectangular stones, ranged in horizontal layers, and uniformly without any cement. For more complete information of what is known of Etruscan architecture, we must refer to Micali, ch. xxv., Inghirami's *text* and *plates*, *Series* IV., and Orioli, *Dei Sepolcrali Edifizi dell' Etruria Media*, also quoted by Inghirami.

ETRUSCANS. [Etruria.]

ETSCH. [Adige.]

ETYMOLOGY. [Language.]

ETYMOLO'GICUM MAGNUM (τὸ μέγα ἐτυμολογικόν) an important vocabulary of the Greek language, of which the author is unknown. Some suppose it was written by a grammarian of the name of Magnus. The idea that it was compiled by Marcus Musurus, the first editor or the Calliergi, is disproved by the fact that this dictionary is referred to by Eustathius. Sylburg considers it as old as the tenth century: much older it certainly was not; for Theognotus, a writer of the ninth century, is quoted in it. The derivations in this work, like most of those attempted by the Greeks themselves, are based upon no principle, and though in some instances accidentally right, they are generally full of the wildest absurdities, as one might expect from the author being confined to mere guess-work. It is valuable however for containing a great many traditions with regard to the meanings of old or uncommon words, and it often enables the scholar to correct the errors of the corrupt but inestimable lexicon of Hesychius. The edition of Sylburg (1594) is very useful, and has an admirable index: the edition of the Etymologicum Magnum, by Schäfer, Lips., 1816. is a reprint of Sylburg's edition. The edition by Sturz, Lips., 1818, 4to., intitled Etymologicum Græcæ Linguæ Gudianum, &c., is founded on the Codex Gudianus, which is more complete than that on which the edition of Musurus and the others already enumerated are based.

EU, a town in France, in the department of Seine Inférieure, on the south-west bank of the little river Bresle, near its mouth. Eu is 91 miles in a direct line N.N.W. of Paris.

In the middle ages Eu became a strong and flourishing place: but on the threat of a descent by the English it was burnt, in 1475, by order of Louis XI., and has never recovered the blow Dieppe and other neighbouring places profited by its downfal. Only the churches and a few houses that were overlooked escaped the general destruction. The massive ruins of the walls and towers yet remain.

Eu has several churches: the finest, that of Notre Dame, is large and of beautiful Gothic architecture. A crypt contains the monuments of the counts of Eu: these monuments were much damaged in the Revolution. A small church adjoining the High School, formerly the Jesuits' College, contains the monument of the duke of Guise, murdered at

Blois in 1588. There are two châteaux. Of one of these, built by a daughter of the duke of Penthièvre, afterwards duchess of Orléans, only half remains, the rest having been destroyed in the Revolution. The situation of the château is charming. the park has an avenue of fine beech trees. There is an hospital attended by the Sœurs de la Charité. The market-place is good. La Chausséo d'Eu is a suburb of Eu, on the opposite bank of the Bresle. Tréport, at the mouth of the river, is the port of Eu: it has a church singularly situated on the extreme verge of a lofty and almost perpendicular cliff, and a projecting doorway of beautiful Gothic architecture.

The population of Eu in 1832 was 3356, that of Tréport 2061, together 5417: the population of the respective communes was 3543 and 2267, together 5810. The population of La Chaussée d'Eu is not given in our authorities. The manufactures of Eu are linseed oil, soap, locks and other ironmongery, leather, cotton yarn, glass, sail-cloth, linen and lace. Eu serves as a mart for the corn of the department of Somme, which is imported into that of Seine Inférieure. There is a school of mutual instruction, which was established by the King of the French when duke of Orléans. There is a tribunal de commerce or court for the decision of mercantile disputes.

EUBŒA (**Εὔβοια**), now called Negropont, is an island of the Mediterranean, lying along the coasts of Attica and Bœotia, from which it is separated by the Euripus, a very narrow channel, over which a bridge has been thrown, connecting the island with the main-land. It is 90 miles in length in a north-west direction, and 30 miles in extreme breadth; but in one part, between Aliveri Bay and Port Petries, it is scarcely 4 miles across from shore to shore. The only towns are Egripos and Karystos; the former situated where the island approaches nearest to the main, and the latter at the southern extremity of the island, at the bottom of a bay bearing the same name.

The island generally is elevated, and contains among its mountains some of the highest in this part of Europe. Mount Delphi rises on the eastern shore to the height of 7266 feet above the sea, and its summit is scarcely ever free from snow; Elias of Karystos, at the southern extremity, is 4748 feet high; Mount Khandhili, 4200 feet, and Telethrius, 3100 feet, are both on the western shore north of Egripos. The general formation of these mountains is grey limestone, with much clay slate.

It appears from the map constructed from Captain Copeland's recent survey, that the small peninsula to the north-west, which terminates in Cape Lithada, is mountainous, and contains one elevation, Mount Lithada, which rises to the height of 2837 feet above the sea. A little south of the point where this peninsula joins the mass of the island, and on the west coast opposite to Bœotia, is Mount Telethrius, with some hot springs near its base. From Telethrius the mountains spread out north-east to Cape Amoni, the most north-eastern point of the island, and eastward to the coast, filling the northern part of the island, and containing several elevations above 2000 feet. Along the northern coast of the island, opposite to Thessaly, and stretching at the base of this mountain group, is the fertile and extensive plain of Oreos, the antient Hestiæotis. South of Telethrius there is high land, with some interruptions, along the west coast as far as Cape Politika: within these limits is Mount Khandhili, near the coast, and another mountain 2694 feet high. Between Cape Politika and Egripos, and extending several miles inland, is the fertile plain of Egripos, bounded on the north and north-east by the high mountains which extend to the eastern coast. The centre of this mountain mass is Delphi, already mentioned, and it contains several other elevations which are between 4000 and 5000 feet. Between the mountains which we have described as occupying the north part of the island and the mass of which Delphi is the centre is the small plain of Mandhoudi on the east coast of the island. South of the narrow channel on which Egripos is situated there is a tract of low land along the Bay of Vathia, backed by the range of Mount Vathia (3821 feet), which appears to be separated by a depression from the group of Delphi, and forms part of the south-east boundary of the plain of Egripos. Farther south and near the west coast there is also the plain of Aliveri. The rest of the island south of Aliveri, along the west coast, and the whole of the eastern coast from the plain of Mandhoudi, appears to be mountainous. The southern extremity of the island is filled by the mass of Mount Elias (4748 feet), which presents to the Archipelago an iron-bound and dangerous coast.

To the southward the plains are generally cultivated with corn and olives, but those to the northward, called the Plains of Oreos, are more particularly devoted to the vine, from which a light red wine is made, which is the common beverage of the Greeks, and forms a staple article of trade. The wine is kept in pig-skins, well coated with resin, which communicates its unpleasant flavour to the contents, which otherwise would not be unpalatable. A deleterious ardent spirit is distilled from the husks of the grapes. Cotton is also planted more to the northward.

On the shores of the Bay of Oreos are some ruins on an eminence, apparently only a military post; a few huts now surround its base, but about two miles in the interior is a large village called Xero Chori, or dry village.

The island is not populous: it is conjectured to contain between 60,000 and 70,000 inhabitants, nearly all Greeks. The villages are few, and, as is the case every where in the Archipelago, built at some distance from the beach, generally on an elevation difficult of access. This precaution has been taken on account of the numerous depredations of the pirates, who were accustomed to land, sack a village, and embark before morning, so that unless the place were tolerably large and populous, there was no safety for life or property.

The passage between Thessaly and Eubœa, called the Trikiri Channel, from the town of that name at the eastern entrance to the Gulf of Volo, is about 4 miles in average width; the narrowest part, which is towards the western extreme, is not quite 1¼ mile; the depth of water is regular, steep from both shores, and decreasing gradually from about 50 fathoms at the entrance to 30 towards the western end of the Negropont, off which lie some small rocky islands called Lithada Islands. Passing these islands, and turning to the southward, is the Gulf of Talanda, so called from the town of that name on the Bœotian shore. A remarkable feature in this part of the channel is the amazing depth of water under Mount Telethrius, where, for about 12 or 15 miles, there is no bottom with 220 fathoms within half a mile of the shore; but from this point the water shoals gradually towards Egripos. Towards the north-west extremity of this shore there is a very safe and excellent harbour, now called Port Ghialtra (formerly Port Kalos). There are two villages on its shores, Ghialtra to the westward, and Elypsos to the eastward · near the latter are some antient remains and beautifully sculptured fragments of white marble.

At Cape Therma, the eastern point of the bay, there are hot springs (already mentioned) of the same kind as, but more abundant than, those of Thermopylæ. The water rushes down in a copious stream into the sea, the vapour from which is visible for a considerable distance. Between this point and Egripos there are only three villages, Orovies, Glim, and Politika, all small; but at each of them there are Venetian remains.

In the southern part of the channel there are many islands along the Eubœan shore, which offer good anchorage, more especially among the Petalion Islands, which abound in rabbits, but possess only one spring of fresh water. From Egripos to Karystos there are only two villages, Aliveri and Stura, in the bays called respectively from their names. The bed of this part of the channel is level, but compared with the northern part it is shallow; the general depth is from 35 to 40 fathoms.

The eastern side of Eubœa is a continuation of rocky coast, the high land descending precipitously to the shore with few interruptions of level ground, and this only, as already mentioned, towards the northern part of the island. In the bight between Capes Doro and Oetonia, it is an unbroken line of precipitous shore, in which it is scarcely possible to find a ravine sufficiently wide to haul a boat up. Fragments of wreck are found at the height of eighty feet perpendicular, washed up by the heavy sea which a north-east wind throws into this bay. These winds, which always blow very strong, are called by the Greeks 'meltem,' probably a corruption of 'mal tiempo.' In addition to this, the Dardanelles current, preserving the course communicated to it by the direction of that strait, sets strong to the south-west into this bay, and renders it a most dangerous coast no vessel once embayed here can escape destruction. The current being deflected to the southward sweeps round Cape Doro, frequently at the rate of three miles an hour

Port Petries is the only refuge which this coast offers, and so little has hitherto been known of this shore that even this shelter has only recently been discovered. The village of Koumi, in the bay of that name, is populous, and being celebrated for its wine, has considerable trade in that article by the small caïques, which however are always obliged to be hauled up on the beach for safety. Along the whole extent of this coast, which is upwards of 100 miles, there are only five or six villages near the shore.

The small number of Turks resident in Eubœa left the island on its being surrendered for the purpose of forming an integral part of the Greek kingdom, of which it will not be the least valuable portion. The mountains are said to contain copper, and the marble quarries near Karystos have long been famous. (Strabo, p. 446.) The soil, favoured by the diversities of climate which such a variety of elevation affords, is capable of yielding the productions of tropical as well as of more northern regions, and of supporting an infinitely larger population than now occupies the land. The island abounds in sheep of an excellent breed; but bullocks are scarce, and bred principally for agricultural purposes. In the mountains are abundance of wild boar and deer, and the plains are overrun with hares and rabbits. Among the trees are the olive, oak, fir, chestnut, walnut, mulberry, and oriental plane. In the whole island there is not a stream deserving the name of a river into which the smallest boat could enter, and the inhabitants generally supply themselves with water from wells.

On the summit of Mount Elias (the Oche of Strabo) are the remains of an antient temple, consisting of rude unornamented blocks of limestone, and columns of the same material.

The town of Egripos, the antient Chalcis, the chief town in the island, is in 38° 26′ N. lat., and 23° 37′ E. long., at that part of the island where it is separated from the coast of Bœotia by a narrow channel of only forty yards. It is a walled town, and further defended, where the walls are not washed by the Euripus, by a deep and wide dry ditch. The walls are turreted, slight, and built without regularity, and the numerous winged lions of St. Mark leave no doubt of their Venetian origin. The area enclosed is about 800 yards in length by about 500 in width, which was formerly inhabited exclusively by the Turks; the streets are very narrow, but the houses capacious. The town has several gates constructed with great intricacy; that leading over the Euripus is particularly tortuous, and well defended; the drawbridges have been replaced by frail fixed bridges of logs, to the great peril of passengers.

Another defence is the fort Karababa, on the main, which stands on an eminence about 130 feet high, commencing its rise immediately from the bridge; this may be deemed the citadel of the place, as it overlooks and commands the town. It is a very misshapen structure, of an oblong form, about 400 yards long, and 150 broad. The walls are in some places so low, that an active man might vault on them; they are similar to and coeval with the walls of the town.

Outside the town to the north is a suburb appropriated to trade, and inhabited (when the writer of this article visited the place) by the Greeks and Jews. It consists of one main street about 300 yards in length, from which minor streets branch off. The houses are very small, and the shops are chiefly coffee-houses, or contain general stores and articles of dress: the whole is enclosed in a stockade. There is no commerce except in supplies of fruit and vegetables, principally from Volo, distant about ninety miles to the north, which is all carried on in small boats. The surrounding country is flat and rich, but poorly cultivated. A subsoil of stiff clay offers materials for brick-making and potteries, which are already commenced on a small scale. The market is well supplied, especially with fish; beef is difficult to be procured, but mutton very plentiful; water is scarce, and procured chiefly from wells.

There are facilities for building vessels of large size, as the shore goes off suddenly into deep water; but the inhabitants have advanced no farther yet than the repairs, clumsily executed, of their small boats, which are built generally at some of the Greek islands. The forests on Mount Delphi of fir and oak (the latter of an inferior quality) would supply wood, which might with facility be brought to the town.

Immediately opposite Egripos the land rises suddenly to hills of considerable height, beyond which lie the plains of Thebes, which town is distant about 4 hours, or 12 miles.

The breadth of the Euripus is diminished by a rock in mid-channel, on which a fort is built, dividing it into two channels: that towards the main, though rather the broader is only practicable for small boats, as there is not more than three feet water at any time. Between the rock and the walls of Egripos is a distance of 33 feet, and the least depth at the highest water is 7 feet. It is here that the extraordinary tides take place for which the Euripus was formerly so noted: at times the water runs as much as eight miles an hour, with a fall under the bridge of about 1½ feet: but what is most singular, is the fact that vessels lying 150 yards from the bridge are not in the least affected by this rapid. It remains but a short time in a quiescent state, changing its direction in a few minutes, and almost immediately resuming its velocity, which is generally from four to five miles an hour either way, its greatest rapidity being however always to the southward. The results of three months' observation, in which the above phænomena were noted, afforded no sufficient data for reducing them to any regularity.

The port to the northward of the bridge, though not capacious, is secure: four or five frigates might moor in it, and it would contain many sail of merchantmen. It is about three-fourths of a mile in depth, decreasing in width from half a mile to the bridge, towards which the water shoals gradually from eleven and twelve fathoms, with a muddy bottom: outside is a good roadstead, with excellent holding-ground. The entrance is clear and free from danger, and although open to the Gulf of Talanda, there is never any sea of consequence; but the gusts which come down off Mount Khandhili are very heavy.

To the southward of the bridge there are two ports; the inner is supposed to be the Port Aulis, where the Grecian fleet assembled previous to the Trojan war. It is about a mile across each way, with six fathoms generally all over it, but a bank of 14 feet in the strait which communicates with the outer port confines its access to vessels of that draught of water. The outer port, which is two and a half miles long and one broad, is joined to Port Aulis by a channel nearly half a mile in length and 400 yards broad, but its outlet to the southward is narrow and intricate. Opposite Egripo Island water may be procured for shipping, though it is not always good or plentiful: the quantity of vegetable substance in the pools which are formed previous to its flowing into the sea renders it frequently unwholesome. A round tower on the eastern point, called the Bourg, is a good mark for the entrance of this port from the southward.

In and about Egripos fragments of antiquity may be seen forming parts of the walls of houses, in common with the grosser materials, like diamonds set in lead. They are generally of white marble, beautifully chiselled; but in no place can any building be traced, or vestiges of walls. The pieces of columns are generally of the Corinthian order, fluted. On Egripo Island there is the appearance of a rude wall traversing the island; and on the mainland, at the southern shore of the channel, between the two ports, where the land rises to about 400 feet, are the remains of Cyclopean walls of very high antiquity. The blocks of stone, which are very massive, rude, and irregular, but fitting closely, are of limestone, and in construction the walls resemble those of Mycenæ. This is most probably the antient Aulis; though there may have been houses at a less elevation and nearer the shore more convenient for commerce, the ascent to these ruins being steep and difficult. The site of Eretria in Eubœa has not been exactly discovered, but it must have been near the west coast and south of Chalcis

Coin of Eretria.

British Museum. Actual size. Silver. Weight 86$\frac{1}{10}$ grains.

The country around Egripos is flat for many miles, and very prettily studded with kiosks and small villages. An aqueduct which, commencing at the foot of Mount Delphi, winds its way to within half a mile of the town, forms a very picturesque object. Though it no longer conveys water, it is by no means in a ruinous condition. It appears to be of Venetian construction, and there are several ruins of that age in the neighbourhood; one especially, called Kastro, situated on the apex of an insulated rise, and presenting towards the sea a steep cliff, resembles the baronial castles on the banks of the Rhine.

Egripos is capable of vast improvements, and of becoming of great commercial importance. Little expense would render the passage of the bridge practicable for vessels of 300 and 400 tons, should it be required, thereby avoiding the passage along the outer coast of the Negropont, which is the worst in the Archipelago, as the Dardanelles current sets on its iron-bound coast, which offers no port whatever, and is a lee-shore in the strong and prevailing north-east winds.

From Egripos there is a carriage road to Karystos, at the southern extremity of the island.

History of Eubœa.—The first inhabitants of this island were probably a Pelasgic race, which is said to have occupied, before the historical times, most of the islands of the Ægean Sea. The Dryopes from Mount Œta were said to have founded Carystus and Styra (Herodotus, viii. 46; Thucyd. vii. 57); and the Athenians founded Chalcis and Eretria, before the siege of Troy. Homer (*Iliad*, ii. 536) calls the inhabitants of Eubœa by the name Abantes, and mentions them as having taken a distinguished part in the expedition against Troy. The Hestiæots were said to be a colony of the Perrhœbi, a Pelasgic tribe: but the Athenians appear to have been from a very remote epoch the principal colonizers of Eubœa. At the dawn of the historical times we find Chalcis and Eretria, two independent but allied towns, which had advanced to a high state of prosperity, holding dominion over the islands of Andros, Tenos, and Ceos, and sending colonies to the coasts of Macedonia and Thrace, as well as to the shores of Italy and Sicily. Naxus, the first Greek settlement in Sicily, and Cuma, one of the oldest in Italy, were colonies of Chalcis. Eretria and Chalcis however quarrelled, and Thucydides (i. 15) mentions the war between the two states as one of the oldest wars on record among the Greeks. This war however was not one of extermination; and we find in the sixth century B.C. the two communities still flourishing, under the government of their Hippobotæ, or wealthier citizens. Unfortunately for them, they co-operated with Cleomenes in his invasion of Attica, which followed the expulsion of the Pisistratidæ, in consequence of which, after the Athenians had repulsed Cleomenes, they invaded Eubœa, about 506 B.C., defeated the Bœotians, who had come to the assistance of Chalcis; and having taken the latter city, they punished it severely, put many of the citizens in fetters, until they ransomed themselves, confiscated all the property of the Hippobotæ, and gave their lands to Athenian colonists, whom they sent over to the island to the number of 4000 (Herodotus, v. 77). Eubœa now became in great measure a dependency of Athens. Afterwards, the Eubœans, together with the Athenians, sent assistance to the Ionians of Asia in their war against Darius Hystaspes; and their troops were among those which burnt Sardes (499 B.C.). The first invasion of Greece was the consequence of that expedition. The Satraps, Datis and Artaphernes, landed in Eubœa with an immense force, completely destroyed Eretria, and sent its inhabitants as slaves into Asia. The Persians then crossed over into Attica, where they were defeated at the battle of Marathon. In the subsequent expedition of Xerxes, Chalcis and other towns of Eubœa manned ships, which, uniting with the rest of the Greek fleet, fought with the Persians at Artemisium. The Hestiæots alone favoured the Persians. After the end of the Persian war we find the Athenians under Cimon, the son of Miltiades, making war in Eubœa against the Carystians, who had revolted, and reducing them to subjection. A general revolt of Eubœa against Athens broke out in 445 B.C., but Pericles, with 5000 regular troops, marched into the island, and recovered possession of it: the towns of Eubœa were reduced to the condition of tributaries to Athens, and an Athenian colony was settled at Oreus in the territory of the Hestiæots, which was the fertile plain on the north coast of the island. This island was of great importance to the Athenians; it furnished them with corn, supplied them with horses, and was considered of more value to them than all their other colonies put together. During the Peloponnesian war, after the defeat of the Athenians in Sicily, another general revolt of Eubœa took place, and the island placed itself under the protection of Lacedæmon, but afterwards returned to the Athenian allegiance, when Athens had recovered its independence; and from that time its four principal towns, Chalcis, Eretria (which had been rebuilt near the site of the old town destroyed by the Persians), Carystus, and Oreus, possessed a kind of municipal independence under the supremacy of Athens, which supremacy was at times disputed by the Thebans, who were at last obliged to leave the island. The Eubœans however joined the Theban league against the Spartans, and fought under Epaminondas. In the general prostration into which the principal states of Greece fell after the death of Epaminondas, Eubœa seems to have been left in great measure to itself. Its principal towns came under the rule of chiefs, or tyrants, as they were called, without any interference on the part of the Athenians. About 350 B.C. Callias and Taurosthenes, sons of the late tyrant Mnesarchus, who were ruling in Chalcis, made overtures to Philip of Macedon, in order to have his assistance in subduing the rest of the island, an opportunity which was eagerly seized by Philip. Plutarch, who was at the same time tyrant of Eretria, applied to the Athenians to check Philip's interference. The Athenians sent an expedition under Phocian, who defeated the Chalcidians after hard fighting; but this led to no favourable result, as Callias remained in possession of Chalcis, and the Macedonian influence was established over the island. While Alexander was absent in his Persian wars, the Chalcidians increased and improved their fortifications, which extended to the main-land over the bridge they had built across the Euripus. When the Romans began to extend their influence to Greece, Chalcis and the other towns of Eubœa contracted alliance with Rome, and they remained steadfast to that alliance during the Ætolian war. (Livy, xxxv. 37. 39.) Chalcis afterwards submitted to Antiochus. (Livy, xxxv. 50, 51.) In the Achæan war, after the defeat at Corinth, Chalcis was taken and destroyed by the Romans, and the whole island fell under the dominion of Rome. It then gradually declined in population and importance; and Pausanias and Dion speak of its fallen state under the emperors.

In the dismemberment of the eastern empire by the Latins or Franks the Venetians obtained possession of Eubœa, which they called Negropont, a barbarous name, probably derived from the town of Egripos, a corruption of Euripus, built on the ruins of Chalcis, and from the word 'ponte,' meaning the bridge which united it to the main land. The Venetians lost the island in 1470, when the Turks took the capital, Negropont, and massacred all the inhabitants. The Venetian doge and general Morosini blockaded it in 1688, but after a murderous siege he was obliged to re-embark with great loss. The people of Eubœa took part in the last revolt of the Greeks against the Turks, and the island now forms part of the new kingdom of Greece.

Coin of Eubœa.

British Museum. Actual size. Silver. Weight 61$\frac{5}{16}$ grains.

EUCALY'PTUS, a genus of New Holland plants, consisting of lofty trees, with a volatile aromatic oily secretion in their leaves and a large quantity of astringent resinous matter in their bark. They belong to the alternate-leaved division of Myrtaceæ, and are generically known among those plants by their corolla being absent, and the limb of their calyx consolidated into a hemispherical or conical cap, which is thrown off when the stamens expand.

This genus occurs in the Malayan Archipelago, but is chiefly Australian, and, together with the leafless Acacias, gives a most remarkable character to the scenery. The species exist in great profusion, and form the largest trees in the forests of that part of the world. A modern writer upon the plants of Van Diemen's Land says that Eucalyptus seems as if it had taken undisturbed possession of those Australian regions, clothing as it does with a stupendous mantle the surface both of Van Diemen's

Land and New Holland, while the intermixture of other plants which this lordly tribe permits is, compared with its own great extent, but small and partial. Wherever you go, one species or other is constantly before you.

No trees in the world so constantly or rapidly arrive at gigantic dimensions: they often become hollow, and are then used by the traveller as roomy places of shelter at night. Frazer found a hollow Eucalyptus at Moreton Bay, used by the natives as a cemetery. Even at Swan River, where, according to the report of Frazer, the species are stunted, they also attain a huge size, as is proved by what that traveller says of the Angophoras, which he terms 'magnificent' and 'gigantic,' and which, in fact, are Eucalyptus calophylla. A height of 150 ft., and a girth of from 25 to 50 are not uncommon dimensions of these trees. Their timber is represented as highly useful for domestic and other purposes; being so soft at first as to render the felling, splitting, and sawing up of the tree when green a very easy process, and when thorougly dry becoming as hard as oak. Their bark is often extremely hard, whence some species, especially E. resinifera, are called iron-bark trees by the colonists. The blue gum-tree and some others have the singular property of throwing it off in white or grey longitudinal strips or ribands, which, hanging down from the branches, have a singular effect in the woods.

In many species the leaves are so variable in their form and other characters at different ages of the tree, or in different situations, that it is a matter of difficulty to know how they are to be botanically distinguished from each other; and in fact the subject of the distinction of species has hardly yet been taken up, no botanist feeling competent to undertake the task without some personal acquaintance with the plants in a native state. The leaves, instead of presenting one of their surfaces to the sky and the other to the earth, as is the case with the trees of Europe, are often arranged with their faces vertical, so that each side is equally exposed to light.

Gum-tree is the universal name among the colonists for a Eucalyptus, and has arisen from the large quantity of an astringent gum-like juice, resembling gum Kino in its qualities, which all the species yield. In cutting down E. robusta, Mr. Backhouse says that 'we often find large cavities between the annual concentric circles of the trunk, filled with a most beautiful red or rich vermilion-coloured liquid gum, which flows out as soon as the saw has afforded it an opening. The gum yielded by E. resinifera is considered by druggists as not in the least inferior to the Kino which the Pterocarpus or Red Saunders wood of India produces.' (*Companion to the Botan. Magazine*, vol. i. p. 69.) At Moreton Bay and in Van Diemen's Land a kind of manna is yielded by certain species. It appears in the form of an exudation, which coagulates and drops from the leaves to the ground in small white particles, often as large as an almond, and with a sweet agreeable taste.

Upon the whole this genus must be considered the most important that New Holland produces. As it occurs so far to the south as Van Diemen's Land, it is almost certain that it might be naturalized in Devonshire, Cornwall, and on the west of Ireland. Even in the neighbourhood of London certain kinds bear moderate winters without shelter, especially E. pulverulenta.

It is very much to be regretted that some settled nomenclature is not introduced, for the colonists apply the same names to different species in different parts of the country; this renders it difficult to tell of what they are speaking. As far as we can collect the evidence, it appears that the following are, or should be, the botanical species to which the colonial names belong:—

Blue Gum of Port Jackson	E. piperita
Ditto of Hobart Town	E. globulus
Stringy Bark . .	E. robusta
Iron Bark . .	E. resinifera
Kino Gum . .	Ditto
Peppermint Tree . .	E. piperita
Weeping Gum of Van Diemen's Land . .	Uncertain
Mountain Blue Gum of ditto	Ditto
Black Gum of ditto	Ditto
Black-budded Gum of ditto	Ditto
Cider Tree of ditto	Ditto
Manna Gum of ditto	Ditto
Ditto of Moreton Bay .	E. Manna, *Cunn.*
Blood-wood of Port Jackson .	E. corymbosa
White Gum of Van Diemen's Land	E. resinifera
Ditto of Moreton Bay	E. subulata, *Cunn.*
Ditto of the S.W. Interior	E. Leucadendron, *Cunn.*

EU'CHARIS. [Beroë, vol. iv., p. 318; Ciliograda, vol. vii., p. 165.]

EUCHARIST (*εὐχαριστία*, thanksgiving) is a Greek name of the Christian sacramental act otherwise called the Communion, or the Lord's Supper; and, in contradistinction from these appellations, it particularly expresses the idea of thankfully commemorating the mediatorial sacrifice of Christ; or, according to others, the name was assigned in reference to the fact that, when Jesus enjoined the observance of the rite, he gave thanks.

An elaborate account of the history and doctrines of the Eucharist is given in the learned dissertations on the subject by bishop Patrick, Dr. Waterland, and numerous other writers, of whom a list is furnished in Watt's *Bibliotheca Britannica*. (Cave's *Primitive Christianity*, part ii., c. 11; Bingham's *Origines Ecclesiasticæ;* Claude, *On the Eucharist*, fol., 1684; *Traité de la Cène du Seigneur*, fol., 1635; *Traité de l'Euchariste*, par Cardinal du Perron, fol., 1633.) [Communion.]

EUCHYSIDERITE (*Achmite*), a mineral which occurs crystallized. Primary form, an oblique rhombic prism, of same cleavage and measurements as pyroxene. Colour brownish-black. Lustre vitreous. Nearly opaque. Sp. gr. 3·34. Hardness 6·0,6·5. Streak, yellowish-grey. Fracture, imperfect conchoidal.

It occurs in Norway. Before the blow-pipe alone, readily fuses into a brilliant black globule; with borax forms a coloured glass.

According to Berzelius it consists of—

Silica . . .	55.25
Oxide of iron . .	31.25
Soda . . .	10.40
Lime . . .	0.72
Oxide of manganese	1.08
	99.70

EUCLASE, a crystalled mineral, the primary form of which is an oblique rhombic prism. It is either colourless and nearly transparent, blue, or pale bluish-green; it refracts doubly; the lustre is vitreous. Hardness 7·5; sp. gr. 3·098. Cleavage very distinct, parallel to the oblique diagonal, but indistinct parallel to the terminal plane and horizontal diagonal. The fracture is uneven, and the streak white.

It was first found in Peru, but has since been met with in detached crystals in alluvial ground in Brazil.

According to Berzelius it consists of—

Glucina . .	21.78
Silica . . .	43.32
Alumina . .	30.56
Oxide of Iron .	2.22
Oxide of Tin .	0.70
	99.58

EUCLID, the Geometrician. [Geometry of the Greeks.]

EUCLID (Εὐκλείδης) of Megara is said to be a different person from the geometrician of the same name. He was a scholar of Socrates, and the founder of the school called the Megaric, which may be considered as the predecessor of the Sceptical school of a later date. This school was distinguished by its dialectic subtlety, by which contradictory propositions could be proved, the consequence of which was universal doubt. The Supreme Good, according to Euclid, was always the same and unchangeable. He wrote six dialogues, which are lost. (See *De Megaricorum Doctrina ejusque apud Platonem et Aristotelem vestigiis*, Ferd. Deycks, Bonn, 1827, 8vo.)

EUCŒ'LIUM. (Zoology.) [Synoicum.]

EUCRA'TEA. [Cellaricea, vol. vi., p. 405.]

EU'DEA. [Spongidæ.]

EUDIO'METER, an instrument invented by Dr. Priestley, and originally employed by him in ascertaining the goodness of atmospheric air obtained from various places and under different circumstances. By the use of this instrument and the modifications which it has received, it has been ascertained that the air is liable to no essential variation of composition except such as arises from local and temporary causes.

The use of the eudiometer, termed eudiometry, has, since its original contrivance, been extended to all gaseous mixtures, but especially to determining the quantity of oxygen which they contain when resulting from the operations of analysis; and it is an essential instrument in the chemical investigation of bodies, not merely such as are naturally gaseous, but which become so by the changes to which they are subjected during chemical research.

The principle upon which the use of the eudiometer depends, so far as atmospheric air and oxygen gas are concerned, is that of exposing them to the action of some substance, whether solid, fluid, or gaseous, which, on account of its affinity for oxygen, combines with it and leaves the gases with which it is mixed unacted upon.

The eudiometer invented by Dr. Priestley arose from and was connected with his great discovery of oxygen gas and the fact which he ascertained of its absorption by another gas, which he called nitrous air, since called by various other names, as nitrous gas, deutoxide of azote, binoxide of nitrogen, and nitric oxide gas.

This gas may be considered as nitric acid deprived of a large portion of its oxygen, which is effected by dissolving a metal in it, as, for example, copper, silver, or mercury, &c.; and of these the last mentioned is said to yield the gas in the greatest purity. The nitric oxide thus obtained being disposed to regain the oxygen which the metal has taken from it, absorbs it with great facility from all such gaseous mixtures as contain it; the evidences of its action are the formation of a red vapour, condensation of volume, and the reproduction of nitric acid; and the quantity of oxygen absorbed is determined by the degree of condensation which is produced by its action.

Dr. Priestley's method was extremely simple: he took a phial capable of holding about an ounce of water, filled it with water, and displaced it with atmospheric air, or with the gaseous mixture to be examined; the volume of this being noted, it was transferred, over water, into an air-jar about an inch and a half in diameter. An equal volume of nitric oxide was added to it, and they remained together for about two minutes: if the diminution was very considerable, another volume of nitric oxide was added. When this part of the process was over, the gas was transferred to a glass tube about two feet long, one-third of an inch in diameter, and graduated into 10ths and 100ths. After noting the volume of the gas, the result was expressed in measures and decimal parts; thus, when equal volumes of common air and nitric oxide were mixed, and they afterwards occupied the space of one volume and two-tenths, Dr. Priestley, in speaking of the air so tried, said the measures of the test were 1·2, or the standard of the air was 1·2.

Although Dr. Priestley determined the volumes of oxygen and nitric oxide required for mutual saturation, he appears mostly, if not entirely, to have confined his eudiometrical operations to comparing the results of them with those on atmospheric air; consequently, although what he calls *the standard* was learnt by his process, the exact quantity of oxygen which the mixture contained was not determined by it.

Numerous attempts have been made by chemical philosophers of the greatest eminence to render the eudiometrical application exact and certain, and if this could be effected, it would be rendered an extremely valuable method on account of the rapidity of its action. Omitting however all notice of the modifications which have been proposed by Cavendish, Fontana, Ingenhouz, Sardinani, &c., we may observe, that while both Dalton and Gay-Lussac imagined that they had removed the uncertainty of the process, the late Dr. Henry admits that he placed but little reliance upon it, and Dr. Thomson states that he has abandoned it altogether, excepting as far as it serves to indicate the presence or absence of oxygen gas in a gaseous residue under examination.

A very different and certainly an improved method, though rather an operose one, of employing nitric oxide was adopted by Davy. Dr. Priestley discovered that a solution of sulphate of iron is capable of dissolving nitric oxide gas, and that in this state it retains its power of combining with and condensing oxygen gas. It is prepared by passing the nitric oxide through the solution of sulphate; as the gas is absorbed the solution becomes of a deep olive brown, and when the impregnation is completed it appears opaque and almost black.

The instruments necessary for ascertaining the composition of the atmosphere by means of this solution consist simply of a small graduated tube divided into 100 parts, and greatest at the open end, and of a vessel for containing the fluid.

The tube, after being filled with the gaseous mixture to be examined, is introduced into the solution, and that the action may be more rapid, gently moved from a perpendicular towards a horizontal position. Under these circumstances the gas is rapidly diminished; and in consequence of the dark colour of the fluid, it is very easy to observe the degree of absorption; in a few seconds the experiment is completed, and the whole of the oxygen is condensed.

The period of the greatest diminution is to be accurately noted; for shortly after this it begins gradually to increase. Davy states that the impregnated muriate of iron (chloride) acts more rapidly than the sulphate.

It is to be observed that this process is not applicable merely to the analysis of the air. It was employed by Allen and Pepys in their laborious and accurate experiments on respiration; and they added a simple solution of sulphate of iron to the residual gas, evidently for the purpose of separating any nitric oxide gas which might have escaped from the solution after arriving at the point of greatest condensation.

The eudiometer next to be mentioned is that invented by Scheele, which was probably the first proposed after Dr. Priestley's. This was a graduated glass tube containing a certain volume of air, which was exposed to a mixture of sulphur and iron-filings made into a paste with water. Although the oxygen was absorbed and the azote left by this operation, yet the process was not to be relied upon, for, by the formation of sulphuric acid, which occurred by the oxidizement of the sulphur, the iron was acted upon, and water being decomposed, its hydrogen was evolved, and interfered with the results of the operation.

This plan, however imperfect, had the merit of simplicity, for the quantity of oxygen absorbed was determined at once by deducting the volume of the residual gas from that of the whole quantity submitted to experiment.

De Marté, instead of using sulphur and iron, employed a solution of sulphuret of potassium prepared by dissolving sulphur in a solution of potash. It is stated that this solution when newly prepared absorbs a small portion of azotic gas; but the fallacy arising from this source is readily obviated by agitating the solution for a short time with a little atmospheric air previously to using it, by which it is saturated with azote. A tube divided into 100 parts and immersed in the solution is sufficient for the use of it.

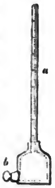
Guyton employed sulphuret of potassium also in his eudiometer, but he used it in a solid state, and applied heat to expedite its action. In this case, as when the solution is used, both the sulphur and potassium are oxidized, and the result is sulphate of potash. It has been objected, and probably with reason, to this eudiometer, that sulphuretted hydrogen was elicited by the action of the heat upon the sulphuret. A description of this eudiometer, which has been but little used, is given in *Nicholson's Journal*, 4to, vol. i.

The eudiometer of Seguin is a glass tube, about an inch in diameter, eight inches long, and open at one end. It is to be filled with and inverted in mercury, a small piece of phosphorus is then put under the open end of the tube, and by its lightness it immediately rises to the top of it, where it is to be melted by the approach of a red-hot iron. A measured portion of the gas to be examined is then to be passed into the tube; the phosphorus inflames on each addition of the gas, and the mercury rises, owing to the condensation of the oxygen. When all the gas under examination has been thrown up into the tube, the hot iron is again used to ensure the completion of the process: the quantity of the residual gas is determined by transferring it into a graduated tube, and the difference between the quantity submitted to experiment and that left after it indicates that of the oxygen absorbed.

In this operation, owing to the affinity existing between the phosphorus and the oxygen, they combine and form phosphoric acid: it is however stated that the azote dissolves a small quantity of phosphorus, and that, owing to the expansion which this occasions, about $\frac{1}{40}$ of the volume of the azotic gas is to be deducted.

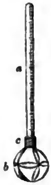
Berthollet also employed phosphorus in his eudiometer, but instead of heating it, as in the above-described method, he allowed combination to take place between it and the oxygen, by what is termed slow combustion. He exposed a stick of phosphorus fastened to a glass rod in a narrow graduated glass vessel, filled with air, and standing over water the phosphorus immediately begins to act on the oxygen of the air, as shown by the formation of the white vapour of phosphoric or phosphorous acid; but this occurs without visible combustion: in six or eight hours the whole of the oxygen disappears, and its quantity is, of course immediately apparent, making the deduction above stated from the azotic gas.

Dr. Hope's eudiometer is represented in the annexed figure. It is used with a solution either of sulphate of iron impregnated with nitric oxide or with solution of sulphuret of potassium. This eudiometer consists of a small bottle, capable of holding about three ounces, for containing the eudiometric fluid, and it is perforated and furnished with a stopper at *b*. Into the neck of the bottle a hollow graduated tube, *a*, closed at the upper end, is accurately fitted by grinding; it holds precisely a cubic inch, and is divided into 100 equal parts. To use the apparatus, the bottle is first to be filled with the solution to be employed, and covering the mouth with a flat piece of glass, it is to be immersed in water; the glass being then removed, the open end of the tube containing the gas to be examined is to be inserted.



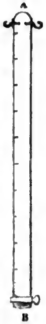
The instrument being removed from the water, is to be inverted. The gas ascending into the bottle, it is to be brought into thorough contact with the liquid by brisk agitation, by which absorption of gas occurs; to supply its place the stopper at *b* is removed under water, a quantity of which rushes into the bottle; the stopper is then replaced, and these operations are alternately renewed, till no further diminution takes place; the tube *a* is then withdrawn, the neck of the bottle being in water, and it is held inverted for a short time, and the diminution is then measured by the graduated scale.

Dr. Henry has pointed out some difficulties attendant upon the use of this eudiometer, to obviate which he has substituted a caoutchouc bottle for the glass one, as shown in the annexed figure at *b*. The tube *a* is accurately ground into a short piece of very strong tube of wider bore, as shown at *c*, the outer surface of which is made rough by grinding, and shaped as represented, that it may more effectually retain the neck of the elastic bottle when fixed by waxed thread. This instrument is used, in every respect, in the same manner as Dr. Hope's. The only difficulty is in returning the whole of the residuary gas into the tube, but the art of doing this is readily acquired by practice.



Pepys has contrived a eudiometer, in which a caoutchouc bottle is employed as in Dr. Henry's. This instrument, from the inventor's statement, appears to be susceptible of great accuracy; for he states that he is able to measure an absorption of only $\frac{1}{1000}$ of the gas employed. For an account of this eudiometer, and of some experiments performed with it, see *Phil. Trans.*, 1807. The parts are too numerous for us to insert figures of, and without them a description would be scarcely intelligible.

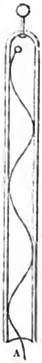
Having now described the use of nitric oxide, sulphuret of potassium, and phosphorus, as eudiometrical substances, and noticed the more important instruments in which they are employed, we shall notice the eudiometer of Volta, and the eudiometric body which he made use of.



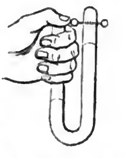
Volta's method of determining the composition of atmospheric air, or of the quantity of oxygen contained in gaseous mixtures, is by means of combustion with a known volume of hydrogen gas; for it having been ascertained that when a mixture of oxygen and hydrogen gases is fired, one-third of the diminution is owing to the condensation of oxygen, we have only to observe the measure of the contraction of volume to ascertain that of the oxygen which was present. Of Volta's eudiometer various modifications have been proposed, all agreeing however in the principle above mentioned. According to Berzelius, that invented by Mitscherlich is to be preferred, on account of the simplicity of its construction and the accuracy of its results. We shall therefore describe it instead of the original one, and it will at once occur to the chemical reader that it is a slight modification of Priestley's and Cavendish's detonating tubes.

This instrument, as represented by the annexed figure, consists of a very thick glass tube from 18 to 24 inches long, and about four lines internal diameter; it is graduated, open at one end, and closed at the other. Near the top A the tube is perforated with platinum wires, placed at such a distance as readily to allow of the passage of the electric spark between them, and externally hooked; near the orifice, B, the tube is laterally perforated and furnished with a glass cock, which is shut after filling the tube with the gas to be examined: this is, of course, to prevent the loss of gas by the expansion accompanying the detonation by the spark. When this is over, the cock is turned under either water or mercury, and the fluid rising in the tube, the condensation is exactly noted by bringing the fluid within and without the tube to the same level.

Another variety of Volta's eudiometer is represented by the opposite figure. It is more simple in its construction than the foregoing, but less certain in its results, on account of the escape of gas which occurs if it be not immersed sufficiently deep in water or mercury: it is a modification of an instrument invented by Dr. Priestley. The only additional explanation required is, that A is a moveable metallic wire with a knob at the end, which is raised near enough to the knob at the top of the instrument to allow of the passage of the electrical spark.



Dr. Ure has also contrived a modification of Volta's eudiometer, which renders the experiment easy of performance by a single person. This instrument is shown by the figure. It consists of a glass siphon, having an interior diameter of from 2-10ths to 4-10ths of an inch; its legs are nearly of equal length, each being from six to nine inches long. The open extremity is slightly funnel-shaped; the other is hermetically sealed, and has two platinum wires inserted; the legs are about one-fourth to one-half an inch asunder. The instrument having been graduated, it is to be filled with water or mercury, and the gas transferred into it in the ordinary manner; then being upright, part of the fluid in the open leg is displaced by inserting a glass rod, or in some other manner. The open leg ought to contain at least two inches of air between the thumb and the mercury: this atmospheric column serves as a recoil-spring, enabling the operator to explode considerable quantities without inconvenience or danger. The open leg being grasped by the hand, the thumb is to be placed lightly over the aperture, so as to close it, and at the same time to touch one of the wires; a spark taken from the conductor to the other wire passes through the gas, inflaming it, and is conducted off by the thumb and hand. The gas in expanding depresses the fluid beneath it, whilst, as already noticed, the air in the part inclosed by the thumb acts as a spring to restrain the violence of the explosion. If a charge from a jar is to be passed, then the thumb must not be allowed to touch the wire whilst closing the aperture. When the jar is charged, the wire connected with the outer coating is first to be hooked upon the eudiometer wire nearest the thumb, and securely retained there, so as not to slip during the experiment; and then the knob of the jar is to be brought to the other wire and the gas inflamed.



After explosion, when the condensation of volume ensues, the thumb will feel pressed down to the orifice by the superincumbent atmosphere. On gradually sliding the finger to one side and admitting the air, the mercurial column in the sealed leg will rise more or less above that in the other; mercury is then to be poured in till the equilibrium is restored, and the resulting volume of gas is then read off.

Dr. Ure states that with the above instrument he has exploded half a cubic inch of hydrogen mixed with a quarter of a cubic inch of oxygen, as also a bulk nearly equal of an olefiant gas explosive mixture, without any unpleasant concussion or noise.

Dobereiner has suggested a eudiometrical process, founded on his curious discovery of the property which spongy platinum possesses of causing the combination of oxygen and hydrogen gases. In this eudiometer the com bination occurs without explosion, and yields results of great accuracy Dobereiner found that when the spongy platinum was mixed with certain substances, so as to prevent its immediate and explosive action, it caused the oxygen and hydrogen to combine with moderate rapidity. The late Dr. Henry, who performed a most important and accurate series of experiments on this eudiometrical process, recommended a mixture of three parts of spongy platinum and two of fine china clay made into a paste with water and moulded into spherules about the size of a pea; these were fastened to a platinum wire, that they might be removed after the action was over. They should be heated and suffered to cool a short time before use: they suffer no loss of power, and possess the great advantage over the electric spark, that they act upon gaseous mixtures which contain so little oxygen and hydrogen that they cannot be fired. The late Dr. Turner ascertained that it was possible to determine the presence of $\frac{1}{100}$ of hydrogen or oxygen in a gaseous mixture; whereas, when these gases formed $\frac{1}{15}$ of a mixture, they could not be detected by electricity. The effect takes place more rapidly in large than in small tubes.

There are various gases which impede the action of the platinum balls. It appears from the experiments of Dr. Henry, that when the compound combustible gases, mixed with each other, with hydrogen, and with oxygen, are exposed to the balls of platinum, the several gases are not acted upon with equal facility; that next to hydrogen carbonic oxide is most disposed to unite with oxygen, then olefiant gas, and lastly, carburetted hydrogen.

Dr. Henry observed, that the property inherent in certain gases of retarding the action of platinum, when they are added to explosive mixtures of oxygen and hydrogen, is most remarkable in those which possess the strongest attraction for oxygen. Heat occasions the platinum balls to act in many cases in which no combination would occur without it.

In concluding this historical sketch of eudiometers and eudiometry, we repeat an observation already made, viz., that whatever volume of the mixed gases may disappear after detonation or by the action of the spongy platinum, one-third of such portion is to be considered as oxygen and two-thirds as hydrogen, the result of their combination being water, formed of these proportions of its constituent gases.

EUDO'CIA, daughter of Leontius, an Athenian sophist, was called Athenais before her baptism. She was carefully instructed by her father in literature and the sciences. After her father's death, being deprived by her brothers of all share in the inheritance, she repaired to Constantinople, and appealed to Pulcheria, sister of Theodosius II., who was so pleased with her that she induced her brother to marry her, A.D. 421. Eudocia surrounded herself with learned men; but the emperor, through jealousy, dismissed all her court, and had her exiled to Palestine, where she continued to reside after the death of her husband. She there embraced the opinions of Eutyches, and supported by her liberality and influence the monk Theodosius, who forced himself into the see of Jerusalem, after driving away Juvenal, the orthodox bishop, and kept it until he was himself driven away by order of the Emperor Marcianus. Euthymius, called the Saint, by his reasonings brought back Eudocia to the orthodox faith, after which she spent the remainder of her days at Jerusalem, where she died in 460, protesting her innocence of the guilt with which her husband had charged her. Eudocia wrote several works, of which Photius quotes a translation in verse of the first eight books of the Old Testament. There is also a work attributed to her, which was translated into Latin by Echard, and was published under the title of 'Homerici Centones Græce et Latine, interprete Echardo,' Paris, 1578. It is a life of Jesus Christ, composed of lines taken from Homer. Most critics however believe that it is not the work of Eudocia, though Ducange is of the contrary opinion.

EUDOCIA the Younger, daughter of the preceding and of Theodosius II., married Valentinianus III. After the assassination of her husband by Petronius Maximus, she was obliged to marry the usurper. Eudocia, out of indignation and revenge, called in Genseric, king of the Vandals, who came to Italy, plundered Rome, and carried Eudocia to Africa with him. Some years afterwards she was sent back to Constantinople, A.D. 462, where she died.

EUDOCIA, the widow of Constantinus Ducas, married Romanus Diogenes, an officer of distinction, A.D. 1068, and associated him with her on the throne. Three years after, Michael, her son, by means of a revolt, was proclaimed emperor, and caused his mother to be shut up in a convent, where she lived the rest of her life. She left a treatise on the genealogies of the gods and heroes, which displays an extensive acquaintance with the subject. It is printed in Villoison's *Anecdota Græca*, 2 vols., 4to. 1781.

EUDO'RA. [MEDUSA.]

EUDOXUS, a native of Cnidus, a city of Caria, in Asia Minor, and the son of Æschines, flourished about 370 B.C. He studied geometry under Archytas, and afterwards travelled into Egypt to study the sciences under the priests of that country. Diogenes Laertius informs us that he and Plato studied in these schools for about thirteen years; after which Eudoxus came to Athens, and opened a school of his own, which he supported with such reputation that it excited the envy even of Plato himself. Proclus informs us that Euclid very liberally borrowed from the elements of geometry composed by Eudoxus. Cicero calls Eudoxus the greatest astronomer that had ever lived; and we learn from Petronius that he retired to the top of a very high mountain that he might observe the celestial phenomena with more convenience than he could on a plain or in a crowded city. Strabo (p. 119) says that the observatory of Eudoxus was at Cnidus, from which the astronomer saw the star Canopus. Vitruvius (ix. 9) describes a sun-dial constructed by him; and Strabo (p. 390) quotes him as a distinguished mathematician. Nothing of his works remains. He died in the fifty-third year of his age. [ASTRONOMY, p. 531.]

EUDOXUS, of Cyzicus, was sent by Ptolemy VII., of Egypt, on a voyage to India about B.C. 125. (Strabo, p. 98, Casaub.) The passage of Strabo referred to contains an account of his adventures. From this Eudoxus, or another of the name, Strabo derived some materials for his great work (379. 550, &c.).

EUDYALITE, a mineral which occurs both crystallized and massive. The crystals are generally small. The primary form is a rhomboid; the colour is red or brownish-red, and the crystals are faintly translucent or opaque. Lustre vitreous, sometimes dull. Sp. gr. 2·9. Hardness 5·0, 5·5. Streak white. Fracture uneven. The massive varieties are imbedded and amorphous.

It occurs at Kandarluarsuk, in West Greenland.

Before the blow-pipe it fuses into a leek-green scoria.

According to Stromeyer it consists of—

Silica . . .	52·47
Zirconia . .	10·89
Lime . . .	10·14
Soda . . .	13·92
Oxide of Iron .	6·85
Oxide of Manganese	2·57
Muriatic acid . .	1·03
Water . . .	1·80
	——99·67

EUDY'NAMYS. [CUCULIDÆ, CUCULINÆ, vol. viii., pp. 206 and 211.]

EU'DYTES. [DIVERS, vol. ix., p. 37.]

EUGENE, FRANÇOIS DE SAVOIE, commonly called Prince Eugene, was paternally descended, in the third degree, from the ducal house of Savoy, but was a French subject by birth, being a younger son of the Comte de Soissons, and born at Paris, October 18, 1663. He was designed for the church, but having formed a decided preference for a military life, and being also moved by certain wrongs which he conceived to have been done to his family by Louis XIV., and which he deeply resented, he entered the service of the Emperor Leopold. From this time he renounced his allegiance to France, and long after, when his reputation was at its height, rejected the most brilliant offers made by the French government to purchase his return to the service of his native country. His first campaign was against the Turks, at the celebrated siege of Vienna in 1683. Eminent bravery and talent, joined to high birth, ensured him rapid promotion. In 1688-9, on the breaking out of war between France and the Empire, he was employed on a diplomatic mission to the duke of Savoy, and in 1691 was raised to the command of the imperial army in Piedmont. During two campaigns he maintained a decided advantage over the French: in 1693 he was less successful. The duke having returned to the French alliance, we next find Prince Eugene commanding the army in Hungary, where he won a great victory over the Turks at Zenta, on the river Theiss, September 11, 1697. The peace of Carlowitz (1699) closed this scene of action; but a more brilliant one was opened in 1701 by the war of the Spanish succession. During two years Eugene maintained the imperial cause in Italy with honour against superior forces commanded successively by Catinat, Villeroi, and Vendôme, against the last of whom he fought the indecisive battle of Luzara, August 1, 1702, in which the flower of his troops was destroyed. At the end of this campaign he returned to Vienna, and was appointed president of the council of war.

In 1704 he commanded the imperial troops at the battle of Blenheim, August 13, 1704. The successes of the French in Piedmont made it expedient for him to return thither in 1705. He soon restored the duke of Savoy's declining fortunes, and won the decisive battle of Turin, September 7, 1706, after which the French evacuated the country. He was thus set again at liberty to co-operate with Marlborough in 1708, and had a share in the victory of Oudenarde, and in the capture of Lille, the siege of which was entrusted to him, while Marlborough protected his operations. In 1709 he was wounded at the bloody battle of Malplaquet, of which he was the chief adviser, and in which he led the attack upon the left wing. On the death of the Emperor Joseph in 1711, he took an important part in securing the succession to his brother Charles VI., and he visited England at the end of that year, in hope of preventing the secession of England from the alliance. He was received as his services deserved, but made no progress towards his object; for the dismissal of the Whig ministry was soon followed by the congress and peace of Utrecht. The emperor being no party to that treaty, Eugene invaded France in 1712 with little advantage, and it became evident that the interests of the empire would be best consulted by peace: the preliminaries were accordingly signed at Rastadt, March 6, 1714.

In 1716 Prince Eugene again marched against the Turks, and won the battle of Peterwaradin, August 6, against an enormous disproportion of numbers. In the following year he besieged Belgrade with 40,000 men. With troops wasted by disease, pressed by an army of 150,000 men from without and opposed by a powerful garrison from within, he was in the utmost danger, when, with the happy boldness which distinguished him, he seized the right moment, and inflicted a signal defeat on the army which threatened him. Upon this the town surrendered. Peace was concluded in the following year.

He took up his residence at Vienna, honoured and trusted by the emperor, in whose political service he was much employed. In 1733 a fresh quarrel with France called him again to command the imperial army on the banks of the Rhine. This war is said to have been undertaken against his advice: at all events age had diminished his energy: he contented himself with standing on the defensive, and used his influence to effect a reconciliation. Preliminaries of peace were signed at Vienna, October 5, 1735. He died suddenly in that capital, April 21, 1736, aged 73.

As a general, Prince Eugene ranks among the first of his kind, but that kind was not of the highest order of excellence. His name is memorable for no improvements in the *art* of war, neither was he famous for skill in manœuvring or combining the operations of distinct masses upon one object. His characteristics were penetration, quickness of perception, decision, and what usually goes along with them, readiness in amending a fault when made; so that his skill lay rather in making the best of given circumstances than in bending circumstances to his will beforehand. It is said that he always took great pains to learn the character of the general opposed to him. Careless of his own person (he was thirteen times wounded in battle), he was also somewhat prodigal of his soldiers' lives. However, he threw a glory round the Austrian arms such as has never dignified them either before or since.

The best account of his exploits is 'L'Histoire du Prince Eugène,' 5 vols. 12mo., by M. de Maubillon, but published without his name. In English, there is Campbell's Military History of Prince Eugene and the Duke of Marlborough, 2 vols. fol.; and several smaller works. Prince Eugene wrote memoirs of himself, which have been published both in French and English.

EUGE'NIA, a genus of dictyledonous polypetalous plants of the natural order of Myrtaceæ; so named in honour of Prince Eugene of Savoy, who was a patron of botany and horticulture. The genus, as at present constituted, contains nearly 200 species, though numbers have been removed to the genera Nelitris, Jossinia, Myrcia, Sizygium, Caryophyllus, and Jambosa, in which are now contained the Clove tree, the Rose apple, and Jamoon of India, formerly included in Eugenia. This genus is confined to the hot and tropical parts of the world, as Brazil, the West India Islands, and Sierra Leone, and extends from the Moluccas and Ceylon to Silhet and the foot of the Himalayas in Asia.

Eugenia is characterized by having the tube of the calyx of a roundish form and the limb divided into four parts; the petals equal in number, and inserted on the calyx. The stamens are numerous. The ovary 2-3 celled, with several ovules in each. Seeds one or two, roundish and large, with the cotyledons and radicle united into one mass. In habit and inflorescence the species resemble many myrtles. Like the family to which they belong, some of the species of Eugenia secrete a warm volatile oil in their herbaceous parts; abound in tannin; yield good wood; and a few have fruit which is edible, though not very agreeable, from being impregnated with the aroma of the oil.

The most remarkable species of the genus, and one of the few which it is necessary to notice, is the Allspice, Pimento, or Bay-berry tree. This is the Eugenia Pimenta of De Candolle; the Myrtus Pimenta of Linnæus and of the London Pharmacopœia. It is a native of South America and the West India Islands, especially Jamaica, and from being cultivated there is often called Jamaica Pepper. The tree is very handsome, often 30 feet high, and much resembles the Clove tree in the form and appearance of its leaves as well as in habit. The trunk is smooth, and much branched towards the top. The older branches are round, the younger compressed, and the twigs as well as the flower-stalks pubescent; the leaves are petiolate, oblong or oval, smooth, and marked with pellucid dots, forming a dense evergreen foliage; the flower-stalks are both axillary and terminal, and are divided into three-forked panicles; the flowers are small, without show, and conformable in structure to the character of the genus. The berry is spherical and crowned with the persistent calyx; when ripe, smooth, shining, and of a dark purple colour; usually one, occasionally two-celled, containing large roundish seeds.

The Pimenta is cultivated with great care in Jamaica, and abounds especially on the hills on the north side of the island. The trees are formed into regular walks, and begin to bear when three years old, but are not in perfection until they have been planted seven years. They thrive best in rocky lands, or a rich soil having a gravelly bottom. Mr. Bryan Edwards says that a single tree has been known to yield 150 lbs. of the raw fruit, or 100 lbs. of the dried spice; but the crop is uncertain, and plenteous perhaps only once in five years. The tree has been introduced into and flourishes in the southern parts of India.

The berries, being the valuable part of the tree, require care in gathering as well as drying; the processes for which are described by Browne in his 'History of Jamaica,' p. 248 They must be picked when they have arrived at full growth, but before they begin to ripen: they are dried in the sun, on raised boarded floors, and frequently turned during the first and second day; they are then put into sheets, often winnowed, and exposed to the sun until sufficiently dried, which is known by the colour and the rattling of the seeds in the berries. Browne says, 'Such of the berries as come to full maturity do, like many other seeds, lose that aromatic warmth for which they are esteemed, and acquire a taste perfectly like that of Juniper berries, which renders them a very agreeable food for the birds, the most industrious planters of these trees.'

The leaves and bark participate in the warm aromatic properties for which the berries are celebrated, and which have received their name of Allspice from their fragrant odour being thought to resemble that of a mixture of cinnamon, cloves, and nutmeg. Their taste being warm and aromatic makes them useful as a spice in cookery, and a stimulant in medicine.

Eugenia Michelii is a Brazilian species, cultivated in Martinique, whence it is called *Cerisier de Cayenne*, as it yields a small edible fruit.

EUGENIACRINITES. [Encrinites, vol. ix., p. 393.] N.B. The Rev. Lansdown Guilding, in his notice of a perfect recent *Encrinus*, found in the Caribbæan seas, and which, according to him, comes nearest to the *Stag's* Horn *Encrinite* of Parkinson, says that its capture has enabled him to settle the point (which way he does not in terms state) as to whether the animal is locomotive or fixed. He gives no detailed description of the species *Encrinus? Milleri*, but speaks of the *Sessile* genera of *Crinoidea*, and says that *E. Milleri* inhabits the Caribæan sea at great depths (in profundis), adhering to *Gorgoniæ*. He describes the *abdomen* of his species as being membranaceous, and situated between the bases of the arms. (*Zool. Journ.*, vol. iv. p. 173.)

EUGENIN, a substance which deposits spontaneously from the distilled water of cloves; it crystallizes in small laminæ, which are colourless, transparent, and pearly, and in time they become yellow: the taste of eugenin is but slight, and the smell much less strong than that of the clove. It is soluble in alcohol and æther in all proportions: by the action of nitric acid, like the oil of cloves, it becomes immediately, even when cold, of a blood-red colour. It is composed of oxygen, hydrogen, and carbon, in the same proportions as constitute the oil of cloves, with one equivalent less of oxygen and hydrogen.

EUGE'NIUS I., a native of Rome, was elected by the Romans, A.D. 654, as successor to Martin I., who had been sent into banishment to the Thracian Chersonesus by order of the Emperor Constans II., who favoured the schism of the Monothelites. Martin dying in the following year, Eugenius continued in dispute with the court of Constantinople till he died in 657, and was succeeded by Vitalianus.

EUGENIUS II., a native of Rome, succeeded Paschas I., A.D. 824, in the midst of great disorder which occurred at Rome owing to the corrupt state of society and mal-administration of that city. To reform these, the emperor, Louis the Good, sent his son Lotharius to Rome, who corrected many abuses which, by the account of Eginhardt and other chroniclers, had grown to an enormous extent. He confirmed the right of electing the pope to the clergy and people of Rome, but under the condition that the pontiff elect should swear fidelity to the emperor before the imperial missus or representative. Eugenius held a council at Rome, in which, among other things, it was decreed that in every episcopal residence, as well as in every country parsonage, there should be a master for teaching the people and explaining the Scriptures. Eugenius died in 827, and was succeeded by Valentinus, who, dying also after a few weeks, was succeeded by Gregory IV.

EUGENIUS III., a native of Pisa, of the Cistertian order, and a disciple of St. Bernard, succeeded, A.D. 1145, Lucius II., who had died of a blow from a stone inflicted in a riot of the Roman people. Arnaldo da Brescia was then preaching his reform at Rome, the senate had declared itself independent of the pope, and Eugenius was obliged to take up his residence at Viterbo. After some fighting and many negotiations between the pope, assisted by the people of Tivoli, and the Romans, Eugenius repaired to France in 1147, and the following year held a council at Rheims. He afterwards returned to Italy, and with the assistance of Roger king of Sicily defeated the Romans, and entered the city, A.D. 1149. New disturbances however arose, which obliged him to take refuge in Campania, where he received of St. Bernard the book *De Consideratione*, the subject of which was advice on his pontifical station and its duties. After having resided some time at Segni he made peace with the Romans, and returned to Rome in 1152. He died the following year, and was succeeded by Anastasius IV. It was under his pontificate that Gratianus, a Benedictine monk at Bologna, compiled his code of canon law called 'Decretum Gratiani,' which greatly favoured the extension of the papal power. [CANON LAW.]

EUGENIUS IV., Gabriele Condulmero, a native of Venice, succeeded Martin V. in March, 1431. His was a most stormy pontificate. He drove away the powerful family of Colonna, including the nephews of the late pope, from Rome, charging them with having enriched themselves at the expense of the papal treasury. Two hundred of their adherents were put to death, and the palaces of the Colonna were plundered; but their party collected troops in the country and besieged Rome. Eugenius, through the assistance of Queen Joanna II. of Naples, defeated the Colonna, and obliged them to sue for peace and surrender several towns and castles they held in the Roman state. He afterwards made war against the various lords of Romagna, who were supported by the Visconti of Milan; and he appointed as his general the patriarch Vitelleschi, a militant prelate, who showed considerable abilities and little scrupulousness in that protracted warfare, by which the pope ultimately recovered a considerable portion of territory. But as Vitelleschi intended to keep Romagna for himself, the pope had him put to death. The famous condottiere Sforza figured in all these broils. But the greatest annoyance to Eugenius proceeded from the council of Basel, which had been convoked by his predecessor, and which protracted its sittings year after year, broaching doctrines very unfavourable to papal supremacy. After solemnly asserting the superiority of the council over the pope, it forbade the creation of new cardinals, all appeals from the council to the pope, suppressed the annates, or payments of one year's income upon benefices, which were a great source of revenue to the papal treasury, and made other important reforms. Eugenius, who had been obliged to escape from Rome in disguise on account of a popular revolt, and had taken up his residence at Bologna, A.D. 1437, now issued a bull dissolving the council, recalling his nuncio who presided at it, and convoking another council at Ferrara. Most of the fathers assembled at Basel refused to submit, and summoned the pope himself to appear before them, to answer the charges of simony, schism, and others; and after a time proceeded against him as contumacious, and deposed him. Eugenius meanwhile had opened in person his new council at Ferrara, in February, 1438, in which, after annulling all the obnoxious decrees of the council of Basel, he launched a bull of excommunication against the bishops who remained in that assembly, which he characterized as a 'satanic conclave, which was spreading the abomination of desolation into the bosom of the church.' The Catholic world was divided between the two councils; that of Basel proceeded to elect a new pope in the person of Amadeus VIII. of Savoy, who assumed the name of Felix V., and was solemnly crowned at Basel. The council of Ferrara in the meantime afforded a novel sight. The Emperor John Paleologus II. came with Joseph, patriarch of Constantinople, and more than twenty Greek bishops, attended by a numerous retinue, and took his seat in the assembly. The object was the reconciliation of the eastern and western churches, which Eugenius had greatly at heart, and to which Paleologus was also favourably inclined, as he wanted the assistance of the powers of western Europe against the Turks. The plague having broken out at Ferrara, the council was removed to Florence. After many theological disputations on the subject of the Holy Ghost, of the primacy of the pope, of purgatory, and other controverted points, the decree of reunion of the two churches was passed, and signed by both parties in July, 1439. The emperor and partiarch returned to Constantinople highly pleased with Eugenius; but the Greeks took offence at the terms of the union, the schism broke out afresh, and the separation of the two churches has continued ever since.

A grave charge against Eugenius is, that he encouraged the Hungarians and Poles to break the peace they had solemnly sworn with the Turks, under pretence that their oaths were not valid without the sanction of the pope; he even sent Cardinal Julian as his nuncio to attend the Christian army. The result was the battle of Varna, 1444, in which the Christians were completely defeated, and King Uladislaus of Poland and Cardinal Julian lost their lives.

Eugenius died at Rome A.D. 1447, after a reign of sixteen years, and in the sixty-fourth year of his age. He left the church in a state of schism between him and his competitor Felix, his own states a prey to war, and all Christendom alarmed at the progress of the Turkish arms. In his last days he is said to have expressed himself weary of agitation, and to have regretted the loss of his former monastic tranquillity before his exaltation. He recommended peace and conciliation to the cardinals assembled around him. He was succeeded by Nicholas V., in favour of whom Felix V. soon after abdicated. The pontificate of Eugenius forms a most stirring and interesting period in the history of Italy and of the church. L'Enfant and Æneas Silvius, afterwards pope, have written the history of the council of Basel. See also the general collections of the councils and Baluze's 'Miscellanies.'

EUKAIRITE, a seleniuret of silver and copper, discovered by Berzelius. It occurs in thin films of a shining lead colour; opaque; its texture is granular; it yields readily to the knife, and acquires a silvery lustre. It occurs in a copper mine in Sweden. Before the blow-pipe it exhales strong smell of selenium, and with charcoal fuses into a brittle metallic globule. It consists of—

Selenium	26
Silver	38·93
Copper	23·05
Earthy matter	8·90
Carbonic acid and loss	3·12
	100·

EU'LABES. (Zoology.) [ROLLERS.]

EULA'LIA (Zoology), a genus established by Savigny, and placed by Cuvier among his Dorsibranchiate Annelids. [DORSIBRANCHIATA.]

EULEN-SPIEGEL. [ENGLISH DRAMA, vol. ix., p. 423.]

EULER, LEONARD, a celebrated mathematician of the last century, was born on the 15th of April, 1707, at Basle, in Switzerland; his father, Paul Euler, was the Calvinistic pastor of the neighbouring village of Riechen. He was a man remarkable for unostentatious piety, and imbued with a considerable knowledge of mathematics, which he had acquired under the tuition of James Bernouilli.

After being instructed by his father in analytical science, young Euler was sent to the university of Basle, in which John Bernouilli was at that time professor, and by his rapid progress and decided mathematical genius he so far gained the esteem of his teacher and of the sons, Nicholas and Daniel Bernouilli, that his father was easily dissuaded from his original intention of forming his son into a divine, and wisely allowed him to pursue unshackled the high distinctions then conferred by a profound scientific reputation.

A prize having been proposed by the French Academy of Sciences on the management of vessels at sea, the ambition of Euler, then only nineteen years of age, induced him to attempt an essay, which was received with considerable applause, though the prize was conferred on Bouguer, an old and experienced professor of hydrography.

The Academy of Sciences at St. Petersburg was then rising to a distinguished rank amongst similar institutions in Europe under the fostering patronage of Catherine I., who had invited several philosophers to her capital, among whom were the Bernouillis above mentioned. On the retirement of Daniel Bernouilli, Euler was appointed professor of mathematics under Peter I. in 1733; soon after which he married a Swiss lady named Gsell, by whom he had a numerous family.

His works previous to the date at which we have arrived were, with few exceptions, confined to those mathematical questions arising from the progressive march of the Integral Calculus, which, at that time, caused much emulation in different countries. In general, Euler was far more in his element in the abstruser parts of pure mathematics than in the applied; in many of the latter he was frequently conducted to paradoxical results.

In the memoirs of the Petropolitan Academy, 1729 and 1732, are found several of his memoirs on trajectories, tautochronous curves, the shortest line along a surface between two given points, and on differential equations; besides which he had published at Basle a physical dissertation on sound.

Euler found it convenient at this time to apply himself intensely to study, not more from his natural ardour for the sciences and the incentive of an increasing reputation than from the desire to avoid the political intrigues which, under a suspicious and tyrannical minister, then agitated Russia.

During this interval he published an excellent treatise on mechanics (Petersburg, 1736, 2 vols., 4to.), a treatise on the theory of music, and one on arithmetic, together with numerous papers in the Petersburg Memoirs, chiefly on astronomical and purely mathematical subjects, among which are contained his views on the solution of Isoperimetrical Problems, which embodied the profoundest researches on a matter of great analytical difficulty previous to the discovery of the Calculus of Variations by Lagrange. Upon the fall of Biren he gladly accepted an invitation from the king of Prussia to visit Berlin. When he was introduced to the queen-dowager in 1741, she was so much struck with the paucity of his conversation that on requiring an explanation, he replied that he had just returned from a country where those who spoke were hanged.

The princess of Anhalt-Dessau, being desirous to profit by the presence of Euler in Berlin, requested to be favoured with instructions on the known facts in the physical sciences. To this wish he fully acceded on his return to Petersburg in 1766, by publishing his celebrated work, 'Letters to a German Princess' (3 vols., 8vo., 1768); in which he discusses with clearness the most important truths in mechanics, optics, sound, and physical astronomy, having published previous to this date several isolated treatises and some hundred memoirs touching on every known branch of theoretical and practical mathematics. During his residence in Prussia he was much employed by the enlightened monarch who then governed that kingdom in questions connected with the mint, with navigable canals, &c. In the midst of such varied employments he was not forgetful of the ties which bound him to his native home: having learned his father's death, he went in 1750 to Frankfort to receive his widowed mother, and brought her to Berlin, where she lived until 1761, enjoying with a mother's feeling the glorious distinction to which her son by his talents and indefatigable industry had arrived.

An incident which occurred in 1760 showed how highly Euler was in general esteemed. The Russians having entered Brandenburg, advanced to Charlottenburg, and plundered a farm which belonged to Euler. When General Tottleben was informed who the propriotor was, he ordered immediate reparation to be made to an amount far above the injury, and the Empress Elizabeth presented him with 4000 florins.

In consequence of his unceasing application to study, Euler had the misfortune to lose the sight of one eye in 1735, and in 1766 that of the other; he however continued his valuable researches, some of his family acting as amanuensis, and his powers of memory are said to have been wonderfully increased even in his old age. He accepted the invitation of the empress Catherine II. of Russia to return to Petersburg in 1766, where he would have fallen a victim to an accidental fire which destroyed his house and property in 1771, but for the courageous efforts of a fellow-countryman (M. Grimon), who bore the old man away in his arms. His manuscripts were saved by the exertions of Count Orloff.

On the 7th of September, 1783, after some calculations on the motions of balloons, then newly invented, Euler dined with Lexell, and conversed on the lately-discovered planet Herschel. While playing with his grand-child, who was taking tea, he expired suddenly and without pain.

Euler was twice married in the same family, and had many children and grand-children; his habit of life was strictly religious, the labours of each day being closed with a chapter from the Bible and family prayer. A catalogue of his published and unpublished writings is given at the end of the 2nd volume of his 'Institutiones Calculi Differentialis,' 1787; and to the first is prefixed an eloquent Eloge by Condorcet.

Every useful subject of mathematical research engaged at some time the attention of Euler; and for relaxation he amused himself with questions of pure curiosity, such as the knight's move in chess so as to cover all the squares. His various researches have gone far towards creating the geometry of situation, a subject still imperfectly known. The following is one of the questions which Euler has generalized:—'At Königburg, in Prussia, the river divides into two branches with an island in the middle, connected by seven bridges with the adjoining shores; it was proposed to determine how a man should travel so as to pass over each bridge once and once only.'

The memoirs of Euler are principally contained in the following works:—'Comment. Acad. Petrop.,' 1729-51; 'Novi Comment. Acad. Petrop.,' 1750-76; 'Nova Acta Acad. Petrop.,' 1777-81; 'Mem. de l'Acad. des Sciences,' 1765, 1778; 'Recueil de l'Acad.,' 1727, &c.; 'Miscell. Beroll.,' tom. vii.; 'Mem. de l'Acad. de Berlin,' 1745-67.

EU'LIMA, a genus of marine Testaceous Gastropods, established by M. Risso.

Generic Character.—Shell turreted, acuminated, polished, with many whorls; aperture ovate, acuminated posteriorly; external lip thickened, generally forming numerous obsolete varices. *Operculum* horny, thin, its nucleus anterior.

Mr. G. B. Sowerby, who gives this generic character, says (*Zool. Proc.* 1834) that this genus of marine shells appears to be most nearly related to *Pyramidella* and *Rissoa*. A species, he adds, which has been long known has had the appellation of *Turbo politus* among British Linnean writers; and a fossil species has been placed by Lamarck among the *Bulini*, under the specific name of *B. terebellatus*. Mr. Sowerby separates the genus into the two divisions below stated, which are characterized by the two species above mentioned: one has a solid *columelia*, and the other is deeply umbilicated. All the species, he observes, are remarkable for a brilliant polish externally, and the shells are frequently slightly and somewhat irregularly twisted, apparently in consequence of the very obsolete varices following each other in an irregular line, principally on one side, from the apex towards the aperture. He describes sixteen species, chiefly from Mr. Cuming's collection.

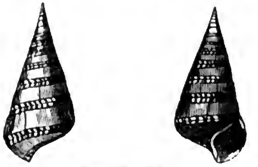
Geographical Distribution.—Wide; principally found, as yet, in warm seas (South and Central America, and Pacific Ocean, Australia) but there are several British species.

Habits.—The species found by Mr. Cuming were dredged or otherwise collected in sandy mud, coarse sand, and coral sand, on mother-of-pearl shells, or on the reefs; at depths (not including the reefs) ranging from six to thirteen fathoms.

a.

Perforated Eulimæ.

Example, *Eulima splendidula.* Shell acuminate-pyramidal, brownish, articulated with white and chestnut near the sutures; umbilicus large; aperture angulated anteriorly. Length 1·45, breadth 0·6 inches. Locality, Saint Elona, South America. Mr. Cuming dredged a single specimen in sandy mud at from six to eight fathoms depth.

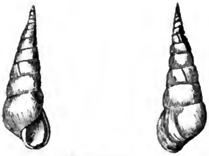


Eulima splendidula.

β.

Imperforate Eulimæ.

Example, *Eulima major.* Shell acuminate-pyramidal, opaque, milk-white; external lip subarcuated. Length 1·6 inches, breadth 0·4. Locality, the Island of Tahiti. The largest specimen was found in coral sand on the reefs.



Eulima major.

Fossil Eulimæ.

Mr. G. B. Sowerby says that the fossil species are found in the *calcaire grossier* near Paris.

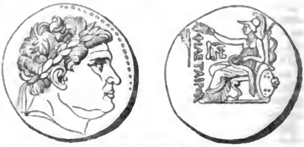
EULI'MENE. [Branchiopoda, vol. v., p 343.]

EULY'MENE. [Medusa.]

EUME'DONUS, a genus of brachyurous crustaceans, the first of the *Parthenopians* of M. Milne Edwards, and which, in his opinion, establish in some sort the passage between the *Stenorhynchi*, *Achæus*, on the one side, and *Eurynome*, *Lambrus*, and *Parthenope*, on the other. The form of the carapace is nearly pentagonal as in the latter, but it is, at the same time, thrown forwards, as it were, and scarcely overpasses the line of the feet of the hind pair of limbs, a disposition which recals the construction of the former. The *body* is depressed; the *rostrum*, which is very large and projecting, is only divided towards its extremity; the *eyes* are very short, and their peduncle entirely fills the orbits, which are circular; a character which again approximates these crustaceans to the *Stenorhynchi*· the internal *antennæ* are folded back very obliquely outwards, and the external antennæ are but little developed. The *epistome* is shorter than in the majority of the *Oxyrhynchi*. The *external jaw-feet* present nothing remarkable. In the male the *thoracic feet* of the first pair are large and much longer than the rest: all these are a little compressed, and their third joint is surmounted by a crest, which is not distinctly perceptible on the other joints; the feet of the second pair are rather shorter than those of the third and fifth pair, which are nearly as long as the fourth. The *abdomen* of the male is composed of seven articulations.

Example, *Eumedonus niger*. This small species, the only one known, is of a bronzed black colour, and inhabits the coasts of China. [Parthenope.]

EU'MENES, of Cardia, a town in the Thracian Chersonese, was an important actor in the troubled times which followed the death of Alexander the Great. [Alexander III.; Antipater; Arrhidæus; Perdiccas.] Being early taken into the service of Philip of Macedon, he served him for seven, and Alexander for thirteen years, in the confidential office of secretary. He also displayed great talent for military affairs through the Persian campaigns, and was one of Alexander's favourite and most esteemed officers. After Alexander's death, in the general division of his conquests, Cappadocia, Paphlagonia, and the coast of the Euxine as far east as Trapezus, fell to Eumenes' share. This was an expectancy rather than a provision, for the Macedonian army had passed south of these countries in the march to Persia, and as yet they were unsubdued. Perdiccas, however, took arms to establish Eumenes in his new government, and did so, at the expense of a single battle. To Perdiccas as regent, and after his death to the royal family of Macedon, Eumenes was a faithful ally through good and evil; indeed he is the only one of Alexander's officers in whose conduct any appearance of gratitude or disinterestedness can be traced. When war broke out between Ptolemy and Perdiccas, B.C. 321, he was appointed by the latter to the chief command in Asia Minor between Mount Taurus and the Hellespont (Cor. Nep., c. 3), to resist the expected invasion of Antipater and Craterus. The latter he defeated; but the death of Perdiccas in Egypt threw the balance of power into Antipater's hands, who made a new allotment of the provinces, in which Eumenes was omitted and Cappadocia given to another. The task of reducing him was assigned to Antigonus, B.C. about 320. The rest of his life was spent in open hostility or doubtful alliance with Antigonus, by whom he was put to death, B.C. 315, as is related in that article, vol. ii., p. 101. Eumenes was an admirable partizan soldier, brave, full of resources, of unbroken spirits. Those parts of Diod. Sic., book xviii., which relate to him, and Plutarch's *Life*, will be read with pleasure by those who are fond of military adventure. Plutarch (*Life of Eumenes*, c. ii.) speaks of some of his letters. The reader may consult also Droysen, *Geschichte der Nachfolger Alexanders*, Hamburg, 1836.



Coin of Eumenes.

British Museum. Actual size. Silver. Weight, 263 grains.

EUME'NIDES (the kind goddesses), a name given to the Erinyes or Furies, a set of goddesses whose business it was to avenge murder upon earth. They were also called Semnæ, or 'venerable goddesses.' The name Erinys was derived from the old Arcadian word *erinuein* (ἐρινύειν), 'to be angry.' (Pausan. viii., 25, 6.) These goddesses appear in the play of Æschylus which bears their name, not only as the instruments of wrath and the pleaders for justice against the matricide Orestes, but also as the promisers of victory, prosperity, and all sorts of blessings to the Athenian people this mixture of characters is to be explained by the fact that their worship was connected with that of a Demeter Erinys at Thelpusa, in Arcadia, and we have seen elsewhere how the goddess of the earth and its productions was also the goddess of the nether world. [Bacchus; Demeter.] The site of their temple at Athens, where their worship possessed a peculiar importance, was the north-east angle of the Areopagus, at its base. 'There is a wide long chasm there formed by split rocks, through which we enter a gloomy recess. Here is a fountain of very dark water'

(Wordsworth's *Athens* and *Attica*, p. 79.) The Athenians sacrificed to the Eumenides, among other victims, black sheep: no wine was mixed up with the libations offered to them, but only oil, honey, and water, in three separate libations, out of different vases. (Soph. *Œd. Col.*, 469, &c) Of the number of these goddesses we have contradictory accounts: in the play of Æschylus it is pretty certain that there were fifteen in the chorus. (Müller's *Eumenides*, § 10.) Every question connected with these divinities is accurately and satisfactorily discussed by Müller in the second essay at the end of his edition of the *Eumenides*, § 77—93.

EUMOLPUS, EUMOLPIDÆ. [ELEUSIS.]

EUMORPHUS, a genus of coleopterous insects belonging to the section *Trimeri* of Latreille, and being the typical genus of the family *Fungicolæ*. These insects are characterized by having the antennæ longer than the head and thorax, the body oval, and the thorax irregularly square; the maxillary palpi filiform, or slightly thickened at the end, but not terminated by a large process as in some genera: the last joint of the tarsus is always deeply divided into two lobes.

Latreille (*Règne Animal*) divides the genus Eumorphus into several sub-genera. Some of the species have the third joint of the antennæ much longer than any of the other joints: these form the genus Eumorphus (proper), in which the antennæ are club-shaped. All the species are natives of America or the East Indies. Ex.: Eumorphus immarginatus. (Latr. *Gener. Crust. et Insect.*, tab. xi., fig. 12.)

2nd Sub-genus, *Dapsus* (Ziég.). Some of the species have the antennæ club-shaped, as in Eumorphus proper, but straighter and more elongated, and with the joints bent laterally: among these, Eumorphus Kirbyanus (Latr.) is now placed. In other species of Dapsus the third joint of the antennæ is not longer than any of the others. Many of the species of Dapsus are indigenous in Europe, living in different fungi, whence the name of the family (Fungicolæ). Some of these insects are also found under the bark of the birch and other trees. 3rd Sub-genus, *Endomychus* (Fab.) has the three last joints of the antennæ bent laterally, larger than the others, and forming a triangular club-shaped mass. 4th Sub-genus, *Lycoperdina* (Latr.) has the maxillary palpi filiform, and the last joints of the labia are enlarged. [TRIMERI.]

EUNA'PIUS, one of those writers known by the name of Byzantine historians, was born at Sardes, in Lydia, A.D. 347. He began his studies under the care of Chrysanthius the Sophist, by whose advice he is said to have composed the lives of some philosophers and physicians. In his sixteenth year he left Asia for Athens to attend the lectures of Proæresius, by whom he appears to have been subsequently treated with the utmost kindness. On his voyage he was seized with fever of a very violent kind, which yielded only to treatment of a peculiar nature. After attending Proæresius for five years he meditated a journey to Egypt, in imitation, as Hadrian Junius says, of Plato and Eudoxus; this intention however he was prevented from fulfilling. He practised medicine with considerable repute, and distinguished himself by a vehement antipathy to Christianity, produced, as is probable, by its growing corruptions.

Besides his biographical works, he wrote a continuation of Dexippus' history, from the reign of Claudius Gothicus, where he quitted it, to the year 404 A.D. It is violently in favour of the old creed, and, in the opinion of Hadrian Junius, shared those peculiarities of style which distinguish the Sophists. All that remain of his historical works are contained in the recent edition of the Byzantine Historians. There is a complete edition of his works by Boissonade, in 2 vols. 8vo., Amsterdam, 1822, with Wyttenbach's notes, and a life by Hadrian Junius. (See Photius, codd. 77, 219; Suidas, under the word 'Κωνσταντῖνος;' and Eunapius in his life of *Proæresius*.)

EUNO'MIA. [MILLEPORIDÆ.]

EUNO'MIUS, one of the chiefs of the Arian sect during the greater part of the fourth century, was a native of the town of Dacora, in Cappadocia, and at first was a lawyer. It is said that he also followed for some time the military profession. He then became a disciple of Aetius, under whom he very successfully studied the doctrinal theory of Christianity as understood by the Anti-Trinitarians. At Antioch he was ordained a deacon, and about A.D. 360 he was elected bishop of Cyzicum. The divinity of Christ was at this period the all-absorbing subject of ecclesiastical controversy. The Trinitarians contended for the Athanasian or Homoousian doctrine (from ὁμοουσίος, of the same essence), against the Semi-Arians, who held the Homoiousian doctrine (from ὁμοιούσιος, of the like essence), and against the doctrine of the Anomoians (from ἀνομοίος, of a different essence). In defence of the last theory, or that of unmodified Arianism, Eunomius exerted a high degree of natural abilities, asserting the impossibility of two principles in a simple substance, one of which is generated from the other, and exhibits the relation of a son to his father. The divine essence, he said, is necessarily characterized by oneness and indivisibility; the persons of the Godhead, like the divine attributes of wisdom, justice, mercy, &c., are merely the names of ideal distinctions of the one Supreme Essence, as considered in its different relations with exterior objects, and it is contradiction and manifest absurdity to suppose this simple essence to consist of a plurality of principles or parts. In reply to these psychological subtleties, the advocates of the Trinitarian doctrine alleged the total incomprehensibility of the nature of God. (St. Basil, *Epist.* 166, St. Chrysostom, *De Incomprehensibilitate Dei Naturæ*.) Eunomius still acknowledged a father, son, and holy spirit, but the father as supreme, eternal, and distinct; the son as generated from the father; and the holy spirit as generated from the son.

In the ceremony of baptism he dipped only the head and shoulders, regarding the lower parts of the body as disreputable, and unworthy of immersion in the holy water; and it is said he taught that those who faithfully adhered to his own theory of Christian doctrine might commit any degree of sin without incurring the danger of perdition; but this is probably a misrepresentation by his opponents, who also accuse him of being an Antinomian, that is, one of those who reject the Mosaic law. (Theodoret, *Hæret.*, l. 4, c. 3; St. Augustin, *de Hæres.*; Epiphanius, *Hæres.*, 76; Baronius, *ad an.* 356.) Eunomius experienced a great severity of persecution without swerving in any degree from the Arian tenets with which he commenced his career. He was thrice banished from his episcopal see; first, by Constantius to Phrygia; then by Valens to Mauritania; and lastly, by Theodosius to the Island of Naxos: however, he died in peace, at a very advanced age, in the year 394. Most of his works are lost, including a copious commentary on the Epistle to the Romans, in 7 volumes, and numerous letters. Two of his principal treatises are printed in the *Bibliotheca Græca* of Fabricius, in Greek and Latin (tom. 8, pp. 235—305): 'A Confession of Faith,' presented in 383 to the Emperor Theodosius; and an 'Apologetic Discourse' in 28 chapters. (Cave's *Prim. Christianity*, part 2, c. 11; Pluquet's *Dict. de Hérésies*; Broughton's *Historical Dict.*; Dr. A. Clarke's *Succession of Sac. Lit.*, vol. i., p. 318; Basnage, in *Canisius*, i. 172.)

EUNUCH (εὐνοῦχος, *eunúchus*, literally, 'one who has the care of a bed'). The Greek word may be considered as descriptive of the functions of those who were made eunuchs, it being usual among the Persians to entrust the care of their wives and daughters to such persons. It does not appear that eunuchs were made by the Greeks, except as we shall presently mention. This peculiar species of barbarity was a Persian practice (Herod. vi. 32). It appears however that the Greeks sometimes carried on the trade of making eunuchs, whom they sold at Ephesus and Sardes to the Persians for high prices; the Persians considering that eunuchs generally were more trustworthy than other men. (Herod. viii. 105.) Tavernier tells us that in the kingdom of Bootan twenty thousand eunuchs were annually made in his time, to sell to other nations; and the seraglios of the East are principally served and guarded by them to the present day.

The Christian emperors of Rome forbade the practice of making eunuchs, particularly Constantine; and Justinian imposed a law of retaliation upon such as exercised this inhumanity. In Italy however the process of castration is still practised upon children intended to supply the operas and theatres of Europe as singers. The Council of Nice condemned those who from excess of zeal made eunuchs of themselves. Persons so mutilated were not admitted into holy orders. The reader who would know more on this subject may consult the 'Traité des Eunuques,' 12mo., 1707, by M. d'Ancillon.

Certain heretics of the third century bore the name of Eunuchs who had the folly or madness, after the example of Origen, not only to castrate those of their own persuasion, but all whom they could lay hands on. They were also called Valesians, from Valesius, an Arab, who was their chief. (See Epiphanius and Baronius' *Annals*, under the years 249 and 260.)

EUO'MPHALUS. [Trochidæ.]

EUPATO'RIA. [Crimea.]

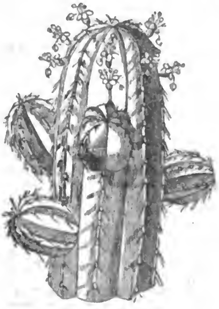
EUPATORIA'CEÆ, one of the tribes of composite plants admitted by De Candolle, who defines it thus:—'Style of the hermaphrodite flowers cylindrical; the arms long, somewhat clavate, covered externally with downy papillæ at the upper end. The stigmatic series but little prominent, and usually disappearing before they reach the middle of the arms of the style.'. Under this character are arranged 38 genera, the most extensive of which is the genus Eupatorium, including no fewer than 294 species.

EUPEN, a circle in the Prussian administrative circle of Aachen, or Aix-la-Chapelle, and in the western part of the province of the Lower Rhine, is, though wooded and mountainous, full of fine pastures. It contains about 76 square miles. It produces timber, grain, vegetables, flax, &c., and large quantities of cheese are made. There are considerable manufactures. Iron, calamine, and potters' clay, are among its mineral products. The population in 1816 was 17,419; in 1831, 19,058; and is now about 19,800.

EUPEN, the chief town (the Néau of the former department of the Ourthe), is situated in a fertile valley on the banks of the Weeze, in 50° 39′ N. lat. and 6° 1′ E. long. It is well built, and with its gardens and meadows covers a considerable surface. It has four churches and chapels, an orphan asylum, and a good school, and contains nearly 1200 houses. The number of inhabitants was 8805 in 1818; 10,534 in 1831; and is at present about 11,300. There are large manufactures of kerseymere and fine woollens. The other productions are woollen yarn, soap, chicory, powder, deals, blotting paper, &c. It is a place of extensive trade, and has several manufacturing villages in the neighbourhood.

EUPHEUS. [Isopoda.]

EUPHO'RBIA, a genus of exogenous plants, giving its name to an extensive and important natural order. It has very small monandrous naked male flowers, crowded round an equally naked female one, in the inside of an involucre looking like a calyx, and formerly mistaken for that organ. The species have either a common leafy appearance, with the involucres proceeding from among large foliaceous bracts, or they are nearly leafless, with their stem excessively succulent, so as to resemble Cacti. Those with the former character are natives of most parts of the world, and are the only kinds found in Europe; the succulent species chiefly appear in the hottest and driest countries. Barren uncultivated places in the plains of Hindostan and the arid regions of Asia and the north of Africa are their favourite stations; in the Canaries, on volcanic soil, E. Canariensis and laphylla form great bushes with arms like candelabras. From Cacti, which some of these plants much resemble, they are readily known by their spines, when they have any, not growing in clusters, and by their emitting, when punctured, an abundant discharge of milky juice. This, in a concrete state, forms what is called the gum-resin, or rather resin, called Euphorbium, an acrid, corrosive, most dangerous drug, principally furnished by E. officinarum, antiquorum, and E. Canariensis. The same properties exist in the herbaceous leafy species, diffused in some, concentrated in others.



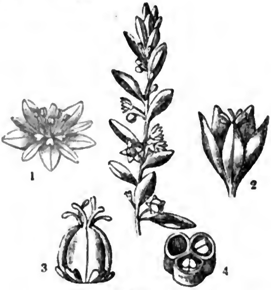
Euphorbia officinarum

E. Lathyris, a common weed in cottage-gardens, where it is called 'caper,' yields from its seeds an oil of the most violent purgative nature. If it were less dangerous it might be substituted for Tiglium oil. Fée states that with as much of this oil as could be sold for a franc ninety adults might be purged.

A few species, having the involucre of some showy colour, are cultivated as objects of ornament; otherwise they are looked upon as mere weeds.

EUPHORBIA'CEÆ, a natural order of exogenous plants, with unisexual flowers and tricoccous fruit. Their real affinity is a matter of great uncertainty. Jussieu placed them among his Diclinous Dicotyledons, and probably he was right in so doing; nevertheless there are many strong marks of resemblance between them and Malvaceous, Celastraceous, and even Elæagnaceous plants. The number of Euphorbiaceæ is unknown, but certainly very considerable. They vary from trees of the largest size to minute herbs, of only a few weeks' duration, and from having both calyx and corolla highly developed to the total absence of those organs. In fact they are constant in scarcely anything except the short character we at first assigned them, and in their sensible properties. Acridity, a virulent corrosive property, which sometimes is so concentrated as to render them most dangerous poisons, and sometimes so diffused as to be of little importance, with all imaginable intermediate qualities, exists throughout the order. Hence some are fatal, others drastic or purgative, and some simply laxative. They also occasionally secrete a farinaceous substance which, being separated from the poison is valuable for the food of man, as in the Cassava.

Among the more dangerous species of this order are the Manchineel, whose very shade is asserted to be dangerous, the Excæcaria, which derives its ominous name from its juice producing blindness; and the Euphorbias, that yield Euphorbium, Castor oil, and oil of Tiglium, well known valuable purgative medicines. Among other products may be named Cascarilla, the bark of a Croton, Turnsole, afforded by a Crozophora, Caoutchouc, the produce of Siphonia elastica, Hura crepitans, and others, and a kind of bird-lime yielded by Sapium aucuparium.



Andrachne telephioides

1, a male flower; 2, a female flower; 3, an ovary nearly ripe; 4, a section of a ripe fruit.

EUPHO'RBIUM, improperly called a gum, or gum-resin, since it is entirely destitute of any gum in its composition, is the concrete juice of several species of euphorbia either exuding naturally or from incisions made in the bark Much of the article found in British commerce is obtained from the Euphorbia Canariensis, while that which occurs on the continent is obtained from Euphorbia officinarum (Linn.) and E. antiquorum (Linn.), and other African species, particularly from an undescribed species, called by the Arabs *dergmuse*. The branches of this plant are used in tanning, and to it, according to Mr. Jackson (*Edinburgh*

Medical and Surgical Journal, vi. p. 457), the morocco-leather owes its peculiarities. By the most recent chemical analyses, euphorbium seems to consist of resin, wax, and saline matter (mostly malates). The resin is the active principle, and differs in some respects from most other resins.

Euphorbium is a powerful acrid substance, causing irritation and inflammation of the parts with which it comes in contact, and by sympathy affecting the nervous system. The dust received into the nostrils or eyes occasions violent sneezing and lachrymation, or even more serious affections of the eyes, so that it is necessary for those who grind this drug to protect the face by masks. Delirium and stupor approaching to apoplexy have followed the inhalation of the dust. When swallowed, it causes, in small doses, vomiting and purging; in larger doses it produces inflammation of the stomach, and sometimes proves fatal. It is now little used, even as an external application to produce vesication or ulceration, except by veterinary surgeons. It is sometimes used as an errhine, largely diluted with starch, and enters into the composition of some cephalic and eye-snuffs; but it is apt to be violent in its effects. In case of poisoning by it, demulcent or oily fluids should be given, and venesection employed if much inflammation ensue.

EUPHRA'TES. [Tigris.] As new information may be expected on the subject of the Euphrates, we have determined to treat of this double river system under the head of Tigris.

EU'PION, a liquid obtained by Reschenbach from animal tar, especially that of bones or horns. The process for procuring it is operose and complicated. Its properties are—that it is very limpid, colourless, inodorous, and tasteless; it boils at about 340° Fahr., and distils unchanged; it remains fluid at 4°. It is insoluble in water, but dissolves in alcohol, oil of almonds and of olives, oil of turpentine, naphtha, &c.; it dissolves chlorine and bromine, which are cooled when it is heated, and it also takes up camphor, stearin, and napthalin, at common temperatures, but when heated, in larger quantity; with iodine it forms a blue solution: it dissolves phosphorus, sulphur, and selenium, when heated, but the greater portion is deposited on cooling; caoutchouc swells in it, and when heated dissolves. It is not altered either by exposure to air, or by acids or alkalis. It has not been analyzed.

EU'POLIS, a writer of the old comedy, was born at Athens about the year 446 B.C. (Clinton's *Fasti Hellenici*, ii. p. 63), and was therefore a contemporary of Aristophanes, who was in all probability born a year or two after. The time and manner of his death are involved in great obscurity. It was generally said that he was thrown overboard by the orders of Alcibiades, when that general was on his way to Sicily in 415 B.C., because Eupolis had ridiculed him in one of his comedies; but this story, which is sufficiently improbable in itself, was refuted by Eratosthenes, who brought forward some comedies which he had written subsequently to that period (Cicero *ad Attic.* vi. 1); besides, his tomb was, according to Pausanias (ii. 7, 3), on the banks of the Asopus, in the territory of the Sicyonians. Another account states that he fell in a sea-fight in the Hellespont, and that he was buried in Ægina. We have the names of twenty-four of his plays, but no adequate specimens of them. To judge from the titles, the object of Eupolis must have been, in almost every case, mere personal satire. The *Maricas*, which appeared in 421 B.C., was an attack upon Hyperbolus, the demagogue; the *Autolycus* (420 B.C.) was intended to ridicule a handsome pancratiast of that name, who is the hero of Xenophon's *Symposium;* and the *Lacedæmonians* was directed against the political opinions of Cimon, who was too much attached to that people, and had even called his son Lacedæmonius (Thucyd. i. 45). From the concurrent testimony of Lucian (*Adv. Indoctum*, § 217), of Platonius, and of the scholiast on Juvenal (ii. 92), it appears that the object of Eupolis in writing the *Baptæ* was to ridicule Alcibiades for taking part in the obscene rites of Cotytto, and that it was for this attack that Eupolis was thrown into the sea. (See Buttmann's *Essay on the Cotyttia and the Baptæ*, *Mythologus* ii. p. 159, &c.) Aristophanes and Eupolis were not upon good terms. Aristophanes speaks very harshly of his brother poet in *The Clouds* (551, &c.), and charges him with having pillaged from *The Knights* the materials for his *Maricas;* and Eupolis in his turn made jokes on the baldness of the great comedian (Schol. on *The Clouds*, 532). Eupolis published his first play when he was only seventeen years old (Suidas).

EURE, a river in France, which rises in the marshes and pools which occupy the eastern extremity of the department of Orne, near the town of Longny. Seven or eight miles from its source it enters the department of Eure et Loir, through which it flows in a south-east direction for about 25 miles without receiving any considerable accession. It then turns northward, and flows in that direction for about 85 miles, through the departments of Eure et Loir and Eure, and past the towns of Chartres, Maintenon, Anet, Ivry, Pacy, and Louviers, into the Seine, which it joins just above Pont de l'Arche; receiving in succession the rivers Voise on the right bank; the Blaise, which waters Dreux, and the Arve or Aure from Nonancourt, on the left; the Vesgre, from Houdan, on the right; and the Iton, which passes Damville and Evreux, on the left. Its whole course is nearly 120 miles. It is navigable from Pacy, about 27 miles above its junction with the Seine, or, according to another authority, from St. George's at the junction of the Aure, about 20 miles higher up; but the navigation is liable to frequent obstructions. It is chiefly used for the conveyance of salt, and of wood for building and fuel for the supply of Rouen. The Eure never freezes in winter.

EURE, a department in the north of France, comprehending a portion of the antient Normandie. It is bounded on the north by the department of Seine Inférieure, from which it is partly separated by the Seine; on the east by the departments of Oise and Seine et Oise, from both of which it is in part separated by the river Epte, a feeder of the Seine; on the south by the department of Eure et Loir, from which it is partly separated by the rivers Eure and Arve, or Aure, the latter a feeder of the Eure; on the south-west by the department of Orne, and on the west by that of Calvados. The form of the department is very irregular; its greatest length is from north-east on the Epte, near Mainville, to south-west, near Monnay, on the road from Rouen to Alençon, 68 miles, and its greatest breadth at right angles to the length, from Fiquefleur, on the Seine, to St. George's, at the junction of the Arve with the Eure, 65 miles. The area of the department is 298 square leagues, or 2297 square miles, rather more than the joint area of the English counties of Cumberland and Westmoreland, and rather less than the average of the French departments. Its population in 1832 was 424,248, or nearly 185 to a square mile, being considerably greater than both the relative and absolute population of the average of the French departments; and very far exceeding that of the two English counties just mentioned. The department lies between 48° 39′ and 49° 29′ N. lat., and 0° 15′ and 1° 48′ E. long. The capital is Evreux, in 49° 1′ N. lat., and 1° 8′ E. long.

The department has, properly speaking, no mountains, though that name is given to the crags which rise at the mouth of the Seine, near Quillebœuf, and do not much exceed 300 feet in height. Mount Rôti is the highest hill in the department; its barren summit rises above the fertile plain round Pont Audemer. The rivers all belong to the basin of the Seine, except the Calone, which falls into the Touques at Pont L'Evêque, in the department of Calvados. The Seine crosses the eastern side of the department in a north-western direction past Vernon, Petit Andely, and Pont de l'Arche, and flows for a short distance along the boundary. In its sinuous course below Rouen it again touches the northern boundary of the department three times, separating it from that of Seine Inférieure: its course within the department is about 40 miles, and along the border 27 miles; for all which it is navigable. The Eure crosses the department in a northward direction; 10 miles of its course are upon and 36 miles within the border, for 25 of which, or according to some, for the whole of which it is navigable. [Eure river.] The Arve, or Aure, has nearly 30 miles of its short course within or upon the border of the department: it flows east by north and joins the Eure on the border of the department at St. George's; it passes Chênebrun, Verneuil, and Nonancourt. The Iton rises in the department of Orne, and crosses this department in a winding channel in a north-eastern direction; its length is 60 to 65 miles; nearly the whole of its course is in this department; it passes Bourth, Breteuil, Damville, and Evreux. The Rille rises in the department of Orne, and crosses that of Eure in a northward direction till it falls into the Seine between Quillebœuf and Honfleur. It passes the towns of L'Aigle, in the department of Orne; and of Rugles, Neuve-

Lire. Beaumont, Brione, Pont-Authou, Annebaut, and Pont-Audemer in that of Eure; it receives between Beaumont and Briône the Charentonne, which rises in the department of Orne, and flows north-north-east past Chabrières and Bernay; the Charentonne receives the Gruil. The length of the Rille is nearly 80 miles, that of the Charentonne about 35 miles, and that of the Gruil 16 to 18 miles. The Epte and the Andelle, both feeders of the Seine, rise in the department of Seine Inférieure, and water the eastern side of the department of Eure; they have a length of about 50 and 28 miles respectively. Part of the course of the Epte is on the border of the department; most of that of the Andelle is within it.

The Iton and the Rille are, in one part of their course, absorbed by the strata over which they flow: the Iton loses itself near Damville, and flows underground for two miles.

The department is almost entirely occupied by the chalk which encircles the Paris basin and the strata more immediately connected with it, and covered with a vegetable soil, for the most part clayey, and very thin on the crests of the hills. Along the bank of the Seine there are some tracts covered with barren sand, and other parts are covered with the debris of quartz and silex, quite incapable of cultivation. Below Quillebœuf, a marsh on the bank of the Seine, once covered by the tide, has been reclaimed and brought into cultivation.

The climate is in general mild, moist, and changeable, bearing a considerable resemblance to that of England. The west and north-west winds bring rain and fog; these winds, with the north and the south-west, are the most common. The country is better wooded than France generally is, though it does not admit of comparison in this respect with England. In descending towards Pacy on the Eure, on the road from Paris to Caen, the magnificence of the prospect is very striking. The valley of the Eure, broad and perfectly level, abounds with fine trees, which enclose the rich meadows. But though the country is rich and fertile, the habitations of the peasantry are very wretched, being clumsily built of wood and earth, like the habitations of five or six centuries ago in the rest of France, and covered with thatch. Bricks and tiles might be made in the department, and houses built less liable to destruction by fire.

The agriculture of the department is considered to be in advance of that of the greater part of France. The produce in grain is considerable; in wheat it is twice as great as the average produce of the departments; and in rye and mixed corn or maslin three times as great: a considerable quantity of potatoes is grown, a small quantity of oats, and very little barley or buckwheat. The quantity of woodland is nearly a sixth of the whole area of the department; the quantity of land occupied in vineyards is small, and the amount of wine made is trifling. The plum, the pear, and the apple, are the fruits most cultivated: the principal timber trees are the oak, the beech, the elm, the hornbeam, the aspin, the service tree, the chestnut, the birch, and, in the valleys, the alder, the ash, the poplar, and the maronnier, or large chestnut tree. In the arrondissemens of Bernay and Pont Audemer, fine flax is grown from seed imported from Riga and Holland; and in various places, leguminous plants, hemp, weld or dyers' weed (for dyeing yellow), and teazles are cultivated. The farming is not very neat; and the hedgerows and ditches are not well kept. Plantations might be increased on the higher grounds. There are many natural meadows and pasture lands, and the cultivation of the artificial grasses is on the increase: the quantity of cattle is not much more than half the average of France, but the number of horses is above half as much again as the average. Horses are much employed in the labours of the field: the fine Norman breed, which the long wars had nearly destroyed, has been renewed with great care. The number of sheep is rather above the average of France: the wool is ordinary; but the flesh of those fed near the sea is delicate and in good repute. The number of swine and the quantity of poultry are considerable. Small game is tolerably plentiful; but the larger sorts the roebuck, the stag, and the wild boar, which were formerly abundant, have been almost entirely destroyed since the Revolution. The rivers abound with fish, especially tench; and great quantities of the salmon and the shad ascend them from the sea and are taken.

The mineral productions are iron, freestone, sandstone, millstones, lime and gypsum, potters' clay, brick earth, and fullers' earth. There are several cold mineral springs; those of Vieux Conches are in the highest repute.

The manufactures of the department are various and important: Dupin (*Forces Productives et Commerciales de la France*, Paris, 1827), states the number of establishments of various kinds at 1511, of workmen at 30,157, and the value of the articles produced at 26,772,297 francs, or above 1,100,000*l.* The workmen are thus classified by Malte Brun: in the woollen manufacture 8500; in the iron and copper works 8000; in the tape manufacture 6000; in the cotton manufacture 4500; in the leather manufacture 1000; in the manufacture of glass, paper, and hosiery 2000. The population is not however collected into large towns, there being no town with 10,000 inhabitants, and only five which have 5000; and taking the whole department, the rural population is to that of the towns as nearly 5 to 1. There are many iron-works, and at Romilly on the Andelle are some of the most extensive and important copper-works in France; nails and pins are made at Rugles on the Rille, cards for carding wool and cotton, and machinery at Louviers, and machinery in the arrondissement of Louviers. The manufacture of linens is widely extended; the linens of Bernay are much esteemed. The woollen cloths of Louviers are among the best in France: other cloths of inferior quality, druggets and flannels, are made in different places in the department. Leather of excellent quality is made at Pont Audemer, and there are tan-yards at Evreux and other places. Tapes are made at the town and in the arrondissement of Bernay, bed-ticks at Evreux, and printed calicos and other cotton goods in various places: cotton and woollen and linen yarn are also spun. To the above articles may be added hosiery (at Pont Audemer), thread (at Bernay), glass, paper, musical instruments, ivory and boxwood combs. Dyeing and bleaching have been carried to great perfection.

The exportations to foreign countries consist of woollen cloths of all kinds, bed-ticks, linens, cotton goods, leather, copper goods, and pins: similar articles, together with iron goods, wood for the shipwright and the builder, and for fuel, corn and cattle, are sent into other parts of France. The imports consist chiefly of the raw material for the various manufactures.

The navigation of the Seine enables the department to communicate readily with Rouen and Paris: a cut in one part shortens the navigation a little: the Eure is navigable for a considerable part, if not the whole of its course in this department: the Iton is used for floating during part of its course; but the Rille is no longer used for that purpose It is navigable however up to Pont Audemer The length of the navigable rivers and canals is half as much again as in the average of France. The department is also better provided with roads than the greater part o France: the road from Paris to Caen and Cherbourg crosses it from east to west through Pacy and Evreux; that from Paris to Rouen by Pontoise (department of Oise) and Ecouis: and that from Paris to Rouen by Vernon, Gaillon, and Pont de l'Arche, along the valley of the Seine, cross it from south-east to north-west. Roads from Rouen to Honfleur (department of Calvados) by Pont Audemer; to Alençon (department of Orne) through Bourgtheroude, Briône, Bernay, and Chambrois; and to Evreux through Pont de l'Arche and Louviers; and from Evreux by Vernon to Gisors, also cross it in different directions. The road from Paris to Dieppe just passes through Gisors in the eastern extremity of the department; and that from Paris to Alençon, Laval, Rennes, St. Brieuc, and Brest, crosses the department just within the southern boundary following the valley of the Aure or Arve through Nonancourt, Tillières and Verneuil. A road from Rouen to Beauvais just touches the north-east extremity of the department. The other roads are bye-roads.

The department is divided into five arrondissemens: that of Les Andelys, in the east and north-east; that of Pont Audemer, in the north-west; that of Bernay, in the south-west; that of Evreux, in the south; and that of Louviers central. The population is thus distributed among them —Les Andelys, 64,337; Pont Audemer, 89,744; Bernay, 82,828; Evreux, 118,397; and Louviers 68,942. The number of cantons or districts under the jurisdiction of a justice of the peace is 36; that of the communes 844.

The principal towns are Evreux, the capital, on the Iton, population 7988 for the town, 9963 for the whole commune; Louviers, on the Eure, population 8627 for the town, 9885 for the whole commune; Pont Audemer, on the Rille, population 5305; Bernay, on the Charentonne, population

4480 for the town, 6605 for the whole commune; and Les Andelys, on the Seine, population 3432 for the town, 5168 for the whole commune. [ANDELYS, LES; BERNAY; EVREUX; LOUVIERS.] The population is from the returns of January 1, 1832.

In the arrondissement of Les Andelys there are Gisors, Etrépagny, Ecouis, Maineville, Lions-la-Foret, Charleval, and Ecose.

Gisors is on the Epte, which divides it into two parts, and on the road from Paris to Dieppe, 39 miles from Paris. The castle was built about A.D. 1100. In the wars of the English in France under Henry V., Gisors was taken by them; but it was afterwards delivered up to the French by the treachery of the governor. In the war of the 'League of the Public Good' against Louis XI. this town was taken by the revolted lords. There are considerable remains of the castle at the extremity of the town towards Rouen, on the river Epte. From its position and general outline, it much resembles the remains of Launceston Castle in Cornwall. The inclosure of the castle is now used as a market-hall; the fosse is planted with trees, and forms a promenade. Some portions of the antient town-wall yet remain. The church of Gisors is a large well-proportioned cross church, adorned with much elaborate sculpture; but its architecture is for the most part a jumble of Gothic and Roman. (Dawson Turner's *Tour in Normandy.*) It has some fine painted glass windows. The town itself is poor, but its situation is delightful, and the walks very pleasant. The population in 1832 was 3248 for the town, or 3533 for the whole commune. The inhabitants are engaged in bleaching calicoes and other fabrics, and manufacture cotton-yarn, printed calicoes, blonde and other lace, leather, glass and beer; they trade in corn and calves for the supply of Paris. There are a high school, a school of mutual instruction, a school for outline-drawing, and an hospital. Near Gisors is the antient castle of Vaux, now in ruins.

Etrépagny, otherwise Estrépagny or Trépagny, a small town a short distance west by north of Gisors, has a substantially-built church. Its population, as given in Dulaure's 'Histoire des Environs de Paris' (Paris, 1828), our latest authority, was 1250. The inhabitants manufacture lace, cotton-yarn, and knit goods, and trade in grain, pulse, cattle, and hemp. There are two fairs in the year.

Ecouis is on one of the roads from Paris to Rouen. It has a market-place covered in with wood, a château of modern construction, and an antient parish church, formerly collegiate. The last mentioned is a substantial but rather plain building in the form of a Greek cross; it contains the statues of several saints and the tomb of Jean de Marigny, archbishop of Rouen. The inhabitants are given by Dulaure at 634: they manufacture lace. There are two fairs in the year.

Maineville is near, but not on the Epte, a few miles north of Gisors.

Lions-la-Foret is on the little river Lieur, which flows into the Andelle. It was inhabited in the Roman times, as appears from some antient tombs, columns, painted walls, medals, and other antiquities discovered here at the beginning of the last century. There was in the middle ages a castle at Lions, where Henry I. of England died A.D. 1135. The population of the commune is given by Dulaure at 1900. The inhabitants manufacture printed calicoes and leather, and trade in corn.

Charleval is a small town at the junction of the Lieur with the Andelle. It takes its present name from a residence built here by Charles IX., of which there are some remains. Calicoes are printed and paper made. The neighbourhood is fertile.

Ecose or Ecos, a very small place, is near the Epte, and between Gisors and Vernon.

Pont St. Pierre, a village on the Andelle, has fulling-mills, a cloth factory, and a cotton-mill, in which above 300 workmen are employed; and at Romilly, just across the river, is an extensive foundry, employing above 300 workmen. Copper, brass, and zinc in sheets, and brass wire for pins are produced. At these works zinc is used instead of lapis calaminaris in the manufacture of brass. The coal is brought from Anzin and St. Etienne, in France [ANZIN; ETIENNE, ST.], and from Belgium.

In the arrondissement of Pont Audemer are Pont Audemer, Beuzeville, Conteville, Cormeilles, Lieurey, St. George du Vièvre, Pont Authou, Annebaut or Appeville, Bourgthéroude, Bourgachard, Routot, Bourneville, and Quillebœuf.

Pont Audemer is on the left bank of the Rille, and on the road from Rouen to Honfleur, 29 miles from Rouen. In the Norman period it was a military station, and was the first scene of conflict between Henry I. of England and his rebellious Norman barons: the victory was gained by the king, to whom the fortress immediately surrendered. In the fourteenth century it was defended successfully by its lord, the count of Evreux, against the generals of the king of France: this was the first siege in which cannon were employed in that kingdom. It was afterwards taken by Duguesclin, its castle razed, and the walls and towers of the town destroyed. It is a small neat place, at the foot of an eminence, with handsome streets and good brick houses. It is defended by walls and a ditch, which may be filled with water at will by means of sluices. It has four gates, and several places or squares. There are several churches, but some of them are now desecrated and converted to other uses. The population in 1832 was 5305: the inhabitants manufacture cotton yarn, printed calicoes, muslins, bed-ticks, tapes, hosiery, and especially leather. The leather is thought to be the best in France. There are an agricultural society and a theatre. The river is navigable up to this town: several of the arms into which its channel is divided have mills on their banks.

Beuzeville has a population of above 2000: the inhabitants are engaged in tanning leather and sawing marble they have some linseed-oil mills.

Conteville is near the mouth of the Rille. The 'Dictionnaire Universel de la France,' our latest authority (Paris, 1804), gives its population at 900.

Cormeilles is on the road between Pont Audemer and Lisieux. It had formerly a Benedictine abbey, founded by William Fitzosborne, a relation of William the Conqueror. The church and other monastic buildings, which had gone much to decay, were repaired in the early part of the last century. The population, according to the 'Dictionnaire Universel de la France,' was 1210. There are an oil-mill, a paper-mill, and tan-yards; linen and calico are manufactured, and some trade carried on in corn.

Lieurey and St. George du Vièvre (population 900), where linen and paper are made, are between the Calone and the Rille.

Pont Authou (population 628), where woollen yarn is spun and cloth made, and cattle sold, and Annebaut (population 1150), where are the ruins of an antient castle, are on the Rille. The population of these places is given from Dulaure: it is not the last return.

Bourgthéroude, near the boundary of the department, not far from Elbœuf, derives its name (in Latin *Burgus Thuroldi*) from Thurold, one of the preceptors, and afterwards grand constable, of William the Conqueror. Its church was formerly collegiate. The inhabitants are given by Dulaure at 738.

Bourgachard is not far from Bourgthéroude. There was an abbey at Bourgachard, but it is now levelled with the ground; there is an hospital or almshouse. The population is given by Dulaure at 1114. The market is considerable.

Routot (population 1100, Dulaure), which trades in cattle and wool, and Bourneville (population 781, Dulaure), are on a bye-road from Bourgachard to Quillebœuf, which is on the left bank of the Seine, on a point formed by a bend of the river. Its port is much frequented by the boats which navigate the Seine, and those vessels which are too large to ascend the river as far as Rouen discharge their cargoes here. It was formerly a place of considerable strength. The inhabitants (1500, Dulaure) carry on a considerable fishery, or pilot vessels up the Seine; the women manufacture lace.

Montfort, on the Rille, between Pont Authou and Annebaut, is given as a village in some of our authorities, as a town in others. It has the ruins of an antient castle, besieged for thirty days in A.D. 1122 by Henry I. of England, and gives title to an English peer. The inhabitants (520, Dulaure) manufacture leather, paper, and woollen cloth, and trade in cattle and linen.

In the arrondissement of Bernay are Le Bec, Briône or Brionne, Beaumont le Roger, La Barre, Beaumenil, Chambrois, Thiberville, and Harcourt.

Le Bec, sometimes distinguished as Le Bec Helloüin, is near the bank of the Rille. Here, before the Revolution, was a Benedictine abbey of the congregation of St. Maur, one of the wealthiest in Normandie, founded by Hellouin, a noble of the country, about A.D. 1034. The abbot's patronage was very extensive. Soon after its foundation this abbey became the seat of a famous school, founded here by Lanfranc, one of the monks of the convent, afterwards archbishop of Canterbury. Anselm, Theobald, and Hubert, also inmates of this abbey, were subsequently raised to the same archiepiscopal see, and Roger, the seventh abbot, had the offer of that dignity, but refused it. The sees of Rochester, Beauvais, and Evreux, were filled by monks from this abbey, which furnished abbots to the convents of Chester, Ely, and St. Edmund's Bury. The Empress Maud, daughter of Henry I. of England, is said to have been buried here. The abbey was fortified when Henry V. invaded France, and stood a siege of a month before it was surrendered to the English. The greater part of the conventual buildings still exist. The tower, 150 feet high, a few ruined arches, and one of the side chapels, are the only parts of the church which remain. A part of the grounds are appropriated to a stud for keeping up the breed of Norman horses. The town of Le Bec is unimportant: its population is about 700

Brionne was, under the dukes of Normandie, a place of some importance; it had three churches, an abbey, and a lazar house, beside an antient castle, of which some slight remains exist, and it was the capital of an earldom, created in favour of a son or brother of one of the dukes of Normandie. The town is pleasantly and advantageously situated on the banks of the Rille. It has only one church now. The inhabitants may be estimated at about 2000. A mill for spinning cotton yarn employs 120 hands, and a cloth factory 500· rape and linseed oils are expressed.

Beaumont le Roger, on the Rille, had also a strong castle and a Benedictine priory. The inhabitants are given in the *Dictionnaire Universel de la France* at 1325: a cloth factory employs 400 hands, a glass-house 100; bottles, chiefly intended for Bretagne, are blown in great quantity at the latter establishment.

La Barre and Beaumenil are between the Rille and the Charentonne: their population was, according to the *Dictionnaire Universel*, 946 and 484 respectively.

Chambrois is on the Charentonne, above Bernay; and Thiberville, near the source of the Calone; the inhabitants of the latter (population 1200 according to the *Dictionnaire Universel*) are occupied in weaving tape. This branch of industry employs at the neighbouring village of Drucourt and the surrounding communes, 4600 workmen.

Harcourt, not far from Brionne, gives title to an English nobleman: there are some remains of an antient castle, built by Robert de Harcourt, one of the companions of William the Conqueror in his invasion of England: the *Dictionnaire Universel* gives the population at 1297.

In the arrondissement of Evreux are Neuvelire, Rugles, Conches, Damville, Breteuil, Bourth, Chênebrun, Verneuil, Tillières, Nonancourt, Ivry, Pacy, St. André, Villiers-en-Desœuvre, and Vernon.

Neuvelire (otherwise Neuvelyre) and Rugles are on the Rille; the latter is higher up the stream. Neuvelire has 600 inhabitants, who trade in corn and cattle; at Viellelyre, near it, there are iron works. Rugles is of more importance; it is the centre of a pin manufacture which employs 2500 workmen, and of a nail manufacture which employs 3600 more. Zinc and copper are rolled out into sheets: the manufacture of iron cables, once carried on in this town, has been transferred to Nevers, in the centre of France.

Conches (pop. in 1826 1725) is on the river Conches, a small stream which joins the Iton between Damville and Evreux. Nails, agricultural implements, and other iron goods, are manufactured here: there are tan-yards, paper, oil and tan mills, and trade is carried on in iron, earthenware, hay, and cattle. The iron work of the bridges des Arts and d'Austerlitz at Paris were cast here.

Damville, Breteuil, and Bourth, are all on the Iton. Their population is given by Dulaure at 762, 2000, and 1670, respectively: there are iron works at all of them. Pins are made at Bourth; and at Breteuil, cannon of every calibre, projectiles of all kinds, screw taps, cauldrons, iron pots and other iron wares, tiles, and bricks. There are at Breteuil mineral waters and the remains of a castle, built by William the Conqueror.

Chênebrun, or Chennebrun, is on the Aure: it is very small; its population is about 360.

Verneuil is on the Avre: it is well laid out with broad straight streets, but wretched and ill-built houses of earth and wood, with a few only of brick: it had in 1832 a population of 3722 for the town, or 4178 for the whole commune. The manufactures of this town and its vicinity consist of leather for bookbinders (but this branch of industry has much declined) and of cotton hose, but this is also languishing. There is a Gothic church in the town, the steeple of which is said to have been built by the English, and an old tower, the remains of a castle which formerly defended the town. This tower is popularly but erroneously ascribed to the Romans. The site of the ramparts has been laid out in promenades. The English obtained a victory over the French at Verneuil in the reign of Henry VI., A.D. 1424. There is a small library.

Tillières and Nonancourt are also on the Aure: they have a population (according to Dulaure) of 950 and 1359 respectively. At Tillières pins and nails are made; and at Nonancourt woolcombers' cards, machinery, woollen and cotton yarn, woollen cloth, calicoes, hosiery, linen, and paper; trade is also carried on in corn and cattle.

Ivry, on the Eure, at the junction of the Vesgre, is celebrated for the battle fought in the adjacent plain, in which Henri IV. routed the army of the League under the duke of Mayenne, A.D. 1590. A pyramid, overthrown at the Revolution, but restored by Napoleon, commemorates the battle. It is a town of 800 inhabitants (Dulaure), who manufacture musical wind instruments, ivory and boxwood combs, cotton yarn, and leather, and carry on trade in corn, cattle, and horses.

Pacy is on the Eure, at the point where, according to some of our authorities, the navigation begins, in a fertile valley. It was antiently a place of some importance, and was defended by a castle and strong ramparts. Before the Revolution it had three churches (one parish church and two others) and a Benedictine abbey. The inhabitants, 1364 in number (Dulaure), trade in cattle and horses (for which they have a large fair), corn, woollen and linen cloth, and iron.

St. André, between the Eure and Iton, had a population of 977 (Dulaure): some trade in cattle is carried on.

Villiers en Desœuvre, a short distance from the bank of the Eure, had a population of no more than 450 (Dulaure); it has some trade in cattle and horses.

Vernon is on the left bank of the Seine, and on the road from Paris to Rouen. Here was in antient times a castle, which William the Conqueror bestowed on his relation, Guy, son of the count of Bourgogne, and which was strengthened by Henry I., the Conqueror's son. The town is situated in a singularly beautiful valley, and is connected by a bridge of twenty-two arches with the suburb of Vernonnet, on the other bank of the Seine. Of the antient defences of the town there remains only a tower, in which the archives of the place are preserved. The church, part of which exhibits some very early Norman architecture, was formerly collegiate; it contained before the Revolution several monuments. The population in 1832 was 2703 for the town, or 4888 for the commune, including the suburb, Vernonnet. Cotton velvet, plain and printed calicoes, leather, and cotton yarn, are manufactured: there is an establishment for making the equipage of the artillery, and another for sawing stone; also lime, gypsum, and tile kilns: trade is carried on in corn, flour, wine, wool, feathers, and cattle.

The arrondissement of Louviers contains Pont de l'Arche, Gaillon, and Neufbourg.

Pont de l'Arche is on the left bank of the Seine, just below the junction of the Eure, and at the point where the tide ceases to be perceptible. It owes its origin to Charles le Chauve, who erected here a palace, in which he convened councils, held assemblies of his nobles, and drew up edicts; and built a fine bridge, defended at one extremity by a citadel, from which the name of the place (in Latin Pons Arcis) is derived, and which was demolished about the beginning of the Revolution. Pont de l'Arche was burned by the English under Edward III. The walls of the town yet remain flanked by circular towers. The bridge is the lowest stone bridge down the Seine, and the only one of any kind between Vernon and Rouen: it is a picturesque object, with mills in some part of its length, and a lock under one of the arches to facilitate the navigation of the river and render it secure. On the bank of the river near the town are the remains of a Cistertian abbey, founded, A.D. 1190, by Richard Cœur de Lion, in pursuance, it is said, of a vow which he had made when nearly lost in the rapid current of the Seine. The church of Pont de l'Arche, though much dilapidated, is a fine building in the decorated style of Gothic architecture: it has some rich carving, and handsome painted windows. The population is given by Dulaure at 1480: the inhabitants manufacture woollen cloth, and trade in cattle, horses, and fruit-trees.

Gaillon is near the left bank of the Seine, between Pont de l'Arche and Vernon. This town was bestowed by St. Louis on the archbishop of Rouen, whose successors had a palace here up to the period of the Revolution, and enjoyed the sole right of trying civil and criminal causes. This palace, destroyed in the wars of the English, A.D. 1423, was rebuilt a century afterwards by the archbishop, George d'Amboise, and embellished by his successors: after being nearly destroyed during the Revolution it has been repaired and fitted up as a prison, and contains now 1200 to 1400 prisoners who are employed in making carpets and cotton goods, and plaiting straw. There was a Carthusian convent here before the Revolution, founded by one of the archbishops of Rouen. A fountain in the town has the property of incrusting with its deposits any object thrown into it. Gaillon is a poor place; its population is given by Dulaure at 1030. The inhabitants carry on trade in cattle and woven goods. Near Gaillon are vineyards, the most northern in Normandie: the grape grown is the small black cluster; the wine produced is of very inferior quality.

Neufbourg or Neubourg, between Louviers and Beaumont le Roger, has the remains of an antient castle where the eldest son of Henry II. of England espoused Marguerite daughter of Louis VII. (*Le Jeune*) of France. The inhabitants, whom Dulaure gives at 1675, manufacture linens and calicoes, dimities, fustian, &c., and carry on trade in corn, wood, cattle, and iron goods.

The department constitutes the diocese of Evreux, the bishop of which is a suffragan of the archbishop of Rouen: it is in the jurisdiction of the Cour Royale of Rouen, and in the circuit of the 'Academie,' or council of education of that city. It is in the 14th military division, of which Rouen is the head-quarters. It sends seven members to the Chamber of Deputies. Education is more attended to than in the average of the French departments: it furnishes one male scholar for every twenty-four inhabitants. This department consists of parts of the former districts of Le Vexin Normand, Le Roumois, La Campagne, Ouche, Lienvin, all in Haute or Upper Normandie.

EURE ET LOIR, a department in France, occupying a portion of the country between the Seine and the Loire. It is bounded on the north by the department of Eure, on the east by that of Seine et Oise, on the south-east by that of Loiret: on the south by that of Loir et Cher; on the south-west, for a short distance, by that of Sarthe; and on the west by that of Orne. Its only natural boundary is on the north, where it is separated from the department of Eure by the rivers Arve (or Aure) and Eure, and for a very little way on the north-east. Its greatest length is from north by east, near Villiers in Desœuvre (department of Eure) to south by west near Cloyes on the Loir, 68 miles, and its greatest breadth, at right angles to the length, is from near Nogent le Rotrou to the neighbourhood of Thoury, 55 miles. It is between 47° 57′ and 48° 56′ N. lat., and between 0° 45′ and 1° 59′ E. long. The area of the department is 304 square geographical leagues (French measure) of 25 to a degree, equal to 2325 English square miles, which is not much below the average area of the French departments, and a very little more than that of the two English counties, Kent and Surrey, taken together. The population in 1832 was 278,820, or 120 to a square mile, about three-fourths of the average population, absolute and relative, of the French departments, and not so much as three-tenths of that of the two English counties. Chartres is the capital.

There are no very lofty hills in the department, but the general level of the country is high; the western part is varied with hills and valleys, the hills being a prolongation of those which overspread Bretagne and Upper Normandie, and which enter this department from the north-west: in the south-eastern side of the department these hills expand into an elevated plain, or table-land, level and without water, though just between two of the largest rivers of France, the Loire and the Seine. This table-land extends on the south-west into the adjacent department of Loiret. The hills divide the department into the basins of the two rivers from which it takes its name; that of the Eure occupying the northern part, and that of the Loir the southern.

The Eure enters the department not far from its source, and flows through it, or along the border, about 70 miles, first in a south-eastern direction past Belhomert, Pontgouin, and Courville, and then in a northward direction past Chartres, Maintenon, and Nogent le Roi. [EURE River.] Its chief tributaries are the Voise (17 miles long), which rises near Auneau and flows into it from the south-east on its right bank below Maintenon, passing the towns of Guédelongroy and Gallardon; the Blaise (about 26 miles long), which rises near Senonches and flows into it from the south-west near Dreux, passing Maillebois and Dreux, and flowing in a channel continually dividing and re-uniting; the Aure, which has been noticed elsewhere [EURE Department]; and the Vesgre (22 miles long), which rises in the adjoining department of Seine and Oise, between Montfort L'Amaury and Rambouillet, and flows in a north-west direction through this department into the Eure at Ivry. The Mauvette, or Meuvette (14 miles long), rises near La Ferté Vidame and flows north-east past Brezolles into the Aure at Nonancourt: and the Oplon, which is a feeder of the Vesgre, and belongs to the department of Seine and Oise, flows for a very short distance along the eastern boundary of the department.

The Loir rises on the south-west slope of the hills which divide the two basins, a short distance south of Courville, and flows 10 miles south, past Illaire, or Illiers, just below which it receives the Thironne, and afterwards the Fouchard; it then flows south-east, and then south (12 miles) past Bonneval, near which it receives the Ozanne; all these join it on the right, or west bank. It then turns to the south-west, and flows 20 miles before it quits the department, receiving by the way the Connie, on the left bank, and the Yere on the right. The whole course of the Loir is about 160 or 170 miles, for nearly 30 of which (viz., from Château du Loir) it is navigable; it falls into the Sarthe just before the junction of that river with the Mayenne: the whole belongs to the system of the Loire (La Loire, feminine), from which the Loir (Le Loir, masculine) is to be carefully distinguished, both as to itself and its orthography.

The Thironne (12 miles long), the Fouchard (15 miles long), and the Ozanne (25 miles long), all rise a short distance east or south-east of Nogent le Rotrou, and all flow east by south into the Loir. The Connie, or Conie (above 20 miles long), rises in the adjoining department of Loiret, near Patay, and flows west-north-west into the Loir, receiving the Connie Palue (12 miles long), which has all its course in the department, on its right bank. The Yere rises in the south-west corner of the department, and flows east-south-east 22 miles into the Loir.

The Huine, a feeder of the Sarthe, just passes Nogent le Rotrou on the western side of the department; and the Braye, which separates the departments of Sarthe and Loir at Cher, and joins the Loir much lower down, has its rise just within this department.

The canal from Pont-gouin to the aqueduct of Maintenon connects the upper part of the Eure at Pont-gouin with the lower part of the same river at Maintenon. The canal is about 27 miles long. The aqueduct was originally designed to convey the waters of the Eure to Versailles, but the design was given up; and the aqueduct, a vast pile, is fast going to decay.

The étang, or pool, of Bois Ballu is supplied with water chiefly from a deep pit, from which, at certain periods, fishes of considerable size are ejected, which disappear a few days after.

The greater portion of this department is occupied by the chalk which encircles the Paris basin, or the strata most immediately connected with it: on the south-east a considerable tract is occupied by the various formations which overlie the chalk. The soil and produce are thus somewhat vaguely described in the *Dictionnaire Géographique Universelle*, Paris, 1827:—'The lands in this department are clayey, mixed with a small quantity of sand; there are also some calcareous soils mingled with clay and sand; others are clayey mingled with large flints (fragmens grossiers de silex); others consist of a deep arid sand. The slopes of the south-west have little vegetable soil; they sometimes are composed of marl and flint (de marne et de silex), sometimes of a reddish sand and flint. The marl, which is found almost every where, is used for the improvement of the land. In the arrondissement of Nogent le Rotrou (the western side of the department) there are many tracts of waste land scarcely capable of producing anything; the ashes of the heath and furze are used for manure. Two-thirds of the department consist of the former territory of Beauce, or Beausse [Beausse], which is a great agricultural district: corn, especially wheat, which yields a great proportion of flour, constitutes its principal riches of this part of the department: the harvests are very abundant, and their produce is chiefly destined for the supply of Paris. In the rest of the department rye, barley, and oats are produced; pulse (légumes) is grown every where; the turnips of Saussaie, the melons of Nogent le Roi, and the onions of Chaudons are in high repute; few potatoes are grown; but in some parts rape, flax, hemp, dyers' weed (reseda luteola), and teazles are raised for the use of the manufacturers; hops grow spontaneously; the vine is cultivated in many places; the wine is of middling quality, and liable to turn sour in hot weather. There are few fruit-trees in the former district of Beauce, but many in the arrondissement of Nogent le Rotrou, especially apple-trees, which furnish cider for home consumption.'

According to M. Dupin (*Forces Productives, &c. de la France*) the value of land and the aggregate rental of the department are above the average of France; the quantity of wheat grown is to the average produce of the other departments as more than five to two; that of oats nearly as four to two; and that of potatoes, contrary to what is stated in the above extract, is more than eight to two. 'The forests (we quote again from the *Dictionnaire Géographique Universelle*) occupy an extent of 45,000 hectares (above 111,000 acres), and consist, in a great measure, of oaks and birches: all the woodland is on the western side of the department, except some round Dreux, in the northern part. The pasture and meadow-land is not in proportion to the quantity of arable, but it is of good quality. A considerable number of horned cattle of a small race are reared: but not a sufficient number of horses for the wants of the agricultural districts: those which are bred in the arrondissement of Nogent le Rotrou are in request for the light cavalry. There are many sheep, some of which yield a fine wool; pigs, fowls (which are sent in great quantity to Paris), and bees. Game is abundant; the rabbits are in repute, as well as the red partridges, plovers, lapwings, and especially a species of the plover called guignard, from which the Chartres pies derive their reputation; pigeons are again increasing. The rivers abound with fish; the golden carp of the Loir, the crayfish of its affluent, the Connie, the trout of the Blaise, the Eure, and the Huine, are accounted excellent.' The number of horses, however insufficient, is given by M. Dupin at 35,967, nearly 8000 above the average of the departments: the number of horned cattle is given by him at 56,464, more than 23,000 below the average: the quantity of wool grown is to the average produce of the departments in the proportion nearly of five to two; and this is more available for exportation, as the woollen manufacture of the department is not great. The department is essentially agricultural; corn is sent not only to Paris, but into the neighbouring departments. There are about 600 flour-mills; a great number of them are on the Eure, the Blaise, the Loire, and other streams. The cottages of the peasantry are, in some parts at least, of a most miserable character; they call to mind the tents of the antient Carnutes who occupied the country.

The only metal dug is some iron: but the mines supply only a part of the ore for the different iron-works, and are becoming exhausted: good freestone is quarried, and sandstone for pavement; there is much marl; peat for fuel is obtained in several places, also potters' clay, and clay for the finer kinds of earthenware produced in the manufactory at Sèvres.

The manufactures are of small importance; they are chiefly in the arrondissement of Dreux, and in that of Chartres. The manufacture of linen is generally diffused, but it is only in one place that it is carried on on a considerable scale; some cotton yarn is spun and some cotton goods are woven; woollen cloths, serges, and other light woollen stuffs, blankets, flannel, knit and woven hosiery, foot carpets, and common hats are made; there are a considerable number of tan-yards; a small quantity of earthenware is made, and a little beet-root sugar.

The department is very ill provided with the means of water carriage; a small part of the course of the Eure, along the boundary of the department, is, according to some of our authorities, navigable. With roads it is better provided. The great road from Paris through Tours to the south-west of France crosses the department, passing through Epernon, Maintenon, Chartres, Bonneval, Châteaudun, and Cloyes; the great western road from Paris to Rennes and Brest just crosses the northern part through Dreux: these are the only roads of the first class. Of the second class are the Orléans road, passing just within the south-eastern boundary of the department, through Thoury; and the road which, branching off from the great south-western road at Chartres, runs through Courville Champrond and Nogent le Rotrou in the direction of Le Mans, Angers, and Nantes. Of roads of the third class are a road from Paris to Chartres through Guédelongroy, roads from Chartres to Dreux and to Orléans, and from Châteaudun to Nogent le Rotrou (and from thence to Alençon, in the department of Orne), and to Orléans. The other roads are bye-roads.

The department is divided into four arrondissemens that of Dreux, in the north, population in 1832 70,532; that of Chartres, in the east and centre, population 103,783; that of Châteaudun, in the south, population 59,758; and that of Nogent le Rotrou, in the west, population 44,747. These arrondissemens are subdivided into 24 cantons, or districts of justices of the peace, and 460 or 463 communes. The chief towns are Chartres, the capital, on the Eure, population 13,576 for the town, or 14,439 for the whole commune [Chartres]; Châteaudun, on the Loire, population 6461 [Chateaudun]; Dreux, on the Blaise, population 5166 for the town, 6249 for the whole commune [Dreux]; and Nogent le Rotrou, on the Huine, population 5812 for the town, or 6825 for the whole commune Of this last and the smaller towns an account is subjoined.

In the arrondissement of Dreux we have Bu, Anet, Nogent le Roi, Le Tremblay, Châteauneuf, Digny, Senonches, Maillebois, Brezolles, and La Ferté Vidame.

Bu (population 1549, Dulaure, *Environs de Paris*, Paris, 1828) was once a place of considerable strength; it has still the ruins of an antient castle, of which one tower is in pretty good preservation. It was the capital of a county. Its markets are well attended.

Anet (population 1500, Dulaure) is in the northern extremity of the department, in a pleasant valley between the Vesgres and the Eure; it has the remains of a magnificent residence, built by Henri II. for Diane de Poitiers, duchess of Valentinois, his mistress. There are tan and corn-mills, and in the neighbourhood paper-mills and iron-works; the inhabitants carry on trade in corn, wood, and hay.

Nogent le Roi (population 1242, Dulaure) is in a pleasant valley on the left bank of the Eure. The inhabitants carry on a trade in cattle. Nogent belonged to Philippe VI. de Valois, who died here A.D 1350. It is probable that it derived from this prince its distinctive epithet of Le Roi; it was, with its territory, erected into a county in favour of Bautru, one of the courtiers of the cardinal de Richelieu. The castle of Nogent, built on a hill which commands the town on the western side, was an object of frequent contest in the times of feudal warfare and in the wars of the English in France under their kings Henry V. and VI. It was garrisoned by Henri IV. in his war with the League, taken by the inhabitants of the neighbouring towns, who had embraced the party of the League, and to whom the garrison was an annoyance, and retaken by the royal forces.

Le Tremblay is very small; its population is under 500 (Dulaure); it lies a little out of the road from Dreux to Chartres.

Châteauneuf (population 1250, Dulaure) is in a fertile plain between Dreux and Nogent le Rotrou. Here was an antient castle, Castrum Theodemerense, a name which was corrupted into Thimer, and gave to the surrounding territory the name of Thimerais; whence Châteauneuf is sometimes distinguished as Châteauneuf en Thimerais. In A.D. 1589 it was taken by the troops of the duke of Mayenne and retaken by those of Henri IV. The inhabitants now carry on a trade in cattle.

Digny is not far from Châteauneuf, with a population, according to Dulaure, of 1197. Some of our authorities make this to be only a village.

Senonches and Maillebois are on the Blaise; the former near its source, the latter lower down. At Senonches (population 1911, Dulaure) steam-engines and hydraulic machines are made, and there are iron-works. Trade is carried on in cattle and horses. At Maillebois (750 inhabitants, Dulaure) woollen cloth and light woollen stuffs are made. Peat is dug in the neighbourhood.

Brezolles is on the Meuvette. Dulaure gives the population at 844. Trade in cattle is carried on.

At La Ferté Vidame (population 808, Dulaure), in the north-western part of the department, trade is carried on in horses and cattle. Some of our authorities make this to be only a village.

In the arrondissement of Chartres are Epernon, Maintenon, Gallardon, Guédelongroy, Auneau, Ouarville, Voves, Janville, Thoury, Illaire or Illiers, Courville, and Pont-gouin.

Epernon is on the high road from Paris to Chartres, in a delightful situation on the slope and at the foot of a hill, near the little river Guesle, a feeder of the Eure. It is tolerably well built: it was formerly walled in on three sides; on the fourth side (the north) it was defended by a castle on the summit of the hill, of which some picturesque ruins still remain. The country round consists of fertile meadows, watered by several brooks. The inhabitants (1462, Dulaure) manufacture leather: there are kilns for gypsum; and trade is carried on in flour, excellent pulse, horses, and cattle.

Maintenon is on the right bank of the Eure, at the junction of the Voise. It was erected into a marquisate in 1685, in favour of the widow Scarron, wife of Louis XIV., better known in history by the name, which she took from this town, of Madame (or rather La Marquise) de Maintenon. The Château de Maintenon was built by Jean Cottereau, intendant of the finances, and sold by his descendants to Madame de Maintenon: some portions of Cottereau's edifice may be observed in the present structure. The chapel of the château is scrupulously preserved: the tradition that Louis XIV. and Madame de Maintenon were married there appears from the testimony of history to be unfounded. The apartment of Madame de Maintenon retains a portrait of her. The grounds are large and well kept up; they are intersected in every direction by numerous canals, over which are no less than 50 bridges. The town itself, though well laid out and well built, presents nothing remarkable: the inhabitants (1542, Dulaure) carry on trade in cattle. Collin d'Harleville, a dramatic author of note, was born here. The aqueduct of Maintenon has been already noticed. Near the town is a plain covered with Druidical remains, called the stones of Gargantua.

Gallardon is on the right bank of the Voise, at the junction of the little brook the Ocre; it had antiently a castle: the town was several times taken and retaken in the wars of the English in France in the fifteenth century. Dunois, who took it from the English A.D. 1443, destroyed the castle except one tower, which still remains. Gallardon was taken by the Huguenots under the Prince of Condé, in the religious wars of the sixteenth century. The inhabitants (1398, Dulaure) carry on trade in corn, pulse, horses, oxen, calves, and sheep.

Guédelongroy is on the Voise. Vaysse de Villiers, who terms it a village, assigns to it a population of 500.

Auneau is on a small stream running into the Voise. It has the remains of a castle, probably built at the latter end of the fourteenth century. In this castle, in the religious wars of the sixteenth century, a body of German cavalry, in the service of the Protestants, were surprised by the royal troops, and in great part killed. What remains of the castle is used as a dwelling-house; at the entrance is a tower of very substantial construction, which commands the surrounding country. The inhabitants of Auneau (1400, Dulaure) manufacture hosiery.

At Ouarville (population 723, Dulaure) hosiery, and at Voves (population 1136, Dulaure) hosiery and light woollen stuffs are manufactured; and at Ouarville trade is carried on in horses and cattle. At Janville (population 986) hosiery and light woollen stuffs are manufactured; and at Thoury or Toury, near Janville (population 1232, Dulaure), hosiery and beet-root sugar; a trade in horses, asses, mules, and cattle is also carried on.

Illaire is on the left bank of the Loir, near its source: its population, in 1832, was 2059 for the town, or 2937 for the whole commune: the inhabitants carry on trade in cattle, sheep, and wool; and manufacture woollen cloths, white serge, and other light woollen stuffs, and hosiery: there are some tan-yards.

Courville and Pont-gouin are both on the left bank of the Eure, the first on the road from Chartres to Le Mans and Angers, the second on a road branching from this at Courville to Belême, Mamers, and Alençon. At Courville (population 1341, Dulaure) some trade in horses and cattle is carried on. The château which the descendants of Sully possessed in this town has been entirely destroyed; but that at Villebon, distant two or three miles from Courville, where that great statesman died, is yet in good preservation, and is one of the finest remains of the sixteenth century At Pont-gouin (population 1400, Dulaure) white serge is made.

In the arrondissement of Châteaudun are Sancheville, La Ferté Villeneuve, Bonneval, Cloyes, and Brou.

To Sancheville, which is, according to some of our authorities, a village, Dulaure assigns a population of no more than 886. La Ferté Villeneuve is still smaller.

Bonneval is on the road from Chartres to Tours, in a pleasant fertile valley on the left bank of the Loir, which here flows in several channels. It was formerly a place of some strength. The parish church has a lofty spire. The inhabitants (1750, Dulaure) manufacture carpets, counterpanes, flannels, woollen stuffs, calicoes, and printed cottons; and spin cotton and woollen yarn. Trade is carried on in corn, flour, wool, and cattle; and there are some considerable tan-yards. There are some Druidical monuments in the neighbourhood of the town.

Cloyes is also on the road from Chartres to Tours, and on the Loir: it is a place of very little trade, with a population of about 1500. (Vaysse de Villiers.) Brou is on the Ozanne, which flows into the Loir: it had, in 1832, a population of 1870 for the town, or 2263 for the whole commune The inhabitants make serges, and other light stuffs, and some of the fittings of weavers' looms. There are some marl-pits of considerable depth in the neighbourhood.

In the arrondissement of Nogent le Rotrou are Nogent le Rotrou, Authon, Beaumont le Chetif, Champrond, La Loupe or La Louppe, and Belhomer or Belhomert.

Nogent le Rotrou is on the road from Paris by Chartres to Le Mans, Angers, Nantes, and other places in the west of France, 33 miles from Chartres. It is a small town in a pleasant valley, watered by the Huine, on the left bank of which the town stands. It is a long place in proportion to its size. There is a castle, a picturesque ruin, which commands the town, and possesses some interest as having been the residence of Sully. There are three hospitals, one of them founded by Sully, who, as well as his wife, was buried here; but the tombs were violated during the Revolution and the remains dispersed. The town had in 1832 a population of 5812, the commune of 6825: the manufactures are druggets, serges, and other light woollens, and cotton-yarn there are several tan-yards, some tan-mills, and a dye-house. There are a public library, a high school, and an agricultural society.

Authon is near the source of the Ozanne: its inhabitants (1211, Dulaure) make serges, druggets, and other light woollens. Beaumont le Chetif (a village, according to some of our authorities) is between Brou and Nogent le Rotrou: its inhabitants (591, Dulaure) manufacture earthenware. Champrond is a village, according to some authorities, with 904 inhabitants (Dulaure), who trade in charcoal and wood. There are in the neighbourhood iron-mines, iron-works, and peat-pits. La Louppe and Belhomer are on the road from Dreux to Nogent: they are both small; Dulaure assigns to them a population of 1096 and 451 respectively. At La Louppe some business is done in horses, oxen, and sheep.

The department constitutes the diocese of Chartres, the bishop of which is a suffragan of the archbishop of Paris. It is comprehended in the jurisdiction of the Cour Royale of Paris, and in the circuit of the Conseil Academique of that city. It is in the first military division, of which the head-quarters are at Paris. It returns four members to the Chamber of Deputies. The state of education in the department is favourable as compared with the greater part of France. The number of male children at school is in the proportion of one for every seventeen inhabitants.

This department consists of the former district of Chartrain, and a portion of Dunois, both of which were comprehended in the county of Beauce or Beausse, and in the province of Orléanois; of a portion of Orléanois proper; of a considerable portion of the county of Perche, comprehended in the province of Maine; and of a small portion of the district Mantois, in the Ile de France.

EURI'BIA. [Thecosomata.]

EURI'PIDES of Athens is said to have been born at

Salamis in the year B.C. 480, on the day of the great victory obtained over the fleet of Xerxes. His father Mnesarchus and his mother Clito were among the refugees driven to Salamis by the progress of the invading army. They seem to have been Athenian citizens of the poorer class, as we find that the mean occupation of this poet's mother was made by Aristophanes one standing subject of the ridicule which he so perseveringly heaped upon him. Philochorus, on the contrary, says that he was of noble birth; but still his parents might be poor. (Suidas, Εὐριπίδης.) Euripides however found means to devote himself early and closely to the study of philosophy in the school of Anaxagoras, as well as to that of eloquence under Prodicus. While he was yet very young, the persecution and banishment of Anaxagoras appear to have deterred him from, or at least disgusted him with, the cultivation of philosophy as a profession, and combined with the strong natural bent of his genius to direct his exertions chiefly to dramatic composition. He is said to have commenced writing at the age of eighteen; and in the course of a long life he composed not fewer than seventy-five tragedies, or, according to other authorities, ninety-two, which rivalled in the public approbation the contemporary productions of Sophocles; and notwithstanding the constant and bitterly satirical attacks which, in the author's own time, they sustained from such as were exclusively and intolerantly attached to the elder tragic school, they secured him for all succeeding ages a place beside its two great masters. When upwards of seventy years old, weary, it should seem, of the feverish excitement in which he must have been kept alike by the petulant criticism and the turbulent applause that attended him at Athens, he accepted the invitation of Archelaus, king of Macedon, and went to live in honoured and tranquil retirement at his court. Here, however, a singular as well as tragical end awaited him. According to one account (for, in this as in many other matters of antient biography, there are discrepancies), he had spent three years in this retreat, when, walking one day in a solitary spot, he was met by some of the king's hounds, which, rushing furiously upon him, tore him so violently that he shortly after died in consequence of the laceration. Aulus Gellius tells us that the Athenians sent to Macedon to ask for the body of Euripides, but that the Macedonians constantly refused it, in order that their own country might retain the honour of the magnificent tomb which they erected for him at Pella, and which, according to Ammianus Marcellinus, was sanctified by the thunder-stroke, as Plutarch informs us had been the case with that of Lycurgus. Thus Athens was obliged to content herself with engraving the name of Euripides upon an empty monument, which in the time of Pausanias was yet standing beside the road from the Piræus to Athens (Pausan. *Attic.* 1, 2), near the tomb of Menander.

Of the numerous tragedies of Euripides, nineteen survive—a much larger proportion than has descended to us of the works of either of the two elder tragic masters. We have already [DRAMATIC ART, &c., vol. ix. p. 131] pointed out his 'Electra' to the reader's attention, not as a favourable specimen of the general powers of Euripides—for, indeed, as a work of art it is decidedly one of the least meritorious of his extant pieces,—but as affording the clearest point of comparison between his most prominently distinctive features as a dramatist and those of his two great predecessors; this being the only instance in which we have a piece from each and all of the three composed upon one and the same historical or mythological subject. 'Orestes,' the subject of which, inasmuch as it relates to the persecution of that hero by the furies of his mother and his proscription as a matricide, is the same as that of the 'Eumenides' of Æschylus, though in scene, incident, and character, excepting that of Orestes himself, they are wholly different, is more vigorous and more affecting than the 'Electra.' 'Iphigenia in Tauris' and 'Andromache' follow out still farther the fortunes of Orestes; both rank among those pieces of the second order in which the highest praise can be given only to certain portions. The same may be said of the six following pieces: the 'Troades,' the mournfully grand conclusion of which exhibits the captive Trojan women leaving Troy in flames behind them; 'Hecuba,' relating to the subsequent history of the captive queen; the 'Hercules Furens,' or 'Raging Hercules;' the 'Phœnissæ,' having the same historical groundwork as the 'Seven against Thebes' of Æschylus; the 'Heraclidæ,' which celebrates the Athenian protection of the children of Hercules, ancestors of the Lacedæmonian kings, from the persecution of Eurystheus; and the 'Supplices,' which in like manner commemorates the interment of the Seven before Thebes and their army, gained, on behalf of Adrastus, king of Argos, by a victory of the Athenians over the Thebans. 'Helen' is a very entertaining and singular drama, full of marvellous adventures and appearances, being founded on the assertion of the Egyptian priests that Helen had in fact remained concealed in Egypt, while Paris had merely carried off an airy semblance of her. The genuineness of 'Rhesus,' taken from the eleventh book of the 'Iliad,' has been much disputed, chiefly on the ground of its great relative inferiority—an argument which is outweighed by certain internal characteristics of the piece itself, combined with the external testimony of the antient writers ascribing it to Euripides. For beautiful morality and unaffected yet overpowering pathos, his 'Ion,' his 'Iphigenia in Aulis,' and above all, his 'Alcestis,' are peculiarly distinguished. He found subjects especially suited to the development of his finer powers in the purity and sanctity of the youth from whom the first of these three tragedies is named, in the unsuspecting innocence of the heroine of the second, and in the tender yet resolute devotedness of connubial affection portrayed in the third, to which Milton so beautifully alludes in his well-known sonnet, beginning

'Methought I saw my late espoused saint
Brought to me like Alcestis from the grave,
Whom Jove's great son to her glad husband gave,' &c.

The 'Hippolytus' and the 'Medea,' exhibiting all the romantic violence of irregular and vehement feminine passions, are deservedly celebrated among the greatest and most thoroughly successful achievements of this dramatist. In the former the heroism of Hippolytus is sublime as well as beautiful; and as regards the conduct of Phædra, as Schlegel has well remarked, it merits the highest commendation for the strict observance of moral propriety in a subject of so critical a nature. After the 'Hippolytus,' the same eminent critic is disposed to assign the next place among all the remaining works of Euripides to the 'Bacchæ,' on account of its harmonious unity, its well-sustained vigour, and of the appropriateness to the very peculiar subject here treated, of that luxuriance of ornament which Euripides constantly displays. This piece also merits especial attention as being the only one remaining of the *serious* dramas that were composed expressly and immediately in honour of Bacchus himself, the patron deity of the theatre. In this instance the glory and the power of Bacchus are not merely the occasion—they form the subject of the tragedy; and the wildly picturesque chorus of Bacchantes, as Schlegel observes, 'represent the infectious and tumultuous inspiration of the worship of Bacchus with great sensual power and vividness of conception.'

An interest yet more peculiar attaches to the 'Cyclops,' as being the sole remaining specimen of the *satyric* tragedy, so called from the chorus of satyrs, which formed an essential part of its composition. This, therefore, seems to be the fittest place in which to give a brief account of that particular and somewhat remarkable dramatic species. From this piece itself and from all collateral evidence, it is to be inferred that the satyric drama was never acted but as a kind of shorter and lighter after-piece, to relieve the minds of the audience, especially the ruder portion of them, after the grave impression of the serious performances: for which purpose, however, it seems to have been very constantly employed, each tragic trilogy being almost invariably accompanied by one of these shorter and lighter productions. Thus we find mention made of five satyric pieces of Æschylus, seven or eight of Sophocles, five of Euripides, besides a number of others by various minor authors. Notwithstanding its burlesque ingredients, the tragic character was so far preserved in the satyric play, that the subject appears to have been always historical, and the action partly serious, though with a fortunate catastrophe. No less than tragedy and comedy, the satyric drama had its peculiar and appropriate stage decorations, representing woods, caves, mountains, and other diversities of the sylvan landscape. Satyrs old and young, with Silenus in his various ages, were distinguished from one another by the variety of their grotesque masks, crowned with long shaggy goats' hair; while the satyrs were negligently clad in skins of beasts, and the Sileni decorated with garlands of flowers skilfully woven. The satyr parts too appear to have been sometimes acted by pantomimic performers moving on a kind of stilts, to give more completely the appearance of goats' legs. The choral dance, it is hardly necessary to remark, was thoroughly rustic, peculiarly lively, and quite opposite in character to the solemn and impressive movements which accompanied the serious tragedy. The piece of Euripides has for its subject the adventure of Ulysses with Polyphemus, as related in the 'Odyssey,' with the addition of Silenus and his satyr band; the characters are accurately discriminated and consistently maintained; and the nature of the plot produces such natural contrasts and even blendings of the ludicrous with the horrible, as, above all things else, render this drama unique among the Grecian remains.

The editions of Euripides are numerous. The first edition, that of J. Laskaris, Florence, near the close of the fifteenth century, contains only the Medea, Hippolytus, Alcestis, and Andromache. That of Aldus, Venice, 1503, contains seventeen plays, among which is the Cyclops. Among subsequent editions are those by Canter, Antwerp, 1571; Barnes, Cambridge, 1694; Musgrave, Oxford, 1778; Beck, Leipzig, 1778-1788. The last complete editions are by Aug. Matthiä, Leipzig, 1813, and by F. H. Bothe, Leipzig, 1825. The editions of separate plays are also numerous; among which that of the Hecuba, Orestes, Phœnissæ, and Medea, by Porson, is the best known. Euripides has been translated into German by F. H. Bothe, and into English by Potter. There are also translations in German of several of the separate plays.

EUROPE is one of the great divisions of the globe, forming the north-western part of the old continent, of which it occupies a little more than two seventeenths; Asia contains nearly nine-seventeenths, and Africa somewhat more than six. The surface of Europe is calculated to contain about 3,900,000 square miles, if Mount Caucasus and the river Ural are considered as forming the boundary-line between it and Asia.

The name 'Europe' first occurs in a poem attributed to Homer. Herodotus says he does not know how the name came to be given to our continent, except it be from Europa, the daughter of the king of Tyre; but he seems hardly satisfied with this explanation, and we have no other to offer. If the history of the discovery of America were lost we should have a similar difficulty in conjecturing how the New World obtained its name.

Europe is separated from America by the wide expanse of the Northern Atlantic, which washes its western and northern shores, and from Africa by the Mediterranean Sea. The boundary-line which divides Europe from Asia is only in part indicated by nature. This line runs through the Archipelago, the straits of the Dardanelles, the sea of Marmara, and the straits of Constantinople to the Black Sea, which is traversed by it. So far all geographers agree, but they do not agree as to the remaining part of the boundary-line. In the last century this line was drawn through the straits of Yenikale and the sea of Azof, and then along the river Don as far as the point where it approaches nearest to the river Volga, and afterwards along this river to its confluence with the Kama. It then followed the Kama to its sources in the Uralian Mountains, and was continued along the crest of this range to the source of the Kara, and thence along that river to the gulf of Kara.

This boundary-line is now abandoned as being too vague, and another is substituted for it. This new line traverses the Black Sea to the western extremity of Mount Caucasus, south of Anapa; it then runs along the watershed of this range, east-south-east to its eastern extremity, where it reaches the Caspian Sea at Soomgait, north of the peninsula of Absheran. Thence it runs through the Caspian Sea, which it leaves at the mouth of the river Ural, whose course it follows up to its sources in the Uralian Mountains. The Uralian Mountains and the river Kara constitute the remainder of this boundary-line.

The most northern point of the European continent is Cape Nord Kyn, in 71° 6′ N. lat.; North Cape, in 71° 10′, is on an island called Mageröe. The most southern points are Punta de Tarifa in Spain (36° N. lat.) and Cape Matapan (36° 17′) in Greece. The most western points are Cape St. Vincent (9° W. long.), Cape Roca (9° 28′), and Cape Finisterre (9° 27′). The most eastern point is in the Uralian Mountains, west of Ekatarinburg (60° 20′ E. long.). But some of the islands extend farther south and west than the continent. The most southern point of the island of Candia is 34° 55′ N. lat. The Blasket Islands on the west of Ireland lie in 10° 5′ W. long. Cape Fugleberg in Iceland is near 25° W. long., and the most western of the Azores, Corvo and Flores, 31° W. long. The most northern extremity of Nowaya Szemlia is about 77° N. lat. A straight line drawn from Cape S. Vincent to the mouth of the river Kara on the Frozen Ocean, the north-eastern extremity of Europe, does not much exceed 3000 miles, and another drawn from Cape Matapan to Cape Nord Kyn, is 2400 miles long.

I. *Progress of Discovery.* The earliest notices of the history of Europe are in the writings of the Greeks, who inhabited the south-eastern corner of our continent. From this country the geographical knowledge of Europe extended by degrees to the west and north. Homer, who probably lived about 1000 years before the Christian æra, was acquainted with the countries round the Ægean Sea or Archipelago. He had also a pretty accurate general notion respecting those which lie on the south coast of the Black Sea; but what he says about the countries west of Greece, on the shores of the Mediterranean Sea, is a mixture of fable and truth, in which the fabulous part prevails. It would seem that in his age these seas were not yet visited by his countrymen, and that he obtained his knowledge from the Phœnicians, who had probably for some time sailed to these countries, but who, according to the common policy of trading nations, spread abroad false accounts of these unknown regions, in order to deter other nations from following their track and participating in the advantages of this distant commerce. It is probable also that the Phœnicians long excluded the Greeks from the navigation of the Mediterranean; for when the Greeks began to form settlements beyond their native country, they first occupied the shores of the Ægean, and afterwards those of the Black Sea. As the European shores of the Black Sea are not well adapted for agriculture, except a comparatively small tract of the peninsula of Crimea, their early settlements were mostly made on the Asiatic shores, and consequently little addition was made by these colonies to the geographical knowledge of Europe. But the navigation of the Phœnicians was checked in the middle of the sixth century before Christ, apparently by their country being subjugated by the Persians. About this time also the Greeks began to form settlements in the southern parts of Italy and on the Island of Sicily, and to navigate the Mediterranean Sea in its full extent. Accordingly we find that in the time of Herodotus (450 before Christ), not only the countries on each side of the Mediterranean Sea and the northern shores of the Black Sea were pretty well known to the Greeks, but that, following the track of the Phœnicians, they ventured to pass the Columns of Hercules, and to sail as far as the Cassiterides, or Tin Islands, by which name the south-western part of England must be understood. It is even reported that some of their navigators sailed through the English Channel and entered the North Sea, and perhaps even the Baltic. It must be observed however that Herodotus professes himself totally unacquainted with the islands called Cassiterides (iii. 115); and Strabo (104, &c.) expresses a very unfavourable opinion of the alleged northern voyages of Pytheas.

Thus a considerable part of the coasts of Europe was discovered, whilst the interior remained almost unknown. When the Romans began their conquests, this deficiency was partly filled up. The conquest of Italy was followed by that of Spain and the southern parts of France, and not long afterwards Sicily, Greece, and Macedonia were added. Cæsar conquered Gallia and the countries west of the river Rhine, together with the districts lying between the different arms by which that river enters the sea. His two expeditions into Britain made known also in some measure the nature of our island and its inhabitants. Thus in the course of little more than 200 years the interior of all those countries was discovered whose shores alone had been previously known. In the mean time nothing was added to the knowledge of the coasts, the Greeks having lost their spirit of discovery by sea with their liberty, and the Romans not being inclined to naval enterprise.

After the establishment of imperial power at Rome, the conquests of the Romans went on at a much slower rate, and the boundaries of the empire soon became stationary. This circumstance must be chiefly attributed to the nature of the countries which were contiguous to the boundaries. The regions north of the Danube are mostly plains, and at that time were only inhabited by wandering nations, who could not be subjected to a regular government. Such at least are the countries extending between the Carpathian Mountains and the Black Sea; and therefore the conquest of Dacia by Trajan was of short continuance and speedily abandoned. The countries between the Alps and the Danube were soon added to the empire; but as the nations who inhabited the tracts north of that river had not yet given up a wandering life, they were enabled to elude the Roman yoke. The most important addition to the empire and to geographical knowledge was the conquest of England during the first century after Christ, to which, in the following century, the south of Scotland was added.

Nothing seems to have been added afterwards. The Geography of Ptolemy contains a considerable number of names of nations, places, and rivers in those countries, which were not subjected to the Romans. Probably they were obtained from natives, and from Roman traders who had ventured to penetrate beyond the boundaries of the empire. But these brief notices are very vague, and in most cases it is very difficult to determine what places and positions are indicated.

The overthrow of the Roman empire by the northern barbarians destroyed a large part of the geographical knowledge previously obtained, except perhaps as to that portion of Germany which was subject to the Franks, which by degrees became better known than it was before. But two sets of men soon made their appearance, who contributed largely to extend the geographical knowledge of Europe—missionaries and pirates. The Christian religion had been introduced into all the countries subject to the Roman power. The barbarians who subverted the empire soon became converts to the Christian faith, and some of them ventured among other barbarous nations for the purpose of converting them also. They visited the natives who inhabited the eastern parts of Germany, but here their progress was at first slow; they did not cross the river Oder, or at least they did not venture far beyond it, and the geographical knowledge of this part of Europe was consequently not much increased. The progress of those missionaries was more important who penetrated from Constantinople into the interior of Russia, where they succeeded in converting to the Greek church the different tribes into which the Russians were then divided. This was effected in the ninth century. In the tenth the western missionaries got into Poland, and its inhabitants by degrees became converts. In the beginning of the thirteenth century the Prussians and Lithuanians had not been converted to Christianity, and the attempts of the missionaries were for a long time abortive. Christianity was however introduced among the Prussians during the thirteenth century by force of arms, the knights of St. John having conquered the country. The Lithuanians were the last to embrace Christianity, which was effected by a stroke of policy: their sovereign acquired the crown of Poland by embracing the new faith.

To the pirates we are indebted for our acquaintance with the northern parts of Europe, especially the Scandinavian peninsula; but this was not owing to pirates who went to but to pirates who came from these countries. The Northmen or Normans, who inhabited Denmark, Norway, and Sweden, first laid waste and then settled in part of France, and afterwards conquered England. In their new settlements they maintained a communication with their native countries, which thus gradually became known wherever the Normans had settled.

It is worthy of remark, that no part of Europe has been discovered or explored by travellers who went for that sole purpose. We must however make an honourable exception in favour of Alfred the Great, who sent two noblemen to explore the countries around the Baltic Sea; and in the account of one of them, Other, or Otter, we find the first accurate notions respecting these regions, especially Prussia, more than 300 years before the Prussians were converted to Christianity.

II. *Surveys of Europe*. In the beginning of the last century trigonometrical surveys were first made with the view of constructing accurate maps. The first of these surveys was made in France under Cassini. Since that time other European governments have caused some parts at least of their respective territories to be surveyed, especially Prussia and Austria. England followed in the same steps towards the beginning of the present century, and to this great national undertaking we owe the publication of the Ordnance Maps. The southern parts of Sweden and Norway have likewise been surveyed. Thus we are now in possession of very exact maps of nearly one-half of Europe. The maps of the other countries of Europe rest on the partial surveys of particular districts, and on a greater or less number of astronomical observations; by means of which those parts which have not been surveyed can still be laid down within certain limits of accuracy. Though maps of this latter kind cannot altogether be relied on, the attention paid by all governments to their gradual improvement has been sufficient to correct very gross errors, and thus these maps have by successive and partial improvements attained a certain degree of correctness.

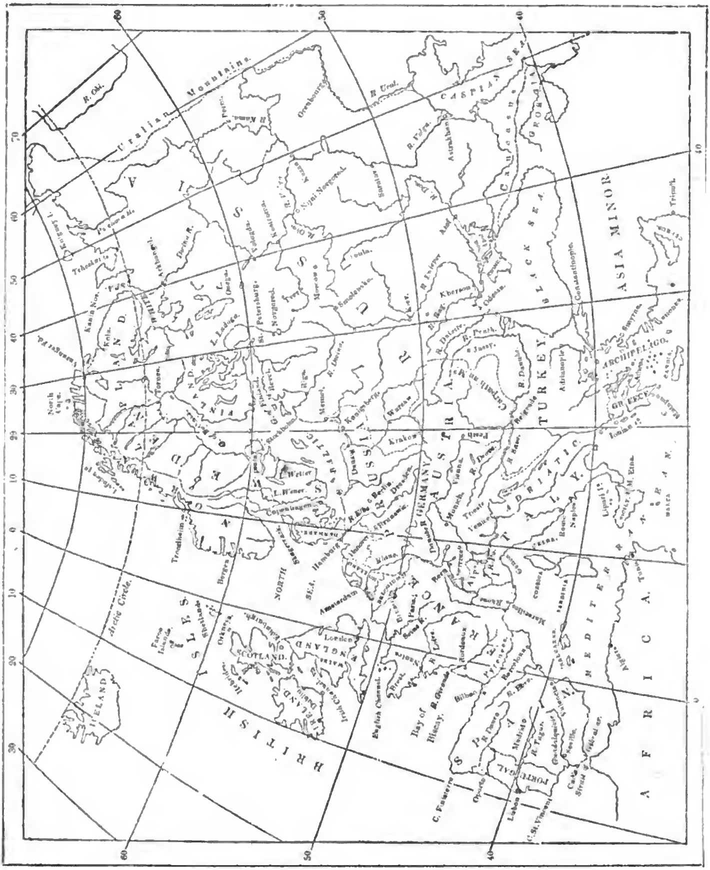
The great increase in commerce and navigation in modern times has convinced the respective governments of Europe of the necessity of a minute and accurate survey of their coasts. But all the coasts of Europe have not been surveyed, though more than half of them have been accurately laid down. The greatest part of the coast of Iceland has been surveyed by the Danish government, and this survey is still going on. The whole western coast of Norway, and east of Cape Lindesnaes, as far as the harbour of Christiansand, was surveyed by the Danes fifty or sixty years ago, but this survey is not considered accurate. The Baltic, including the Kattegat, has been surveyed by the governments to which the coasts belong, but not minutely, nor is the survey considered accurate. The coast between the mouth of the river Elbe and the Dollart was surveyed by the French, and continued to the Schelde by the Dutch. The coast between the Schelde and Gravelines was surveyed by the French, while the English ascertained the outer dangers.

Our government has shown great activity in surveying the British coasts. A minute and accurate survey has been made of the whole eastern coast of Great Britain south of the Murray Frith, and of the whole southern coast, except the tract between Sidmouth and Plymouth. The western coast, including the Bristol Channel, has been surveyed as far as Bardsey Island, and again between Holyhead and Liverpool. Farther north only the Solway Frith is partly surveyed. The coast of Ireland has been surveyed between Dublin Bay and Donegal Bay, inclusive, along the northern shores of the island. The Shetland and Scilly Islands, as well as Guernsey, Jersey, Alderney, &c., have been surveyed completely, but the survey of the Orkneys is not yet terminated.

The coast of France has been surveyed by the French government from the Strait of Dover to Bayonne, except a part of the coast of the Bay of Biscay from about Belle Isle to the Isle of Ré. Most of the harbours on the coast of Spain have been minutely surveyed by the Spanish government.

Most of the islands in the Mediterranean have been surveyed; Corsica and Elba by the French, Sicily and Sardinia by the English. The survey of the Adriatic has been completed by the Austrians and English co-operating. From the Adriatic to the Archipelago the coast has been surveyed by the English, and they have also carried on a survey through the islands and coasts of the Archipelago, which is nearly completed.

III. *Physical Geography*. Nearly two-thirds of the surface of Europe consist of an immense plain; the remainder is partly mountainous, and partly hilly. The plain occupies the east part of the continent; and the hilly and mountainous countries extend along its western and southern shores. On the eastern boundary the plain extends across the whole continent from south to north, from the mountain-range of the Caucasus and the shores of the Black Sea to those of the Arctic Ocean. In width it extends in this part of the continent from the Ural Mountains to 26° E. long. To the west of this meridian it terminates on the north on the shores of the Baltic, and in the mountain-region of Scandinavia; on the south it continues along the southern shores of the Baltic, and extends even farther west to the shores of Holland opposite the British Islands. If small eminences are not taken into account, it may even be said to continue in a south-west direction through Belgium and the northern parts of France to the banks of the Seine, where it terminates between Paris and the mouth of the river. The portion of the plain, west of the meridian of 26°, is narrowed on the south by the Carpathian Mountains, and other ranges which



are connected with them. Towards the eastern part it extends over ten degrees of latitude, but in its progress towards the west it becomes gradually narrower, partly owing to the mountains advancing farther north, and partly also owing to the seas which form its northern border running farther to the south. Here its mean breadth does not exceed three degrees of latitude, except where the peninsula of Jutland joins it. Along the coast of the North Sea it is still narrower.

By this narrow portion of the Great European Plain and the Baltic (which may be considered as its lowest part, being covered with water), the mountain-regions which constitute the western portion of the Continent are divided into two separate systems. To the north lies the system of the Scandinavian Mountains, and to the south what we shall here call the South European Mountain System.

The Great Plain occupies about 2,500,000 square miles, the South European Mountain Region 1,100,000, and the Scandinavian Mountain System about 300,000 square miles.

Scandinavian Mountain System.—This comprehends the whole of the Scandinavian peninsula, or Sweden and Norway. A line drawn from the mouth of the river Torneo, at the most northern angle of the Gulf of Bothnia, to the Waranger Fiord, a bay of the Arctic Ocean, would separate it from the north-western part of the Great Plain. A huge mountain-mass occupies the west part of this peninsula. It rises on the very shores of the sea to a height of some hundred feet, and attains, at a short distance from it, an elevation of 3000 or 4000 feet, and frequently more. South of 63° N. lat. it has not the form of a mountain-range, but of a mountain-plain, its surface frequently presenting a perfect level, and in some places swelling into hills. This elevated plain is from 100 to 150 miles across, and as it attains in many parts the line of perpetual congelation, which in this latitude is about 4200 feet above the sea, a great portion of it is always covered with snow; while other districts, where the snow melts during several weeks in every year, afford pasture-ground. On the plain there rise a small number of summits, among which the Skagstölstind attains 8400 and the Sneehätten 8200 feet. The western side of the plain is indented by deep inlets of the sea, which penetrate from 30 to 60 miles, and even more, inland: the eastern side is furrowed by narrow and deep valleys, of nearly the same length.

North of 63° N. lat. the masses of rocks take the form of a high ridge, the summits of which however rarely extend more than a few miles, and frequently present a sharp-edged crest. Their ascent on the side towards the Atlantic Ocean is rapid and frequently precipitous, a character which increases as we advance farther north, because the highest part of the range gradually approaches the ocean till it constitutes its very shores. The highest summit is the Sulitelma, which rises to more than 6000 feet; but many other parts exceed the snow-line, which varies between 2000 and 3000 feet, and towards the north sinks much lower.

The country to the east of this range, and at the base of it, is more than 1000 feet above the sea, and descends towards the Gulf of Bothnia in long slopes, interrupted by small level plains, and intersected here and there by ridges of hills, running in the direction of the slopes, and approaching in some parts to the shores of the gulf.

Mount Styltfiellen is on the northernmost extremity of the mountain-plain, where it begins to contract to the dimensions of a range. It stands near 63° N. lat., and attains the height of 6486 feet above the sea. From it, as from a common centre, branch off several ridges to the east, south-east, south and south-west, and though they soon sink down to hills, they continue through the south-eastern part of the peninsula, the mean elevation of which is from 300 to 400 feet above the sea, and above which the hills rise a few hundred feet. The Scandinavian ridges enclose the great lakes of Mälarn, Wenern, and Wettern. To the south of the last lake these ridges unite, and form the table-land of Småland, whose surface is on an average about 500 feet above the sea, and which constitutes the most southern extremity of the Scandinavian system. It descends with a gentle slope towards the east, but very rapidly to the south and west. The peninsula of Scania, which joins it on the south, is low and flat.

The Färoe Islands, which are between Norway, Cape Wrath in Scotland, and Iceland, and nearly equidistant from these three countries, resemble in their conformation the rocky plain of South Scandinavia, rising abruptly from the sea to more than 1000 feet, and presenting on their summits, at an elevation of more than 3000 feet above the sea, generally a level surface. This seems also to be the case with the south-eastern part of Iceland, which is called the Klofa Yökul, where a surface of more than 8000 square miles has never been explored, probably owing to the thick layer of snow which has accumulated on a mountain-plain which rises above the snow-line (3000 feet). The western and northern districts of Iceland, which in general rise only to a moderate elevation, though some isolated ridges and summits attain the snow-line, seem to be the produce of that active volcanic agency which has frequently laid waste this portion of Iceland.

Though the Scandinavian Mountains are not visibly connected with the South European Mountain system, we may perhaps be excused in considering the island of Great Britain as forming such a link. The most northern part of Scotland lies in the same parallel with the southern part of the Scandinavian mountain-plain, and bears a considerable resemblance to it in configuration, consisting of one enormous mass of high rocks, which rise abruptly from the sea, and exhibit on their surface extensive plains, sometimes flat and sometimes diversified with eminences. These plains however are not covered with snow, as they do not rise above 2000 feet, and sometimes attain only 1000 feet, or a little more, an elevation which falls considerably short of the snow-line. This description is applicable to the whole of Scotland north of the Central Grampians (57° N. lat.), with the exception of the greater part of the counties of Caithness and Aberdeen. Even to the south of 57° N. lat. we meet with an elevated plain, about 1000 feet above the sea, which, under the name of the Moor of Rannoch, extends more than thirty miles in every direction between Ben Cruachan and the southern chain of the Grampians. But farther south the Scandinavian character of the country is lost, and the surface presents the broken character of ridges, valleys, and plains, by which the most northern portion of the South European mountain system is distinguished. This character of the country softens gradually as we proceed farther south. Between 57° and 54° N. lat. the plains are generally of small extent, and a great number of summits rise to 1000, 2000, and sometimes even to 3000 feet and upwards above the sea. South of 54° N. lat. however these lofty elevations, and the comparatively narrow valleys which accompany them, occur only along the western coast of Great Britain, in Wales, and the counties of Devon and Cornwall. East of the Severn the hills do not generally rise so high as 1000 feet, nor are their slopes abrupt; the whole surface consists of gentle swellings and slopes, with wide levels between them. Towards the North Sea it sinks down entirely, and forms (with few interruptions not worth mention in this general survey) a great plain, which occupies the counties of Lincoln, Cambridge, Huntingdon, Norfolk, Suffolk, and Essex. As these flats lie opposite to the western extremity of the Great European Plain, one might imagine that they are a continuation of that plain, and that in the island of Great Britain the three great systems which occupy Europe have their representatives. South of the Thames the country resumes its undulating surface, and approaches in its form to those districts of France which extend along the southern shores of the Channel.

South European Mountain System.—This system, which extends over the whole of South Europe, from Cape La Roca in Portugal to the Straits of Constantinople, presents a surface more diversified in its form than any other portion of the globe of equal extent, China perhaps excepted.

To give greater perspicuity to our description, we shall follow the natural division made by a valley which traverses the whole of this mountain-system from north to south, between 4° and 8° E. long. In the northern part of the valley flows the Rhine from Basel northwards, in the southern the Rhone from Lyon southwards. The middle portion of the valley is occupied by the vale through which the Saone, a tributary of the Rhone, and the Doubs, a branch of the Saone, have their course. The most northern bend of the Doubs lies nearly under the same parallel as Basel, and less than thirty miles from it. In this part there occurs a great depression in the mountains, which divide the Rhine from the Doubs, and the French government have taken advantage of it, by carrying through this depression a canal, which is called the Rhone and Rhine canal, and which unites the Doubs to the Ill, a tributary of the Rhine. The highest part of this canal is nearly 1760 feet above the sea.

In the region which lies west of this long transverse valley, nature has effected another natural division, by forming across the continent a wide plain, skirting the northern side of the Pyrenees, and extending from the Bay of Biscay to the Mediterranean. The western part of this plain is low and flat, and drained by the river Garonne; the eastern is traversed by low hills, but does not rise much higher than the western part. The canal of Languedoc, which is made through this portion of the plain, and unites the Garonne with the Mediterranean Sea, attains at its greatest elevation about 600 feet above the sea.

South of this plain the mountain-chain of the Pyrenees rises with a rapid ascent, and runs across the whole continent from the Bay of Biscay to the Mediterranean. In its central parts it attains a mean elevation of about 6000 or 7000 feet, but a much less height towards its two extremities. The highest summits are upwards of 11,000 feet high, as the Mont-perdu (11,282), the Maladeta (11,500), and there are many more which exceed 10,000 feet. The southern declivity runs out in long mountainous slopes, intersected by deep valleys, and terminates on the banks of the river Ebro. Not far from the western extremity of the Pyrenees another chain branches off, which may be considered as its continuation, since it runs directly to the west. As far as 6° W. lat. it is a single chain, with short offsets, but west of that meridian it divides into several ranges, which traverse the north-western part of Spain in different directions, and terminate respectively at the capes of Ortegal, Finisterre, and Silleiro. This chain, which may be called the Cantabrian range, rises in its eastern parts to about 4000 or 5000 feet, but west of 5° W. lat. it attains a height of 5000 or 6000 feet, and even more.

South of these ranges extends the table-land of Spain, the highest parts of which occur between 1° and 4° W. long., where they are from 2000 to 2500 feet above the level of the sea. The country east of this line descends rapidly, but in high chains of hills, which contain some mountain summits, to the Mediterranean. On the highest part of the table-land also, a few high mountains occur, as the Sierra Urbion, which rises to 7272, and the Sierra Molina, to 4500 feet, but they do not form continuous chains. The country west of them is a plain, which presents a large extent of level ground, in some places a hilly surface, and in others ridges about 1000 feet above their base. Such are the ridges which divide the basin of the river Tajo from that of the Guadiana. But between the Tajo and the Duero the dividing ridge rises to 5000 or 6000 feet, and attains in the Sierra de Gredos even the elevation of 10,548 feet. In its continuation towards the Atlantic is the Serra d'Estrella, 7524 feet high; and even the Serra do Junto, not far from its termination at Cabo da Roca, is 2319 feet above the sea.

The Sierra Morena, which divides the basins of the rivers Guadiana and Guadalquivir, forms the southern boundary of the table-land. It does not however rise much above it, the mean elevation of this range varying between 3000 and 4000 feet. South of the Sierra Morena the country sinks considerably to the valley of the Guadalquivir, which, in its upper part is only about 1000 feet above the sea, and in its lower course traverses an extensive level plain, which, near the sea, is covered with swamps.

This valley is divided from the Mediterranean by a long chain of mountains running east and west, a considerable part of which is always covered with snow, and has therefore received the appropriate name of Sierra Nevada. The highest summits occur between 3° and 4° W. long., and are the Cerro de Mulhacen (11,660 feet high), Cerro de Machos (11,096), Cerro de Veleta (11,387), Cerro de Caldera (10,793), and Cerro de Fajos Altos (10,778). Many other summits exceed the snow-line, which, in this latitude, is about 9000 feet above the sea.

The country between the plain of the Garonne and the valleys of the Rhone and Rhine presents a different character. It contains also an elevated region, rising to between 2000 and 3000 feet above the level of the sea. But this region is of comparatively small extent, being included between 44° and 46° N. lat., and between 1° and 4° E. long. On its surface rise three chains of mountains, which enclose the valleys of the Allier and of the Upper Loire. The most western part is called the mountains of Auvergne, the middle the mountains of Forez, and the eastern range the Cevennes. The mountains of Auvergne, which exhibit unequivocal signs of volcanic origin, rise in Mount Cantal to 6090 feet, in Mont d'Or to 6200, and in Puy de Dôme to 4840 feet. The country west of them continues high and hilly, but gradually declines in elevation as far as the source of the Charente, from which point to the sea it extends in a low and level plain. The mountains of Forez rise in the Pierre Haute to 6200, and in the Mount Magdalene to 4800 feet. The two chains terminate about 46½° N. lat., near the town of Moulins, on the Allier: the country extending to the north and north-west of them has an undulating surface, resembling that of the southern counties of England; it varies from 200 to 300 feet above the level of the sea, and does not exhibit ranges of hills, except in the south of Normandie and in Bretagne, where the hills rise from 1000 to 1500 feet above the sea.

The Covennes, which separate the valley of the Upper Loire from that of the Rhone, rise in Mount Mezin to 5820 feet, in Mount Pilate to 3516 feet, and in Mount Tarare to 4756 feet. South of 47° N. lat. they sink down to the level country, and through the depression thus formed runs the Canal du Centre. North of this canal the chain rises again, but to a less elevation, and is here called the Côte d'Or, which, between 47° and 48° N. lat., terminates in a hilly plain, called the Plateau de Langres. On this plain, which may be about 1000 feet above the sea, several of the rivers of France take their rise, and among others the Seine. From the north-eastern part of this plain issues a chain of low hills, called Monts Faucilles, which, at 48° N. lat., extend eastward till they meet the higher range of the Vosges mountains, which rise in the Ballon de Sulz to 4560 feet. The chain of the Vosges runs parallel to the Rhine and terminates at a short distance from the town of Mayence, in the Mont Tonnerre, or Donnersberg, 2656 feet high. West of this chain, as far as the Côte d'Argonne (a range of high hills which issues from the western extremity of the Monts Faucilles, and separates the valley of the Meuse from the sources of the eastern tributaries of the Seine), extends a rugged country, intersected by valleys and chains of hills, running in a northern direction, and terminating in the Ardennes and the Eifel, which are hilly and rugged plains, about 1800 feet above the level of the sea, occupying the space between the Meuse and the Rhine as far north as 50½° N. lat. West of the Côte d'Argonne extend the dry chalk-plains of Champagne, which gradually subside in the level country which occupies the north of France (the departments of Seine and Marne, Aisne, Oise, Seine Inférieure, Somme, Artois, and Nord), and joins that of Belgium. On this plain only a few hills, and those of very moderate elevation, occur at considerable intervals.

We pass now to that portion of the south European mountain system which lies to the east of the valleys of the Rhone and of the Rhine. Here we find the mountain system of the Alps, which extend from the banks of the Rhone as far east as 18° E. long., and cover an immense tract of country, measuring on an average about 130 miles across. The Alps may be divided into the Higher and Lower Alps. The Higher Alps extend to about 13° E. long., and the Lower between 13° and 18°.

The Higher Alps have the form of a quadrant, beginning on the shores of the Mediterranean, and running first due north, but gradually declining to the east, until they run due east, in which direction about one half of their course continues. Their mean breadth does not exceed 100 miles. Many hundred summits, perhaps not less than a thousand, rise above the snow-line, which here is found at somewhat more than 8000 feet above the sea. The highest summits are Mont Blanc (15,748 feet), Mont Rosa (15,170), and Mont Cervin 14,778 feet above the sea. The valleys by which these mountains are intersected are narrow, and sink down to 2500 and 2000 feet, and still lower.

The Lower Alps do not rise to so great an elevation, few of the summits attaining the snow-line; the highest summit is Mont Terglou, near the sources of the Save, which is 9380 feet above the sea. But the space occupied by these mountains widens considerably as they proceed eastward; between 15° and 16° E. long. they are upwards of 200 miles across, and fill up the whole country between the Adriatic Sea and the Danube. They form also several chains running east and west, between which there are wide longitudinal valleys. East of 16° E. long., where they approach the mountain system of the Balkan, they narrow to about 80 miles, and continue to run along the Adriatic Sea.

The Alps descend with a rapid slope southward to the plain of Lombardy, which extends from the western part of the Higher Alps to the Adriatic. Its length is about 250 miles, with an average breadth of about 50. Its western and higher districts are about 400 feet above the sea, but it gradually subsides as it advances east, till it terminates in a low sandy shore. It is mostly a dead flat, of great fertility, and very well cultivated.

South of this plain extend the Apennines, a mountain-range which, at its western extremity, joins the most southern part of the Higher Alps, and runs in one chain eastward along the plain of Lombardy, from which it rises with a steep ascent. It afterwards turns south and traverses, in different chains, the peninsula of Italy, terminating at its most southern extremity, the Capo dell'Armi, on the straits of Messina, with the Monte Aspro, 5300 feet. The highest part of this range is between 43° and 42° N. lat., where the Monte Corno or Gran Sasso d'Italia rises to 9510, and the Monte Sibilla to 7200 feet. The valleys, which are included between its several ranges, are wide and fertile. In some places the mountains do not extend to the shores of the sea, but leave spacious plains, as is the case along the Adriatic, north of 44°, and again between 42° and 43°. The latter plain, called the Tavogliera de la Puglia, is a savanna, without trees, and of very indifferent fertility. Along the Mediterranean occurs the plain of Terra di Lavoro, in which the town of Naples and Mount Vesuvius are situated, one of the most fertile spots of Europe or the world. Many of the mountainous districts along the Mediterranean are covered with lava.

The Island of Sicily, which is separated from Italy by the strait of Messina, has a hilly surface. Along the northern coast there runs a chain of low mountains, which, in Mount Madonia, rise to 3788 feet. Unconnected with this chain is the volcano of Mount Ætna, which attains an elevation of 10,800 feet above the sea. Between the hills, with which Sicily is studded, and sometimes on their very tops, there

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are plains of moderate extent, which are sometimes nearly 1000 feet above the sea.

The island of Sardinia consists of two chains of mountains running north and south, and an elevated valley between them. The eastern chain, which is the higher, rises in Mount Schimschiu to 6000, and in the Lyubarra mountains to 5768 feet. The western chain probably does not exceed 3000 feet in elevation. Along the coast there are some low swampy tracts.

The island of Corsica is still more mountainous. If a few small tracts along the eastern shores are excepted, which are covered with swamps, it is everywhere studded with high hills and ridges of mountains. Some of the summits attain a great height. Monte Rotondo is 9060, and Monte Paglia Orba 8691 feet above the sea. The valleys are numerous but very narrow, and of indifferent fertility.

Passing to the countries north of the Alps we find that this great mountain-system, at its western extremity, is bounded on the north by the river Rhone, from the point where it issues from the lake of Geneva to its junction with the river Saone. Immediately north of the Rhone there rises another chain of mountains, different in character and in elevation, called the Jura. This chain extends from the banks of the Rhone, in a north-east direction, to the river Rhine, on whose banks it terminates between the mouth of the river Aar and the town of Basel. Its length may be about 160 miles, and its width less than 20 on an average. It consists of a number of parallel ridges, rising 1000 feet and more on a base which is nearly 3000 feet above the sea. Some of the summits exceed 5000 feet in absolute elevation. The highest are towards the southern extremity of the range. The Pré des Marmiers attains 5640, Reculet 5619, and the Dôle 5500 feet.

Along the south-east side of the Jura, and between it and the Alps, extends the plain of Switzerland, beginning on the shores of the lake of Geneva and terminating on those of the lake of Constance. This plain is between 1250 and 1350 feet above the level of the sea. At each extremity some hills rise to a considerable height, but the central districts exhibit only a strongly undulating surface. Its length may be about 180, but its width does not exceed 20 miles.

Opposite the northern extremity of the Jura, but on the northern banks of the Rhine, rises the Black Forest, a mountain-range, about 20 miles across, which runs parallel to the Rhine, and whose western sides approach the river sometimes within three or four miles. It terminates on the banks of the river Neckar. Its length may be between 130 and 140 miles. The upper part of this range extends in wide plains more than 3000 feet above the sea; the number of summits which rise above these plains is not great. The Feldberg attains 4912 feet, and the Kandel 4160 feet above the sea. The Odenwald, which extends between the Neckar and Mayn, in the same direction, may be considered as its continuation, but it does not attain an equal elevation, its highest summit, the Katzenbuckel, rising only to 2000 feet.

Between the Black Forest and the Odenwald on the east, and the Vosges mountains on the west, lies the valley of the Rhine, which is about 20 miles in width, but the length from Basel to Mayence is not less than 200 miles. At its upper extremity it is 800 feet, but at its lower hardly more than 400 feet above the sea. This valley presents a level surface of great fertility.

The Rhine, below the great cataract of Schafhausen, is not more than 1000 feet above the level of the sea; but the Danube, at Danaueshingen, nearly under the same meridian, is 2200 feet above it; yet between both rivers no mountain-range occurs. With only a hilly surface, and in an extent of hardly 15 miles, the country rises more than 1200 feet. This hilly country may be considered as the commencement of the elevated plain of Bavaria, which extends from the foot of the Alps (about 47½° N. lat.), between the Black Forest and Odenwald on the west and the Böhmerwald (forest of Bohemia) and Fichtelgebirge on the east, to the Thüringer Wald and the Rhöngebirge (51° N. lat.). The length of this plain is about 180 miles, and its breadth about the same. The western part of the plain, which joins the Black Forest, is hilly, and intersected by a mountain-ridge, called the Rauhe Alp, which runs along the northern bank of the Danube for 70 or 80 miles, with a mean width of about 16 miles. South of this ridge the country is nearly 2000 feet above the sea, but north of it less than 1000 feet. The eastern part of the plain, south of the Danube, is nearly a level, which sinks gradually and almost imperceptibly from the foot of the Alps towards the river. The town of Munich, which nearly occupies its centre, is 1664 feet above the sea, and Ratisbon, on the Danube, more than 1000 feet. That part of the plain which lies north of the Danube has an undulating surface, upon which some hills rise towards the banks of the river Mayn. From the banks of the Danube the country rises slowly, but hardly more than 150 feet above the river, when it forms the water-shed between the Danube and Mayn, and begins to subside towards the bank of the last-mentioned river, where it is only from 600 to 800 feet above the sea.

The elevated plain of Bavaria does not extend far enough north to reach the Great Plain, being divided from it by a mountain-region which extends between 50½° and 52° N. lat. over the whole of Germany, from the very banks of the Rhine to the Fichtelgebirge and Erzgebirge. This region, which has a width of about 100 miles, contains a great number of ridges, bearing different names. Their mean elevation is about 3000 feet, and the highest summits attain upwards of 4000. The most northern of these ridges is the Harz. For a more peculiar account of them we refer to GERMANY.

The countries which we have hitherto considered are to the north of the Higher Alps. To the north of the Lower Alps, and divided from them only by the narrow valley of the Danube, is another system of mountains, which encloses, in the form of a quadrilateral figure, the kingdom of Bohemia, and might therefore be called the Bohemian mountains. The several ridges of which it consists have different names. They attain a mean elevation of 3000 or 3500 feet above the sea; their highest summits rarely exceed 5000 feet. The great valley of Bohemia, which is enclosed by these ridges, is subdivided into numerous smaller valleys by the lower ridges, which advance into it from those which surround it. Near the higher ridges the surface of these valleys is 1500 feet and upwards above the sea, but they subside rapidly towards the middle of the great valley, where they are not more than 700 and 900 feet above the sea. Where the Elbe carries off the waters of Bohemia it is somewhat less than 400 feet above the sea.

At the eastern extremity of this mountain-system, where the rivers Oder and Morava take their origin, the Carpathian Mountains commence. They run first due east, then decline to the south-east, and when in that direction the range has passed 26° E. long., it turns suddenly to the west, and having proceeded in that direction to 23° E. long. it gradually declines to the south, and terminates on the banks of the Danube on both sides of the meridian of 22°. The length of this range does not fall much short of 800 miles; its breadth is not very considerable, in a few places only exceeding 70 or 80 miles. Its mean elevation may be between 3000 and 4000 feet; but in two places it rises much higher: Tatra Mount, which is intersected by 20° E. long., is an enormous mass of rock, about 50 miles long and 30 wide in the central parts, whose surface is about 7000 feet above the sea. Above this huge mass there rise about ten peaks which exceed 8000 feet. The highest is the Peak of Lomnitz, which rises to 8675 feet above the sea. The Peak of Eisthal (dale of ice) is 8640, and the Krywan 8150 feet high. Elevated summits occur again on the most southern part of the range, where the Buzesd attains 8700 feet, and Mount Surul 7572 feet. Towards the great plain, and on the north and east, the range sinks with gentle slopes, forming no offsets, except a few short ones at the sources of the rivers Pruth, Serith, and Suczava, between 47° and 48½° N. lat. But some considerable offsets occur towards the two extremities of the range. Four chains are detached from it between 18° and 20° E. long., which run southward and terminate not far from the banks of the Danube, after traversing the north-western part of Hungary: they are comprehended under the general term of Hungarian Ore Mountains, from their being rich in gold and silver ore. The valleys between them are wide and fertile. No considerable chain branches off from the middle part of the range, but from its eastern extremity four or five ridges issue: these ridges running in a western direction some hundred miles, traverse Transylvania, and render the whole of this country a succession of mountains and wide valleys, which are generally very fertile.

Between these offsets of the Carpathians on the east, the principal range, and the Hungarian Ore Mountains on the north, and the eastern termination of the Alps (16° E. long.), lies the plain of Hungary, the most extensive that is included within the South European mountain-system. It extends from north to south about 300 miles, and its mean breadth is not less. The Danube traverses it. To the west of the Danube is a small range on the plain, the Bakony Mountains, which rise in their highest part somewhat more than 2000 feet; and farther south (near 46° N. lat.), the hills of Fünfkirchen occur: but both these ranges occupy only a small surface. The plain east of the Danube is a dead flat. That portion which lies west of the Danube is fertile, as well as that which skirts the Hungarian Ore Mountains, but by far the greatest part of it is either covered with sand or swampy, and affords only indifferent pasture. This great plain towards the south is only 300 feet above the sea, but towards the north it rises to 400 and 450 feet.

South of the Carpathian Mountains, and between them and the lower course of the Danube, extends the plain of Wallachia, 250 miles in length from west to east, and about 130 miles in breadth. It is generally level, but towards the mountains undulating; in its lower parts along the Danube it is only about 100 feet above the sea. It is of great fertility, but in many places swampy.

The third great division of the South European mountain-system is formed by the Balkan, which, with its numerous branches, traverses the most eastern of the three great southern peninsulas, which advance from the body of the continent into the Mediterranean Sea. The Balkan range is not disjoined from the Alps by any natural separation, but is so closely connected with them as to form a continuation of that mountain-system. Geographers have however assumed a dividing line about 18° E. long.

From this line the principal range of the Balkan runs in a south-east direction till it reaches 22° E. long., from which point it continues in a general due east direction till it terminates on the shores of the Black Sea in Cape Emineh. The length of this chain may be about 600 miles. Its elevation is considerable west of 24° E. long., especially between 22° and 24° E. long., where a great part of the chain, called here Shardagh (Scardus) and Egrisu Dagh, is covered with perpetual snow, which shows that it must rise at least to 9000 feet. East of 24° E. long. it does not rise so high, and it is supposed that in this part its mean elevation varies between 3000 and 4000 feet. The extent of country covered with this range and its numerous branches is very great. West of 24° E. long., all the immense tract which lies between the Save and Danube on the north and the Adriatic as far south as Cape Linguetta or Karaburnu, presents nothing but a continuous succession of high mountains and generally very narrow valleys, and is probably the most rugged part of Europe, as it is certainly the least known. The country which lies between the great range and the Danube, east of 24°, is only mountainous near the foot of the range, for its offsets rapidly decrease in height, and subside as they approach the river, on the banks of which the country exhibits merely an undulating surface.

From the southern side of the Balkan three ranges branch off: the eastern, which leaves the principal range about 70 or 80 miles from the Black Sea, is called Strandja or Stanches Dagh, and runs south-east, parallel to the Black Sea, but gradually approaching it. About 50 miles west of Constantinople, it turns to the south, and terminates at the mouth of the river Maritza. The latter portion is called Tekir Dagh. Both parts are of moderate elevation. The second range branches off from the Balkan east of 24° E. long., and runs first south-east till it approaches the Ægean Sea, within 20 or 30 miles, when it turns east and terminates nearly opposite the Tekir Dagh, on the banks of the Maritza. This chain, called Dispoto-Dagh, rises to a considerable elevation, though none of its summits seem to attain the snow-line.

The country between the Strandja Mountains, the Dispoto Dagh, and the Balkan is only mountainous towards the two last-named ranges; the greater portion of it rises only into hills, separated from one another by wide valleys, which in several places spread out into plains of moderate extent. This country possesses great fertility, and is one of the finest parts of Europe.

The third and most considerable range, which branches off from the Balkan on its southern side, since no modern name has been assigned to it, may be called by the antient denomination of Pindus. It leaves the principal range near 22° E. long., and runs south, forming the watershed between the rivers which fall into the Adriatic and those which empty themselves into the Ægean Sea. It may be considered as terminating south of 39° N. lat. with Mount Veluchi (7657 feet high). The length of this chain is upwards of 200 miles; and the greatest part of the upper range is for eight or nine months, and some summits probably the whole year round, covered with snow.

The country between this range and the Adriatic is very mountainous: it generally consists of high ranges and deep and narrow valleys, though in some places there are elevated plains of moderate extent, as that on which the town of Joannina (or Yanina) is built, which probably is at least 1500 feet above the sea.

The countries to the east of the Pindus range are less mountainous. That portion which extends north of 40° N. lat. contains high summits and ridges near the great range; but as it approaches the sea the mountains subside into hills, and the valleys widen by degrees into plains. Mount Athos, or Hagion Oros, is an isolated mass which terminates the most eastern of three projecting tongues of land, and rises to the height of 6349 feet.

Near 40° N. lat. a lateral chain branches off from the Pindus range. It is called Volutza Dagh and runs east, terminating near the sea in Mount Olympus, which attains the height of 6520 feet. Near 39° N. lat., between Mount Itamo (5789 feet high) and Mount Veluchi (7657), two lateral chains branch off to the east and terminate respectively on each side of the Gulf of Zeitoun. In the northern range, called by the Greeks that of Othrys, the Ieracovouni rises to the height of 5670 feet. In the southern range, known among the antients by the name of Oeta, the Katavothron rises to 7070 feet. Between the Othrys, the northern of these two ranges, and the Volutza Dagh is the plain of Thessaly, celebrated from the most remote antiquity for its beauty and fertility. Though it extends nearly 60 miles from north to south it is much narrowed by hills, which advance from the neighbouring ranges 15 or 20 miles into the plain, and on the sea side it is shut in by a barrier of mountains.

The country south of the Oeta range and the Gulf of Arta is mountainous in its western districts, but farther east it assumes a more undulating surface, though some of its numerous elevations rise to the height of mountains, as Mount Parnassus, which is supposed to rise to 6000 feet, and several others are perhaps not much lower.

Round the lake of Topolias, the antient Copais, there is an extensive plain, whose surface is several hundred feet above the sea level and walled in on the east by the high mountains which line the western margin of the Euripus. Some of these mountains are above 2000 and others above 3000 feet high.

The peninsula of the Morea is united to the continent by a rocky isthmus which in one part contains a considerable depression, across which several attempts were made in antient times to cut a canal. The Morea preserves the character of the countries which are dependent on the Balkan, being very mountainous, especially in its eastern parts, where several lofty ranges run in a south-eastern or southern direction. Mount Zyria, the Cyllene of the Greeks, seems to be the knot where the ranges unite. Cyllene is 7744 feet high, but the Pentedaktylon (Taygetus), in the southern part of the peninsula, rises to 7920 feet. The central districts of the peninsula contain some elevated plains which are probably as high as the interior of Spain. Tripolitza is 2224 feet above the sea, and Madrid, according to Bauza, is 2222 feet above the same level. In the western disdistricts the mountains gradually subside into hills; and several plains of moderate extent occur along the bay of Koron and the banks of the Alpheius.

The mountains of the island of Eubœa, which lies parallel to the coasts of Attica and Eubœa, belong to the mountain system of Othrys and of Oeta, from which it is separated on the north and west by those prodigious fissures which form the sea-valleys or channels of Trikiri and the Euripus.

The Great Plain.—Beginning at its western extremity, we find that between the mouths of the Schelde and the Elbe, the country hardly in any place rises to more than 100 feet above the sea. Its surface is covered with a succession of moors and heaths, ill adapted for agriculture, except in the alluvial tracts along the rivers. But this sterile country is surrounded by fertile marshes, which run along the shores of the North Sea, and are so low that it is necessary to defend them by dykes from the invasion of the waves. The width of these marshes varies from one to four or five miles, except at the western extremity, where they occupy the whole of the province of Holland. Towards the banks of the Elbe the soil mostly consists of sand, but it begins here to be covered with forests.

The countries between the Elbe and the Vistula are more fertile, though the sandy soil prevails, especially towards the north; yet even here extensive tracts of fertile land occur. Towards the mountain region which borders on it on the south, especially in Silesia and the southern districts of Poland, the country may be considered as rather fertile. No marshes occur along the Baltic, but at the south-western extremity of this sea a series of small lakes begin which run parallel to the shore and follow its sinuosities. Their distance from the sea is about 50 miles, and they are situated on the highest part of the plain, perhaps at a mean elevation of 150 feet. They form the watershed between the small rivers which fall into the Baltic and those which run southwards into the interior of the plain.

That portion of the plain which we have so far noticed is drained by rivers which originate in the mountain-region south of it and traverse it in a north-western or northern direction. But east of the upper branches of the Vistula, the rivers originate in the plain itself which they drain. These rivers run either north-west and north to the Baltic and White Seas, or south and south-east to the Black and Caspian Seas. The watershed which separates their sources begins about 23° E. long. on the northern declivity of the Carpathian Mountains, in a range of hills which separate the Saan, a branch of the Vistula, from the sources of the Dniester. This range of hills runs in a north-eastern direction to the sources of the Bug, another tributary of the Vistula, where it turns north, and is lost in the plain. It is soon replaced by an immense swamp, the largest in all Europe. The principal body of this swamp covers nearly the whole basin of the river Priepec, which extends about 200 miles east and west, with an average breadth of 100 miles. It also continues northward, but with a much diminished width, between the sources of the Niemen, Beresina, and Vilia, and terminates on the banks of the Düna, south of Dünaburg and Polotz. The surface covered by this swamp is perhaps not inferior to that of England. Some parts of it are wooded. We do not know what is the elevation of this swamp above the level of the sea, but we may conjecture that it is not less than 300 feet. Towards the northern extremity of the swamp the watershed turns due east, and is here formed by an undulating country which separates the upper courses of the rivers Düna and Dnieper. But where it approaches the sources of the Volga it turns first north-east and then north, and here it is overtopped by steep and rocky hills, called the Hills of Waldai, which rise highest in the neighbourhood of that town, where they attain an elevation of 1200 or 1300 feet above the sea. This seems to be the highest point of the watershed. It continues in a northern direction till it passes 60° N. lat. between the lakes of Onega and Bielo Osero, and then turns south-east to the sources of the Suchona, the principal branch of the Dwina: thence it proceeds in an east-north-east direction to the sources of the Petshora, which falls into the Arctic Sea, and of the Kama, a branch of the Volga, where it terminates in the Uralian range. That portion of the watershed which is east of the hills of Waldai is covered with an immense forest, called the Forest of Volkhonsky.

The country north of the watershed is, in general, of moderate fertility; there are some districts which are covered with sand, while others have a rich soil. That series of small but very numerous lakes which we noticed in the western part of the plain continues in this at nearly the same distance from the Baltic, forming likewise a subordinate watershed. East of 22° E. long. however it stretches farther inland, approaching the northern extremity of the great swamp, and then continues north of it along the watershed to the hills of Waldai, and still farther in the Forest of Volkhonsky, where it terminates near 35° E. long.

The country north of 60° N. lat. is only in a few places fit for agriculture, partly on account of its cold climate, and partly on account of the sterility of the soil. That portion which lies west of the lake of Onega is rocky, and is mostly traversed by ridges of rocky hills, which lie in a north and south direction. These hills rise in some places to 500 or 600 feet above the sea. Most of them, as well as the level country between them, affords excellent pasture ground. This region is remarkable for its numerous large lakes, which cover nearly one-fourth of its surface, and are connected by short natural channels. The largest of these lakes are the Ladoga, Onega, Saïma, and Enara.

There are only a few lakes east of the lake of Onega. It appears that the watershed here rises to a greater elevation, and that the slope of the country is more regular. Its southern districts are still covered with forests, and a few spots are cultivated; but its northern districts extend in immense plains, covered with moss, which by attracting the water of the melting snow renders them impassable for the greatest part of the summer. A few rocky ranges of hills occur on this plain, but we are not acquainted with their direction and elevation.

By far the greater part of the Great Plain extends to the south of the watershed. Contiguous to its southern declivity extends a country of great fertility, from 300 to 400 miles in width. It begins on the west near the foot of the Carpathian Mountains, and terminates on the east where the Volga begins to run south-south-west. The parallel of 49° forms its southern boundary, as far east as about 40° E. long., whence it runs in a north-eastern line to the town of Simbirsk on the Volga. The town of Moskwa, situated nearly in its centre, is 480 feet above the sea. The country east of the Volga, as far as the Uralian range, is mostly covered with hills, and is even mountainous, being traversed by the offsets of the great range: it is of moderate fertility in the valleys, which are frequently wide. The hills and lower parts of the mountains are covered with forests.

To the south of this region extend the deserts which are called the Steppes. They may be divided into the Higher and Lower Steppes, the line of separation between them being the high ground which extends north and south between the Don and Volga. The Higher Steppes occupy the western part of the plain, extending south of the fertile region to the very shores of the Black Sea. Their elevation above the sea may be between 150 and 200 feet. They are without trees, produce only in some places a few shrubs, and are overgrown in the early part of the summer with a coarse grass, which affords very indifferent pasture. In the latter part of the summer and autumn their dry brown surface shows no sign of vegetation. Agriculture can only be carried on in the narrow bottoms along the rivers. The peninsula of the Crimea is connected with them by a low isthmus. Three-fourths of its surface resemble the Lower Steppes; but on its southern shores rises a mountain-range, whose highest summit, the Chatyr Dagh, is 5040 feet. The valleys of this range are fertile.

The Lower Steppes are at the eastern extremity of Europe, extending between the southern extremity of the Uralian range and Mount Caucasus along the banks of the river Ural, and on both sides of the lower course of the Volga. They occupy a space more than twice as large as the area of the British Islands. The southern part is lower than the level of the sea, the Caspian Sea being more than 300 feet beneath it, and the adjacent country rising very little above its shores. The town of Saratow on the Volga, more than 300 miles from the Caspian, is not above the sea-level. We do not know how much higher the northern districts of these steppes rise, nor if their soil differs from that of the southern, which are covered with a fine sand, intermixed with shells, producing no trees nor shrubs, but at certain seasons a scanty grass. This soil is strongly impregnated with saline matter, and most of the lakes which occur here contain such a quantity of salt that it crystallizes in summer, and supplies the greatest part of the inhabitants of Russia. In no part of these steppes are any traces of agriculture visible except in the neighbourhood of Astrakhan.

We shall conclude this general survey of Europe by observing, that the Uralian range, which runs about 1500 miles, first south and then south-south-east, rises in its highest summit, the Pawdinskoi Kamen, to more than 6800 feet above the sea; that the Lower Steppes extend east of the river Ural far into Asia; and that Mount Caucasus, though only few of its summits attain the snow-line, rises in its highest summit higher than the Alps, Mount Elboorz attaining an elevation of 16,800 feet.

Looking at the map of Europe we find that its coast-line is formed alternately by wide projecting promontories and deep bays, which divide them from one another. This peculiarity has led a large proportion of its inhabitants to a sea-faring life, and as the winds and weather in the waters that surround this continent are not regulated by the seasons of the year, but are subject to continual changes, this circumstance has given to them that boldness in maritime enterprise which forms the most distinguishing feature in their character, and raises them above most other civilized nations of the globe.

Europe, in fact, considered by itself, is only a large peninsula, which is further cut up into a great number of smaller peninsulas by the interior seas and gulfs which penetrate far inland into the main mass of the peninsula; consequently, in proportion to its surface, it presents a much greater extent of coast than any other of the great divisions of the globe, as will appear by the annexed table, which however must be considered only as a rough approximation:—

	Surface in square miles.	Coast-line. Miles.	Ratio of one mile of coast-line to area in square miles.
Asia .	18,000,000	35,000; or including the islands, 40,000.	500; or including the islands, 420.
Africa .	14,000,000	16,000	900
Europe	3,900,000	20,000	195
America	15,000,000	32,000 (without the coast of the Arctic Sea).	470

The Atlantic Ocean, with which all the seas that wash the shores of Europe are connected, except the Caspian (and this is rather to be considered as an immense inland lake), forms the Bay of Biscay between Cape Finisterre and the island of Ushant; the English Channel between the northern coasts of France and the southern coasts of England; St. George's Channel, between Great Britain and Ireland; and the North Sea, which separates Great Britain from the Netherlands, Germany, Denmark, and Norway. The North Sea might be considered a closed sea, as it is united on the south to the great expanse of the Atlantic only by the straits of Dover, which, between the South Foreland in Kent and Cape Grisnez in France, is only eighteen miles wide, and by the comparatively narrow channel called the English Channel, if it were not on the north connected with the Atlantic by the open and wide expanse of sea which separates North Britain from Norway.

The close seas, which are united to the Atlantic by straits, are the White Sea, the Baltic, and the Mediterranean; with the latter the Black Sea and the Sea of Azof are connected.

The White Sea, the smallest of these inland seas, covers an area of only about 40,000 square miles. The strait by which it is connected with that portion of the Atlantic which is called the Arctic or Icy Sea, is about 200 miles long, and of considerable width, its narrowest part being from 30 to 40 miles across. This sea is entirely or partially covered with ice during four or five months of the year. Into its eastern part the Dwina falls; and into the wider part of the strait the river Mezen.

The Baltic is connected with the North Sea by a channel with about 80 or 90 miles of average width; this channel branches off from the North Sea in an east-north-east direction, but afterwards suddenly turns south. That portion which is connected with the North Sea and extends to the east-north-east is called Skagerack, or the Sleeve by the British sailors, and the other part, which lies south and north, the Cattegat. At the southern extremity of the Cattegat are the three straits by which the Baltic is entered like three gates. The Sound, between Zeeland and Sweden, is the passage generally taken by vessels; it is at the narrowest place only about two miles wide. The Great Belt is in the middle between Zeeland and Fünen, and eight miles across at the narrowest place. The Little Belt, which is only three-quarters of a mile wide where narrowest, separates the island of Fünen from the peninsula of Jutland. The Baltic forms three great gulfs—those of Riga, Finland, and Bothnia. Receiving, by the numerous rivers which fall into it, great masses of fresh water, it is less salt than the Atlantic. This circumstance, and the small depth of its waters, sufficiently explain why ice is formed nearly every year along its shores, and the navigation is interrupted for three or four months.

The Mediterranean is connected with the Atlantic by the strait of Gibraltar, which is about ten miles across. It is the largest of the close seas which wash the shores of Europe, but it receives the drainage of a comparatively small portion of its surface; the number of rivers which fall into it is very considerable, but few of them run 100 miles. Evaporation carries off a larger portion of its waters than is supplied by the rivers which flow into it, and there is accordingly a strong current setting continually through the straits of Gibraltar. A motion of its waters towards the east is proved by vessels requiring a greater time to sail from the coast of Syria to Gibraltar than from Gibraltar to Scanderoon. Its waters are salter than those of the Atlantic. It also forms several large gulfs; as, on the European side, the Bay of Lyon, that of Genoa, the Adriatic, and the Ægean Sea, or Archipelago. By means of this sea the Straits of the Dardanelles (one mile across where narrowest), the Sea of Marmara, and the channel of Constantinople (six furlongs across at the most narrow place), the Mediterranean is united to the Black Sea, from which a constant current pours through the narrow straits into the Ægean. [EUBŒA.] The Black Sea is connected by the strait of Yenikale with the Sea of Azof. It is less salt than the Mediterranean, and its northern shores in winter are frequently fringed with ice.

The Caspian Sea, whose north-western shores only are included in Europe, is the largest of the numerous seas without an outlet which occur in the north-western regions of Asia. Ice is formed every winter along its northern shores. Its waters are salt, but only in a slight degree.

Seas.	Extent. sq. miles	Specific gravity of its waters.
Mediterranean . .	760,000 .	1.0293
Black Sea and Sea of Azof	190,000 .	1.0142
Caspian	180,000	
Baltic	160,000 .	1.0400
White Sea	40,000 .	1.0190
Atlantic Sea, in the northern hemisphere . . .		1.0283

When we consider these seas as the receptacles of the drainage of the adjacent countries, we find that those towards the east have the most extensive basins. The basin of the Caspian Sea, though it is only drained by two large rivers, the Volga and the Ural, occupies a surface of 850,000 square miles, as far as it belongs to Europe, and runs with its northern boundary along the parallel of 60° N. lat. The basin of the Volga, the largest of the rivers of Europe, contains an area of above 750,000 square miles. The basin of the Black Sea is somewhat larger. Its south-western boundary is formed by the principal range of the Alps; its north-western by a line drawn from Switzerland to Moscow; and another line from this city to the mouth of the Volga, forms its north-eastern border. Its area in Europe is rather more than 900,000 square miles. The countries which are comprehended in the European part of its basin are drained by the Danube, Dnieper, Dniester, Don, and Kuban, and their tributaries. The basin of the Baltic is nearly equal in extent, including the Cattegat and Skagerack, being on all sides surrounded by countries which belong to Europe; their basin extends over a surface of nearly 900,000 miles, though perhaps none of its rivers rise more than 350 miles from its mouth in a straight line. The great rivers which fall into the Baltic are the Oder, Vistula, Niémen, Düna, Newa, and the numerous rivers descending from the Scandinavian range, as the Tornea-elf, Calix-elf, Lulea-elf, Pitea-elf, Scaleftea-elf, Umea-elf, Angerman-elf, Indals-elf, Liunga-elf, Liusna-elf, and Dal-elf; and likewise the Götha-elf, and Glommen, which fall into the Cattegat and Skagerack, The basin of the White Sea is drained by the Dwina, the Mezen, and Petshora, and some other smaller rivers, and occupies a surface of about 400,000 square miles. Though the coast-line of the Atlantic from Cape North Kyn to Cape Tarifa, comprehends the whole of the shores of the western declivity of Europe, including the British islands, its basin probably does not much exceed 600,000 square miles. No considerable river flows into the Atlantic between Cape North Kyn and the mouth of the Elbe. Into the North Sea there flow the Elbe, Ems, the Rhine, Schelde, and of the rivers of Great Britain, the Spey, Tay, Forth, Humber, and Thames; into the English Channel, only the Seine; into St. George's Channel, the Severn; into the Bay of Biscay the Loire and Garonne; and immediately into the Atlantic the Clyde, the Shannon, the Duero, Tajo, Guadiana, and Guadalquivir. The basin of the Mediterranean, including the Archipelago, is by far the smallest of all those which belong to the inland seas of Europe, comprehending only about 250,000 square miles. The largest of its rivers, the Rhone, flows only 500 miles, including its bends. The other rivers, which are of a considerable length, are the Ebro in Spain; the Po and Tiber in Italy, and the rivers of Albania and the Maritza in Turkey. All the rivers which drain the basins of the Mediterranean and Atlantic Sea rise in the South European mountain region; those which fall into the Black Sea rise within the Great Plain except the Danube and its tributaries, which drain about one-third of the mountain region. The rivers which run to the Caspian rise partly on the watershed of the Great Plain, and partly in the Uralian range; and the same is the case with those that drain the basin of the White Sea. The rivers which flow from the east into the Baltic rise on the Great Plain; those which flow into it from the south rise on the edge of the mountain region; and those which fall into it from the north descend from the Scandinavian range.

Climate.—The climate of Europe presents great differences, if we compare it with that of those countries in other divisions of the globe, which lie within the same parallels. It is a well-established fact, that the eastern coast of North America is much colder than the western coast of Europe, under the same latitudes. This difference is in some places equal to 10° of latitude. Thus we find that the mean annual heat of London (51° 31′ N. lat.) is nearly 50° Fahr., while at Quebec (46° 48′ N. lat.) it hardly exceeds 42° Fahr. At Lisbon (38° 43′ N. lat.) it is 61⅓° Fahr., and at Williamsburg in Virginia (37° 5′ N. lat.) only 56° Fahr. It is however worthy of remark, that the eastern countries of Europe, especially those north of the Black Sea, are much colder, and approach in climate those of the eastern coast of America. At Moscow (55° 47′ N. lat.) the mean annual heat is not quite 38° Fahr., whilst at Edinburgh (55° 58′ N. lat.) it exceeds 47° Fahr.

This difference in the climate of Europe may perhaps be explained by the circumstance that this continent is enclosed on most sides by seas whose water is warmer than that of the ocean at large. The water of the Mediterranean is from 4° to 5° Fahr. warmer than the ocean without the straits. Between America and Europe the warm water of the gulf stream, which exceeds the heat of the other water of the Atlantic by 8° or 10° Fahr., covers a surface not inferior to that of the Mediterranean, and the exhalations of this immense expanse of warm water are carried by the prevailing western and south-western winds to the western shores of Europe. Besides this, the water in the sea between Spitzbergen, Greenland, and the coast of Norway indicates a higher degree of temperature when drawn from some depth under the surface of the sea than on the surface itself. This has been proved by the experiments of Sir John Franklin and Captain Scoresby, though the contrary is the case in all other seas, as far as we know.

Dr. Brewster however thinks that there are two frigid poles in the northern hemisphere, and that the degree of warmth increases with the distance from the meridian in which these poles are situated. By comparing the few exact meteorological observations which have been made in remote countries, he is induced to infer that these meridians are about 90° from the western countries of Europe, and hence he presumes we may account for the greater mildness of the climate in these regions. The observations which the latest traveller through the north of Asia, Dr. Erman, has made in those remote countries, seem rather to confirm than to contradict the theory of Dr. Brewster.

With respect to climate, Europe may be divided into three zones, the northern, the central, and the southern. These zones may be separated from one another by two lines, of which the northern begins near 60° N. lat., on the western coast, and terminates between 55° and 54° N. lat. on the Uralian range on the east; the southern commences about 48° N. lat. on the west, and terminates on the east at the mouth of the Danube (45° N. lat.). In the northern zone only two seasons occur, summer and winter, the former lasting about three months (June, July, and August), and the latter nearly nine months. These seasons are separated by a spring and autumn of a few days, rarely two weeks' duration. In summer the heat is very great, and the vegetation inconceivably rapid. The winter is severe and boisterous, and brings down immense quantities of snow. In the central zone the four seasons are distinct, and the passage from heat to cold and *vice versâ* is very gradual. The heat is less than in the northern zone, and so is the cold during the winter; still frost prevails during two, three, or four months, and snow is common except on the coasts. In the southern zone frost is either not felt at all or only during a few days; and snow is of rare occurrence, or it does not lie on the ground for more than a few days. Vegetation accordingly is very little interrupted. But the countries within this zone have abundant rains during the last three months of the year, and are subject to great and long droughts in summer. These droughts frequently continue for four or five months, and in some places occasionally for eight or nine months.

IV. *The Man of Europe.*—Nearly the whole population of Europe belongs to that race which is comprehended under the name of the *Caucasian* race; but along the Uralian range, and at the most northern extremity of the continent, a few nations occur which belong to the Mongolian race; to which must be added the Magyars, who inhabit nearly the centre of Europe (Hungary).

The inhabitants of the Caucasian race may be divided into three great branches and several smaller ones, if we consider them with reference to their language. The first division comprehends those languages which are derived from the Latin and an admixture of the languages of the antient aborigines and of the later destroyers of the Roman empire. These languages are spoken in the peninsulas of Italy and Spain and in the countries west of the valley of the Rhine. They are the Italian, Spanish, Portuguese, and French languages. In some districts of the countries where these languages are spoken there still exist the languages of some of the aboriginal inhabitants of Europe. On both sides of the western extremity of the Pyrenean mountains, south and west of the river Adour, the Basque language is spoken by a population not exceeding 600,000 souls, according to the most exact computation. The Cymric language is spoken in Wales, and also in the interior districts of the most north-western peninsula of France, which is called Bretagne (Little Britain), by a population amounting to about 2,000,000 individuals. The most extensive of these languages is the Celto-Gaelic language, which is still prevalent in the greater part of Ireland, and in some of the northern districts of Scotland. The number of the individuals who speak it perhaps does not fall short of 7,000,000. Many persons think that the Cymric and Celto-Gaelic languages ought to be considered only as dialects of the same original language.

The second great branch of the languages is formed by those of Teutonic origin. These languages are spoken by the inhabitants of England, a great part of Scotland and Ireland, Iceland, Norway, Sweden, Denmark, Germany, and the Netherlands. In every one of these countries a pecular dialect is spoken, though the affinity of all these languages cannot be questioned. It would seem as if these languages had been introduced into these countries by their first inhabitants, or aborigines, as at present no other language is spoken in any of these districts (with the exception of the British islands), nor do we find any mention in historical records of such other languages ever having existed.

The third great family of languages is comprehended under the name of Slavonian. The most western tribes that speak these languages are found in the eastern districts of Germany. The Czekes inhabit Bohemia, and the Wendes the north-western part of the Prussian province of Silesia. In the south-western part of the same province Polish is spoken. Between Vienna and Trieste is another Slavonian tribe, also called Wendes, or Windes by the Germans; but they call themselves Slovenzi. Towards the south the Slavonian language extends to the very summit of the Balkan, the inhabitants of Dalmatia, Croatia, Slavonia, Bosnia, Servia, and Bulgaria, speaking dialects of that language. From these extreme points the Slavonian language is spoken over the whole of the great plain of Europe to the borders of Asia, on the Uralian range, and on the river Ural. The most extensively spoken languages of this family are the Russian and the Polish.

In the immense tract of country in which the Slavonian language may be considered as prevalent, some extensive districts are occupied by nations who speak different languages. We shall first notice the tribes of Mongolian origin, who form three different groups. The most numerous tribe are the Magyars, who inhabit the greatest part of the Hungarian plain, especially that port on which lies east of the Danube, from the banks of which river they extend to the foot of the Carpathian mountains, where they are on every side surrounded by Slavonian tribes. The second group of nations of Mongolic origin occupy the countries between the Scandinavian Peninsula on one side, and the White Sea and the three great lakes of Ladoga, Onega, and Peipus on the other side. The Laplanders inhabit the country between the northern extremity of the Gulf of Bothnia and the White Sea: the Finns occupy the country farther south, as far as the Gulf of Finland. At the most eastern part of this gulf live the Inghers, and south of it the Esthonians and the Livonians, who extend to the southern part of the Gulf of Riga. All these nations speak dialects of the same language, which is said to have a great resemblance to the language of the Magyars. The third group of the Mongolian tribes occupy the countries along the Uralian range, and between the rivers Ural and Volga. The most northern tribe are the Samoyedes, who occupy the eastern portion of the government of Archangel, between the river Metzen and the Uralian range. South of them, in the eastern districts of the government of Wologda, are the Siryanes, who also occupy the northern part of the government of Perm. In the southern districts of this government are the Permiens, the Wogules, and Wotyakes. Here are also a few families of the Mordwines, Cheremisses, and Chuwashes, who are dispersed over the surface of the governments of Viatka, Kasan, Simbirsk, and Pensa, where they inhabit an extensive district on the western side of the Volga. Their neighbours on the other side of the Volga are the nomadic tribes of the Calmucks and Kirghises. The former occupy the countries contiguous to the Volga, on its eastern bank; but the Kirghises inhabit those between the rivers Useen and the river Ural. The two latter tribes are Bhuddists. To these tribes are still to be added the Bashkirs, who, in their stature, and the conformation of their face, evidently show their Mongolian origin, though they speak a Turkish dialect. They inhabit the most eastern part of Europe, the northern portion of the government of Orenburg, and some districts of that of Perm, on both sides of the Uralian range.

Different both from the Mongolian languages, and those of the Slavonian tribes, are the languages spoken by the Lithuanians and Courlanders, two small nations who inhabit the countries between the rivers Niemen and Düna, and extend over the northern districts of eastern Prussia and the Russian governments of Grodno, Minsk, Wilna, and Mitau.

The Wlaches, or inhabitants of Wallachia and Moldavia, speak a peculiar language, with which a great number of Latin words are mixed up. Hence it is inferred that their ancestors inhabited these countries when they were subject to the Roman empire.

The eastern peninsula of southern Europe is inhabited by nations who speak three different languages. The most numerous are those who speak the Turkish language, which is used by the Osmanlis or Turks, and the Tartars. Some tribes of the latter nation are also dispersed among the Slavonian nations, on the northern shores of the Black Sea, where they are known by the names of the Nogai Tartars and Meshtcheryakes. They are most numerous in the Crimea, and along the northern declivity of the Caucasus. The Osmanlis form the bulk of the population in those parts of Turkey which lie between the Balkan and the Volutza range. The mountainous countries west of the Pindus range are inhabited by the Albanians, who speak a peculiar language, and are considered as the descendants of the Illyrians, the aborigines of these countries. The most southern part of the peninsula is inhabited by the Greeks, who form the bulk of the population in Greece, and also in that portion of Turkey which lies between the Volutza and Othrys ranges. Their language does not differ substantially from the antient Greek, of which it is a corrupted form, mixed up with some Latin, Italian, Turkish, and other foreign words.

The population of Europe is calculated to amount to about 230 millions in round numbers. The Christian religion is that which generally prevails. The Catholic faith is nearly exclusively professed by the inhabitants of Portugal, Spain, and Italy, and also by the majority in France, Austria, Bavaria, Poland, Belgium, and Ireland. Catholics are also numerous in some cantons of Switzerland, and some provinces of Prussia and of Russia. The whole number of the adherents of this faith is calculated to amount to 112 millions. To the Greek church belong the Russians and the Greeks; and a great number of the members of this church are dispersed over different parts of Turkey: they amount altogether to about 54 millions. The inhabitants of Sweden, Norway, and Denmark are nearly exclusively Protestants; and the various sects of Protestants form the great majority in England, Scotland, Holland, Switzerland, Prussia, and the northern and western states of Germany. In France, Austria, Ireland, Belgium, and some provinces of Russia, Protestants are numerous. The whole number is about 52 millions. There are Armenians in Russia, Austria, and Turkey; about 200,000 in all.

The Turks and Tartars, with some of the small tribes of Mongol origin along the Uralian Mountains, are Mohammedans. Their number is supposed not to fall much short of six millions. Among the Laplanders and Samoyedes there are still some who have not embraced Christianity. The Calmucks and the Kirghises are mostly Bhuddists. At Astrakhan there are a few Hindoos. The Jews are most numerous in some parts of Russia, Poland, Austria, and Turkey. Their number cannot be accurately estimated. In the south-eastern countries of Europe there is a considerable number of gypsies: it is doubtful what their religion is.

The following is a tabular view of the sovereign states of Europe in 1837. The areas and population are given from the latest and best authorities, and, wherever they could be got, from official documents. It is hardly necessary to observe that these figures must be considered only as approximations with respect to several of the states of Europe, such as Turkey and Greece, for instance.

Those thus marked * are states which are members of the Confederation of Germany.

States.	Form of Government.	Area. Sq. miles.	Population.
ANDORRA (Pyrenees)	Republic, with two syndics and a council	190	15,300
*ANHALT-BERNBURG	Duchies, with states having limited powers	336	45,600
*———COTHEN		310	36,400
*———DESSAU		357	57,500
*AUSTRIA, Empire of 1, in Germany, Hungary, &c.;	Absolute monarchy, with the exception of Hungary and Transylvania, which have legislatures	237,334	29,600,000
2, in Italy		17,892	4,500,000
*BADEN	Grand duchy; limited sovereignty, with legislature of two chambers	5,712	1,240,000
*BAVARIA	Limited monarchy; two chambers	28,435	4,200,000
BELGIUM	Do.	12,569	4,200,000
*BREMEN	Republic; senate and convention	67	57,800
BRITAIN, GREAT, Ireland, and settlements and islands in Europe	King and two houses of parliament	116,700	25,300,000
*BRUNSWICK	Duchy; limited sovereignty, with one chamber	1,525	250,000
CHURCH, States of the, or Papal States	Absolute and elective sovereignty	17,048	2,590,000
CRACOW	Republic; senate and chamber of representatives	490	124,300
DENMARK, Continental	Absolute monarchy, with provincial states having limited powers	21,472	2,040,000
——— Islands		38,290	57,400
FRANCE	Limited monarchy; two chambers	202,125	33,600,000
FRANKFORT (on the Main)	Republic; senate and legislative body	91	56,000
GREECE	Absolute monarchy	10,206	810,000 (a)
*HAMBURG	Republic; senate and common council	149	153,000
*HANOVER	Limited monarchy; two chambers	14,600	1,679,000
*HESSE-CASSEL, or Electorate of Hesse	Limited sovereignty; one chamber	4,386	699,000
*HESSE-DARMSTADT, or Grand Duchy of Hesse	Do. two chambers	3,198	765,000
*HESSE-HOMBURG	Landgraviate; absolute sovereignty	154	24,000
*HOHENZOLLERN-HECHINGEN	Principality; limited sovereignty, with one chamber	136	21,000
*——— SIGMARINGEN	Do. do.	383	42,800
HOLLAND (including Duchy of Luxemburg)	Limited monarchy, with two chambers	13,890	2,820,000

(a) The area is assumed from the President's decree of the 25th of April, 1828. Balbi and others carry it above 15,000. The population according to Klade's Almanac for 1837, is 926,000, besides 12,326 troops.

States.	Form of Government.	Area. Sq. miles.	Population.
Ionian Islands	Free state; with council and one chamber, under British protection	998	242,000
*Liechtenstein	Principality; limited with one chamber	52	5,800
*Lippe-Detmold	Do. do.	432	79,000
*Lübeck	Republic; senate and common council	142	46,500
Lucca	Duchy; limited sovereignty, with a senate	410	145,000
Marino, San	Republic; with senate and council of antients	21	7,500
*Mecklenburg-Schwerin	Grand duchy; limited sovereignty, with one chamber	4,701	472,200
*———— Strelitz	Do. do.	1,094	85,300
Modena and Massa	Duchy; absolute sovereignty	2,073	390,000
Monaco	Principality; absolute sovereignty	50	6,700
*Nassau	Duchy; limited sovereignty, with two chambers	1,736	372,700
*Oldenburg	Grand duchy; absolute sovereignty	2,470	260,000
Parma	Duchy; absolute	2,184	440,000
Portugal	Limited monarchy; with chamber of representatives	34,500	3,400,000
*Prussia	Absolute monarchy, with provincial states having limited powers	106,302	13,800,000
*Reuss, Principalities of	Limited sovereignty, with one chamber	588	83,400
Russia, Empire of—Russian Dominions	Absolute monarchy	1,994,139	47,000,000 (a)
Kingdom of Poland	Do.	47,670	4,100,000
Sardinia	Do.	28,830	4,500,000
*Saxony	Limited monarchy, with two chambers	5,705	1,680,000
*Saxe-Altenburg	Do. with one chamber	491	113,700
*Saxe-Coburg and Gotha	Do. do.	790	132,000
*Saxe-Meiningen-Hildburghausen	Do. do.	880	146,400
*Saxe-Weimar-Eisenach	Do. do.	1,403	243,000
*Schwarzburg, Principalities of	Do. do.	756	118,500
*Schauenburg-Lippe	Do. do.	205	26,000
Sicilies, The Two	Limited monarchy, with a council (consulta)	41,521	7,650,000
Spain	Do. with legislature	179,480	11,963,000 (b)
Sweden and Norway	Do. with diet and storthing	284,530	4,150,000
Switzerland	Confederation of republics, with diet	17,208	2,116,000
Turkey, Empire of (including Wallachia, Moldavia, and Servia)	Absolute monarchy	183,140	12,000,000
Tuscany	Grand duchy; absolute sovereignty	8,302	1,330,000
*Waldeck	Principality; limited sovereignty, with one chamber	455	56,000
*Würtemberg	Limited monarchy, with two chambers	7,568	1,610,000
		3,708,871	233,834,800

Zoology of Europe.—In giving a general view of the animals of Europe, it will be found that the number of wild quadrupeds at present existing (many species having become extinct from the progress of civilization), is too small to exhibit many characteristic peculiarities in their geographical distribution and local adaptation; and the close connexion of this continent with that of Asia makes it very difficult to draw any exact line between their productions. Many of the animals of the south of Europe are also common to the north of Africa; and most of the quadrupeds inhabiting the northern parts of our continent are found in the corresponding latitudes of Asia and America. But though the zoology of Europe does not possess much interest from the number, size, or peculiarity of its animals, this is in some measure compensated by the intimate acquaintance which we possess with the habits and manners of many of the smaller species, whose natural history has been carefully investigated by many able and industrious naturalists.

In the following table the mammalia which are found in Europe are arranged according to their position in the orders of the Cuvierian system; those which are peculiar to this continent, and those which are common both to it and other parts of the globe, are placed in separate columns.

ORDERS.	Whole No. of known species.	Whole No. of European species.	No. of species peculiar to Europe.	No. of species common to Europe and other Continents.
I. Quadrumana	186	1	0	1
II. Cheiroptera	192	27	18	9
III. Carnivora	320	50	17	33
IV. Marsupialia	67	0	0	0
V. Rodentia	295	35	12	23
VI. Edentata	23	0	0	0
VII. Pachydermata	30	1	0	1
VIII. Ruminantia	157	8	1	7
IX. Cetacea	76	28	10	18
Total	1343	150	58	92

We here see the relative number of European mammals placed according to their organization, in different groups or orders; and we may remark that no animal is found in Europe belonging to the Marsupialia and Edentata, while of the Quadrumana and Pachydermata two species only inhabit our continent, one belonging to each order, the Barbary ape (Inuus sylvanus) and the wild boar (Sus scrofa). The former is found among the precipices of the rock of Gibraltar, and thus enters into the geographical limits of Europe.

The domesticated quadrupeds occupy a much more important station among the animals of our continent than any of the wild species: under this head we shall mention the horse, ass, goat, sheep, ox, hog, dog, and cat, and in the more northern parts of Europe the rein-deer may be added.

No wild races of horses at present exist which have not descended from domesticated varieties; but it seems probable that they were aboriginal in Tartary, and most likely in other parts of Asia. From the former country it is conjectured that they were originally imported into the north and east of Europe; while in the southern and western parts of the continent they were probably derived from Barbary and Arabia; but this of course must be mere conjecture, as we cannot name any time within historical limits when these animals were not spread over all or the greater part of Europe. The horses of Spain were celebrated in the time of the Romans, after which they were probably crossed with the Barbary and Arab breeds during the Moorish dynasty. They may be considered as the lightest and fleetest of the old European breeds, and the nearest approaching to the Arab; but they have fallen off greatly during the last century, little care having been bestowed in keeping up the more noble breed. The best Spanish horses are generally about four feet six or eight inches high, and closely resemble the beautiful Arabians of Barbary called Barbs: those of Andalusia, Granada, and Estremadura are the best. The heaviest horses in Europe come from the shores of the North Sea, and the smallest from the north of Sweden and from Corsica. Those of Germany and Italy are of little note. Switzerland produces good draught horses, and those of Holland are noted for the same qualities. The French is a useful and hardy race, and will endure greater fatigue, though it is not possessed of the size and beauty which now characterize the English horses: the native breeds have been much improved lately by crossing with English stallions. Greater attention is paid to the breeding of horses in England than in any other country except Arabia; but while the Arabs only endeavour to preserve their breed in its original purity, we have improved upon it by crossing with other varieties, till the English horses both exceed the Arabian in size and fleetness, and equal them in many instances in symmetry, though they are not quite their match in powers of endurance. The English horses have been divided into four principal classes—the racer, the hunter, the carriage-horse, and the dray-horse.

The ass in Europe holds a very inferior place to the horse

(a) Including the governments of Perm, Viatka, Kasan, Simbirsk, Pensa, Saratof, Astrachan, and part of Orenburg, 453,390 square miles.

(b) According to the Appendix to a decree in the 'Madrid Gazette' of August, 1836.

It is generally an ill-used and neglected animal. Originally of Asiatic extraction, it does not accommodate itself so well to our climate as the horse; for it feels the effects of cold more, and degenerates in northern countries; a circumstance which partly accounts for the contempt in which it is held. In the southern parts of Europe it is a fine spirited animal, and approaches in appearance and usefulness to those of Western Asia and Egypt. The Spanish and Maltese are the finest breeds of asses in Europe. One principal use of this animal is for the breeding of mules, which are extensively used in the mountainous parts of Southern Europe as beasts of burden, where, from their possessing the sureness of foot of the ass, with greater size and strength, they are found exceedingly useful.

Sheep and goats, though placed in distinct genera, are so nearly allied, that the characters which distinguish them are very slight; and there are several races or species of wild sheep and goats very nearly approximated.

It is not easy to trace the present domesticated varieties of either of them to any species still existing in a wild state, for both goats and sheep were among the earliest animals domesticated by man. Cuvier imagined that all the present varieties of the domestic goat have arisen from the Capra ægragos, a wild species inhabiting the mountains of Persia, where it is called Paseng by the natives. He also states that this animal has been found on the Alps; but it has been supposed that this variety, which is met with there in a wild state, might have been a hybrid between the common goat and the Ibex. It seems probable that the goat preceded the sheep in domestication; at any rate it did so in the north and west of Europe for many ages. It is a hardier animal, and will live on the roughest fare, being an inhabitant of mountainous districts, where it is principally bred. The most numerous and finest varieties of domestic goats are in Asia. The Welsh breed is large, with fine long hair, generally white. In Sweden and Spain there are long-haired hornless breeds, with upright ears. The utility of goat's milk is well known; and though the flesh of the adult animal is not much valued, that of the kid is very palatable; the horns and hair are used in different manufactures; and the skin is formed into leather for making gloves, &c.

Sheep seem to have been originally derived from western Asia, whence they were imported into Africa, where they arrived at greater perfection than in their parent country. All the wild varieties of sheep have hair, and not wool: the change in the covering of the body seems to have arisen from the effects of cultivation and climate. The different kinds of domestic sheep are all supposed to have arisen either from the Argali (Ovis ammon), or the different varieties of Musmon (O. musmon), one of which is still found wild in some of the islands of Europe, as Candia, Sardinia, and Corsica. There seems formerly to have been a wild race of sheep in Great Britain, which was very large, with great horns and tail. Mr. Pennant observes (*History of Quadrupeds*) that such an animal is figured on a bas-relief taken from the wall of Antoninus, near Glasgow. Boethius says that a breed of sheep lived in St. Kilda which had horns as large as an ox, and reaching to the ground. The principal European breeds of domestic sheep are—1, the many-horned of Iceland; 2, the Cretan; 3, Wallachian; 4, Merino, or Spanish: 5, the English, of which there are many varieties. The most important among the continental races is the Merino, which differs from the English in bearing wool on the forehead and cheeks. The wool is of the finest quality for manufacturing cloth. This breed is extended over the greater part of Spain. But Great Britain possesses the most valuable race of sheep, taking every thing into consideration; for it produces the greatest quantity of the best wool, and the most delicate flesh.

The ox, which belongs to the largest tribe of ruminating animals, is eminently serviceable to man, though since the horse has come into such general use, oxen have been less employed in husbandry. It was first domesticated by the Caucasian nations of western Asia, and from thence is supposed to have found its way into Africa and Europe; but it has been imagined that the domestic varieties in our continent might have arisen from races which once existed in Europe, and even in Britain, in a wild state, the only remains of which is the wild bull of Scotland (Bos Scoticus), still preserved in one or two parks in the North. This is most probably the species which was named Urus by Cæsar, and other antient writers; but what makes it improbable that this was the parent of our domestic oxen is the fact, that several important anatomical differences, principally as to the shape of the skull, are discovered between the Scotch bull and the domestic ox. Numerous specimens of fossil skulls, found in the more recent formations, which are supposed to have belonged to the antient Urus, present also the same differences. The largest European breeds of cattle are those of Podolia, and the Ukraine, of Turkey, Hungary, and the Roman states. The Roman variety is supposed to have been introduced by the Goths, as all the representations of oxen found among old sculptures seem to denote a smaller race, more resembling that which is now seen in Tuscany, of a fine form, and pure white colour. There is a large breed of oxen in Denmark, which is the origin of the Dutch and Holstein varieties, the latter is the parent of the English unimproved breeds.

The hog occupies a low place in the scale of domestic animals, though its flesh forms an exceedingly good article of diet, and one much used by the peasantry in Christian countries. One of its most valuable qualities is that of preserving exceedingly well with salt, without becoming dry and hard, and losing its nutritive properties. The common wild boar (Sus scrofa) of Europe is no doubt the original parent of our domestic varieties. It was once indigenous over the whole of the old world, though now exterminated from some countries, as for instance Great Britain. The English breed of pigs is the finest in Europe, and some of them are fattened to an enormous size. In Ireland every cottager keeps his pig as a regular part of his establishment; and the salting of pork for exportation is a considerable article of trade in that country. There is a peculiar long-legged race of swine in Portugal and Spain. The pigs of Poland and Russia are of a reddish colour, and very small.

The dog claims our attention, not for his use as a beast of burthen, or in providing food for our tables, but for the attachment which he shows to man, becoming his companion and friend, assisting him in his pleasures, and protecting his property and home.

M. F. Cuvier has divided the different varieties of dogs into three primary types; the first has the jaws and muzzle elongated, and we may remark that all the wild species, as the Dingo of New Holland, &c., belong to this group, and more resemble the wolf and fox: this therefore may be considered as the most natural type. The second group has the jaws shorter than in the first, though longer than in the last division. The principal varieties of dog found in Europe belonging to the first group are—1, the *Albanian*, mentioned by the oldest historians and poets; 2, the *French matin*, which is considered by the writers of that nation as the most important of the canine race, and the ancestor of many others; 3, the *Irish Greyhound;* 4, the *great Danish Dog;* 5, the *common Greyhound*. The second group of dogs includes the most intelligent and useful kinds, as the spaniels, hounds, shepherd's, and wolf dogs; and we may here mention as belonging to this section the Alpine spaniel, or Mount St. Bernard dog, a variety of the Spanish breed, which is a beautiful and intelligent animal, kept by the monks at the monastery, from whence it derives its name, for the preservation of unfortunate travellers, who are often lost in the snows of this inhospitable region. Two of them are said to be sent out together, one carrying a cloak, and the other a basket of provisions and cordials: thus provided, they often discover, and are the means of saving persons who would otherwise perish with cold and fatigue. In the last group, which have the muzzle very short, are placed the *mastiff, bull-dog, pug*, &c. Our English breeds of mastiffs were once so celebrated that the Roman emperors appointed an officer in the island, whose business it was to send these dogs to Rome to fight in the arena; and in later times, when in our own country savage conflicts between dogs and wild beasts were a fashionable amusement, great care was bestowed on the breeding of bull-dogs and mastiffs.

There has been considerable diversity of opinion respecting the origin of the domestic cat, and the part of the world from whence it originally came. It has been thought by some that it must have been an inhabitant of warm climates, as it is a chilly animal, and always creeps as near to the fire as possible. Cuvier believed that it was a native of our European forests, and was the same species as the wild cat at present found, having been only altered by the effects of domestication. In support of this opinion, it is asserted that cats in some places, near woods or forests, will stray away and return to a savage state, when they assume very much the characters and appearance of the wild cat. According to Bewick (*History of Quadrupeds*), wild cats are found with little variety in most climates. The domestic cat is very useful in destroying vermin, as rats and mice, and is a favourite pet, though it is not capable of much attachment.

The reindeer, which is naturally wild in the north of Europe, becomes, when tamed by the Laplander, of the greatest value to him. It serves him for food, clothing, and as a beast of burthen; by its organization it is formed for crossing the snowy wastes, which without this animal would be impassable: it will draw a great weight when attached to a sledge, and go with amazing swiftness. The riches of a Laplander are estimated by the number of reindeer which he possesses: during the winter season when the ground is covered with snow, and the ox and horse would starve, the reindeer finds plenty of food in a peculiar lichen (*Cladonia rangiferina*), which grows in the greatest abundance, and often covers the soil in steril places for miles, affording nourishment for vast herds of reindeer, which root for this vegetable under the snow like swine in a pasture. Attempts have been made to domesticate this animal in England, but hitherto they have not succeeded. The reindeer is not adapted to our climate, and does not seem likely to be of much use in any point of view even if the experiment should succeed.

The whole number of wild European mammalia at present met with is only 150, which includes 28 belonging to the whale tribe, and 8 species of phocidæ or seals, among which the morse or walrus (*Trichecus rosmarus*) is placed: these being deducted, the number of land animals is reduced to 114, a proportion very small when compared with the three other great continents: of these seventy are also found out of Europe, most of them being common to Asia; there only remain therefore forty-four quadrupeds which are now peculiar to Europe.

We have already mentioned the only quadrumanous animal found within our limits, the Barbary ape, or magot, which, though now naturalized, is probably not an aboriginal inhabitant of Gibraltar.

Of the *Cheiroptera* twenty-seven species are found in Europe, most of which belong to the genus Vespertilio, a small and harmless race of bats. The most common and best known species is the *V. murinus*, the flitter-mouse of the English, which lives in caves, ruined buildings, church towers, the roofs of houses or churches, and hollow trees, where it hybernates during the whole winter, snugly wrapped up in the wing membranes, and suspended by the hind feet. There are two or three or perhaps more European species of the genus Rhinolphus, commonly called horseshoe bats, and one species of Plecotus has been described as found in Europe. As many as sixteen bats have been enumerated by Jenyns as inhabitants of Britain.

Most of the *Carnivora* of Europe are very insignificant animals by the side of their congeners of Asia and Africa. The only formidable beasts of prey now found within the limits of our continent are the bear, the wolf, and the lynx; but it seems probable that the lion was once met with in the south of Europe. Herodotus says that it was found in Greece between the rivers Nestus and Achelous (vii. 125); and he mentions the circumstance of the army of Xerxes being annoyed by lions on its march from Acanthus to Therme [Athos]. The fact of these animals having inhabited our continent is also confirmed by Aristotle, Pliny (unless he is merely copying other writers), and Pausanias. Of the genus Bear there are two species in Europe, the common brown bear (*Ursus arctos*), and the polar bear (*U. maritimus*): the former was once general over the whole continent, and is now found widely diffused in the most solitary districts from the arctic circle to the summit of the Alps and Pyrenees. It is a lonely animal, hybernating during the winter in the hollow of a tree or a cavern, where it remains till the spring without taking any sustenance. It is supposed to be nourished during that time by the fat which accumulates beneath the skin in great quantities in the summer. Cuvier describes a black bear peculiar to our continent, differing from that of America: however, as he never saw but one living specimen, and did not know its habitat, it was probably only a variety of the former species. The polar bear is almost confined to the frozen regions surrounding the north pole, but a solitary individual is occasionally drifted as far south as Iceland, or even the northern extremity of Norway and Lapland. The wolf and fox, the latter under different varieties or species, appear generally distributed over Europe: the former is even now not uncommon among the wooded and mountainous districts of France: when pressed by hunger, it will descend to the farms, and even attack the inhabitants. The lynx, once common in central Europe, has for some time been extirpated, except from some parts of Spain, the Apennines, and the northern parts of the continent: it is about twice the size of the wild cat, which is still said to be a native of Britain. The common glutton or wolverine (*Gulo arcticus*) is a native of Denmark. It is one of those animals whose history is obscured by fable: it feeds principally on dead carcases, though it will kill prey of the smaller kinds, as mice, marmots, &c.; but the stories of its falling from the boughs of trees on to the backs of deer and other large animals, and maintaining its hold there till they drop with fatigue and loss of blood, are doubtless entirely fabulous, as it is a most cowardly animal, and may be easily killed with a stick.

Of small carnivorous quadrupeds there are several species; as many as eight Mustelidæ, or weasels, inhabit different parts of Europe, which are particularly destructive to birds.

Few of the *Rodentia* of Europe require particular notice. The beaver was formerly recorded as a British animal; at present it is found in the neighbourhood of the Rhone, the Danube, the Rhine, and other large rivers on the continent. The porcupine (*Hystrix cristata*) is said to be occasionally met with in Italy, and other parts of the south of Europe. The flying squirrel (*Pteromys volans*) is an inhabitant of Denmark and Lapland, as well as one or two species of lemming (*Georychus*). The different kinds of rats and mice, of which seventeen species have been described, arranged in different genera, form an important feature in European zoology. One species of Hamster (*Cricetus vulgaris*) is distributed over central and northern Europe; and two marmots (*Arctomys marmotta* and *Bobac*); and the Spermophilus Citillus, or Soulisk of the Germans, occurs in the same region.

The *wild boar*, the only aboriginal pachydermatous animal in Europe, was formerly an inhabitant of the forests of Great Britain, and was one of the noblest and most favourite objects of the chase; it is still found on the continent.

The number of *Ruminants* found wild in Europe is very limited, there being only eight species. Of these five are deer, all of which are also inhabitants of other continents, viz., the elk or moose-deer, the rein-deer, the fallow-deer, the red-deer, and the roebuck, which are severally described in the article Deer. The three remaining animals of this order are the ibex, the chamois, and the musmon. The first (*Capra ibex*) is found, though rarely, in the Alps, still more rarely in the Pyrenees, and it is said in some other mountainous parts of Europe and Asia: it lives only in the most lofty and inaccessible places, and is sought for at the extreme peril of the hunter. The chamois inhabits also the wildest and most precipitous regions in the mountains of Europe, though it scarcely ascends to the same heights as the ibex; it is placed in the same group with the antelopes, though by some naturalists it is considered that it should form an intermediate genus between those animals and the goats. The musmon (*Ovis musmon*), the only ruminating quadruped which appears confined in its range to Europe, we have already mentioned as being the supposed parent of our domestic sheep; it has disappeared from the continent, though there is no reason for believing that it formerly existed on the mountains of Spain.

The *Cetacea* are a tribe of animals of which little is known. Their habitation being in the deepest recesses of the ocean, it is impossible to learn much of their habits and characters; and hardly any species can be said to be peculiar to one continent more than another, for the same whale may be met with on the coast of Europe at one time, and on that of America at another. A great many species frequent the shores of Europe, principally on its northern part, and the Greenland fishery is an important branch of European commerce.

The *birds* of Europe are much more numerous than the mammalia. Above 400 species have been described as regular inhabitants of our continent, and a good many more are occasional visitants; but we must confine our notice to a few of the more remarkable and typical species. In the northern or arctic regions very few birds are met with, and most of them belong to the wading and swimming orders; to whose nourishment and increase the arctic solitudes are particularly congenial. Almost all these species are found also in the northern parts of Asia and America; and the largest proportion occur in southern latitudes, extending even to the shores of the Mediterranean. One of the most characteristic birds of arctic Europe is the great snowy owl (Strix nyctea), which preys chiefly on the ptarmigans and grouse, which frequent these northern regions in great numbers. Two other formidable rapacious birds frequent the northern countries, particularly Lapland: the Iceland falcon (Falco Islandicus), which rarely wanders to more genial climes, and another gigantic owl (Strix lapponica), which is a peculiar inhabitant of the dreary solitudes of Lapland. As we proceed to warmer latitudes, and vegetation acquires a more decisive character, the number and species of birds subsisting on the produce of the earth and on insects greatly increase. Several woodpeckers are met with in the pine forests of Norway, one of which (the Apternus tridactylus) is remarkable for having only three toes on its feet. Among the noblest and most formidable birds of central and southern Europe may be mentioned the golden and imperial eagles; the former (Aquila chrysaëtos) is an inhabitant of the wildest parts of Scotland and Ireland, and rocky places among the higher mountains on the continent. The latter (A. imperialis) is chiefly found in the southern countries. Four species of vulture are met with on the Alps, two of which are found in the north of Africa and the western part of Asia. The bearded vulture (Gypaëtus barbatus), which is almost peculiar to the Alps, is a noble bird, partaking more of the characters of the true falcons, being very courageous and sanguinary; it is above four feet and a half long, from the tip of the bill to the extremity of the tail, and will attack sheep and goats, and it is said that even the ibex and chamois are sometimes killed by it. The great-eared owl represents in central Europe the snowy species of the arctic regions; it is common in the German and Hungarian forests, and is sometimes, though rarely, met with in England. The Gallinaceous genera are few and widely dispersed. The great bustard (Otis tarda) ranges from the western extremity of central Europe to the confines of Asia. The red grouse (Lagopus Scoticus) is the only bird peculiar to Great Britain. This race of birds seems to occupy an intermediate station between the centre of Europe and the confines of its polar extremity: the largest species is the famous cock of the woods (Tetrao urogallus), once an inhabitant of the Scottish forests. The rocky and uncultivated tracts of Spain and Turkey are inhabited by two species of rock grouse (Pterocles), of a genus different from those belonging to northern latitudes. On the shores of the Mediterranean there is a union of the ornithology of Europe, Africa, and Asia: the pelican, the spoonbill, and the flamingo are there met with, though not now very plentifully. Few of the birds of Europe are remarkable for that brilliancy of plumage which is so splendid a characteristic of the birds of tropical climates, but this is, in many instances, more than compensated by their sweetness of voice. The nightingale, the best songster in the world, is common in England and other European countries, though not confined to our continent; it visits us in the breeding season, along with numbers of other warblers, or small insectiverous birds, which enliven our woods and hedges during the spring and summer. The melody of the blackbird and thrush is too well known to require any eulogy. But Europe is by no means destitute of birds characterized by the beauty of their colours, though they are chiefly confined to its southern boundaries: the wall-creeper with its bright rosy wings is common in Italy; while the golden oriole, the European bee-eater, the hoopoe, and the roller are met with in abundance in the two Sicilies during the spring and autumnal migrations; and a modern author says that 'they may occasionally be seen hanging in the poulterers' shops in Naples and Palermo.'

The *reptiles* of Europe are few, and generally harmless. The common viper is almost the only venomous serpent. Numerous little lizards are common in the houses in the southern parts of the continent, as in Italy; but most of them are not peculiar to Europe, being also found on the opposite shores of the Mediterranean. An excellent edible species of turtle inhabits this sea, which resembles in appearance the logger-head of the West Indies, but is much more palatable when dressed. The most remarkable and curious reptile in Europe is the *Proteus anguinus*, which somewhat resembles a water lizard in shape, or an eel with very imperfect legs: it is found in the lake Zirknitz, in Carniola, and more often at the bottom of the grotto of the Maddalena at Adelsberg. It was conjectured by Sir H. Davy and others not to be a natural inhabitant of the surface of the globe, but to be forced up from a subterranean lake through some crevices in the rocks. It was also doubted whether this was a perfect animal or only the larva of some other, but it has been proved to be furnished with both gills and internal lungs; its eyes are quite rudimentary and situated beneath the skin.

Insects and other annulose animals are very numerous in Europe, but few of them possess sufficient interest to require any notice in this general sketch. The scorpion is frequently found in houses in Sicily, though fortunately unknown with us. The common gnat is one of our most troublesome insects, and in warm shady places, where there is much stagnant fresh water, it will cause almost as much annoyance to some people as the mosquito of hot climates, which it closely resembles. In Sweden and other northern countries, where the summer though very short is proportionably hot, it is said that true mosquitos are more numerous than in the woods of tropical America.

Many of the *fish* which frequent the shores of Europe are very important in an economic point of view. We may particularly mention the herring, the anchovy, and the tunny, whose capture and preparation employ a great number of men, and which are also important articles of diet. Herrings (*Clupea harengus*) arrive in great shoals on the western coasts of Europe towards the end of the summer for the purpose of depositing their spawn, and at that time immense numbers are caught, particularly on the British coasts, where they abound. It was supposed by the older naturalists (and among others even by Cuvier) that the herrings migrated from the Northern Ocean in the spring, and returned there after depositing their spawn; but it is the more recent opinion (which is supported by the authority of Mr. Yarrell) that these fish inhabit the deep waters round our coasts, and only approach the shore for the purpose of spawning, and then retire again to the depths of the ocean, where they remain during the winter and spring. The pilchard (*C. pilchardus*), which belongs to the same genus as the herring, is caught only on the coast of Cornwall, where it makes its appearance in July: it goes away in the autumn, and returns in the beginning of January. The anchovy (*Engraulus encrasicholus*) is principally met with in the Mediterranean, which sea it enters in enormous shoals by the Straits of Gibraltar in the spring for the purpose of breeding, after which it retires again to the depths of the Atlantic. The most productive fishery is off Gorgona, a small island west of Leghorn, where it is carried on during the months of May, June, and July. The anchovies are fished for only during the night, and are attracted round the boats by means of fires kept burning in them. Their principal use is for forming a sauce, which is very generally known, and esteemed as a condiment.

The tunny (*Scomber thynnus*) is also an inhabitant of the Mediterranean. It was a fish well known to the antients, and made a considerable branch of commerce: the time of its arrival in the Mediterranean from the ocean was observed, and stations for taking it established in places which it most frequented. (Strabo, p. 225.) It is in the interior of the Mediterranean that this fishery is now principally carried on, particularly along the shores of Catalonia, in Provence, in Liguria, in Sicily, and in Sardinia. These fishes frequent the coasts of Britain, but not in shoals like the tunny of the Mediterranean.

The salmon (*Salmo salar*), which is one of our most valuable and finest fishes, is found in all the seas on the north of Europe, Asia, and America, but it has never been met with in the Mediterranean. According to Cuvier it comes from the Arctic seas, whence it enters in large shoals the rivers of northern countries in the spring for the purpose of spawning. In temperate climates it is towards the end of winter that the salmon quits the sea: in the more northern regions it enters the rivers when the ice begins to melt on the shores of the ocean. Though the salmon is principally confined to the more northern regions, it has not been clearly ascertained how far south it extends, but probably not much beyond the 45th degree of latitude. It occurs, though not plentifully, in the rivers on the western coast of France.

The pike (*Esox lucius*), which is a palatable and wholesome fish, is exceedingly destructive and voracious; it has been called the fresh-water shark. It is found in almost all the fresh waters in Europe, though more plentifully in the northern than the southern parts. It sometimes grows to a very large size.

EUROPE, BOTANY OF. This continent in its most southern limits exhibits a strong resemblance to the vegetation of Africa and its adjacent islands. In Sicily, for example, along with the vine, grow, in the more steril situations, the poisonous leafless *Euphorbia Canariensis*, an inhabitant of the Canaries, and its congener *E. balsamifera*. *Euphorbia dendroides*, a fine globular shrub, is also met with in company with the castor-oil plant (*Ricinus Africanus*), and the Solanum sodomæum of Egypt. The Date, the Pisang (*Musa Paradisiaca*), and the Prickly Pear (*Cactus Opuntia*), ripen their fruit abundantly; *Agave Americana*, the American aloe, darts up its gigantic flower-stem from the midst of huge horny leaves; rice is grown; the sugar-cane is cultivated at Avola; the cotton-plant (*Gossypium herbaceum*) yields produce of the finest quality on the banks of the Simeto; while the great Italian reed (*Arundo Donax*) supplies the place of the bamboo, and furnishes the long stakes on which the vine is trained. Many parts of the south of Spain partake of this character. The *Smilax aspera* loads the bushes with its fragrant snow-white clusters, maize and Guinea corn are common articles of cultivation, the Peruvian Cherimoyer ripens its fruit in the gardens of Grenada, and the delicate melons of Valencia are as common an open crop as in the fields of Persia. At Barcelona, in the neglected botanic garden, were still found, a few years since, the Sappan tree of Brazil (*Coralpinia Sappan*), the *Schinus Molle* of Peru, and other trees from similar climates flourishing as if in their native air. In Portugal the laurel (*Cerasus Lusitanica*) seems almost identical with the Hixa of the Canaries, while the Coral trees at Lisbon unfold their noble leaves and gorgeous blossoms with all their native South American vigour. In Italy arborescent Endogens extend as far as Nice in the form of the dwarf Palmetto; and the Victor's laurel (*Laurus nobilis*), a common evergreen, is a European representation of the laurels of the Canaries. Along all these latitudes the fig, the olive, the orange, the vine, and the maize find a climate congenial to their southern constitutions. Even in valleys the olive will not exist higher than 44½° N., nor the vine produce good wine beyond 48°, except in a few sheltered places.

About the northern limits of the olive, that is to say, in the parallel of the south of France, a marked change occurs in vegetation; most of the southern equinoctial forms of vegetation either disappear or become uncommon. The Quercus Cerris, so common in Italy and Turkey, is hardly found; evergreen oaks (*Quercus Ilex*), common oaks (*Q. pedunculata* and *sessiliflora*) supply its place. Cluster pines and Scotch firs (*Pinus pinaster* and *sylvestris*) and other species, especially Pinus halepensis, grow along the sea-coast and occupy the position held by the more southern stone-pine (*Pinus pinea*); while *Juniperus Phœnicea* and *oxycedrus*, on the branches of which its peculiar mistletoe is sometimes met with, sweet chestnuts (*Castanea vesca*), the narrow-leaved ash (*Fraxinus oxyphylla*), the flowering ash (*Ornus Europæa*), mastich-trees, and Phillyreas increase the catalogue of trees, no vestige of which is to be traced much higher in a wild state. Still more to the north, where the vine begins to languish, its place in better occupied by broad plains of wheat and other corn; the hardy trees of England, elms, limes, oaks, ashes, alders, beeches, birches, willows, and poplars are found everywhere, with rich pastures and verdant fields, unknown in the land of oranges and myrtles. At last, in the more northern districts of the continent, aspens (*Populus tremula*), bird-cherries (*Prunus Padus*), birches, lime-trees, alders, junipers, spruce-firs, and pines are the principal trees that remain; barley and oats are the only corn-plants, but potatoes continue to be reared in the short cold summer.

Among plants less conspicuous than these and less popularly known, changes occur between the north and south of Europe not less striking to the eye of a botanist. In Sicily occurs a *Stapelia*, a form of vegetation so African, that Arabia Felix and Abyssinia are the nearest points where a parallel can be found. Mandrakes (*Mandragora autumnalis*) cover whole tracts in Turkey and Sicily in the autumn with their sky-blue flowers. Quantities of labiate plants, Boraginaceæ and gay Liliaceæ, Medicagos in abundant variety, an endless host of Cistus and Helianthemum Narcissi, Tulips, many species of Ophrys, and numerous kinds of Genista and Cytisus mark a zone of vegetation corresponding very much with the distribution of the olive. To the north of this limit such plants either disappear or diminish essentially in number and variety Apiaceous and Brassicaceous species become predominant, fungi swarm in the autumn, turnips and buckwheat (*Polygonum fagopyrum*) are cultivated advantageously, as also are hemp, flax, hops, carrots, parsnips, common clover, beans, vetches, and lucerne, as common field-crops. But in higher latitudes the predominant forms of herbaceous vegetation are numerous species of Ranunculus, Potentilla, Saxifraga, Arenaria, Primula, Mosses, and Lichens; and there also occur abundance of stunted or pigmy trailing shrubs, such as bilberries and whortleberries (*Vaccinium Myrtillus* and *uliginosum*), *Salix herbacea*, *Arbutus Alpina*, *Arctostaphylos Uva Ursi*, crowberries (*Empetrum nigrum*), and the like.

These changes take place if we merely look to the districts of the plains. In Europe, as in other parts of the world, similar alterations in vegetation occur as we ascend into the atmosphere. In Sicily for instance, with an almost tropical vegetation in the valleys, there is a transition to the middle forms of European vegetation midway on the mountain side, and then to the most northern flora at its summit, 9000 feet above the sea [ÆTNA]; and so with other mountains as we advance to the south, till at last on Sulitelma, in Lapland, not a trace of vegetation can be discover above the height of 3640 feet.

EURY'ALE. [STELLERIDEANS; MEDUSA.]

EURY'BIA. [MEDUSA.]

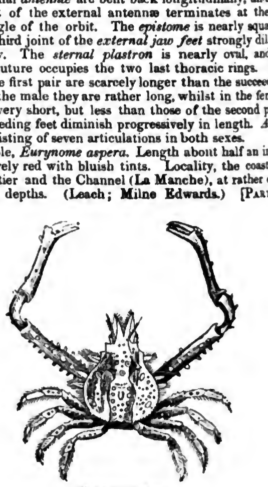
EURY'DICE (Zoology). [ISOPODA.]

EURYLAIMUS. [MUSCICAPIDÆ.]

EURY'MEDON. [ANATOLIA, vol. i., p. 494.]

EURY'NOME, a genus of brachyurous crustaceans established by Dr. Leach, and forming the second genus of the *Parthenopians* of M. Milne Edwards, who remarks that it establishes the passage between *Parthenope* or *Lambrus* and the other *Oxyrhynchi*. The general form of the body and aspect approximates these crustaceans to *Parthenope*, whilst the disposition of their external antennæ is similar to the conformation in *Maia*. The *carapace* is nearly in the form of a triangle with a rounded base, and is strongly tuberculated and covered with asperities. The *rostrum* is horizontal, and divided into two triangular horns. The *eyes* are small; the *orbits* deep, their upper border very much projecting and separated from the external angle by a slit. The internal *antennæ* are bent back longitudinally, and the first joint of the external antennæ terminates at the internal angle of the orbit. The *epistome* is nearly squared, and the third joint of the *external jaw feet* strongly dilated externally. The *sternal plastron* is nearly oval, and its median suture occupies the two last thoracic rings. The *feet* of the first pair are scarcely longer than the succeeding ones; in the male they are rather long, whilst in the female they are very short, but less than those of the second pair; the succeeding feet diminish progressively in length. *Abdomen* consisting of seven articulations in both sexes.

Example, *Eurynome aspera*. Length about half an inch; colour lively red with bluish tints. Locality, the coasts of Noirmoutier and the Channel (La Manche), at rather considerable depths. (Leach; Milne Edwards.) [PARTHENOPE.]



Eurynome Aspera.

EURYPO'DIUS. [Leptopodiidæ; Macropodians.]

EURYSTO'MIDÆ. [Rollers.]

EUSE'BIUS PA'MPHILI, bishop of Cæsarea, in Palestine, the friend of Constantine, and one of the most distinguished among the earlier Christian writers, was born in Palestine towards the end of the reign of Gallienus, about A.D. 264. He passed the earlier part of his life at Antioch, and acquired a great reputation for learning: it was said of him 'that he knew all that had been written before him.' He became intimate with Pamphilus, bishop of Cæsarea, who suffered martyrdom under Galerius in the year 309, and in memory of whose friendship he added to his name that of Pamphili. In 313 he was himself raised to the see of Cæsarea, which he filled until his death. He attended the great council of Nicæa, A.D. 325, where he joined his brethren in condemning the tenets of Arius; but he is said to have raised some objections to the word 'consubstantial with the Father' as applied to the son, in the Nicæan creed. His intimacy with his namesake Eusebius, bishop of Nicomedia, who openly espoused the cause of Arius, led him also to favour the same, and to use his influence with the emperor for the purpose of reinstating Arius in his church, in defiance of the opposition of Athanasius. [Arius; Athanasius.] The party to which he attached himself were called Eusebians, from their leader Eusebius of Nicomedia; and they seem to have acted in great measure from hostility against Athanasius and his supporters, as they did not as yet openly advocate the objectionable tenets of Arius, who had himself apparently submitted to the decrees of the council of Nicæa. In 331 Eusebius attended a council at Antioch, consisting of prelates of this party, who deposed, on some insidious charge, the bishop Eustathius, a zealous supporter of the Nicæan doctrine, and offered the see of Antioch to Eusebius of Cæsarea, which he declined. At the council of Tyre, A.D. 335, Eusebius joined in condemning and deposing Athanasius on the charges of disobedience to the emperor in not reinstating Arius, want of respect to the council, and an alleged desecration of some sacred vessels. Eusebius was deputed by the council to defend before Constantine the judgment which they had passed against Athanasius; and he appears to have used his influence with the emperor to have Athanasius banished. The part which he took in this unfortunate controversy caused him to be stigmatized as an Arian, though it appears that he fully admitted the divinity of Christ; and all that his accusers can prove is, that he believed that there was a certain subordination among the persons of the Trinity. (Mosheim, *Ecclesiastical History;* and Schoell, *History of Greek Literature*, and the notes and references therein.) Eusebius of Nicomedia afterwards openly advocated the Arian doctrine under the reign of Constantius, especially at the council of Antioch, A.D. 341. Eusebius of Cæsarea died A.D. 340.

Eusebius was possessed of most extensive erudition, sacred as well as profane, and he was one of the warmest defenders and expounders of Christianity. His principal works are—1. 'The Ecclesiastical History,' in ten books, from the advent of our Saviour to the defeat of Licinius by Constantine, A.D. 324. Eusebius has been styled the father of ecclesiastical history. He is silent on the subject of the Arian controversy, although it had begun at the time when he ends his narrative. Upon the whole, his history is written with considerable discrimination and impartiality. 2. 'De Præparatione Evangelicâ,' in fifteen books. In this work he examines the various systems of theosophy and cosmogony of the antient philosophers, the purest part of which, he maintains, was borrowed from the Jewish sacred writings. Among the writers whom he quotes, and whose works are now lost, are the Phœnician Sanchoniatho and the Egyptian Manetho. From the aberrations of the heathens and the speculations of the philosophers he draws arguments in favour of the truth of the Christian doctrines. This work of Eusebius was followed by another—3. 'De Demonstratione Evangelicâ,' in twenty books, of which only ten have come down to us. It consists of further proofs of the truth of the Christian faith, chiefly directed against the Jews, being drawn from the books of the Old Testament. 4. The 'Chronicle or Universal History,' was only known by fragments until it was lately discovered entire in an Armenian MS. version, found at Constantinople, and published by Zohrab and Mai at Milan in 1818. The work is divided into two books; the first, entitled 'Chronography,' contains brief separate sketches of the history of the various nations and states of the old world, from the Creation till the year 325 of our æra. The author gives extracts from Berosus, Alexander Polyhistor, Abydenus, Cephalion, Manetho, and other lost writers. The second book consists of synchronical tables, with the names of the contemporary rulers of the various nations and the principal occurrences in the history of each, from the age of Abraham till the time of Eusebius. The author has made use of the works of Africanus, Josephus, and others. The discovery of the Armenian copy of Eusebius has been a valuable acquisition, as it serves to correct several errors and to supply many deficiencies in chronology and antient history. The other works of Eusebius are—5. 'Onomasticon Urbium et Locorum Sacræ Scripturæ.' 6. 'The Life of Constantine,' in four books, a piece of panegyrical biography. 7. A Life of his friend Pamphilus, of which only a fragment remains; and other minor works.

EUSTACHIAN TUBE. [Ear.]

EUSTA'CHIUS. Bartolomeo Eustachio, or Eustachius, was one of the distinguished band of Italian professors to whom we owe the restoration of anatomy and much of its advancement in modern times. He was born in the early part of the sixteenth century at San Severino, in the marquisate of Ancona. Having accomplished himself in the classical and Arabic languages, he studied medicine at Rome, and afterwards settled there with a view to practise as a physician, under the patronage of the celebrated cardinal Borromeo. The interest he could thus command and his unusual talents were sufficient to elevate him to the chair of medicine in the Collegio della Sapienza; yet he never obtained any degree of professional success, and after a long struggle with poverty and sickness, died in great indigence about 1574.

It is not surprising that Eustachius should have failed as a practical physician, for the exclusive devotion with which he pursued his favourite study must have left him little time for the cultivation of the lucrative branches of his art; but the complete failure as a teacher, of a man of so much genius and enthusiasm, is remarkable. It may be attributed perhaps to the ascendancy of the rival school of Padua, supported by the wealth of Venice, and illustrated by the established fame of Vesalius and his successors; and may be due in part to a defective temper, of which some indications may be observed in his writings, and to the jealousy with which he concealed his discoveries. Eustachius published little in his lifetime, though he lived long and laboured much; yet his treatises, short and few as they are, and composed when anatomy was yet an infant science, are of high authority even at the present day, and bear witness to the accuracy and extent of his researches. They are all in Latin, and are nearly all collected in his 'Opuscula Anatomica,' published in 4to. at Venice in 1564, by himself, and again by Boerhaave, Leyden, 1707, in 8vo. He also published an edition, with annotations, of Erotian's 'Lexicon Hippocraticum.' His principal work, 'On the Disputed Points of Anatomy,' upon which he evidently intended to rest his fame, was unpublished to the time of his death, although announced in the 'Opuscula,' probably for want of means; it was then lost, and has never been recovered; but thirty-nine copper-plates, engraved as early as 1552, and intended to illustrate the text of this work, were found at Urbino in 1712, and given to the world two years afterwards by Lancisi, with the aid of Morgagni, Pacchioni, and other anatomists of distinction. Several editions of them have since appeared with voluminous commentaries; the best is that of Albinus, published at Leyden in 1744, in folio, and reprinted in 1762. The importance attached to these plates, after so long an interval of oblivion, shows how much Eustachius must have preceded his age; and they prove that many facts of great importance in anatomy were accurately known to him, the partial re-discovery of which had shed lustre on a century and a half of subsequent inquiry.

Haller declares it to be impossible without writing a treatise on the subject to particularize the discoveries and corrections that Eustachius introduced into anatomy. The tube leading from the ear-drum to the throat, and a certain valvular membrane in the heart which bear his name are among the former.

EUSTA'THIUS, archbishop of Thessalonica in the latter part of the twelfth century, was one of the most learned scholiasts of his age. He wrote a Commentary upon the 'Iliad' and the 'Odyssey,' which is a mine of antient erudition, and contains extracts from the older commentators, such as Apion, Heliodorus, Demothenes of Thrace, Porphyrius, and others. It was first printed at Rome in the edition of Homer, 4 vols. fol. 1542-48; the latest edition is that of Leipzig, 1827. Eustathius wrote likewise a Commentary on Dionysius Periegetes, or the Geographer, which was published by Robert Estienne, 1547, and often reprinted since. He also wrote a Commentary on Pindar, which is lost. There are letters of Eustathius existing in MSS. in several libraries; but they have never been published. The novel of 'Hysmine and Hysminias,' published at Paris, 1618, has been also attributed to Eustathius, but, as it is now proved, erroneously.

EUSTA'TIUS, or EUSTATIA, St., in 17° 33′ N. lat., and 63° 3′ W. long., one of the Leeward islands in the West Indies, is a small rocky island, about 25 miles in circumference, rising from the sea, in the form of a truncated pyramid, or sugar-loaf, terminating in a plain surrounded with woods, having a hollow in the centre, which is now a vast den for numerous wild beasts, and is perhaps the crater of an extinct volcano. The climate is in general healthy, but the island is frequently visited by those dreadful thunder-storms and hurricanes which have so repeatedly ravaged the West Indies. These hurricanes have usually occurred in August and September. The extraordinary fertility of the soil, aided by the industry of the Dutch, who have cultivated the island to the very summit, have rendered it one of the most flourishing and wealthy of all the Caribbee islands. The principal article of cultivation is tobacco, but they grow likewise sugar, indigo, and cotton. The island has great abundance of hogs, goats, rabbits, and poultry of all kinds, not only for the consumption of the inhabitants themselves, but for the supply of the neighbouring colonies, with which they are said to carry on a profitable contraband trade, the situation of the island being remarkably convenient for that purpose. This may be one ground of the very jealous policy of the Dutch, which is far more strict than that of the other European nations who possess any of the islands. The only landing-place, naturally difficult of access, is further guarded by a fort, and fortified so as to render it impregnable; nor has any thing been neglected to render every part of the island equally so. Strangers therefore being nearly excluded, have little knowledge of the internal affairs of the island and of the riches with which it abounds.

St. Eustatius became the property of the Dutch by the right of first occupancy; the States-General granted it to some merchants at Flushing, and it was first settled about the year 1600. In 1665, when the English were at war with the Dutch, the latter were dispossessed by an armament sent from Jamaica. In the sequel France and Holland having formed an alliance, St. Eustatius was reconquered from the English by a combined force, and the French kept a garrison in the island till the treaty of Breda, when it was restored to the Dutch. Soon after the revolution of 1688, the French expelled the Dutch from St. Eustatius, but were obliged to capitulate to Sir Timothy Thornhill, who granted them only their lives and baggage, and left a small English garrison for the protection of the Dutch, who again recovered the entire possession of the island by the peace of Ryswick. They kept it till 1781, when it was taken by the English, but restored at the peace in 1783. The English again took it in 1801, and gave it back to the Dutch in 1814.

EUSTYLE. [Civil Architecture.]

EUTO'CIUS, a Greek mathematician of Ascalon, in Palestine, who flourished about A.D. 550. He was pupil of Isidorus, the architect who designed and chiefly built the celebrated church (now the mosque) of St. Sophia at Constantinople; and he became ultimately one of the most distinguished geometricians of his time.

It was the general custom of mathematical and philosophical authors, during the decline of learning, to give their views and their discoveries, where they made any, in the form of commentaries on some earlier writer. Eutocius, like Proclus and others, delivered his views in this way; and like them he furnishes some valuable contributions to the history of mathematical science amongst the Greeks.

The commentaries of Eutocius on the works of Archimedes and Apollonius are the only works by which he is known to modern readers. His commentaries on Apollonius were published in Halley's Oxford edition of the works of that author, 1710; and those on Archimedes in various editions, from that of Basil, 1544, to that of Oxford, 1792.

Of the commentaries of Eutocius, those on the treatise of Archimedes 'On the Sphere and Cylinder' are most valued; and chiefly for his account of the various modes of solving the Delian problem of the Duplication of the Cube. All of them, however, though of less value both as to historical and geometrical matter, are still interesting to every one who takes a pleasure in investigating the history of pure science.

The commentary on the 'Measurement of the Circle,' by Archimedes, was translated into German, together with the text of Archimedes to which it refers, by J. Gutenäcker, Würzburg, 1825 and 1828, 8vo.

EUTRO'PIUS, FLAVIUS, was a Latin historian of the fourth century. Little is known of his life; he was secretary to the Emperors Constantine and Julian, and accompanied the latter in his unfortunate Parthian campaign. He is believed to have been of senatorial rank. He is known as the author of a compendium of Roman history, in ten books, from the foundation of the city down to the accession of Valens, A.D. 365, which, being short and easy, has been much used as a school-book. Meagre as it is—for it might be contained in 100 common-sized octavo pages—it is still of some use towards filling up those gaps in history which are left in consequence of the total loss of some writers and the imperfect condition in which others have come down to us. The best edition is said to be that of Haverkamp, Leyden, 1729, 12mo., improved by Verseik, Leyden, 1762, 2 vols. 8vo.

EUTYCHIANS, a sect of Christians which began in the East in the fifth century. Eutyches, its reputed founder, though the opinions attributed to him are said to have existed before (*de Eutychianismo ante Eutychen*, by Christ. Aug. Selig, and also Assemani, *Bibliotheca Orientalis*, tom. i., p. 219), was a monk who lived near Constantinople, and had a great reputation for austerity and sanctity. He was already advanced in years when he came out of his retirement, A.D. 448, in order to oppose the Nestorians, who were accused of teaching 'that the divine nature was not incarnate in, but only attendant on, Jesus, being superadded to his human nature after the latter was formed;' an opinion however which Nestorius himself had disavowed. In his zeal for opposing the error ascribed to the Nestorians, Eutyches ran into the opposite extreme of saying that in Christ there was 'only one nature, that of the incarnate Word,' his human nature having been absorbed in a manner by his divine nature. Eusebius, bishop of Dorylæum, who had already opposed the Nestorians, denounced Eutyches before a council assembled at Constantinople by Flavianus, bishop of that city. That assembly condemned Eutyches, who, being supported by friends at the court of Theodosius II., appealed to a general council, which was soon after convoked by the emperor at Ephesus, A.D. 449, under the presidency of Dioscorus, bishop of Alexandria, and successor to the famous Cyril, who had himself broached a doctrine very similar to that of Eutyches. The majority of the council tumultuously acquitted Eutyches and condemned Flavianus; the bishops opposed to him were obliged to escape, and Flavianus was cruelly scourged by the soldiers; it was in short a scene of disgraceful violence, which earned for the council of Ephesus the name of 'a meeting of robbers.' Flavianus appealed to Leo the Great, bishop of Rome, who, in his answer, condemned the doctrine of Eutyches, but could not obtain of Theodosius the convocation of another council. After the death of that emperor, his successor, Marcianus, convoked a council at Chalcedon, A.D. 451, which is reckoned as the fourth œcumenical council of the Church, and which the pope's legates attended. By this assembly the acts of the council of Ephesus were annulled, Dioscorus was deposed and banished, and Eutyches, who had already been banished by the emperor, was again condemned, and deprived of his sacerdotal office. The doctrine was at the same time expounded that 'in Christ two distinct natures are united in one person, and that without any change, mixture, or confusion.' Eutyches died in exile; but several monks, especially in Syria, continued the schism, and having found a protectress in the empress Eudocia, the widow of Theodosius, who was living in Palestine, they became more daring, and excited the people against the partizans of the council of Chalcedon, whom they stigmatized as Nestorians. The emperor was obliged to send troops to repress these disorders. The doctrine of Eutyches was perpetuated in the East under certain modifications, or rather quibbling of words, which caused the sect to be divided under various names all however comprehended under the general name of Monophysites, or believers in one nature. (Assemani, 'de Monophysitis,' at the beginning of vol. ii. of his *Bibliotheca Orientalis*, and Albufarragius's *arguments* in favour of that doctrine in the same vol., pp. 288,9.) In the sixth century a fresh impulse was given to the Eutychian doctrine by one Jacob, a monk, surnamed Baradæus, who reconciled the various divisions of the Monophysites throughout the East, and spread their tenets through Syria, Armenia, Mesopotamia, and Egypt, found supporters among several prelates (among others in the bishop of Alexandria), and died himself bishop of Edessa, A.D. 588. He was considered as the second founder of the Monophysites, who assumed from him the name of Jacobites, under which appellation they still constitute a very numerous church, equally separate from the Greek, the Roman or Latin, and the Nestorian churches. The Armenians and the Copts are Jacobites, and so are likewise many Syrian Christians in contradistinction to the Melchites, who belong to the Greek church. Jacobite congregations are found in Mesopotamia.

The Monothelites who appeared in the seventh century have been considered as an offshoot of the Eutychians or Monophysites, though they pretended to be quite unconnected with them. They admitted the two natures in Christ, explaining that after the union of the two into one person there was in him only one will and one operation. This was an attempt to conciliate the Monophysites with the orthodox church, and it succeeded for a time. It was approved of by many eastern prelates, and even by Pope Honorius I., in two epistles to Sergius, patriarch of Constantinople, which are found in the Acts of the Councils. But the successors of Honorius condemned the Monothelites, and Martin I., in a bull of excommunication, A.D. 649, consigned them and their patrons (meaning the Emperor Constans, who protected them) 'to the devil and his angels.' Constans, indignant at this, caused his exarch in Italy to arrest Martin, and send him prisoner to the Chersonesus. At last, under Constantine, who succeeded Constans, the council of Constantinople, which is the sixth œcumenical council, A.D. 680, condemned the Monothelites, and with them Pope Honorius himself. (Mosheim, *The Acts of the Councils*; and Bossuet, in his *Defence of the Declaration of the Gallican Clergy*, 1682.)

EUXINE. [BLACK SEA.]

EVA'GORA. [MEDUSA.]

EVA'GRIUS, born at Epiphania, in Syria, about the year 536, practised as an advocate at Antioch, where he acquired a brilliant reputation. He was afterwards appointed quæstor, and filled other public offices. He wrote an ecclesiastical history in six books, beginning with A.D. 431, about the period where the histories of Socrates and Theodoretus terminate, and continuing to the year 593. His work is spoken of favourably by Photius. Evagrius, though not always to be trusted implicitly, yet shows greater discrimination than Socrates; he consulted the original documents, and appears to have been tolerably impartial. He was well acquainted with profane, as well as ecclesiastical history. His work was published by Robert Estienne, and afterwards by Valois, Paris, 1679, in an improved edition founded upon two different MSS. It was published again with notes at Cambridge, 1720.

EVALD, JOHANNES, the most distinguished poetical genius produced by Denmark in the eighteenth century, was born at Copenhagen, November 18th, 1743. His father, who was a clergyman in that city, possessed considerable theological attainments, but was prevented by ill health from acting as preceptor to his sons. Johannes, therefore, the second and most gifted of the three, was shortly before his father's death (1754) sent to Slesvig, where his tutor left him entirely to his own choice of books for his leisure reading. Among these were translations of 'Robinson Crusoe' and 'Tom Jones,' the former of which so captivated his imagination that he proposed its hero as a practical model to himself, and when no more than 13 years old, eloped with the view of making his way to Holland, and there get on board ship for Batavia; but he was overtaken, and his project frustrated. He was still, however, left as before to inflame his fancy with romantic reading and with legendary lore, including that of saints and martyrs, as well as of northern fable and mythology. In reading the classics it was the adventurous part that chiefly engaged his attention: indeed he had at that time no relish whatever for the beauties of the Roman poets, as he himself has acknowledged in his fragmentary autobiography. Notwithstanding he was of exceedingly weak frame of body, he longed to devote himself to a military career, and the war then carried on between Prussia and Austria afforded an opportunity; but his mother would not consent to his entering the army. Soon after, his thoughts were for a while diverted from such views by a very different object. He suddenly became violently enamoured with a young lady, a relation of his step-father's, for his mother was now married again, whom he has celebrated under the name of Arense, and his passion for whom he has described in the most glowing colours; a passion which, although hastily conceived was lasting in its effects, and which, although the source of heartfelt bitterness to him—since Arense bestowed her hand upon another—while it cast a shade of melancholy over his whole life, had a favourable influence on his poetical talent, producing in him that depth of feeling and pathos which discovers itself in his 'Balders Död' (Death of Balder). At this period, however, poetry, at least authorship, formed no part of his plans. Dissatisfied with being beneath his step-father's roof, he joined with his elder brother in the scheme of entering the Prussian service as hussars. The latter returned after reaching Hamburg, but Johannes proceeded to Magdeburg, where he enlisted, but was received only as a foot-soldier. In consequence of this disappointment he deserted to the Austrians; served in Bohemia; and was at Dresden when that capital was besieged by the Prussians. On his return to Denmark he applied himself to the study of theology, with the view of settling in that profession and marrying, when his hopes of the latter were frustrated, as already noticed. He now regarded with indifference all schemes of earthly felicity; and it was in this frame of mind that he took up his pen and produced his 'Lykken's Temple' (The Temple of Fortune, a vision), which at once stamped his reputation. This was succeeded by his 'Adam and Eve,' a dramatic composition replete with poetical energy, yet in many respects defective and anomalous. Conscious of its imperfections, he devoted two years entirely to the study of poetry and the best models, in order to prepare himself for some more finished undertaking. Having made himself master of the English language, he carefully perused Shakspeare, with whom he was before acquainted only through Wieland's translation. Ossian was likewise a favourite with him, and when he again took up his pen, he composed his 'Rolf Krage, a tragedy strongly tinctured with Ossianic taste. It was first given to the public in 1770; about which time he was attacked with a most painful disorder in his limbs, that continued to afflict him with little intermission during the rest of his life. Notwithstanding his severe sufferings, he not only pursued his literary occupations, but wrote his comedy of 'Harlequin Patriot,' a masterpiece of its kind, abounding with pleasantry and satire chiefly directed against pseudo-reformers. In the following year, 1773, he executed his literary chef-d'œuvre, 'Balders Död,' a drama of extraordinary poetical beauty, and greatly superior to anything of the kind that had then appeared in the Danish language. Yet although well received, its merits were not so well appreciated by its author's contemporaries as they have been since. Although it is on this and his other poetical works that his reputation chiefly rests, Evald produced several things in prose, some of which—as his 'Forslg om Pebersvende' (Project respecting Old Bachelors), are replete with shrewd satire and strong comic humour, notwithstanding they were written when he had to contend both with ill-health and distressed circumstances. Their liveliness forms a strong contrast to the seriousness and even melancholy that pervade his other writings; in which respect he presents a parallel to the author of 'John Gilpin.' There is likewise another point of resemblance between Evald and Cowper; each in his affliction met with generous sympathy and succour from a female friend. What Mary Unwin was to the one, Madame Skou was to the other; and it was beneath the hospitable roof of the latter that the Danish poet breathed his last, on the 17th March, 1781, after being confined during two years to his bed or arm-chair and almost deprived of the use of his limbs. The two poets may further be likened to each other for the high moral tone of their writings, vividness of conception, and happiness of expression.

EVANGELIST is the Greek appellation *Euangelistes* (εὐαγγελιστής, from εὖ and ἄγγελος), which signified a messenger of any good news, as in Isaiah xli. 27, of the Septuagint version. In the first ages of Christianity it was a general name of all those who, either by preaching or writing, announced the 'glad tidings' of the Christian revelation. The learned Hooker, in his 'Ecclesiastical Polity,' b. v. § 78, says that 'Evangelists were presbyters whom the apostles sent forth, and used as agents in ecclesiastical affairs.' They were similar to the class of ministers who in modern times are known as itinerant preachers. The deacon (subordinate minister) Philip is called an evangelist (*Acts* xxi. 8: see Grotius on the passage); so Ananias, Apollos, Timothy, and several others. St. Paul, in his epistle to the Ephesians (iv. 11), places evangelists in the third rank of ecclesiastical officers; thus, apostles, prophets, evangelists, pastors, teachers. The use of the term is now confined to the four writers to whom the canonical gospels are attributed, Matthew, Mark, Luke, and John, and the gospels themselves are not unfrequently, though incorrectly, called the Evangelists. St. Jerome states that the symbols of the four evangelists are a man, a lion, a calf, and an ox; but St. Augustine declares them to be a lion, a man, an ox, and an eagle. (*Ezekiel*, i. 5-10; *Rev.* iv. 7.) Dr. Campbell, in his 'Dissertation on the Gospels' (vol. i. p. 126, &c.), gives a variety of learned and critical remarks on the word *εὐαγγελίζειν* as the translation of the Hebrew בשר *bashar*, 'læta annunciare,' 'to announce good tidings.' (See the word in Rose's ed. of Parkhurst's *Gk. Lex. of the N. T.*, and a list of works on the Evangelists in Watt's *Bibliotheca Britannica*, and Horne's *Introduction to the Bible.*) General histories of the four Evangelists have been written by Kirstenius, Spanheim, Mollerus, Florinus, Schrœder, &c.

EVAPORATION. [HEAT.]

EVECTION. [LUNAR THEORY.]

EVELYN, JOHN, author of 'Sylva,' 'Memoirs,' &c., was the second son of Richard Evelyn, Esq., of Wotton, in Surrey, and was born at that place October 31, 1620. He received his education at Lewes' free school and Baliol College, Oxford. In 1641 he went abroad, and served for a short time as a volunteer in Flanders. Instead of taking arms in the royalist cause, as his family politics would have inclined him, he went abroad a second time in 1644, with the king's permission, and spent, with one interval, the next seven years on the continent, diligently employed in studying natural philosophy, cultivating his taste in the fine arts, and acquainting himself with such particulars of manners, trade, and manufacture as were most worthy of notice. In June, 1647, he married the daughter of Sir Richard Browne, the royalist ambassador at Paris, and in right of his wife became possessed of Sayes Court, near Deptford, where he fixed his abode on returning to England in 1652. He lived in privacy and study till the Restoration; after which, being much esteemed by the king and of some weight by family, fortune, and character, he was often withdrawn from his retirement and engaged in many capacities in the public service. He was appointed a commissioner to take care of the sick and wounded, on the Dutch war breaking out in 1664, commissioner for the rebuilding St. Paul's, a member of the Board of Trade on its first institution, &c. He was also one of the first members of the Royal Society, and continued through life a diligent contributor to its 'Transactions.' His most favourite pursuits were horticulture and planting, upon which he wrote a variety of treatises, which are collected at the end of the fifth edition (1729) of his 'Sylva, or a Discourse on Forest-trees and the Propagation of Timber in his Majesty's Dominions,' first published in 1664. The object of this, the best known and chief of Evelyn's works, was to encourage planting, both as a matter of national interest and of private adventure. It sold largely, and, as Evelyn himself says, had no small effect. In the same year he published the first 'Gardener's Almanac,' containing directions for the employment of each month. This was dedicated to Cowley, and drew forth one of his best pieces, entitled 'The Garden,' in acknowledgment.

Mr. Evelyn's works on the fine arts are: 'Sculpture,' 1662, a history of the art of engraving, in which the first account is given of Prince Rupert's new method of mezzotinto engraving: 'A Parallel of Antient and Modern Architecture,' 1669: 'Numismata, a Discourse upon Medals,' 1697. All these, though long superseded, were much esteemed, and were in fact valuable additions to the then existing stock of literature.

By the death of his brother, in October, 1699, Mr. Evelyn succeeded to the family estate at Wotton, where he died, February 27, 1706, full of honour as of years. He was a diligent and successful labourer, in that age of discovery, in the subordinate departments of science; a valuable pioneer, as he used to call himself, in the service of the Royal Society. Besides this, he was a model for the character of a gentleman. A friend of the learned and the good, devoid of jealousy, pious, beneficent, intellectual, delighting in the occupations of his station, yet always ready to quit them for the public service: he was respected even by the court profligates to whom his example was a daily reproach. To the present age he is best known by his Memoirs, a journal extending nearly from his childhood to his death, which contains much curious matter relative to his travels, and to the manners and history, political and scientific, of the age. Many of his letters, and the private correspondence of Charles I. with Secretary Nicholas, and Clarendon with Sir R. Browne, are subjoined to these memoirs, which were first printed in 1818. (Kippis, *Biog. Brit.*; *Preface and Appendix to Memoirs.*)

EVERGEM, a town and commune of East Flanders, in the district of Ghent, about three miles north of the city of Ghent, in 51° 8′ N. lat. and 3° 44′ E. long. The canal of Sas-de-Gand, which connects Ghent with the Scheldt, passes Evergem, the little river Caele runs on the south of the town, on the south-west is the Ghent and Bruges canal, and on the west the Liève, which rises in the north-east quarter of West Flanders and joins the Bruges canal near Evergem. The population of the town is 7790; it contains establishments for cotton-printing and dyeing, breweries, distilleries, and a salt-refinery. Cotton and linen weaving give employment to many of the inhabitants. In 1832 the town contained a communal and six private schools: in the former 57 boys and 49 girls were taught, and in the latter 261 boys and 211 girls.

(Vandermaelen's *Dictionnaire Géographique de la Province de la Flandre Orientale.*)

EVERGREENS, in horticulture, are plants which shed their old leaves in the spring or summer after the new foliage has been formed, and which consequently are verdant through all the winter season; of this nature are the holly, the laurel, the ilex, and many others. They form a considerable part of the shrubs commonly cultivated in gardens, and are beautiful at all seasons of the year.

The principal circumstances in which evergreens physiologically differ from other plants are the hardness of their cuticle, the thickness of the parenchyma of their leaves, and the small number of breathing pores formed on the surface of those organs. These peculiarities, taken together, enable them to withstand heat and drought with more success than other plants, but are often not sufficient to protect them against such influences in excess. Hence we find them comparatively uncommon in those parts of the continent of Europe where the summers are hot and dry, and most flourishing in a moist insular climate like our own. This is rendered more intelligible by a comparison of the proportions borne by their evaporating pores, or stomates, and those of deciduous plants. As far as this subject has been investigated, it appears that their leaves are usually altogether destitute of such organs on the upper side, and that those of the lower are mostly fewer in number and much less active than in deciduous plants.

The greater part of evergreens are raised from seed; some are propagated by cuttings or layers, and the variegated varieties by budding and grafting. The soil in which they succeed best differs with the kinds; American evergreens, such as rhododendrons, kalmias, &c., grow best in equal quantities of peat earth, sand, and vegetable mould; European sorts grow in their greatest vigour in a fresh hazelly loam, but will thrive in almost any kind of soil.

The operation of transplanting evergreens may be performed with success at almost all seasons of the year. *Midsummer planting* has even been recommended; it however is a work of necessity rather than propriety, because its success depends entirely upon the nature of the weather after the operation; if it be cloudy and wet for some time they may succeed; but if, on the contrary, it be hot and dry, they are sure to suffer: for this reason, if the practice may be adopted, it is not to be recommended. The common holly however has been often known to succeed when planted at this season, either for hedges or as single plants. The hollies in one very remarkable case, were carefully dug up in the cool of the evening and removed to large trenches which had been prepared for their reception; a quantity of water was then poured upon the roots, and the soil thrown upon the top of it, which of course was carried down and deposited in all the crevices in the trench, rendering the plants perfectly firm. In the instance alluded to the weather was very favourable for a considerable period after the operation was performed.

Autumn and spring are much better seasons for work of this kind; the plants are not so liable to suffer from the intense heat of the sun, and are more likely to be benefited by dews and frequent rains.

But, according to the most experienced cultivators, the winter months (that is, from October to February) are decidedly the best time for transplanting evergreens. Mr. McNab, who is one of the greatest authorities upon this subject, says—'I have planted evergreens at all seasons of the year with nearly equal success, except from the middle of June to the middle of August, and even during this period I have planted some; but unless the weather is very dull and moist, it is difficult to prevent the plants suffering considerably, and in many cases it is years before they recover. Although, however, I have planted evergreens ten months out of the twelve with little difference of success, yet one season has a preference over the others with me, and when there is the power of choice I would recommend late in autumn, winter, or early in spring; that is, any time from the middle of October till the middle of February; and, in general, the beginning of this period is the best; that is, from the middle of October till the middle of December; always providing that the weather and the ground are favourable; that is, supposing there is no frost, no drying wind, nor much sunshine, and that the ground is not too much saturated with wet, either from continued rain, or from the nature of the soil. One of the principal things to be attended to in planting evergreens is to fix on a dull day for winter planting, and a moist day for spring and autumn planting.'

It is of great importance to keep a number of the more tender sorts of evergreens in pots, in order to send them to a distance if required; and if they are to be transplanted at home their roots are not so liable to be injured as when they are dug from the ground. The more tender species of the following genera should be treated in this way:—Arbutus, Cupressus, Daphne, Erica, Juniperus, Laurus, Magnolia, Phyllirea, Pinus, Quercus, Rhamnus, Thuja, &c.

In lifting evergreens particular care should be taken of the young rootlets, as upon their preservation the success of the operation, in a great measure, depends; especially if the specimens have arrived at any unusual size. Small evergreens are planted like other things; but the following precautions should be observed in all cases where individuals of any great size are the subject of the operation.

When the plant has been lowered into the hole dug for its reception, the soil must be thrown in loosely around it (not trod in), and a basin made to hold a quantity of water, which must be filled several times until the whole is completely saturated; this will convey the particles of soil down to the roots of the plant, and render it much more firm than any other method. By this treatment we have seen plantations of evergreens formed without a single failure, which, when finished, appeared to have been growing for many years.

It matters little what size the plants have attained, if they can only be lifted without injuring the small fibres of the roots: they have been moved, from ten to twenty feet high and otherwise large in proportion, with complete success. Should, however, the roots be unavoidably injured in transplanting, the branches must be closely pruned and shortened in proportion; so that when they begin to draw upon the roots for support they may not require more nourishment than the latter can supply.

Considering the great importance of evergreens in a climate like that of Great Britain, where they flourish in such unrivalled beauty, and form so much natural protection to bleak exposed situations, they cannot be too extensively planted. The following lists will furnish information as to the principal kinds to be procured in the nurseries.—

I. *Evergreens whose beauty depends exclusively upon their foliage.*

TREES.

Abies. All the species, where the soil is light enough to suit them, particularly *A. Douglasii*, *excelsa*, the Norway Spruce, *Deodara*, the Cedar of India, *Cedrus*, the Cedar of Lebanon, and *Larix*, the common Larch, together with *balsamea*, the Balm of Gilead, *picea*, the Silver fir and *Webbiana*, the Silver fir of the Himalaya mountains. [ABIES.] The Cedar of Lebanon will grow well in a swamp.

Araucaria imbricata, the glory of the mountains south of Chili: it will hardly succeed north of the midland counties.

Cunninghamia lanceolata, the Chinese fir; very handsome, but only suited to the south of England.

Cupressus sempervirens, the common cypress, and *C. horizontalis*, the spreading cypress, are quite hardy: and the latter, if to be procured, forms a tree much more ornamental than the other with its formal shape. But the nurserymen almost always sell a slight variety of *C. sempervirens* for it.

Cupressus lusitanica, the Cedar of Goa, is a beautiful tree, but only suits the climate of southern counties.

Ilex Aquifolium, common Holly: the nurseries contain endless varieties of it, both green and variegated. The latter are not to be compared with the others for beautiful effect.

Juniperus. The *J. excelsa* forms a fine tree; *J. Virginiana*, the common Virginian Cedar, is less handsome: but both are quite hardy. [JUNIPERUS.]

Pinus. All the species where the soil is light and steril enough, with that proportion of decayed unfermented vegetable matter which this genus delights in. The finest, as ornamental plants, are *P. pinaster*, *taurica*, *Pinea*, the stone pine, *nigricans*, *halepensis*, and *Pallasiana*, which will grow in any soil that is not stiff and swampy in winter. *P. sylvestris* and *nigricans* are the hardiest.

Quercus. The *Ilex*, or Evergreen oak, of which there are many varieties; *austriaca*, of which the Lucombe and the Fulham oaks are possibly domesticated forms; *Turneri*, *Suber*, the cork-tree, and *gramuntia*, the *Bellota*, or Spanish oak with sweet acorns, are all fine species equally handsome when young as bushes, and when old as trees. [QUERCUS.]

Taxus baccata, the common Yew, and *fastigiata*, the Irish Yew.

Thuja occidentalis, the American, and *orientalis*, the Chinese Arbor Vitæ.

SHRUBS OR BUSHES.

Aristotelia Maqui, a Chilian broad-leaved shrub, quite hardy.

Abies Clanbrasiliana, a curious dwarf fir, only suited to plant singly upon grass.

Cunninghamia lanceolata, the Chinese fir, rarely grows beyond the size of a bush.

Arbutus Andrachne, the Oriental Strawberry tree, and *hybrida*.

Aucuba Japonica, a Japanese spotted-leaved bush.

Buxus sempervirens, the tree box; will succeed in light, especially sandy, steril soil; prefers chalky downs; will not thrive in stiff wet soil.

Juniperus communis, the common juniper; *Suecica*, the Swedish juniper, much less handsome; *Sabina*, the Savin bush, excellent for undergrowth and ornamental as a single bush upon lawns.

Laurus nobilis, the sweet bay, quite hardy, though a native of 'the warm south;' its aromatic leaves employed in confectionary, pickles, &c.

Ligustrum vulgare, the common privet; excellent for hedges and for undergrowth, especially the *evergreen* variety.

Phyllirea. Every variety of this valuable genus should be cultivated; *obliqua* and *latifolia* as large species, *media* as a middle-sized one, and *angustifolia* as a graceful bush.

Pinus pumilio or *Mughus*, the alpine pine tree.

Rhamnus alaternus, of which there are several varieties and *R. Clusii*; hardy bushes, which bear pruning or cutting down to the ground remarkably well.

TWINERS.

Hedera. Many varieties of the common ivy; *Canariensa*, the Irish ivy; and *chrysocarpa*, the golden-berried.

II. *Evergreens whose flowers have a conspicuous appearance*

Trees

Andromeda arborea requires peat; grows 40 feet high in North America.

Arbutus Unedo, the common strawberry tree; of this there is a beautiful variety with deep red flowers, and another with double flowers, much less handsome than either.

Acacia affinis grows without protection near Edinburgh: *dealbata*, *lophantha*, and several other New Holland species, will flourish without protection in the southern counties.

Eucalyptus perfoliata, *pulverulenta*, exist in the open air near Edinburgh; they and other species will thrive in the South and West of England.

Ligustrum lucidum, the wax tree, a Japanese plant.

Magnolia grandiflora, with many varieties; they are scarcely hardy enough to live in this country away from the shelter of a wall, except quite in the south; unprotected specimens exist, however, near Edinburgh.

Shrubs or Bushes

Andromeda. The handsomest species are *A. Catesbæi*, *angustifolia*, *Mariana*, which is rather tender, *pulverulenta*, *speciosa*, and *floribunda*. Require peat soil.

Arctostaphylos Uva Ursi, a trailing plant.

Ammyrsine Lyoni, a beautiful little American bush, requiring peat.

Berberis aquifolium, *fascicularis*, *repens*, *Asiatica*, *aristata*. [Berberis.]

Bupleurum fruticosum stands the sea-breeze well upon chalky cliffs.

Cistus, all the species. They are quite hardy if planted where wet cannot lodge in winter, and exposed to the full sun in summer.

Colletia spinosa.

Cotoneaster microphylla and *rotundifolia*, small bushes.

Cytisus scoparius, common broom; there is a double variety; *albus*, the Portugal white broom.

Daphne. All handsome, the following the most so. *Laureola*, the spurge laurel, grows well beneath trees; *pontica*, with pale green fragrant flowers; and *Cneorum*, or Garland flower, one of the most lovely and sweetly perfumed plants in the world, but not to be cultivated except in a dry peaty soil and a well ventilated situation; late spring frosts injure it so much that it is not worth cultivating in valleys.

Duvaua dependens, and some others.

Erica Australis, *carnea*, *stricta*, *Mediterranea*, *codonodes*. [Erica.]

Escallonia rubra, *illinita*, *montevidensis*, handsome South American shrubs. Bees take great delight in the blossoms of the last: the second species smells very strongly of melilot.

Garrya elliptica, with long pendulous catkins of a yellowish green colour.

Genista tinctoria, the dyer's broom, with a few others.

Helianthemum of all kinds, to cover rockwork, or ground where the wet does not lodge in winter.

Kalmia latifolia, *angustifolia*, especially the first; require peat.

Lavandula spica and *latifolia*, common lavender.

Ledum latifolium, or Labrador tea, and *palustre*, low bushes requiring peat.

Menziesia polifolia or Irish heath; there is a white variety.

Myrtus communis, and its varieties; lives out of doors south of London.

Prunus Laurocerasus, the common laurel; *lusitanica*, the Portugal laurel.

Pittosporum Tobira, quite hardy south of London; sweet-scented.

Rosmarinus officinalis, common rosemary.

Rhododendron. Numerous varieties are to be procured; those of *ponticum*, *maximum*, and *cataubiense* are the most robust; *hybridum* obtained between the Indian and American species is less hardy; *ferrugineum* and *hirsutum*, dwarf alpine species; *campanulatum*, a North Indian species.

Spartium Junceum, Spanish broom; and *acutifolium*, a Turkish broom.

Viburnum. Of the Laurustinus, one of the prettiest of all evergreens, there are three species; *V. Tinus*, the common Laurustinus, the hardiest; *V. lucidum*, with shining leaves, rather larger and more delicate; *V. strictum*, with upright shoots, more hairy, and the least hardy of the three.

Ulex Europæus, the common furze; a double variety, which is particularly handsome: and *U. strictus*, the Irish furze, a smaller species, which does not flower abundantly.

Yucca. Several species quite hardy. They only require to be grown in places where water does not stagnate in winter; *Y. gloriosa*, *filamentosa*, *Draconis*, *flaccida*, and *superba*, are the handsomest species.

Twiners or Climbers.

Bignonia capreolata, with dull brownish-red trumpet-shaped flowers; rather tender.

Caprifolium flexuosum, *gratum*, *japonicum*, *sempervirens*, all handsome honeysuckles.

Jasminum revolutum and *officinale*, the common white jasmine.

Vinca major and *minor*, the larger and smaller periwinkle; trailers.

EVERLASTING FLOWERS. This name is popularly given to certain plants whose flowers have the property of retaining their brightness and colour for many months after being gathered. They owe this quality to a hardness of their tissue, which has exceedingly little moisture to part with, and which, consequently, does not collapse or decay in the progress of acquiring perfect dryness. It is generally in the scales of the involucre of composite plants or in the bracts of others that this property resides. Those who wish to possess such plants will easily find the following in the gardens of this country.

Hardy annuals. *Helichrysum bracteatum* (yellow), *Xeranthemum annuum* (purple or white).

Hardy perennials. *Antennaria dioica* (pink), *triplinerris* and *margaritacea* (white). *Ammobium alatum* (white). *Gnaphalium stæchas* and *arenarium* (yellow).

Tender annuals. *Rhodanthe Manglesii* (red), *Morna nitida* (yellow), *Gomphrena globosa* (purple).

Greenhouse shrubs or herbaceous plants. *Astelma eximium* (crimson), *Helichrysum argenteum* (white), *ericoides* (pink), *sesamoides*, *proliferum*, and others (purple).

EVESHAM, a borough and market-town, having separate jurisdiction, locally situated in the hundred of Blackenhurst, in the county of Worcester, 15 miles south-east from Worcester, and 96 north-west-by-west from London. Evesham was formerly called 'Eovesham,' or 'Eovesholme,' an appellation derived from 'Eoves,' a swineherd of Egwin bishop of Wiccii, who was superstitiously supposed to have had an interview with the Virgin Mary on this spot. It owes its importance to an abbey that was founded here in 709, and dedicated to the Virgin.

The abbot and the convent received numerous grants of land, as well as ecclesiastical and temporal privileges from various kings and other benefactors. The last abbot but one was Clement Lichfield, who built the isolated tower, now almost the only relic of this once celebrated abbey. This tower, called the Abbot's Tower, is a beautiful specimen of the pointed architecture of the period immediately preceding the Reformation it is supported by panelled buttresses, adorned with windows having rich ogee mouldings, and surmounted by open embattled parapets and eight pinnacles. It was originally intended for a campanile, to which purpose it was converted in 1745. The tower is 110 feet in height, and is 22 feet square at the base.

A battle was fought near Evesham on the 4th of August, 1265, between Prince Edward (afterwards Edward I.) and Simon Montfort, earl of Leicester. Leicester placed King Henry III., whom he had made prisoner, in the van of his army, hoping that he might be killed by his son's troops, who were fighting for his release. However, the king was recognised nearly at the first onset by the prince, who rushed through the thickest of the battle to the assistance of his father, and soon placed him in safety. Leicester's defeat was complete, and he himself, as well as his son, fell in the field of battle.

The corporation claim prescriptive rights and privileges, but they were all confirmed by charter in the 3rd year of the reign of James I. They had the power of trying and executing for all capital offences, except high treason; and as late as 1740 a woman was burnt for petty treason. A court of record is held every Tuesday for the recovery of debts to 100*l.*; a court of session is also held for the borough on the Friday after the county quarter-sessions. The borough returned two members to parliament in the 23rd of

Edward I., and again in the reign of James I., since which time it has continued to do so. In 1831 there were 3991 inhabitants the number registered is 359. Evesham is one of the few municipal boroughs the boundaries of which were not altered by the Reform and Municipal Corporation Acts. The town is pleasantly situated on the banks of the river Avon, over which is a stone bridge, which connects it with the parish of Bengworth, which is within the boundaries of the borough. The two principal streets are wide and clean, and the town has a cheerful appearance. The Vale of Evesham is famous for the richness of its soil; and large portions of land near the town are laid out in gardens, which supply the neighbouring towns and villages with vegetables and fruit. There are also some corn-mills, and a linseed-oil mill. The market-day is Monday. Fairs are held on the 2nd of February, the Monday after Easter, Whit-Monday, and the 21st of September: the latter is famous for cattle and horses.

The borough comprises the parishes of All-Saints, St. Lawrence, and Bengworth, in the archdeaconry and diocese of Worcester. The living of All-Saints is a vicarage, which, with the curacy of St. Lawrence, is of the clear annual value of 208*l.* The church is said to have formed part of the abbey; it is in the later style of English architecture, and has a tower, spire, and a handsome porch. The church of St. Lawrence is now quite in ruins, and forms a beautiful specimen of the ornamented Gothic. In the south aisle is the chapel of Clement Lichfield; it is only 18 feet by 16, but is (as Tindal says) of such elegance and delicacy of construction as a verbal description would but very imperfectly convey to the reader's imagination.

There are places of worship for Baptists, Quakers, Wesleyan Methodists, and Unitarians. The free grammar-school, endowed originally by Abbot Lichfield, was re-founded by Henry VIII., and again re-modelled by James I. The master receives 10*l.* per annum from the crown, a house, and some other emoluments. At Bengworth there is a school, founded by John Deacle in 1709, for poor children of that parish. There are also several donations to the poor, and for apprenticing children.

In the parish of Bengworth was a castle belonging to the Beauchamp family, but it was destroyed by Abbot William D'Andeville in 1169, and the site was converted into a burying-ground, for which we believe it has continued to be used down to the present day. (For a full account of the abbey and antiquities, see Tindal's *History of Evesham.*)

EVIDENCE (*Judicial*). Evidence, in jurisprudence, denotes the means by which facts are ascertained for judicial purposes. The practical importance of the subject is obvious from this definition; and it has accordingly not only attracted much attention from judicial writers, but has formed a prominent part of the systems of jurisprudence of most civilized countries, though the particular rules of evidence adopted have varied according to the constitution of the tribunal by which judicial truth is to be ascertained. Thus the Roman law, in which facts are ascertained for judicial purposes by professional judges, contains (so far as we now know it) few regulations respecting evidence, the whole subject being comprised in one short chapter of the Digest, which lays down several positive rules for the exclusion of witnesses within prescribed degrees of consanguinity to the litigant parties. In the common law of England, where facts are ascertained by juries, the body of rules and restrictions denominated the law of evidence has been gradually established within the last two centuries. Previously to that time, in the infancy of the trial by jury, as we understand that institution, the only positive rules respecting evidence were those which related to the two witnesses in treason required by statutes passed in the reign of Edward VI. This fact of the gradual development of restrictions upon the admission of testimony seems to show that, in this country at least, the tendency of civilization has been to contract and not to enlarge (as some writers have supposed) the rules of judicial evidence. The accounts of our earlier judicial proceedings contained in the State Trials sufficiently prove that it was the practice formerly to admit without scruple or question every species of testimony; whereas the present law of evidence is almost wholly composed of restrictive rules.

In giving a compendious view of the principles of the English law of evidence (which are the same at equity as at common law, and in criminal and civil proceedings) it is proposed—1. To enumerate the limitations which it prescribes to the competency of witnesses; 2. To give a brief summary of the principal rules by which the reception of oral evidence is governed; and 3. To state the principal rules which relate to written evidence.

I. *Of the competency of witnesses.*—The general rule of English law upon this subject is, that all persons may be witnesses in courts of justice who have sufficient understanding to comprehend the subject of their testimony, and sufficient religious principle to ensure a right sense of the obligation of an oath to speak the truth. Thus very young children are admissible as witnesses, if they have a competent knowledge of the nature of an oath, and a religious apprehension of the consequences of falsehood. All testimony, by the law of England, must be given under the sanction of an oath; but the form of the oath is immaterial, and nothing is required beyond a persuasion upon the mind of the witness that in swearing to the truth of what he states he is appealing to a Divine Being able to punish him for falsehood.

To the general rule of the admissibility of all persons of sufficient intellect and religious belief there are several important exceptions. In the first place, a husband cannot be a witness for or against his wife, nor a wife for or against her husband; a rule which is said to arise from the identity of interest subsisting in such a connexion. However, in criminal prosecutions founded upon personal violence committed by either of these parties upon the other, such testimony is admitted upon the ground of necessity. Secondly, in actions at the common law, a party to the suit cannot be examined as a witness; but in courts of equity defendants in a cause may be made witnesses upon a special application for that purpose; and in those courts, if a plaintiff consents to be examined as a witness his evidence may be admitted. Thirdly, a person cannot be a witness who has been convicted of treason or felony, or of any offence which involves the *crimen falsi* (such as perjury or cheating), or which is liable to a punishment which the law considers infamous, as whipping, branding, or the pillory. This principle of exclusion, which is derived from the Roman law (*Digest*, lib. ii., tit. *De Testibus*), is now of little practical importance, as the recent statutes have enacted that a pardon in felons, or the actual endurance of the punishment in felony or misdemeanour, excepting perjury or subornation of perjury, shall have the effect of restoring the competency of the party as a witness. Fourthly, the law of England excludes the evidence of those who have a direct interest in the result of the proceedings in which they are called to testify. The indefinite state of the rule respecting the nature of the disqualifying interest has led to much perplexity in its practical application.

The principle however which is illustrated by a great variety of cases, is, that, in order to disqualify a witness on the ground of interest, he must either be directly and immediately benefited by a result of the proceeding favourable to the party who calls him, by exonerating himself from a liability to costs or to some process founded upon the decision of the cause in which he is called to testify; or he must be in such a situation as to be able to avail himself of the decision of the cause, by giving it in evidence in support of his own interest in some future litigation. The first of these alternatives is, in fact, nothing more in principle than a part of the same proposition which excludes the parties to a suit from being witnesses; for where the determination of the suit in one way directly affects the witness in interest, he is in a certain sense a party to it, and would, in fact, be testifying in his own cause. The second section of the rule which is peculiar to the law of England, and first appeared in practice about fifty years ago, is of more doubtful expedience. It is much more exclusive in its operation than the former, and is objectionable and inconvenient in practice by introducing into the question of the competency of a witness in a particular action the complicated and embarrassing process of considering his position in every supposable litigation which may afterwards affect him as arising out of that action. With the view of removing the practical difficulties arising from this objection, it was enacted by the stat. 3 & 4 Will. IV., c. 42, § 26, that 'if any witness shall be objected to as incompetent, on the ground that the verdict or judgment in the action on which it shall be proposed to examine him would be admissible in evidence for or against him, such witness shall nevertheless be examined; but in that case a verdict or judgment in that action in favour of the party on whose behalf he shall have been examined, shall not be admissible in evidence *for* him; nor shall a verdict or judgment against the party on whose behalf he shall have been examined be admissible in evidence *against* him. By the 27th section, it was enacted that the name of every witness objected to as incompetent, on the ground that the verdict or judgment in the cause in which he is examined would be admissible in evidence for or against him, shall, at the trial, be indorsed on the record on which the trial shall be had, together with the name of the party on whose behalf he was examined, and shall be afterwards entered on the record of the judgment; such indorsement or entry to be sufficient evidence that such witness was examined in any subsequent proceeding in which the verdict or judgment shall be offered in evidence.

II. *The principal general rules by which the reception of oral evidence is regulated.*—The first general rule which applies equally to written as to oral testimony) is that all evidence produced must be relevant to the point at issue between the parties. The object of special pleading by the common law is to reduce controversies between parties to particular issues, or propositions of fact affirmed by one and denied by the other, which are to be decided by the jury; and the rule of evidence, that the proofs in the cause must be strictly confined to these issues, is founded upon obvious reasons of justice as well as convenience. Secondly, the affirmative of every issue is to be proved; that is, the party who asserts the affirmative of a proposition is to bear the burthen of proving it. This principle is taken from the civil law; 'Ei incumbit probatio qui dicit, non qui negat.' Thirdly, in proving a fact, the best evidence of it must be given of which the nature of the thing is capable. Thus, a party is not permitted to prove the contents of a deed by a copy, and still less by oral testimony, where the deed itself may be produced; nor to prove the execution of a deed by any other person than a subscribing witness, when he is living and producible. This rule is justified by the presumption which the offer of secondary evidence raises, that the production of the best evidence might have prejudiced the party in whose power it is, had he produced it. This rule is not, however, to be understood as requiring that all the evidence which can be given upon the fact in dispute should be produced; as, for instance, if there are several attesting witnesses to a deed or other contract, it is not necessary that more than one should be called. Fourthly, hearsay testimony, which is a statement on oath of what an absent person has said respecting a fact to be proved, is, in general, excluded both on the ground that the witness to the actual fact does not declare his knowledge upon oath, and also because he is absent from the cross-examination of the party who is to be affected by what he states. To this rule, however, there are the following exceptions:—1. The declarations of persons who are in imminent danger and under the apprehension of immediate death, and who are therefore considered to be speaking under as powerful a religious sanction as the obligation of an oath; 2. The declarations of deceased persons, and made against their interest; as, for instance, charging themselves with the receipt of money on account of third persons, or acknowledging the payment of money due to themselves; 3. The declaration of deceased persons respecting rights of a public nature, such as the boundaries or general customs of a manor or district; 4. The declarations of deceased persons on questions of pedigree, or family occurrences of antient date before the memory of living witnesses, such as births, deaths, or marriages. With respect to the two last exceptions, however, evidence of declarations of this kind is inadmissible, if they have been made *post litem motam*, that is, after the matter to which they relate has become the subject of litigation.

III. *Written evidence consists of records, documents under seal, as charters and deeds, and writings not under seal.*—Acts of parliament are records of the highest nature, being the memorials of the legislature; but a distinction is made with respect to evidence between public and private statutes. A public statute requires no express proof in courts of justice, every one being presumed to know the law which he is bound to observe; as to them, therefore, the citation of the statute itself is in all cases sufficient. But private acts of parliament are considered as documents relating to individuals, and must therefore be proved by copies compared with the original roll of parliament. A second and inferior species of records is the proceedings of courts of justice, which are proved by exemplifications, sworn copies, and office copies. Exemplifications are transcripts of the records of different courts, accredited by having the seals of such courts attached to them. Sworn copies are transcripts made by individuals who authenticate them upon oath, when they are produced in evidence. Office copies are copies certified to be true and accurate by an officer expressly entrusted for that purpose by an officer of the court to which the records belong. Charters and deeds are proved by the production of the instrument and proof of the execution by the party to be charged with it; but where the document is more than thirty years old, the execution need not be proved. The general rule is that the original deed must be produced, on the principle already alluded to of its being the best evidence; but this is subject to the following exceptions:—1. Where it has been lost or destroyed by accident; 2. Where it is in the possession of a party to a suit against whom it is sought to be produced, and who refuses to produce it: in either of which cases the contents of the document may be proved by a copy, or if no copy exists, by oral testimony. Deeds attested must, in general, be proved by one at least of the subscribing witnesses; but if the attesting witnesses be dead, or are not to be found after a diligent search, or are infamous, or for any other reason incompetent by law to give evidence, the execution of the deed may be proved by proof of the hand writing of the party. The proof of hand-writing, by the law of England, is peculiar. The testimony of persons skilled in hand-writing is wholly excluded, comparison of hands being inadmissible for the purpose. The course is that a witness acquainted with the writing of the individual in question, and who has seen him write, or who has had a written correspondence with him, shall testify to his belief that the document to be proved is in his hand-writing.

From the above summary of the principal rules of evidence existing in the English law, it will be observed that the system is extremely exclusive. Upon the subject of interested witnesses, the law does not merely caution and restrict the amount of credit to be given, but entirely rejects them from being heard wherever a pecuniary interest in the result of the cause, however small, is shown to exist. So also with respect to the reception of secondary and hearsay evidence, it sanctions no degree or kind of testimony at second-hand (except in the cases above enumerated), but excludes it under all varieties of circumstances. That the statement of an interested person is always to be received with caution, often with suspicion, and often with disbelief, may be readily admitted; that it should be always peremptorily rejected as unworthy to be heard is a different and much more questionable proposition. Again, it is true that we ought not to attach so much weight to hearsay evidence as to direct testimony, because it is beyond all doubt that the certainty of obtaining the truth is diminished, and that the means and causes of error are multiplied, in proportion as you remove from the actual observer and add links to the chain of testimony. 'Any testimony,' says Mr. Locke, in his chapter on the Degrees of Assent, 'the further off it is from the being and existence of the thing itself, the less force and proof it has. A credible man vouching his knowledge of it is a good proof; but if another, equally credible, do witness it from his report, the testimony is weaker; and a third that attests the hearsay of an hearsay is yet less considerable. So that, in traditional truths, each remove weakens the force of the proof; and the more hands the tradition has necessarily passed through, the less strength and evidence does it receive from them.' Admitting the justice of this objection to the effect of hearsay evidence, it may still be questioned whether its absolute and unconditional rejection for judicial purposes is justifiable. So also with respect to the mode of proving hand-writing, it might be unsafe wholly to rely upon the evidence of comparison of hands by persons of experience in that occupation, but there seems no good reason why such proof should not be *admissible* in aid of the present vague and unsatisfactory mode of proof by the general belief of a witness.

The most plausible reason for the exclusiveness of the English law of evidence is derived from the nature of the trial by jury, with reference to which it is contended to be safer to withdraw doubtful evidence altogether from their consideration, than to leave it to persons who are often uninstructed, and incapable, of drawing correct distinctions upon the subject of testimony to form a proper estimate of its credibility. But this reason is founded upon an assumption not justified by the fact, namely, that the means of proof actually legalized are infallible guides to truth; whereas, the truth is that many of them are quite as liable to lead to a false conclusion as those which are excluded. In this state of things, therefore, there seems no good reason why all practicable means of attaining to truth, however various in their degrees of effectiveness, should not be committed to juries. This seems indeed to be the growing impression in the profession; the inclination of the courts of late years being to let in as much light to a cause as possible, and to regard objections to evidence rather as matters of *credibility* upon which juries may exercise their judgment, than of *competency* to be wholly withdrawn from their consideration.

In the article **Equity** a reference is made to the present head of **Evidence**, and we shall accordingly briefly state the manner of ascertaining facts in courts of equity, which differs from the practice in courts of law, where the witnesses are produced and examined orally before the court.

Witnesses in proceedings in equity are examined upon written interrogatories before the examiner of the court or before commissioners in the country, both examiner and commissioners being sworn to secrecy. The answers of the witnesses to these written interrogatories, or their depositions, as they are called, are taken down in writing, and form the only evidence for the plaintiff and defendant (except the defendant's answer, if the plaintiff choose to avail himself of it), which is admitted at the hearing of a cause.[*] The interrogatories are drawn by counsel, according to the instructions which he receives as to the facts which a witness is considered able to prove; but it frequently happens that the instructions are very defective, and the counsel is obliged to frame his interrogatories as well as he can, in order to elicit the proof of facts favourable to the party for whom he is employed. Though each several interrogatory, when well drawn, is framed for the purpose of establishing some single and distinct fact, written interrogatories cannot from their nature be otherwise than long and somewhat difficult to comprehend. In the oral examination of a witness, it necessarily happens that several questions must be asked consecutively for the purpose of completing the investigation into and the establishment of every important fact to which the examination is directed. Written interrogatories must be framed on the same principle, and therefore every subsequent part of an interrogatory must be framed on the supposition of every previous part being answered in some way; and consequently, it is hardly possible in written interrogatories to avoid what is called making them *leading*, and at the same verbose and cumbrous. These long interrogatories, it is proved by experience, are often imperfectly comprehended by the witnesses, and consequently their evidence is to some intents either incomplete or inaccurate, or both. The interrogatories which either party proposes to his witnesses are not known to the adverse party until the examination of all the witnesses on both sides is concluded, when *publication* is passed, as it is termed, and copies of all the depositions are delivered to the litigating parties under an order of the court.

Under this system, there is of course no cross-examination, in the proper sense of the term; for one party does not know what the witnesses examined by the opposite party have deposed, and cannot therefore effectually examine them, as in a court of common law, where the cross-examination of a witness follows and is founded upon what the witness has stated in his examination in chief. If a party to a suit in chancery will cross-examine a witness who is produced by his adversary for examination, he must examine him on written interrogatories, without knowing what interrogatories have been proposed to him by the opposite party, and without knowing what he has said in his depositions in chief. Such a cross-examination must be in general altogether useless, and often dangerous to the interest of the party making it; unless his object is to ascertain that the witness is an incompetent witness, or unless the witness is one whom be would bimself have examined in chief. Under the 32nd Order of the 21st of December, 1833, the last interrogatory before that date commonly in use is in future to be altered as follows: 'Do you know or can you set forth any otber matter or thing which may be of benefit or advantage to the parties at issue in this cause, or either of them?' &c. A party however is not bound to insert this interrogatory; and indeed no great harm will result if it is never used. Owing to various causes, such as disinclination on the part of a witness to give himself further trouble, particular affection to one of the litigating parties, or forgetfulness, it might have been anticipated that this general interrogatory would fail in its object; and so far as it has been used, such is said to be the case.

This mode of ascertaining facts in suits in equity is evidently very defective, and has been the subject of considerable complaint and of lengthened inquiry; but hitherto nothing has been done to amend the system.

(See *Minutes of Evidence taken before the Chancery Commissioners, annexed to their Report of* 1826; and a recent pamphlet (1837) by W. A. Garratt, entitled *Suggestions for Reform in Proceedings in Chancery.*)

Those who may be inclined to follow this subject further will find it discussed at great length and with much acuteness in Bentham's *Rationale of Judicial Evidence.* The full development of the English law of evidence is contained in the treatises of Mr. Phillipps and Mr. Starkie.

EVIL EYE. It was an antient superstition that certain persons were endued with the power of injuring those on whom they cast a hostile or envious look. The eyes of such persons were supposed to dart noxious rays on every object on which they were fixed. This power of injuring with the eye was called *Bascania* (Βασκανία) by the Greeks, and *Fascinatio* by the Romans. Several writers who have collected the testimonies of the antients concerning it (as Potter, *Archæologia Græca*, lib. ii. c. xviii., and Alsarius, 'de Fascino,' *Grævii Antiq. Rom.*, tom. xii. p. 885), may be consulted for particulars. Those who enjoyed great prosperity, or met with any extraordinary good fortune, and such as were too much elated by praise and flattery, were more particularly liable to the effects of fascination. Hence when the Romans praised any thing or person, they used to add, *Præfiscini* or *Præfiscine dixerim*, to avert any fascination that might ensue, and to prove that their praise was sincere.

It is remarkable that the same superstition prevails to the present day in several parts of the world, even in the northern part of our island, and in Ireland. In Greece it is at present called *kako mati* (κακο ματι), and its effects are averted by spitting, in the same manner as was practised by the antients against fascination (Theocr., *Idyl.* vi. 39) and ill omens of every kind. In Italy it is called *mal-occhio*, and among the lower orders of people its effects are supposed to be very powerful and fatal. When praise is bestowed on beauty, riches, or any other advantages, the person praised immediately exclaims, 'se mal-occhio non vi fosse,' from an apprehension that the praise may not be sincere, but proceeds solely from a malicious intention to injure. This exclamation is accompanied with a sign of the hand, or by holding up pieces of coral, shells, or various kinds of stones worn as amulets.

The belief in fascination is extremely antient, and in the opinion of some is connected with the story of Medusa and the Gorgons, whose eyes caused immediate destruction. From this source the superstition of the evil eye is probably derived.

Virgil alludes to this superstition in his third Eclogue:—

'Nescio quis teneros oculus mihi fascinat agnos.'

Scot, in his 'Discovery of Witchcraft,' has one or two passages relating to it. He says, p. 35, 'The Irishmen affirm that not only their children, but their cattle are (as they call it) *eye-bitten* when they fall suddenly sick.' It is likewise mentioned in Martin's 'Description of the Western Islands of Scotland,' in Heron's 'Journey,' vol. ii. p. 228, and in several volumes of the 'Statistical Account of Scotland,' as still believed there.

'Nothing,' says Dallaway, in his 'Account of Constantinople,' 4to. Lond. 1797, p. 391, 'can exceed the superstition of the Turks respecting the Evil Eye of an enemy or infidel. Passages from the Koran are painted on the outside of the houses, globes of glass are suspended from the ceilings, and a part of the superfluous caparison of their horses is designed to attract attention, and divert a sinister influence.'

(Millingen's *Observations on an Antique Bas-relief, on which the Evil Eye, or Fascinum, is represented; Archæolog.* vol. xix. p. 70—74; Brand's *Popular Antiquities*, 4to. edit. vol. ii. p. 400—403.)

EVIL, KING'S. [Scrofula.]

EVILMERODACH [Babylon History.]

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[*] The execution of written instruments, not wills, may be proved at the hearing by an attesting witness; or where the instrument is not attested, the handwriting of the party may be so proved also.

EVOLUTE. [Involute and Evolute.]

EVOLUTION. [Involution and Evolution.]

EVOLUTIONS, MILITARY, are the movements made by any body of troops either acting by itself or in conjunction with other bodies, for the purpose of arriving at or of retiring from a field of battle, or of placing itself in a position to act offensively or defensively against an enemy.

The circumstances attending the great movements of armies along their lines of communication, and the dispositions of the troops on the field of battle, are developed under the words Strategy and Tactics. The present article will therefore comprehend merely a description of the manner in which the principal evolutions of a battalion of infantry, a regiment of cavalry, and an entire army, are performed; and will conclude with a short account of the movements of light troops in the field.

Evolutions of a Battalion.—When a battalion formed in line has to march in that order towards the front or rear, in order to ensure exactness in the movement three directing serjeants post themselves a little way in front of the centre of the line, and observing some object in the required direction, they advance directly towards it, the battalion following and keeping itself perpendicular to the line of march. While the battalion is thus moving in line, the two flanked companies are wheeled backwards, and made to march in files perpendicularly to the line of the battalion, in order to cover it; and on a halt being ordered, they face towards the enemy.

This order of march can of course only take place where the country is open; when partial obstacles occur, the troops near them necessarily form in file till they have passed them, and afterwards they wheel into the line; but when the obstacles are of great extent, and occur frequently, it is evident that the march of the battalion should be in column.

Columns formed for this purpose are designated columns of companies, of subdivisions, and of sections, according as their breadths, or the extent of their front, is equal to that of a whole, a half, or any portion of a company; and they are said to be at open order, at half, or at quarter distance, according as the intervals between the companies or their divisions are equal to the whole, to one-half, or to one-quarter of the breadth of the column. The order is said to be close when the several divisions are at the distance of one pace only from each other in the length of the column.

The wheel from line into column, and the converse, when the battalion is at a halt, must obviously be performed by causing the divisions to describe a quarter of a circle on their respective pivots. But when a battalion in column is on the march, and it is required to change the route, should the divisions be at the full distances from each other, that is, at intervals equal to the length of a division, it is necessary that the first division, after having described on its pivot an angle equal to that which the new direction is to make with the former, should march forward as soon as the wheeling pivot of the next division has arrived at the like pivot of the first division: the second division then wheels and marches in like manner, and so on. The same rule may be followed when the divisions are at less than full distance, provided the angle which the intended direction of march makes with the former is sufficiently obtuse to allow the divisions to describe the required angle without interfering with one another, otherwise the wheeling must be made by parts; the first division describing a portion of the angle corresponding to the required change of direction, then marching forward a few paces, and completing the wheel, the other divisions doing the same in proportion as they arrive at the ground where the preceding division performed the evolution. The wheelings may be made upon either extremity of a company or subdivision, and they may take place either forward or backward, according to circumstances; occasionally also a company is required to perform a wheel upon its centre, in which case one-half wheels backward, and the other half forward; but in all cases the wheeling pivots are to remain dressed, or in one line.

When a battalion is formed into a column for the purpose of an attack, it is called a column of manœuvre; and when so formed in order to move along a road or through a defile, a column of route. In either case the column may be in open order, at half, or at quarter distance, or in close order; and in the first formation the column of course occupies in length an extent of ground equal to that which it occupies in line, minus the length of the first division. Columns at half, or at quarter distance, or at close order, have the convenience of moving upon less space than the open column, with equal capacity of forming in any manner that may be required for resisting an attack; and their compact order enables them to avoid the evils attending the loss of distances which may occur with an open column, from the inequalities of the ground.

The battalion in line may be formed into a single or double column: the former upon or in rear of either flank company, and the latter upon the two centre companies or the two centre subdivisions. In either case the column is equally fit for its purpose, and the preference of one to the other must depend upon the ground or upon the point to which the movement is to be directed: the single column, however, can always be diminished to the smallest degree, according to the breadth of the defile; whereas the double column, if much diminished, may be in danger of becoming disordered by the intermixture of the files. For an attack, the column formed on the centre of a battalion can be more rapidly brought to bear upon the required point than a column formed on one of the wings, seeing that the divisions in line have but half the distance to march through in order to arrive at their places in the column, and a corresponding advantage is enjoyed when the battalion has to deploy from column into line.

It is to be observed that the front of a column should never be unnecessarily contracted, and battalions should be so instructed as to render it indifferent whether the first or second rank is in front, or whether the right or left flank division (of the line) is at the head of the column; but occasions may occur in which the order of battle is to be reversed, and then the divisions must necessarily change their positions by countermarching.

A battalion in column at open order is formed in line by merely causing the divisions to wheel upon their respective pivots; but a close column of companies, having its head already in the alignement, is deployed by causing the several divisions to move out by files to the right or left parallel to the alignement; each division having got beyond that which was in front of it halts, and then marches up to its place in the line. The deployment may take place upon any one of the companies, which then remains at rest.

Echellon movements are performed when it is required to advance or retreat obliquely, and when a change is to be made in the position of a line, corresponding to a wheel of the whole about some given point: the movements are made to the front when an enemy's flank is to be turned, and to the rear when it is required to cover the flank of the line itself. Echellon movements are the safest that can be adopted by troops in presence of the enemy, as they have the advantage of preserving a general front during the march. A direct echellon, as it is called, may be formed by the different companies or subdivisions marching from their position in the line towards the front or rear, keeping parallel to that position, and halting successively when arrived at the required distances. The oblique echellon is formed by causing the different companies or subdivisions to make a wheel upon their pivots through any angle less than a right angle, but generally not more than one eighth of it; the parallelism of the divisions being ensured by causing a non-commissioned officer of each division to place himself, as the case may require, before or behind some given file, suppose the eighth, from the pivot, and to take a given number of paces on an arc of which that pivot is the centre; the division is then to wheel up to the place where he halts.

An important evolution of a battalion is that of placing itself in a square or oblong form, with the men on the four sides facing outwards, so as to be enabled to resist an enemy who may attempt to surround them. This figure is always formed hollow, or so as to enclose a space in which baggage or treasure may be placed for security; if otherwise, it is evident that great numbers of the men would be useless, since they could not use their fire-arms.

When a battalion in line is to form a hollow square, the manœuvre may take place upon any given company, or upon one formed of the two contiguous subdivisions of two companies, which then for the moment remain at rest; while the other companies break out of the line and march, some to the front and some to the rear of the troops who are stationary, so as to form with them a column of companies at quarter distance. The second division in the column closes up to the first, and these two form the front of the square; the two rear divisions then face outwards, the last but one closes up to the last, and these two form the rear of the square. The remaining divisions wheel outwards, and constitute the two sides of the square or oblong, which is thus formed four deep. If the square is to resist an attack of cavalry, the two front ranks kneel and slope their firelocks outwards till, at the word of command, they fire a volley: the men in the two standing ranks fire by files, or independently of one another. It is said that Bonaparte, while in Egypt, formed his infantry in squares whose sides were six ranks deep, in order to resist the Mameluke cavalry.

When several battalions form themselves into squares, they dispose themselves either en echellon or in two lines, each square in the first line being at some distance in front of the interval between two squares in the second line; by which means the fire of one square may defend the face of another.

Squares may be reduced to columns, and these to line, by reversing the processes above mentioned. One square consisting of several battalions is not recommended, as much time would be spent in its formation, and the safety of the troops might be endangered should they be attacked while so occupied.

A battalion in column may be obliged to engage in a street or narrow pass where deployment is impossible. In this case, if the column is advancing, the two front companies or divisions fire, the first kneeling and the other standing; after which, on a favourable occasion presenting itself, the whole column moves forward: if the column is to retire, the first division, after firing, faces outwards, half to the right and half to the left; these subdivisions file away to the rear, where they re-load; the second division fires, then files to the rear in like manner, and so on.

Evolutions of a Regiment of Cavalry.—The movements of cavalry on a field of battle, like those of infantry, consist of marches to the front or rear, in line or en echellon; deploying from open or close columns into line, and the converse.

If it be required to form a line for attack from an open column of divisions upon any particular division, those divisions which are in front make a wheel forward equal to three-eighths of a circle, and those which are in rear wheel forward one-eighth; all the divisions being thus parallel to each other, they march in this order up to the alignement on the division which remained stationary, wheeling into it as they arrive. On the contrary, if the column be in retreat, and it be required to form a line on the defensive from an open column of divisions, suppose on the first division of the first or leading squadron, all the divisions are to make a wheel equal to one-eighth of a circle, and in this order march up and wheel into the alignement. It must be observed that the line first formed in these cases is to be at the distance of two horses' length in rear of the intended alignement, in order to allow the officers in front of each squadron to dress the troops, which they can do more correctly than the officers of divisions who are in the line itself.

To deploy in line to the front from a close column of squadrons for an attack, suppose on the second squadron; all the squadrons except this break into divisions by threes, as it is called (that is into divisions consisting of three horses in each of the two lines); the divisions of the first squadron wheel a quarter circle to the right, and march in that order till they get beyond the squadron on which the line is to be formed; the third and fourth squadrons also break into divisions in like manner, wheeling to the left, and marching till they get opposite their respective places in the intended line, which is supposed to be in front of the ground occupied by the first squadron, and into this line all the squadrons now march. But if the line be required to be formed on the rear of the regiment when in retreat, for the purpose of defence, suppose on the fourth squadron, this squadron must then change its front by a countermarch, the others break into divisions, wheel a quarter circle, and march to the left till they come opposite their proper places in the intended alignement, into which they then march as before.

The evolutions are made as above stated when the regiment is in column with its right in front; but it is easy to apply the precepts to the contrary case.

The reason why the squadrons are made to break into divisions by threes is that, since the breadth of three horses is about equal to the length of one, each division of three can wheel within a space equal to that which it occupies in line: the practice however has been objected to on account of the extension of the files which is produced when marching in this order. Movements by the usual divisions or sub-divisions have been preferred on this account, but the former method prevails.

Evolutions of an Army.—The general principles upon which the evolutions of armies, divisions, or brigades are performed, correspond nearly to those of single battalions. When a whole line has to advance parallel to itself, one of the battalions is considered as the regulator, and all the others should conform to its movements. The commander of this battalion must therefore devote his whole attention to the preservation of the direction which has been indicated by the general commanding the army, while the flank officers of the other battalions must endeavour to preserve the regularity of their own battalions by the line of the colours.

Columns of route or manœuvre are formed of any number of battalions, each in column of companies or of sub-divisions, in rear of one another; and if the columns are at close order, the interval between every two battalions is only six paces, or the same as if all the troops were drawn up in line. If the distances of the companies are equal to one quarter of the length of their front, the intervals between the battalions are twelve paces; but when the columns are at open order, the intervals of the battalions should be equal to the breadth of the column, together with the six paces which should be the intervals between the battalions in line. Such columns as the last can instantly be thrown into line by each company making simply a wheel on its proper pivot. When one general column is required to form into what is called a line of columns, the heads of all the columns must be placed in one alignement, but the distances of the several columns from one another in the direction of the line may, according to circumstances, be of any extent, from six paces (in which case the columns are said to be contiguous), to the proper distance for deployment, that is, a distance equal to the length of a column.

A column whose divisions are either at quarter distance from each other, or in close order, can always wheel into a line of columns, because each battalion, in performing the wheel, leaves room for the wheel of that which is in its rear; but a line of contiguous columns, when the depth of each battalion exceeds the extent of its front, cannot for want of room be wheeled into a single column. When such a manœuvre becomes necessary, the line of columns must open out to the right or left far enough to allow the wheel to be performed. When a line of columns is required to be changed into one column, for the purpose of performing a march towards either flank, the most convenient disposition would be that in which all the columns in the line stand with their right wings in front, if it is intended that the march should be towards the right; and the contrary, if it is to be towards the left, for then a simple wheel to the front brings the divisions into the alignement in their proper order.

When a column is on a march, the baggage should be in the rear; or if, on any account, it is placed within the line, it should be, together with the artillery which accompanies the column, in the intervals between brigades, and never between the battalions of a brigade. The preservation of the original extent of a column in front is of importance, and defiling, in order to pass an obstacle, should be avoided if possible, on account of the loss of time which it occasions in fact, it will frequently happen that, on arriving at a stream, a ditch, or a bank, the obstacle will be more conveniently passed by extending than by contracting the front.

Echellon movements of an army are almost always those which are made when in presence of the enemy, the inequalities of ground generally preventing large bodies of troops, if it were otherwise adviseable to do so, from acting against one another in continuous lines. Like the echellon movements of battalions, those of an army may be either direct or oblique: the former are executed by advancing brigades, battalions, or companies parallel to and at unequal distances from their front; and this advance may be made from the centre of the line when it is intended to refuse both wings to an enemy, or from one flank when it is intended to turn that of the enemy. The direct echellon may also be produced by posting columns in proper situations, ready for deployment, parallel to the enemy's position: the distances between the battalions in echellon should be sufficient to allow them to form squares checquerwise, so as to flank one another.

Oblique echellons of an army are formed by wheeling, and then marching in the new directions so as to gain ground obliquely towards a flank; each of the several bodies performing the manœuvre should not exceed a company, as it might be hazardous to present one flank of a large body towards an enemy in position, and thus expose the line to be enfiladed. And, as the enemy would endeavour to counteract the intended project of outflanking him, should he observe it, advantage ought to be taken of the localities to conceal some of the divisions, and to gain points of support for the bodies placed in advance of the rest of the army. When it is intended to refuse one wing, the battalions of that wing may retreat en echellon as far as necessary, and the artillery of that part of the line which is stationary should be ready to enfilade the enemy on his advance towards the retiring divisions. Movements of attack may be made in columns, which should deploy in line at from 1200 to 1400 paces from the enemy; the destructive effects of an enfilading fire preventing a nearer approach in column.

Generally speaking, the most convenient order for an army, whether on the offensive or defensive, is in column, provided the columns can be covered by the ground from the enemy's artillery; since it may be readily moved up to any given point of attack, while the enemy has few means of judging where that point of attack will be.

Changes in the front of a position, when under fire, are best effected by an echellon march of companies; but when the line is extensive, the battalions which are most remote from the new alignement, and which may be attacked by cavalry during the movement, should be marched up in columns of battalions, the divisions being at quarter distances from one another.

The retreat of a line is accomplished by causing each alternate battalion to retire, perpendicularly to the front, to a certain distance towards the rear, not exceeding 200 yards, that the divisions may be able to support each other by their fires; the remaining battalions protecting the retreat of the others, and then retiring as far as the intervals between the former battalions, who then retreat still further, and so on. The intervals in the lines should be occupied by light infantry; and if the enemy should press closely, the second line of the army, after the first battalions have passed through it, must contribute by its fire to the defence of the intervals in the first line.

This retreat by alternate battalions, or by half-battalions, is indispensable when it is made over a plain; and if the retreat is to be continued, defiles and commanding spots of ground must be occupied and defended as long as possible; by degrees the bodies may diminish their fronts and form themselves into columns of march.

If a gradual retreat of the whole line is not intended, on a flank of the army being attacked, that flank only may be retired in direct echellon by alternate battalions or half-battalions, beginning with that which is at the extremity of the flank attacked; the remaining battalions then retire, still en echellon, thus keeping the menaced flank refused to the enemy, taking care that the distances between the corps are not so great as to render it impossible for them to defend each other by their fire. Each body must repel an attack, if made upon it by infantry, by a counter-attack; if by cavalry, it may dispose itself in a square; or a new line may be formed in the oblique position, if it be thought best thus to resist a general attack of the enemy.

The movements of the second line of an army should correspond exactly to those of the first; the two lines always preserving their parallelism and distance. The second is however frequently kept in a line of columns of battalions, and is made to move in that order even when the first line is deployed.

The most proper stations for cavalry are on the wings of an army, because troops of this class are unfit for resisting an attack; and should they be compelled to retire when placed in the centre, there would be left an interval which the enemy might immediately occupy, and from thence enfilade the wings. This false disposition was made by the French at the battles of Hochstet and Minden, and was the cause of their defeat in those actions. Cavalry are generally employed in the operation of turning a line; and it is evident that this manœuvre must be more readily made from the nearest wing than from the centre.

Manœuvres of Light Troops.—To the light infantry and riflemen, or troops acting as such, are entrusted the guard of the encampments or cantonments. When an army is on the march they reconnoitre the country, repel any parties of the enemy which might get between the columns while advancing; and they check the pursuit of the enemy in a retreat.

When a battalion is employed as light infantry, not more than one-third of the men should actually engage as skirmishers; these extend themselves in line, in two ranks, to the right and left, from some given file, at any distance which may be appointed; or, if no order is given, at the regulated distance of six paces. The rest of the battalion is divided into parties, as supports, of which one is usually in rear of the centre, and another is towards each flank; and when the skirmishers have advanced about one hundred paces to the front, these supports follow them, and are themselves followed by a general reserve. Each of the supporting bodies and the reserve should be kept in compact order; and when the skirmishers retire upon their support, they form in sections in its rear. The skirmishers advance or retire, as the case may be, in one general line, and they should avoid standing exposed if any cover, as that of a hedge, ditch, or copse, can be obtained on the ground: for this reason, when obliged to cross an open plain, their line should make a simultaneous rush towards the spots where they may fire under cover. On open ground, they fire kneeling or lying down, the front rank man discharging his piece first, then retiring in rear of the second rank and loading: as soon as he has loaded he gives the word, ready, in a low voice, when the second rank man fires and loads, care being taken that the muskets of both ranks are not unloaded at the same time.

On the appearance of cavalry the nearest supporters and the reserve move towards the threatened part, and form squares; the skirmishers at the same time run to any cover from whence they may aid the supports by a cross fire.

When light troops have to advance across a bridge, or through a short defile, on arriving at the bank of the river, or at the entrance of the defile, the skirmishers lie down in line and fire; the supports, strengthened by the reserve, charge the enemy on the bridge, or in the defile, drive him back, and then form an extended line as skirmishers, while the former skirmishers pass the bridge or defile, and now constitute the supports and reserve. In retreating the supports pass first over the bridge or through the defile, covered by the skirmishers, and immediately deploy, in order to act as skirmishers themselves; the former skirmishers then rapidly pass, followed by the supports, and the whole form in column in rear of the present skirmishers, who then, by their fire, protect the retreat if it is to be continued.

E'VORA, the principal town of the province of Alentejo, in Portugal, is built upon an eminence in the midst of a fine open country, which produces wine, oil, and corn, and is south-west of the Serra de Osa, which forms part of the range which crosses Alentejo from east to west. Evora is an archbishop's see, has a college, two female houses of education, several good buildings, and a fine aqueduct, attributed to Sertorius, who for a time made this town, then called Ebora, his residence. Julius Cæsar, after his Spanish campaign, made Ebora a municipium, with the name of Liberalitas Julia. There is now at Evora a handsome temple of the Roman period, supposed to have been dedicated to Diana: the front presents an hexastyle of the Corinthian order, the columns remain, and the capitals are of very delicate workmanship, but the entablature is gone, and has been replaced by a rubble work with pinnacles in the Moorish style. (Murphy's *Travels and View of this Temple, with Copies of Roman Inscriptions found at Evora.*) Evora has about 12,000 inhabitants, some manufactures of hats and leather, and a considerable inland trade. It suffered greatly in the French invasion of 1808, for having attempted an insurrection against the invaders; many of the inhabitants were put to death. (Southey's *History of the Peninsular War.*) Evora lies on the road from Lisbon to the Algarve, and is about 80 miles south-east of Lisbon, 30 miles north of Beja, and 50 miles west by south of Badajos

EVREMOND, CHARLES de St. Denys, Seigneur de St. Evremond, was born April 1, 1613, at St. Denys le Guast, near Coutances, in Normandy. He entered the army early, and by his literary talents and sprightly wit, as well as bravery, acquired the friendship of Turenne, Condé, and other of the most distinguished men of that brilliant epoch. Condé made him lieutenant of his guards, for the sake of his society; and he fought with that great commander at the bloody battles of Rocroi and Nordlingen. But the prince, though fond of raillery at the expense of others, could not bear it levelled against himself; and St. Evremond, by an imprudent exercise of his satiric humour, lost his patron and his lieutenancy in 1648. In the wars of the Fronde he espoused the royal cause, and was rewarded with promotion and a pension. He incurred a three months' imprisonment in the Bastile by making too free with Cardinal Mazarin; but found means to reinstate himself in the minister's favour. Another indiscretion in ridiculing the treaty of the Pyrenees (unless, as has been said, there was some secret cause for his disgrace, and this was only a pretext), led to a second order for his arrest in 1661. He received timely notice, and fled, first to Holland, then to England, in which two countries the rest of his long life was spent. Louis XIV., though solicited by his most favourite courtiers to pardon St. Evremond, remained inflexible till 1689, when he granted the exile a tardy permission to return. But it was then too late for St. Evremond again to change the scene; and though in banishment, his life had all that he required for happiness. He was a favourite with Charles II., who gave him a pension of 300*l.*, and his society was courted by the most distinguished wits and beauties of that reign: nor was he less fortunate in possessing the regard of William III., who had known him in Holland, and took much pleasure in his company. Devoted to the enjoyment of the present, and availing himself moderately of every source of social pleasure, he retained his faculties, mental and bodily, to the last, and died in his 91st year, September 20th, 1703.

St. Evremond was one of those who, aiming chiefly at success in society, leave no memorials sufficient to sustain the reputation which they have enjoyed in life. He possessed however extensive reading and an independent and acute judgment, as well as wit. His verses are deservedly forgotten; but his treatises on Roman literature and on the modern drama are ranked among his best works. His letters are among the most brilliant specimens of that style of composition in which the French have excelled. He appears to have been a disbeliever in revealed religion, but he was not a scoffer, and he checked wanton insult to religion in others. Neither was he, as has been said, an atheist; but some atheistical books were falsely published under his name long after he was dead. He never derived profit from the sale of his works, nor authorized their being printed; so that the earlier editions, which were all pirated, contain much that was foisted in by the booksellers to profit by his popularity. The first correct edition is that of Des Maizeaux, 3 vols. 4to., Lond., 1705, with a life prefixed, from manuscripts revised by the author and editor jointly, shortly before the death of the former. Des Maizeaux also translated the whole into English. (*Biog. Univ.*; see also Des Maizeaux's *Life* and Grammont's *Memoirs* for scattered notices of St. Evremond.)

EVREUX, a city in France, capital of the department of Eure, on the little river Iton, a feeder of the Eure, 51 miles in a direct line west by north of Paris.

Evreux is mentioned by Ptolemy and by Ammianus Marcellinus, in the Itinerary of Antoninus and in the Theodosian Table. It bore the name of Mediolanum, and was the capital of the Aulerci Eburovices. The name Eburovices was afterwards applied to their chief city, and in the middle ages appears under the corrupted Latin forms of Ebroicæ and Ebroas, from which is derived Evreux. It has been matter of dispute whether the old Mediolanum was on the site of the present city or at a village in the neighbourhood known by the name of Old Evreux; but the remains of a theatre and of several antiquities which have been discovered may be considered as showing that Mediolanum was close to, if not on the site of, the present city. Evreux came into the hands of the Normans, but the duke of Normandie, Richard I., severed it from the duchy and erected it into a distinct county in favour of his second son, from whose descendants it afterwards passed to the house of Montfort. In the beginning of the twelfth century (in 1119) it was burned by Henry I. king of England; and toward the close of the same century (in 1194 and 1199) it was twice destroyed by Philippe Auguste, king of France, who shortly afterwards acquired permanent possession of it. The county of Evreux was bestowed as an apanage on a branch of the royal family of France, which subsequently acquired the throne of Navarre; but on the death of Charles le Mauvais, king of Navarre, it reverted to the French crown. In the wars of the English in France, under Henry V. and VI., Evreux was repeatedly taken and retaken: the last time was in 1441, when it was captured, after a vigorous resistance, by the French, from whose hands it has never since passed away.

A great proportion of the inhabitants (who in 1832 were 7988 for the town, or 9963 for the whole commune) are persons of independent property. The houses are for the most part built of wood and clay or plaster. The streets are broad and beautifully neat. The city stands in the midst of gardens and orchards in a fertile valley watered by the Iton, which divides into two branches before reaching the town, and flowing on each side, under or near the walls, and afterwards reuniting, renders the position of the city insular. Part of the waters of the Iton are conducted through the city by means of a canal.

The principal edifice is the cathedral, which was rebuilt by Henry I. of England, after he had burned the former one with the rest of the town: the nave alone retains any vestiges of early architecture: its massy piers and semicircular arches are evidently of Norman origin, and are probably part of the church erected by Henry. All the rest is comparatively modern. The interior is adorned with some elegant carving, both in stone and wood: there are some good specimens of painted glass.

The church of St. Taurinus (formerly attached to the Benedictine abbey of St. Taurinus, founded in the seventh century) contains some valuable specimens of Norman architecture: the interior has been modernized. A portion of the monastic buildings serves as a seminary for the Catholic priesthood. The church of St. Gilles, now converted into a stable, presents some antient features worthy of notice.

Among the other remarkable buildings are the episcopal palace, the hospital, a fine new building, the office of the prefect, formerly the hospital, and the prisons. There are some handsome public walks.

The manufactures of Evreux are woollen cloth, woollen and cotton yarn, bed-ticking, calico, cotton velvet, hosiery, leather, paper, wind musical instruments (flutes, clarinets, &c.), and ivory and box-wood combs. Trade is carried on in these articles, and in grain, brandy, cider, perry, and linseed oil. There are seven annual fairs; the most important, that of St. Taurin, lasts eight days. There are a subordinate court of justice, 'une chambre consultative des arts et manufactures;' a central society of agriculture, sciences, arts, medicine, surgery, and pharmacy; a high school; a public library of 6000 volumes; and a botanic garden, at which courses of lectures on botany are delivered.

In the neighbourhood of Evreux, about a mile and a half from the town, is the Château de Navarre. Jeanne, daughter of Louis Hutin, king of France and Navarre, in which latter kingdom she succeeded her father, married the then count of Evreux, and built a château, which she called the Château de Navarre: this structure was, in 1686, levelled to the ground by its possessor, the duke of Bouillon, who erected the present building. Upon the emigration of his descendants, it became national property, and was given by Napoléon to the Empress Josephine, who resided here for a time. The house, which is of stone, is formal and ill proportioned; but the woods around are beautiful, the avenue noble, and the sheets of water extensive. The château is now deserted. Old Evreux appears to have been the site of a Norman and previously that of a Roman fortress. There are some remains of a Roman aqueduct and Roman medals in gold, silver, and bronze have been dug up.

The arrondissement of Evreux contains 11 cantons or districts under the charge of a justice of the peace; two of these are in the town of Evreux. It comprehends 287 communes, and had, in 1832, 118,397 inhabitants. The diocese comprehends the department of Eure: the bishop is a suffragan of the archbishop of Rouen. The foundation of the see is ascribed to the third century. (Dawson Turner, *Tour in Normandy*; Dulaure, *Histoire des Environs de Paris*; *Dictionnaire Géographique Universel*, &c.)

EX. [Devonshire.]

EXAMINATION. [Evidence.]

EXANTHE'MATA (*Exanthematous diseases*), ἐξάνθημα, an *efflorescence*; a term under which are comprehended the eruptive fevers, or the diseases commonly termed rashes. Rashes are superficial red patches, variously figured, and diffused irregularly over the body, leaving interstices of a natural colour, and terminating in cuticular exfoliations. Fever is an essential element in the definition of an exanthematous disease, as this term is usually employed by nosologists; but the writers on cutaneous diseases give to it a modified signification, and comprehend under it only those diseases which are properly termed rashes, whether those rashes are attended with fever, and whether they are contagious or not. Thus Dr. Bateman comprehends under the order Exanthemata measles, scarlet fever, nettle-rash, roseola or the rose, purpura, and erythema.

EXARCH was the title of the governor of Italy under the Byzantine emperors, established by Justinian after the reconquest of Italy from the Goths in the sixth century. The first exarch appointed was Longinus, A.D. 568. The residence of the exarch was at Ravenna, then a sea-port town, and the great entrepôt between Greece and Italy. The exarchs, who were generally chosen among the officers and favourites of the Byzantine court, were of course removable at the pleasure of the emperor, but several of them remained in their office to the end of their lives. Their administration was often marked by acts of oppression and treachery, the results of Byzantine corruption as well as of the peculiar difficulties of their situation. They were engaged in frequent hostilities against the Longobards who had invaded the greater part of Italy, and were also not unfrequently at variance with the popes, and their authority was often confined within the walls of Ravenna. At last, in the year 752, Ravenna being taken by Astulf or Astolphus, king of the Longobards, the exarchate, as well as all dominion of the Byzantines over North Italy, was at an end; but the Greek emperors still retained possession of parts of Apulia and Calabria, where Bari became the residence of the catapan or Byzantine governor. (See *Chronological Series of the Exarchs* in Petau, *Rationarium Temporum*.)

EXCAVATIONS. [Foundations.]

EXCENTRIC. [Ptolemaic Hypothesis.]

EXCENTRICITY, a term applied to the ratio which the distance between the centre and focus of an ellipse or hyperbola bears to the whole semiaxis. [Ellipse; Hyperbola.] With regard to this word, it should be noted that in the older writings on conic sections it was not the *ratio* of these two lines, but the former of them, namely the distance between the centre and focus, which was called the eccentricity.

Let a be the semimajor axis of an ellipse or hyperbola, b the semiminor axis, and e the eccentricity; then

$$\text{in the ellipse } e^2 = 1 - \frac{b^2}{a^2}$$

$$\text{in the hyperbola } e^2 = 1 + \frac{b^2}{a^2}$$

EXCESS. For a peculiar mathematical use of this term, namely, the *spherical* excess, see Spherical Triangle.

EXCHANGE. The term exchange is commonly employed by merchants to designate—first, the written instrument by which the debts of persons residing in different countries or in different parts of the same country are brought to a condition for final liquidation; and, second, the varying price of such negotiable instruments in the market.

The first division of the subject is discussed under the title Bill of Exchange; the following article will comprise the second, and will include an investigation of the principles on which exchange transactions are based.

International, or, as it is commonly called, foreign trade, arises out of the unequal or exclusive capacity of different countries to produce the various objects of desire. One country, for instance, has abundance of coal and iron; another enjoys a climate especially adapted to the culture of the vine; whilst a third possesses some peculiar advantages for the growth of wheat. If interchange were not restricted by legislative enactments, if trade were perfectly free, the first country would supply the other two with iron wares, taking from the second wines, and from the third wheat; whilst the two last would in like manner exchange their respective productions with each other.

Peculiarities of soil and climate, abundance and cheapness of land or of labour, the exclusive presence of certain animals, vegetables, or minerals, all give rise to interchange between nation and nation. Every country has some peculiarity which gives it an advantage with respect to that peculiarity over all other countries: it is by means of interchange that such advantages are shared equally among all.

In the article Bill of Exchange, already referred to, we have explained how this mode of settling accounts between parties in different countries arose; and the various legal rights of the parties to a bill of exchange are also in that article fully explained.

In investigating that part of the subject which belongs to the present article it is necessary to bear in mind that different countries make use of different coins—different in denomination, in weight, and consequently in value. The pound, for instance, is the money of England, the franc that of France, the dollar that of America. These several coins contain very different quantities of the precious metals. The dollar, for instance, contains about five times as much silver as the franc, whilst the guilder contains only twice as much. The value of a currency depends on the quantity of pure metal contained in the coin which forms its legal tender, alloy being left wholly out of the account.

In the language made use of by merchants, the existence of a *par of exchange* is usually assumed. Between two countries making use of the same metal a par may exist; but between two countries one of which makes use of gold and the other of silver an invariable par cannot exist.

The following is a statement of the contents, in pure silver, of the several coins forming the money of account of the several countries specified:—

	Grains.
Franc of France . . .	69·4
Mark of Hamburg . .	105·15
Florin of Amsterdam . .	146·8
Dollar of America . .	370·1

Hence the mark is worth, in Paris, 1·515 francs; in Amsterdam, 14 stivers 5 pfennings; and in New York, 28·2 cents.

Gold is now a legal tender in America, and the sovereign is by law worth 4·87 dollars, making the eagle of 10 dollars worth 2*l.* 1*s.* 0¾*d.*; the dollar (of gold), 4*s.* 1¼*d.*; and the 100*l.* sterling equal to 487 dollars; all of which are different expressions for the *par* between England and the United States—both being gold-using countries.

We have said that a par of exchange cannot exist between two countries making use of different metals as the standard of their respective currencies: we shall now explain the reason. Gold is the standard in England. The silver coin of England possesses a conventional value independent of the market value, and the latter may fluctuate without affecting the former. Foreign coins, the franc or the guilder for instance, possess no such conventional value. They are merely a commodity liable to fluctuation with the varying price of silver.

Within the last ten years the price of silver in the London market has varied from 4*s.* 10⅜*d.* to 5*s.* 1*d.* per ounce of 444 grains pure, the medium price being 4*s.* 11¾*d.* to 5*s.* The extreme prices give the following results:—

Price of Silver per oz.		Value of Franc.	Value of £1.
s.	*d.*	*d.*	*f.*
4	10⅜	9⅛	26·30
5	1·	9·54	25·15

Thus making a fluctuation in the so-called par of exchange of rather more than 4½ per cent.

The assumption of a par of exchange where no par can exist is likely to lead at times to great inconvenience. Suppose, for instance, that the par between Paris and London be assumed at 25·58fr., which is about the medium. Suppose further that exchange is quoted at 26·30fr.; what would be the inference? Why that exchange was 2·8 per cent. in favour of England, and (the cost of transmission being much less than the above difference) that consequently bullion was about to pour into London. But sup pose that at the same time the market price of silver had declined in London to 4s. 10½d. per ounce, and gold in Paris had advanced in a like ratio, what would be the effect? Why the supposed premium in favour of England would vanish, and the par, for the time being, would be brought to coincide with the actual rate.

Though there exists no invariable par of exchange, it is extremely useful to the merchant to know the average value of the currency of every country with which he trades, in order to ascertain what may be called the *approximate par*, which must be the pivot around which fluctuations will necessarily turn. This approximate par (a term which we make use of for the sake of conforming, as nearly as truth will permit, to the language familiar to merchants) should be grounded on the average value of a currency taken on a period sufficiently long to include fluctuations from highest to lowest. To the approximate par so taken will be the tendency of the rate of exchange to conform.

The approximate par of exchange will be liable to be affected by four pairs of circumstances, in addition to a rise and fall in the price of the precious metals. These are—

1. Changes made by the supreme authority in the quantity of the pure metal contained in the coin by way of increase or diminution.
2. Depreciation from the use of paper money, and restoration.
3. Clipping, and restoration.
4. Wear and tear, and restoration.

1. *Legal Changes in the Coinage.* Governments have not unfrequently found the diminution of the quantity of the metal contained in the current coin an easy way of getting rid of improvidently contracted debts. The English pound was once a troy pound of silver; it is now about four ounces. The French livre, once probably the same quantity, is now less than a *seventieth* part of a lb. By what a succession of frauds must this change have been brought about!

A government having borrowed *so many pounds* of its subjects would find it a very convenient thing, when the day of payment should come round, to call ten or fifteen shillings 'a pound;' and as it would have all the debtors in the kingdom on its side, popularity would be divided on the measure. But although creditors at home may be compelled to submit to this robbery, creditors abroad cannot. Their contract is to receive a given sum of the money of their own country, and the only effect of any debasement will be that the foreign debt will require more of the debased money to liquidate it; in other words, exchange will fall in the ratio of the debasement. Thus suppose the sovereign to be reduced in weight 10 per cent., exchange on the Parisian Bourse, if at 25·58f., would fall to 23f. 2c. If, on the other hand, the franc were reduced, exchange would rise.

We can illustrate this by two historical facts. Formerly the Spanish dollar contained as much silver as 4s. 6d. sterling, and consequently the average value of 100*l.* was 444 dollars 44 cents. The weight of the dollar however has been since reduced, and it now contains only as much silver as 4s. 2d. sterling, so that that the average value of 100*l.* sterling is now 480 dollars; the difference being 8 per cent. The old language of quotation however has never been wholly abandoned by the American merchants. They still assume the old par, so that when exchange is quoted at 10 or 11 per cent. premium—a premium which, as we shall presently see, could not be maintained for an hour—it is in fact at 2 or 3 per cent. only (the remaining 8 per cent. being nominal); and when it is quoted at 6 or 7 per cent. premium, it is in fact at 1 or 2 discount. The other fact to which we allude is the recent adoption of a gold standard in the United States, at a rate, compared with silver, to render the American currency practically debased.

Before the introduction of the Gold Bill the average value of 100*l.* sterling, as we have seen, was 480 dollars; by the new standard, the quantity of gold contained in 100*l.* is now coined into 487 dollars, being a difference of 1·45 or nearly 1½ per cent. Thus the par between England and America is now 487 d. = 100*l.*, or adhering to the old (erroneously assumed) par, a nominal premium of 9·45 per cent.

2. *Paper Money.* One of the evils to which paper money is liable is depreciation from excess. The market price of money, like that of every thing else, varies in the inverse ratio of its quantity. If it be scarce it will be dear; in other words, all other things will be cheap. If, on the other hand, money be in excess, it will be cheap: in other words, much of it will be given in exchange for other things. To say that prices are advancing, is equivalent to saying that money is getting cheaper and cheaper. The effect of issuing paper money in excess is, then, to make money, both metallic and paper, cheap. Being cheap, it becomes desirable to export it; but paper money is not available for this purpose, and hence metallic money is alone exported. Bullion in the uncoined state would, under such circumstances, advance in price, but the sovereign would be still a sovereign; hence there would exist a motive to convert coined money into bullion, or to export it. Bullion however would not be exported, except when it was really cheaper than in other countries.

During the Bank restriction the depreciation reached 27·9 per cent. Gold was then worth 5*l.* 8s. per ounce, and silver 6s. 11d. estimated in paper money. But at these nominally high prices the proportion between gold and silver was precisely the present average proportion, namely, 1 to 15·52; or, gold at 3*l.* 17s. 10½d., and silver at 4s. 11¾d. The Parisian par was then 18·43 f. per 1*l.* sterling (instead of 25·58 f.), so that although *coin* might be sent away as a cheaper mode of conversion than melting, bullion would not necessarily be an article of export, unless when exchange was really, and not merely nominally, against us.

We have seen that the present average value of the dollar is 4s. 2d.; when silver was at 6s. 11d. the value would be 5s. 9½d. in the depreciated English money. Hence a debt in London of 100*l.* could be discharged with 346 dollars 18 cents, whereas now it would require 480 dollars. The dollars remained unchanged, but 100*l.* of 1813 was worth only 72*l.* 2s. in gold.

As the par of 4s. 6d. was then, as now, retained, the depreciation was met by a heavy nominal discount of $27\frac{9}{10}$ per cent. It is unnecessary to pursue these calculations to other countries: the same principles apply to all countries.

It is scarcely necessary to observe, that in the process of restoration the phenomena are reversed. A restoration of the English currency, for instance, would be similar in its effects to a depreciation of the currencies of all other countries.

3. *Clipping the Coin.* In some countries the practice of clipping the coin still continues, and it is likely to continue just so long as people will take clipped coin. If people would take shillings clipped into polygons, they would be so clipped in less than twenty-four hours.

The effect of clipping on the exchange is precisely similar to the two cases we have already examined. If the silver coin of France were clipped to the extent of one-tenth of its weight, exchange would be affected to that extent. Instead of requiring only 25·58 f. to purchase 1*l.* sterling on the Parisian Bourse, it would require 28·14 f. Restoration would be equivalent to clipping the coins of other countries.

Some of the continental states in which clipped coin circulates have adopted an expedient to keep up the character of their money of account. This expedient is to transact all their dealings with other nations in what they call *Banco*, which may be defined money *as it ought to be*, to distinguish it from the current or clipped money, which may be called *money as it is*. The merchants keep their bank accounts in *money as it ought to be*, paying in the clipped money, or *money as it is*. They are charged with the depreciation, which is known by the term *Agio*. This is purely an arrangement of convenience.

4. *Wear of Coin.* The case of a worn coinage is precisely similar to that of a clipped coinage, except that the latter is sudden in its effects, the former gradual. Hence depreciation from wear is much more likely to deceive than that which arises from clipping. Restoration by means of a new issue reverses all the effects.

We have now enumerated the principal circumstances affecting the value of a currency. Fluctuations in the rate of exchange proceeding from an alteration of the value of the medium in which price is quoted are purely *nominal;* and so they are usually designated. They are alterations proceeding from the altered quantity of the article purchased, and are analogous to an alteration of the price of wheat from an alteration in the capacity of the imperial quarter.

What is usually called the *real* exchange is the actual market-price, determined by the same law as the price of sugar, corn, or broad-cloth: namely, the existing proportion between supply and demand.

The demand for bills of exchange arises out of the necessity of paying for importations. The supply arises out of the practice of drawing for the amount of exportations. If the supply and demand be equal—if for every pound's worth of goods imported there be exactly a pound's worth of exported goods to be drawn for—there will be no real exchange: that is, the real exchange, however much the nominal exchange may alter, will be at par.

When, however, the importations are not precisely equal to the exportations, exchange can no longer remain at par. An excess of importation would cause exchange to advance against the importing country. Let us suppose a case. Let us suppose that an actual or anticipated advance in the price of wheat causes the transmission of extensive orders to the north of Europe. This would produce a sudden demand for bills of exchange—not perhaps to the extent of the orders; for in all probability goods adapted to the markets of the wheat-growing countries would be sent in part payment—but, at all events, to a considerable amount. There would accordingly be an advance in the rate of exchange, first on the wheat-shipping ports, and next on all other countries. Thus, England imports wheat from Danzig, and exchange on Danzig rises. But exchange on Amsterdam is at par, as it is also at Amsterdam on Danzig. Hence the wheat-importer would buy a bill on Amsterdam, and with the proceeds would there buy a bill on Danzig. But the buyer of exchange on Amsterdam cannot go into the market without causing an advance in the rate. In this way the advance becomes general.

The real exchange, however, is subject to a limit beyond which it cannot advance. This limit is the cost of transmitting the precious metals. A debtor to a foreign country—say the importer of wheat—can liquidate his debt by the transmission of bullion as well as of a bill of exchange; and he will be determined in his choice by the comparative cheapness of either mode. The cost of transmitting specie is, let us assume, 2 per cent.: so long as exchange continues below 2 per cent. the debtor will continue to purchase it; but the moment the drawer demands more than that rate, the exportation of bullion will be resorted to, and bills of exchange will cease to be demanded. The cost of transmitting bullion, including the cost of collecting it at the port of shipment, is therefore the limit beyond which the real exchange cannot advance.

But an advance in the rate of exchange, even up to this point, cannot long be maintained. The tendency in an advance in the rate is to check importation and stimulate exportation. Articles which would only just pay with exchange at par would pay a profit sufficient to induce exportation where the exporter could secure 1 or 2 per cent. more for his draft. Thus, by the stimulus to exportation, the supply of bills would be increased to meet the demand, and *pro tanto* to check the advancing rate of exchange. On the other hand, an imported article which was only just paying when exchange was at par would cease to pay when it should cost the importer 2 per cent. more to make his remittance. Thus, whilst the cost of exporting the precious metals is the immediate check upon an advancing rate of exchange, the effect of the real exchange in stimulating or checking importation or exportation, as the case may be, is to work its own remedy. The real exchange is, in fact, continually gravitating towards par, though at times superior forces may overcome that perpetual tendency.

Most of the errors which prevail in relation to the subject of exchange arise out of confounding the real with the nominal exchange. For the purposes of general reasoning, it is well to know what is the average value of the currencies of the several nations with which we have commercial relations; but for practical purposes the actual par for the moment should be rigidly calculated. Unless this be done, the practical merchant will be liable to continual error. For farther information on the subject, the reader may consult Mill's *Elements of Political Economy*, chap. iii. sec. 16, p. 182; Ricardo's *Principles*, chap. vii., *On Foreign Trade;* article *Exchange* in the *Encyclopædia Britannica:* and Tooke's *High and Low Prices*, passim.

EXCHANGE, ROYAL. [GRESHAM.]

EXCHEQUER COURT is a superior court of record established by William the Conqueror as part of the Aula Regis, and reduced to its present order by Edward I.

It is the lowest in rank of the four great courts which sit at Westminster Hall, although in ancient times one of the first in importance, as all causes relating to the rights of the crown were there heard and determined, and the revenues of the crown were supposed to be received there. Perhaps the inferiority in point of precedence of this court may be attributed to its having been originally erected solely for the king's profit, which was considered an object inferior to the general administration of justice to the subject.

Etymologists have exhausted much research in ascertaining the origin of the name: some assert that it is derived from the old French word *Eschequier*, a kind of abacus or table; or the German, *Schatz*, 'treasure.' The Latinized form of the word is *Scaccarium*. Camden says it was so called from the covering of the table at which the barons sat being party-coloured or *chequered*, and on which, when certain of the king's accounts were made up, the sums were marked and scored with counters.

The judges of the court of exchequer are the chancellor of the exchequer for the time being, the chief baron, and four other barons, who are created by letters patent, and are so called from their having been formerly chosen from such as were barons of the kingdom, or parliamentary barons. (Selden's *Titles of Honour*.)

The court of exchequer was formerly held in the king's palace. Its treasury was the great deposit of records from the other courts; writs of summons to assemble the parliaments were issued by its officers; and its acts and decrees, as they related almost entirely to matters connected with the king's revenue, were not controlled by any other of the king's ordinary courts of justice.

It now consists of two divisions, one of which exercises jurisdiction in all cases relating to the customs and excise, and over revenue matters generally. The other division is subdivided into a court of common law, in which all personal actions may be brought, and a court of equity, where suits in equity may be commenced and prosecuted.

A plaintiff, when bringing an action in this court, previously to the Act for Uniformity of Process in personal actions (2 Will. IV. cap. 39), fictitiously alleged himself to be the king's debtor, in order to give the court jurisdiction in the cause; but since the passing of that act it is no longer necessary to resort to this fiction in order to bring an action on the plea side of the court of exchequer, as that statute assimilates the practice of all the common law courts, and the operation as well as the name of the processes issued from them are the same.

The number of officers on the plea side of the court of exchequer, and their several duties, are regulated by the 2nd and 3rd Will. IV. cap. 110. By 3rd and 4th Will. IV. cap. 70, a great number of old offices are abolished.

When the court sits in equity the chancellor of the exchequer has a voice (although now very rarely exercised) in giving judgment. The last case in which the chancellor was required to sit, owing to the barons being equally divided in opinion, was that of Naish against the East India Company, Michaelmas Term, 1735, when Sir Robert Walpole was chancellor, and his decision in a question of very considerable difficulty was said to have given great satisfaction.

An appeal lies from this court by writ of error to the justices of the courts of king's bench and common pleas sitting in the exchequer chamber, who alone have power to review the judgments of the barons; and from their decision a further appeal may be brought before the house of lords.

The Court of Exchequer chamber was first erected in England by stat. 31 Edward III., to determine causes upon writs of error from the common law side of the court of exchequer. The judges of the three superior courts occasionally sit here to hear arguments in important criminal cases, and upon causes of great weight and difficulty, in which the judges of the court below have not given their judgment.

As a court of error, the court of exchequer chamber underwent considerable alterations by the passing of the 11th Geo. IV. and 1st Will. IV. cap. 70., and its constitution is now regulated by that statute. [COURTS.]

The Court of Exchequer in Scotland was established by the 6th Ann, cap. 26. The judges are the high treasurer of Great Britain, with a chief baron, and four other barons.

By a recent act (3 and 4 William IV. c. 13) the powers of the barons of the Scotch Exchequer as to the duties and revenues, &c., mentioned in the act have ceased, and are vested in the Commissioners of the Treasury: and the collection and management of the assessed taxes and land-tax of Scotland are transferred to the Commissioners for the Affairs of Taxes, but the judicial powers of the barons are specially saved.

The Court of Exchequer in Ireland was established by the 40 Geo. III. cap. 39, and consists of the chief justices, chief baron, and the rest of the justices and barons, or any nine of them.

EXCHEQUER BILLS form the principal part of the unfunded public debt of this country. These bills are issued under the authority of parliament for sums varying from 100*l*. to 1000*l*., and bear interest. They were first issued in the reign of William III.; and although their amount has since varied greatly at different times, the convenience which they afford to individuals and their advantage to the public have been such as to cause their constant issue. Their convenience to individuals arises from the circumstance of their passing from hand to hand without the necessity of making a formal transfer, of their bearing interest, and of their not being subject to such violent fluctuations as sometimes occur in the prices of the funded debt. This comparative steadiness in value is caused by the option periodically given to the holders to be paid their amount at par, or to exchange them for new bills to which the same advantage is extended; besides this, when a certain limited period has elapsed from the date of their first issue, they may be paid to the government at par in discharge of duties and taxes. The amount of premium that may have been paid at the time of purchase is consequently all that the holder of an exchequer bill risks in return for the interest which accrues during the time that it remains in his possession. The advantage to the public consists in the lower rate of interest which they carry compared with the permanent or funded debt of the nation, to which, however, they must in this respect bear some certain proportion. When the price of the public funds is high, the interest upon exchequer bills will be low; and if, through any public or commercial derangement, the funds should fall in price so as to afford a much more profitable investment than exchequer bills, the rate of interest upon these must be raised in order to prevent their payment into the exchequer in discharge of duties, a thing which would embarrass the financial operations of government. When first issued in the reign of William III., the interest borne by exchequer bills was 5*d*. per 100*l*. per diem, being at the rate of 7*l*. 12*s*. 1*d*. per cent. per annum. In the same reign the interest was afterwards lowered to 4*d*. per 100*l*. per diem, or 6*l*. 1*s*. 8*d*. per cent. per annum; and in the following reign the rate was still further reduced to 2*d*. per diem, or 3*l*. 0*s*. 10*d*. per cent. per annum. During the greater part of the war from 1793 to 1814, the rate of interest upon these securities was fixed at 3½*d*. per cent. per diem, or 5*l*. 6*s*. 5½*d*. per cent. per annum. Since the last-mentioned year the rate has been progressively reduced to 2½*l*., 2*d*., and 1½*d*. per 100*l*. per diem, at which latter rate they were in the market at the time of the derangement of the currency which was experienced in the beginning of 1837. Under these circumstances, it was considered important as far as possible to relieve the Bank of England, by which establishments a very large proportion of these securities were then held, and to place it in the most favourable position for affording relief to the commercial classes; and accordingly the rate of interest upon exchequer bills was raised to 2¼*d*. per cent. per diem, at which rate they are still current (August, 1837), although the high premium which they bear in the market—48*s*. per cent.—leads to the supposition that it will be soon again reduced.

In periods of commercial pressure arising from causes which are believed to be temporary, it has sometimes been considered advisable by parliament to make advances to merchants upon the security of goods; these advances have been made by the issue of exchequer bills, which have been cancelled when the exigency that called for them has passed away. A more permanent occasion for their issue, apart from the immediate wants of the government, has been the desire of aiding individuals or private associations in the prosecution of works of public utility, such as canals, roads, &c. In these cases the rate of interest charged to the borrowers is somewhat greater than that borne by the bills, and the difference has been applied to defray the expense of management on the part of the public.

The amount of exchequer bills 'outstanding and unprovided for' at the end of each of the last ten years was as follows:—

	£.		£.
1827 .	. 27,546,850	1832 .	. 25,696,000
1828 .	. 27,657,000	1833 .	. 28,384,700
1829 .	. 25,490,550	1834 .	. 28,521,550
1830 .	. 25,609,650	1835 .	. 29,007,950
1831 .	. 25,351,350	1836 .	. 28,155,150

EXCISE DUTIES, the name given to taxes or duties levied upon articles of consumption which are produced within the kingdom. This description, which has usually been given of excise duties, is more strictly applicable now than it was formerly, when the commissioners of excise revenue were also charged with the collection of duties upon various articles imported from foreign countries. Among these foreign articles were wine, spirits, tobacco, glass, and tea. The last named of these was the last that was withdrawn from the management of the Excise and transferred to the Board of Customs. There are still, it is true, certain duties to which the name of excise is applied which can hardly be called duties upon consumption, although they are accessary to it, such as the duty on sales by auction and the sums charged for licenses to permit parties to carry on certain trades.

Excise duties are said to have had their origin in this country in the reign of Charles I., when a tax was laid upon beer, cider, and perry of home production. The act by which these duties were authorised was passed by the long parliament in 1643. This act contains also a list of foreign articles, and among others tobacco, wine, raisins, currants, and loaf sugar, upon which excise duties were imposed, in addition to duties of customs already chargeable. This act was adopted and enforced under the protectorate of Oliver Cromwell; and by the statute 12 Charles II. c. 24, the duties of excise were granted as a part of the revenue of the crown.

For a long time this class of duties was viewed with particular dislike by the people, on account of its inquisitorial interference with various industrial pursuits, and it certainly forms a very strong ground of objection against excise duties, that the security of the revenue which they yield is held to be incompatible with the perfect freedom of the manufacturer as to the processes which he may apply in his works. In every highly-taxed country where consumption duties form part of the public revenue, it would seem however to be hardly possible to avoid the adoption of this class of duties. If, taking for our example an instance which is now exercising an injurious effect in a neighbouring country, it is found expedient to impose a customs' duty upon the consumption of foreign-made sugar, it is clearly necessary for the protection of the revenue that an excise duty should be imposed upon sugar of domestic production, otherwise the community at large is made to bear the load twice, once in the form of some other tax, and again to the producer of indigenous sugar, who will charge the consumer nearly as much as he would pay to the importer of foreign sugar, including the amount of the duty. By such means a branch of industry would be fostered, unprofitable to the country at large, and profitable only to the few persons by whom the indigenous sugar is produced, but whose profits will not long continue greater than the usual profits upon the employment of stock obtainable in the same country from other branches of industry. An attempt has been lately made to set up a beet-root sugar manufactory in England, but parliament having imposed an excise duty upon the produce equal to the customs' duty charged upon colonial sugar, it does not appear probable that the attempt can be successful, or indeed that it can be persevered in, which indeed is little to be regretted, for the reason already assigned.

Excise duties are liable to this among other very serious objections, that the regulations under which they are collected are made, perhaps unavoidably, to interfere with processes of manufacture, so as to prevent the adoption of improvements which would be beneficial first to the manufacturer and afterwards to the community at large, which must always be interested in their adoption, because of the greater excellence or cheapness of the products which it is the object of the experimenter to attain. It will give some idea of the extent to which this interference is injurious, if we state, on the authority of a gentleman conversant with all the details of the art of calico-printing, that upon the same premises, with the same capital, and employing the same amount of labour, double the quantity of cloths are now printed which could have been printed previous to the repeal of the duty, and to the consequent withdrawal of the excise-officers from the works. Another great objection that may be urged against excise duties is, the facilities which they offer for the commission of frauds against the revenue, an offence which, in the eyes of many persons, is of a venial kind, but which too often ultimately demoralizes those by whom it is committed. In the Seventeenth Report of the Commissioners appointed to inquire into the management and collection of the excise revenue it is stated as a striking proof of the extent to which frauds are committed by manufacturers of soap, that 'there are in England fifty that take out licenses, for which they pay 4*l.* per annum, each of which makes, or rather brings to charge, less than one ton of soap per annum, from which it is obvious that as the profits of such a sale would not pay for the license, the entry is made in order to cover smuggling.' With regard to malt, another article of great consumption which is subject to excise duties, the commissioners state it to be their opinion, founded upon the evidence given by several respectable maltsters, 'that malt is sold throughout the season, and in large quantities, for a price that is insufficient to pay the expense of making it and duty; and that the duty is evaded to a great amount.' A strong presumptive evidence to this effect is contained in the fact that the average number of bushels of malt brought to charge in each of the ten years from 1725 to 1734 was 26,177,330, while in the ten years from 1825 to 1834, that is, after the lapse of a century, the number of bushels so brought to charge was 29,572,380; although during that time the population had been more than doubled, and the habits of the people not altered in any way that should lead to the supposition of any decreased consumption of the products of malt.

The articles now subject to excise duty are:—auctions; bricks; glass; hops; licenses; malt; paper; soap; spirits (British); vinegar.

In addition to the foregoing, excise duties were collected in 1797, under the following nineteen heads, viz.; * starch; * stone bottles; * sweets and mead; tea; * tiles; * candles; * coaches; cocoa; coffee; * cider; * perry; * hides and skins; pepper; * printed goods; * salt; spirits (foreign); tobacco and snuff; wine; * wire.

Of these nineteen articles the duties have been repealed upon the twelve to which an asterisk is prefixed: the collection of duties on the remaining seven articles has been transferred to the Customs department.

The following table states the amount of payments made into the Exchequer on account of excise duties in England, the charges of collection and the rate per cent. on the collection calculated on the gross revenue in each year from 1797 to 1835.

	Net Receipt.	Charges of Collection.	Rate per cent.		
	£	£	£	s.	d.
1797	9,452,887	411,696	3	14	4¼
1798	9,872,025	409,357	3	10	11¼
1799	11,429,523	425,174	3	3	7¾
1800	10,198,749	432,329	3	12	1
1801	10,529,110	557,766	4	9	2
1802	13,774,158	520,022	3	7	0½
1803	16,889,374	525,583	2	17	9¼
1804	19,448,143	557,470	2	13	1½
1805	21,015,539	564,594	2	10	0
1806	21,739,067	579,940	2	9	6½
1807	22,087,226	648,756	2	14	6
1808	22,933,712	694,883	2	16	5½
1809	21,273,197	701,990	3	0	1¼
1810	23,382,772	737,043	2	18	0
1811	23,384,554	802,261	3	3	11¾
1812	20,961,813	826,493	3	12	7
1813	22,877,737	830,621	3	5	11¾
1814	23,649,676	860,787	3	4	0
1815	24,796,633	885,169	3	4	8¼
1816	21,553,638	928,659	3	13	2
1817	18,396,400	992,744	4	13	10½
1818	21,330,746	953,869	3	19	7¼
1819	21,492,839	951,431	3	19	10½
1820	24,742,242	958,124	3	10	7¼
1821	24,781,957	964,515	3	10	4¾
1822	24,022,441	950,644	3	10	7
1823	22,375,780	933,815	3	13	9½
1824	23,498,903	923,864	3	10	0¼
1825	18,055,446	889,994	4	1	8
1826	16,158,649	857,310	4	12	10
1827	15,446,801	846,591	4	13	5¼
1828	16,718,861	829,162	4	4	10¾
1829	15,761,547	822,070	4	10	1¾
1830	14,747,976	840,101	4	16	5¼
1831	12,411,676	797,298	5	11	3¾
1832	12,909,188	762,863	5	6	2
1833	12,846,800	750,982	5	5	1½
1834	11,061,893	748,724	6	1	8
1835	9,518,688	738,812	6	16	0

The gross and net receipt, charges of management, and the rate per cent. for which the gross revenue of excise in England, Scotland, and Ireland respectively, were collected, for the year 1835, were as follows:—

	Gross Receipt.	Net Receipt.	Charges of Management.	Rate per cent for which the Revenue was collected.		
	£	£	£	£	s.	d.
England .	10,861,182	10,255,486	738,812	6	16	0
Scotland .	2,456,705	2,232,961	150,530	6	2	6
Ireland .	1,911,464	1,906,150	183,049	9	11	6

The gross receipt, as stated in the foregoing abstract, was collected on the different articles subject to excise duties in the following proportions:—

	England.			Scotland.			Ireland.			United Kingdom.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
Auctions	215,171	2	0	19,766	17	11½	10,838	11	8¼	245,776	11	7½
Bricks	395,080	7	8¾	8,945	11	7½	..			404,025	19	4¼
Glass	921,544	7	10¼	39,554	4	2	16,630	0	7½	977,728	12	7¾
Hops	333,856	3	6	..			..			333,856	3	6
Licenses	847,259	8	11¾	124,564	12	0	146,212	17	3½	1,118,036	18	3¼
Malt	4,321,456	14	2¼	548,147	10	6¼	260,294	13	11¼	5,129,898	18	8
Paper	742,101	13	3½	126,915	18	9½	33,321	19	4¾	902,339	11	5¼
Soap	891,647	6	7¾	82,451	11	9½	..			974,098	18	5¼
Spirits	2,155,531	9	4½	1,467,514	15	3	1,436,191	7	5	5,059,237	12	0¼
Tea	59	12	7¼	..			..			59	12	7¼
Vinegar	25,871	0	8¼	222	15	8	408	8	8	26,502	5	6¼
	10,849,579	6	10	2,418,083	17	9½	1,903,89"	19	0½	15,171,561	3	7¼
Late collector's balances . . .	..			..			918	12	0	918	12	0
Law-costs recovered . . .	876	11	4¾	215	0	8¼	1,811	11	8½	2,903	3	9½
Fines and forfeitures . . .	10,726	4	11½	2,027	0	11¾	4,836	5	6¾	17,589	11	[illegible]
Produce of stock, &c. belonging to the late Scotch Excise Incorporation Fund	..			36,379	4	9	..			36,379	4	9
Total . .	10,861,182	3	2¼	2,456,705	4	2½	1,911,464	8	3½	15,229,351	15	8¼

The estimated amount of excise duties repealed since 1824 is 6,782,000*l.*, and the amount of those, the management of which has been transferred to the Customs, is 11,238,300*l.* The rates of excise duties at present chargeable in England, Scotland, and Ireland respectively, are as follows:—

	England.	Scotland.	Ireland.
Auctions.—On estates, houses, annuities, shops, plate, jewels, &c.	7*d.* in the £	7*d.* in the £.	6*d.* in the £.
On household furniture, horses, carriages, and other goods and chattels	1*s.* in the £.	1*s.*	10*d.*
On sheeps' wool	2*d.* in the £.	2*d.*	2*d.*
On foreign produce, the 1st sale thereof	¼ per cent.	¼ per cent.	¼ per cent.
Bricks.—Common	5*s.* 10*d.* per 1000	5*s.* 10*d.* per 1000	
Large	10*s.*	10*s*	
Polished	12*s.* 10*d.*	12*s.* 10*d.*	
Extra polished	2*s.* 5*d.* per 100	2*s.* 5*d.*	
Extra large polished	4*s.* 10*d.*	4*s.* 10*d.*	
Glass.—Flint, fluxed materials	3½–4½*d.* per lb.	3½–4½*d.* per lb.	2½*d.* per lb.
Plate	60*s.* per cwt.	60*s.* per cwt.	
Crown	£3 13 6 ditto	73*s.* 6*d.*	
Broad glass	£1 10 0 ditto	30*s.*	
Bottle	7*s* ditto	7*s.*	7*s.*
Hops	2*d.* per lb.		
Malt	2*s.* 7*d.* pr. bus.	2*s.* 7*d.* pr. bus.	2*s.* 7*d.* per bus.
Paper.—Writing, drawing, printing, elephant, cartridge, and all other kinds, mill-bds., &c.	1½*d.* per lb.	1½*d.* per lb.	1½*d.* per lb.
Soap.—Hard	1½*d.* per lb.	1½*d.* per lb.	
Soft	1*d.*	1*d.*	
Spirits (British)	7*s.* 6*d.* pr. gal.	3*s.* 4*d.* pr. gal.	3*s.* 4*d.* pr. gal.
Vinegar.	2*d.* per gal.	2*d.* per gal.	2*d.* per gal.

The number of traders who were obliged to take out excise licenses in 1835, or whose premises were subject to visits from the excise officers, in England, Scotland, and Ireland respectively, was—

	England.	Scotland.	Ireland.
Brewers of beer for sale, viz.—			
Common brewers	1,918	216	232
Retail brewers	23	22	..
Brewing victuallers	25,456	323	4
Other brewers	14,521	..	..
Total number of brewers	41,918	561	236
Maltsters	12,695	1,171	388
Soap-makers	263	39	..
Brick-makers	5,711	127	..
Paper-makers	442	49	57
—— stainers	94	1	45
Pasteboard-makers	56	1	..
Glass-makers	116	13	6
Distillers	13	248	95
Vinegar-makers	39	5	5
—— rectifiers	2	..	..
Pyroligneous acid makers	28	1	2
Rectifiers	105	8	19
Tobacco and snuff-manufacturers	303	151	291
Tallow-melters	2,737	188	..
Glass-pinchers	56	..	..
Malt-roasters	20	1	3
Crude pyroligneous acid makers	24	5	..
Soap-claimants	2,374	327	..
Snuff-mills	3	4	..
Card makers	6	..	..
University printers	3	2	2
Iron liquor maker	1	..	..
Spirit-grocers	..	..	45
Dealers in brandy	2,082	58	98
—— wine	1,812	34	218
—— tea	79,181	13,590	12,203
—— tobacco	148,850	13,027	11,989
—— vinegar	77,539	2,331	3,503
Spirit-dealers who have also retail licenses	1,094	511	318
Retailers of spirits	47,384	16,391	18,957
—— wine	18,701	2,527	2,772
—— sweets	556	29	48
Beer-dealers	905	30	33
Retailers of beer, cider, &c. not to be drunk on the premises	35,731	22	..
Corn-mills	..	..	1,892
—— kilns	..	..	2,796

The management of a branch of the revenue which is collected in every part of the kingdom necessarily gives employment to a great number of officers. The numbers so employed in England, Scotland, and Ireland, and the amount of their salaries at different periods, were as follows:—

Years.	England.		Scotland.		Ireland.		Total.	
	No.	Salaries.	No.	Salaries.	No.	Salaries.	No.	Salaries.
		£.		£.		£.		£.
1797	4,777	323,671	926	51,321	877	38,290	6,580	413,282
1805	5,067	422,878	1,160	71,234	875	38,705	7,102	532,817
1810	5,318	587,774	1,150	89,477	1,005	114,912	7,473	792,113
1815	5,509	630,786	1,054	110,494	1,076	127,402	7,639	868,612
1819	5,798	654,781	1,121	122,710	1,067	127,431	7,966	904,922
1827	4,790	594,196	1,004	99,560	700	80,044	6,494	773,800
1833	4,286	529,095	872	98,071	650	82,549	5,808	709,715

EXCITANTS. [STIMULANTS.]

EXCOMMUNICATION, from *Excommunicatio*, is the highest ecclesiastical censure which can be pronounced by a spiritual judge. The person against whom it is pronounced is for the time being excluded from the communion of the church. This punishment, as well as many others, springing from ecclesiastical jurisdiction, according to some opinions, had its origin in the advice given by St. Paul when reproving the early Christians for scandalizing their profession by prosecuting law-suits against each other before heathen judges; and the apostle accordingly recommended them to leave all matters in dispute between them to the decision of the Ecclesia, or the congregation of the faithful. This advice was soon followed, and heathen tribunals were seldom afterwards occupied by the controversies of the Christians.

The bishop and his clergy, and afterwards the bishop alone, became sole judge in these disputes; but possessing no coercive powers to enforce their decrees, they were obliged to adopt the only means of which they could avail themselves, to bring the refractory to submission, namely, by excluding them from the rites of the Church, and warning other Christians from their company and presence. A Christian thus shut out from the fellowship of his own brethren could not do otherwise than submit unconditionally.

This censure, although instituted by the primitive church as the means of preserving its purity, and of enforcing obedience to its just laws, was afterwards used for the promotion of ecclesiastical power, and was converted into an engine of the greatest oppression in those countries which were most subject to ecclesiastical rule. (Robertson's *History of Charles V.*, vol. ii. p. 109.)

In England excommunication became at a very early period the instrument of punishment under the authority of the bishops, and others possessing ecclesiastical jurisdiction. It was divided into the greater and the less excommunication. The latter only removed the person from a participation in the sacraments, and is what was most commonly meant by the term excommunication; the other was called anathema, and not only removed the party from the sacraments, but from the Church and all communication with the faithful, and even deprived him of Christian burial. Subjects were absolved from their allegiance to an excommunicated prince: indeed they were forbidden to obey him. Gregory V. was the first prelate who ventured to excommunicate a reigning prince in the case of Robert, king of France, in 998. John and Henry VIII. are well-known instances in English history. The latest instance of all was Napoleon, in 1809, by Pius VII.

Excommunication sometimes followed immediately upon the commission of an offence, and was then called canonical, to distinguish it from that which did not depend upon any established canon, but upon the sentence of a judge.

The following offenders were punished with the greater excommunication: diviners, heretics, their receivers and comforters; simoniacs; violators and plunderers of churches; those who spoiled clerks going to Rome; the plunderers of the property of a bishop which ought to go to his successor; those who gave aid, favour, or counsel to excommunicated persons; those who laid violent hands on clerks or religious persons, or commanded others to do so.

Those punished with the less excommunication were persons committing any mortal sin, as sacrilegious persons; those who received a church from lay hands; notorious offenders; those who talked with, saluted, or sat at the same table with, or gave anything in charity to persons excommunicated by the greater excommunication, unless they were familiars or domestics.

Excommunication was also pronounced for other matters which belong to ecclesiastical jurisdiction, as adultery, incontinence, fornication, &c., or for contempt of any ecclesiastical order or sentence. A sentence of excommunication was preceded by three monitions at due intervals, or one peremptory, containing the legal space of time, with a proper regard to the quality of the person and the nature of the offence. But, as Blackstone remarks, 'heavy as the penalty of excommunication is, considered in a serious light, there are, notwithstanding, many obstinate or profligate men, who would despise the *brutum fulmen* of mere ecclesiastical censures, especially when pronounced by a petty surrogate in the country, for railing or contumelious words, for non-payment of fees or costs or other trivial causes. The common law therefore compassionately steps in to the aid of the ecclesiastical jurisdiction, and kindly lends a supporting hand to an otherwise tottering authority.' This was effected by the writ 'de excommunicato capiendo,' or for seizing the excommunicate. But before the writ for taking the excommunicated person could be granted the contumacy and contempt of the party were to be certified by the bishop to the court of Chancery by letters under his seal; and by 5 Eliz. c. 23, the writ was made returnable into the King's Bench. By the statute just cited the cause of excommunication was to be stated in the writ, in order that the court might judge as to the justice of the case. The sentence of excommunication might be revoked by the judge who passed the sentence, or upon appeal the party might be absolved. Absolution generally belonged to the same person who passed the sentence, unless in some particular cases, which were referred to the pope or a bishop. (Reeves' *Hist. of English Law;* Sullivan's *Lectures.*)

By a sentence of excommunication, both greater and less, those denounced were excluded from the right of Christian burial, from bringing or maintaining actions, from becoming attornies or jurymen, and were rendered incapable of becoming witnesses in any cause. But since the 53rd Geo. III. c. 127, excommunication cannot now be pronounced in England, except in certain cases (as spiritual censures for offences of ecclesiastical cognizance); and by the 3rd section of that statute 'no person who shall be pronounced or declared excommunicate (pursuant to the second clause of this statute) shall incur any civil penalty or incapacity, in consequence of such excommunication, save such imprisonment, not exceeding six months, as the court pronouncing or declaring such person excommunicate shall direct.' The proceedings in those cases, in which excommunication may still be pronounced, are the same, as to the issuing and return of the writ, as they were before the act of 53 George III. By the same act (53 George III. c. 127), in all cases cognizable by the laws of England in ecclesiastical courts, when any person shall refuse to appear when cited by such court, or shall refuse to obey the lawful order or decree of such court, no sentence of excommunication, except in the cases above alluded to, shall be pronounced; but a writ 'de contumace capiendo' shall issue, which in effect is the same as the old writ 'de excommunicato capiendo' was. Thus the various difficulties are now obviated which formerly existed in courts of law with respect to excommunication.

EXECUTION is the effect given to the judgments and other proceedings analogous to judgments of courts of law and in civil suits. This term denotes the process by which a party is put into the actual possession of that to which by the proceedings of a court he appears to be legally entitled.

As a judgment of a court of common law ascertains that the party is entitled to the possession of some subject of a real or personal nature; or to recover damages in respect of property withheld or injuries done, so the execution founded upon such judgment will be framed with a view to putting the party in whose favour the judgment is given either in the actual possession of the thing in dispute, or to enable him to obtain pecuniary compensation.

For this purpose a written command issues in the name of the king or other lord or owner of the court, to an officer of the court: when the judgment is in one of the king's superior courts at Westminster, the officer of the court for this purpose is the sheriff of the county in which the property is situate, or, in the case of pecuniary compensation, the sheriff of the county in which the party from whom such compensation is due is supposed to reside; which, until the contrary is shown, is taken to be the county in which the litigation was carried on.

Where lands or other corporeal hereditaments are recovered, the process of execution varies according to the nature of the interest recovered. If a right to a freehold interest has been established, the writ commands the sheriff to give the recoverer seisin of the lands, &c., and is called habere facias seisinam. [HABERE FACIAS SEISINAM.] If a chattel interest only is recovered, the writ does not affect to authorize the sheriff to intermeddle with the freehold, and directs that officer merely to give possession of the land, &c. This is called an habere facias possessionem. [HABERE FACIAS POSSESSIONEM.]

A judgment in the action of detinue [DETINUE] establishes the right of the recoverer to the possession of a specific personal chattel, and the writ of execution called a distringas ad deliberandum issues, requiring the sheriff to coerce the defendant by his distringas (distress) to restore the specific chattel or its value.

A judgment for the defendant in replevin [REPLEVIN] establishes his right to the possession of the personal chattel which formed the subject of the litigation. In the ordinary case of an action of replevin after a distress, the right of the defendant in respect of the chattel distrained is merely to hold it as a security for the payment of the debt or duty, the payment or performance of which is sought to be enforced by the coercion of a distress. [DISTRESS.] The writ of execution requires the sheriff to cause the chattel to be restored to the possession of the defendant. This is called a writ de retorno habendo, and in case the sheriff is unable to find the chattel, further process issues commanding him to take other chattels of the plaintiff as a substitute for that which is withheld, by a writ called a capias in withernam.

The most ordinary cases of execution are those in which pecuniary compensation is to be obtained, but in these cases the sheriff is not authorized directly to take money from the party by whom it is to be paid. Formerly the only mode of obtaining this compensation was by process of distringas or distress. And this is still the case in inferior courts; but in the superior courts execution of judgments or other records establishing pecuniary claims may be had by a writ of fieri facias [FIERI FACIAS] affecting the personal property; by writ of elegit [ELEGIT], affecting both real and personal property; and by capias ad satisfaciendum [CAPIAS], by which compliance with the pecuniary demand is enforced by detention of the person of the defaulter in prison until the claim be satisfied, or the adverse party consents to his discharge.

A subject is not entitled to pursue all these remedies at once; but in the case of the crown, the right to obtain satisfaction from the goods, lands, and person of its debtor may be enforced simultaneously, by writ of capias, and extendi facias, or extent. [EXTENT.]

EXECUTION is also the term applied to denote the giving effect to the sentence of a court of criminal jurisdiction. In this sense it is most commonly used with reference to the execution of sentence of death. [SHERIFF.]

EXECUTOR. An executor is he to whom another man commits by will the execution of that his last will and testament. He answers in some degree to the *hæres designatus*, or *testamentarius*, in the civil law, as to the debts, goods, and chattels of his testator; but the origin of executors seems to be properly traceable to a constitution of Manuel Comnenus (*περὶ διοικητῶν τῶν διαϑηκῶν*). All persons who are capable of making a will, and some others besides, as married women and infants, are capable of being made executors; but infants are by statute rendered incapable of acting in the execution of the will until they attain the age of twenty-one.

An executor can derive his office from a testamentary appointment alone, though it is not necessary that he should be appointed by express terms; any words of the testator indicating an intention to make the appointment are sufficient: in this case he is usually called 'executor according to the tenor.' If no executor is appointed by the will, administration is granted by the ordinary, with the will annexed, in which case the administrator is bound to obey the directions given by the will. An executor may renounce probate; but having once acted, he cannot divest himself of the office or its liabilities; nor can an administrator who has accepted the office, get rid of his responsibility.

An executor may do many acts in execution of the will, even before probate, as paying and receiving debts, &c., but he cannot, before probate, sustain actions or suits. An administrator can do nothing till the letters of administration are issued; for the former derives his power from the will, and not from the probate: the latter owes his entirely to the appointment of the ordinary. If an executor die before probate, administration must be taken out to his testator, with the will annexed; but if an executor, having proved the will, die, his executor will be the executor and representative of the first testator, unless, before proving the will of the second testator, he expressly renounces the execution of the will of the first. If the executor dies intestate, his administrator is not the representative of the testator, but an administrator *de bonis non* of the testator must be appointed by the ordinary. If there are several executors, the office survives, and is transmitted ultimately to the executor of the surviving executor, unless he dies intestate. Executors have a joint and entire interest in the effects of their testator; any one of them is capable of acting by himself; and the receipt of a debt, or the transfer of property by one, is as valid as if it had been done by all.

If a stranger takes upon himself to act as executor without any authority, as by intermeddling with the goods of the deceased, he is called an executor *de son tort* (of his own wrong), and is liable to all the trouble of an executor without any of the advantages attached to the office. He is chargeable with the debts of the deceased, so far as assets come to his hands; and is liable not only to an action by the rightful executor or administrator, but also to be sued as executor of the deceased by his creditors and legatees. The only advantage which an executor derives from his office is the right to retain any debt due to him from the testator, as against creditors of equal degree, and this privilege is allowed him, because he cannot take any legal steps to recover payment. This, though practically a privilege, is in reality only a provision of the law that he shall not be prejudiced by his appointment; otherwise as a man cannot sue himself, all the other creditors would, by instituting a suit against the executor, gain priority over him in respect of their debts.

The duties of executors and administrators are in general the same, the only essential difference between them being, as before mentioned, the mode of their appointment. Their duties are to bury the deceased, to prove his will in the proper Ecclesiastical Court, to collect and get in his goods and chattels, to pay his debts in the order appointed by law, and also his legacies, if he has bequeathed any, and to dispose of the residue of his goods and chattels in the manner by the will directed, or according to the statutes for the distribution of the effects of intestates, if there should be a total or partial intestacy. Executors and administrators are liable to an action at law, and also to a suit in equity, for the payment of the debts and liabilities of their testator or intestate; and to a suit in equity and the Ecclesiastical Court for the legacies bequeathed by him, and the due administration of his estate: but no action at law lies for a legacy, at least not until after the executor has assented to it, as it is called, that is, has acknowledged the sufficiency of the assets after providing for the payment of the debts. [LEGACY.]

It appears to have been a subject of much controversy whether the probate of wills was originally a matter of exclusive ecclesiastical jurisdiction, but whatever may have been the case in earlier times, it is certain that at this day the Ecclesiastical Courts are the only courts in which, except by special prescription, the validity of wills of personalty can be established or disputed. If all the goods of the deceased lie in the diocese or jurisdiction within which he died, the probate is made before the bishop or ordinary of that diocese or jurisdiction; but if he had *bona notabilia* (that is, goods and chattels to the amount of *5l.*) within some other diocese or jurisdiction than that in which he died, then the will must be proved before the archbishop or metropolitan of the province by special prerogative; and if there be *bona notabilia* in different provinces, there must be two prerogative probates. A will should be proved within six months after the death of the testator, or within two months after the termination of any dispute respecting the probate. (See 55 Geo. III. c. 184, sec. 57.)

Executors and administrators are treated by the courts of equity as trustees for the creditors, legatees, and next of kin of their testators or intestates. They are bound to administer the assets according to their due order of priority and to pay the debts of the deceased in like manner; and though the ecclesiastical courts will entertain suits for the payment of debts or legacies and the due administration of the assets, yet, where there is any trust to be executed, or any charge on real estate to be established, a court of equity will interfere by injunction or prohibition; for the constitution of the ecclesiastical courts is not adapted to the administration of trusts, and over real estate they have no jurisdiction. The probate is exclusive evidence of a will of personalty; but courts of equity assume the jurisdiction of construing the will in order to enforce the performance of the trusts by the executor: hence they are sometimes styled courts of construction, in contradistinction to the ecclesiastical courts, which, although they also are courts of construction, are the only courts of probate. Formerly, the personal estates only of persons deceased were liable for the payment of their simple contract debts; but now, since the statute 3 and 4 Wm. IV. c. 104, real estates are liable for the payment of debts of that nature; and it may be broadly stated that all the real and personal estates of the deceased are assets for the payment of his debts. The personal estate is liable in the first instance, unless the testator direct otherwise. Estates descended are applied before estates devised; and in other respects the estates of the deceased are administered in the order laid down by the courts.

The debts are also payable in a certain prescribed order. 1. The funeral expenses, the expenses of probate, and the costs of a suit for the administration of the estates, if any be instituted. 2. Debts due to the crown on record or specialty. 3. Certain debts, which by statute are to be preferred to others, as poor-rates, by stat. 17 Geo. II. c. 38, &c. 4. Debts of record, as judgments, statutes, and recognizances. 5. Specialty debts, *i. e.*, debts due on bonds or instruments under seal. 6. Simple contract debts, as upon bills of exchange and ordinary verbal engagements. It seems that in this class debts due to the crown and the wages of domestic servants are entitled to priority.

A mortgage made by the testator must, if there be no specified direction in his will, be paid out of the personal assets, if there be sufficient to pay the other creditors and legatees; it is, in fact, considered as the personal debt of the testator: though, if he did not create the mortgage himself, but took the estate subject to the mortgage by purchase, inheritance, or devise, the debt, not being his personal engagement, must be borne by the estate itself. The executor must pay the debts in the order mentioned; for if he apply the assets in payment of those of a lower degree, he will be personally answerable, to the extent of the assets misapplied, to the creditor of the higher degree. He may, however, pay a debt of an inferior degree before one of a superior, provided he has no notice of the latter and a reasonable time has elapsed after the testator's death; except in the case of debts of record due to the crown, of which the executor is bound to take notice. An executor or administrator may also retain his own debt as against creditors of an equal degree; and he may pay any one or more debts to creditors of equal degree, although thereby he may exhaust the assets, unless a suit or action be commenced against him; and even in that case he may, by confessing a judgment, enable a creditor to obtain priority. But notwithstanding an action or suit be commenced, he may pay a creditor of a higher degree than the one proceeding against him; save only where the suit is for a general administration of the estate, when the executor should not make any farther payments.

The debts being all paid, the next duty of an executor or administrator is to pay the legacies, and distribute the personal estate to the next of kin of the testator if there be any overplus; but where the testator has made a residuary legatee, he is entitled to the surplus. If the assets are not sufficient for the payment of the legacies, the executor must pay to each legatee an equal proportion of his legacy, unless the testator has directed the order of payment, in which case the legacies must be paid in full in the prescribed order, and the whole loss must fall upon the last in order. Specific legatees, *i.e.* persons to whom a specific fund or article of property is given by the will, are not liable to abatement of their legacies, but receive the fund or article whether the assets are or are not sufficient to pay the other legatees; though if the fund is changed, or the article sold, or from any other cause is not in existence at the death of the testator, the legacy fails, or in technical language, is said to be adeemed. Executors and administrators cannot be compelled to pay legacies or distribute the personal estate before the expiration of a year after the decease of the testator; and not even then, if notice has been acquired or there is reasonable ground to suspect the existence of debts and liabilities. Indeed, unless the assets are of ample amount, the executor or administrator should not pay within the year, even though the testator has directed it to be done; for it has been held that such a payment affords no defence against a creditor, and the testator or intestate may be bound by covenants upon which subsequent liabilities may accrue; or he may have been a trustee, and some maladministration of the trust estate may be discovered after the lapse of many years. In these and many other cases, executors and administrators should not part with the assets until all chance of liability is at an end, or security be given by the parties receiving them to refund in case of need. This last course will sometimes be directed by a court of equity in a suit for a legacy; for though an executor or administrator may recover from the legatees or next of kin to whom he has handed over the assets in case of subsequently-discovered debts of the deceased, it is obvious that this is a very insufficient and uncertain security. Where a legatee is an infant, or the testator has directed his executors to invest any portion of his estate in the funds, or has provided for some future payment to be made, or from any other cause, an investment by the executors becomes necessary, they are, in the absence of any express direction to the contrary, bound to make such investment in the Three per Cent. Consols, that fund being considered by the Court of Chancery as the most desirable for the purpose of investment. The rule is inflexible, and an executor who should disregard it would run great risk of having to pay the costs of a suit to compel him to place the money in that fund, and to make good any loss which might occur through the change of securities.

Full information upon these subjects will be found in the works of Williams, and Toller 'On Executors,' and Wentworth 'On Administrators.'

EXE'DRA (ἐξέδρα), a name given to certain open recesses in the buildings of the antients. There were numerous exedræ in the baths. Vitruvius says the spacious exedræ of the Greek palæstra were furnished with seats. The exedræ were placed in the three porticos of the palæstra. (Vitruvius, v. c. 9.) Sometimes in houses a covered hall, and of a square form, was called exedra. (Vitruvius, vi. cap. 5.) In the disposition of the Greek house the exedræ were placed looking to the west. (Vitruv. vi. cap. x.)

EXERCISE. [ANALEPTICS.]

EXETER, a city and a county of itself, locally in the hundred of Wonford, in the southern division of the county of Devon, of which it is the chief town; 44 miles northeast from Plymouth, and 174 west by south from London.

Exeter is supposed to have been a settlement of the Britons before the Roman invasion. It was then called 'Caer-Isc' and 'Caer Rydh,' the former derived from its situation on the Ex or Isc, the latter from the red soil on which the castle is built. By the Romans it was called Isca Dumnoniorum, to distinguish it from the Isca Silurum in Wales. From the number of coins, small bronze statues (evidently Penates), tesselated pavements, and other Roman antiquities discovered near the walls and in the neighbourhood of the city, it must have been a Roman station of some importance. It is uncertain how long Exeter retained its appellation of Isca Dumnoniorum, but in the reign of Alfred it had acquired that of Exan-Cestre (castle on the Ex), whence its present name.

In the reign of King Stephen, Baldwin Rivers, earl of Devon, fortified Exeter on behalf of the Empress Maude, and did not yield till reduced by famine after a long siege. It was besieged in the 12th year of the reign of Henry VII. by Perkin Warbeck, and again by the rabble of Devonshire and Cornwall in 1549.

The city of Exeter was formerly surrounded by walls and strongly fortified. Leland, in speaking of it, says, 'The toune is a good mile and more in cumpace, and is right strongly waullid and maintained. Ther be diverse fare towers in the toune waul bytwixt the south and west gate. There be four gates in the toune, by names of Est, West, North, and South. The Est and the West Gates be now the fairest, and of one fascion of building: the South Gate hath been the strongest.' Situated on a high eminence, on the north side of the town, are the ruins of the castle, called 'Rougemont.' When this castle was first erected is unknown; but it was either rebuilt or much repaired by William the Conqueror, who bestowed it on Baldwin de Briono, husband of Albrina his niece, in the possession of whose descendants it remained till the 14th year of the reign of Henry III., who then took it into his own hands. It was completely dismantled during the civil war, and has never since been rebuilt. In the area of the castle-yard a session-house has lately been erected, which is a neat-looking building, faced with Portland stone, and contains, in addition to two good-sized courts, a grand-jury room, magistrates' room, &c. In front is a fine open space, where county, election, and other meetings are held. To the north of the castle is a delightful walk, shaded by fine old elm trees, called Northernay. Nearly in the centre of Exeter is the guildhall, where the assizes for the city (which is a county of itself) are held, as well as the sessions, elections, and other business relative to the city alone. The building contains several valuable portraits, amongst others, those of Henrietta Maria, Charles the First's queen, of her daughter Henrietta duchess of Orleans, and of General Monk. The only other antient building of any importance at Exeter is the cathedral. It is uncertain when the present edifice was begun, but probably it was soon after the see of Devon was transferred to Exeter from Crediton, which was its locality till the year 1049. At all events it was considerably altered and enlarged by Warlewast, third bishop of Exeter, who was a Norman, and came over with the Conqueror. It then assumed its present cruciform shape, but underwent numberless alterations and additions during the thirteenth and fourteenth centuries. It now consists of a nave, 76 feet in width and 175 in length, with aisles on each side; two short transepts, formed by two Norman towers 130 feet in height; a choir of the same width as the nave, and 128 feet in length; ten chapels or oratories, and a chapter-house. The whole building from east to west (including St. Mary's Chapel) is 408 feet in length. The western front is highly decorated with a profusion of niches and elegantly carved figures, and presents one of the richest façades of any building in Europe. The towers are highly interesting to the antiquary as specimens of Norman architecture. The interior is also exceedingly fine; the vaulted roof of the nave is supported by clustered columns, surmounted by fine pointed arches; as is also that of the choir, which is separated from the nave by a screen of exquisite workmanship. The chapter-house is a beautiful edifice, with a handsome oak roof: it was used as a stable by Cromwell and his soldiers, but has since been thoroughly repaired, as other parts of the building also have lately been.

In the north aisle are the splendid monuments of Sir Richard and Bishop Stapleton. The organ, with the exception of the one at Haerlem, is perhaps the largest in Europe: the large pipes are nearly twenty-three feet in height, and four feet in circumference. (For a further account of this truly magnificent building we must refer the reader to Risdon; Oliver; Britten's *Cathedral Antiquities*, &c. &c.)

The city was antiently held in demesne by the crown; its earliest charter was granted by Henry I., and confirmed by Henry II. and Richard I. The governing charter was granted by George III. in 1770. The corporation hold a court of quarter-sessions, and the assizes are held by the judges of the western circuit twice a year for the county of the city at the guildhall, and twice a year for the county at the session-house. There is also a county court, and a court of requests for the recovery of debts under 40*s*., the former held every Tuesday, the latter once a fortnight. Petty sessions are held before the magistrates of the county every Friday at the session-house; and some magistrate of the city sits every day at the guildhall. Under the Municipal Act, Exeter is divided into six wards, with twelve aldermen and thirty-six councillors.

Exeter has returned two members to parliament ever since the reign of Edward I. At the first election after the passing of the Reform Act, there were 2952 registered voters. The population of the city and borough is 28,242, of whom 15,559 are females. There are not many manufactories, and the population is chiefly employed in handicraft and the retail trade.

The city of Exeter comprises the parishes of Allhallows, Allhallows on the Walls (the church of which has been demolished), St. Edmund, St. George, St. John, St. Kerrian, St. Lawrence, St. Martin, St. Mary Arches, St. Mary Major, St. Mary Steps, St. Olave, St. Pancras, St. Paul, St. Petrock, St. Sidwell, St. Stephen, and the Holy Trinity, and the parochial chapelries of St. David and St. Sidwell, and the extra-parochial precincts of the Cathedral Close and Bedford Chapel, all in the archdeaconry and diocese of Exeter. There are besides these several other chapels, as well as places of worship for Baptists, Quakers, Independents, Wesleyan and other Methodists, Unitarians, Catholics and Jews.

The town is pleasantly situated on a steep acclivity on the river Ex, over which a handsome stone bridge was erected in the year 1778, at an expense of about 20,000*l*., a little above the site of an antient bridge originally built in 1250. The streets, with the exception of the High Street and Fore Street, are generally narrow, but there are some handsome squares and terraces in Northernay, Southernay, &c., which contain many well-built houses. The town is lighted with gas, and well supplied with water by waterworks erected in 1794. The subscription ball-room is one of the finest country ball-rooms in England; it measures eighty feet by forty, and is very handsomely fitted up. There is a subscription library in Fore Street; and in 1813 the Devon and Exeter Institution was founded, for the promotion of arts, &c., the library of which contains about 10,000 volumes. The theatre is a neat building. To the north of the city are the cavalry barracks, and very near them is the new bridewell and the county gaol, both of which are judiciously planned, and contain the governor's residence, chapel, &c. There is also a city prison. The port of Exeter extends from the coast near Lyme Regis to the Ness Point. The trade principally consists in woollen goods and manganese; the imports are wine, hemp, tallow, &c. A branch bank has lately been established here by the Bank of England. The market day is Friday; but there is a daily sale of meat, vegetables, fish, fruit, &c. Fairs are held on the third Wednesdays in February and May, the last Wednesday in July, and second Wednesday in December. There is a great horse fair held at Alphington, about one mile from Exeter.

The free grammar-school was founded by the citizens in the reign of Charles I.; the sons of freemen are instructed gratuitously. There are fifteen exhibitions to either of the universities of Oxford or Cambridge, six of which are of 36*l.* each, the others are much less. The school-room is partly formed of the remains of an antient convent, of Augustine friars founded in 1239. There are no less than ten charity schools in Exeter, independent of Sunday-schools; amongst others are St. Mary Arches' school, founded in 1686, by W. Wootton, for the instruction on Dr. Bell's system of forty-four boys, of whom thirty are clothed; the Devon and Exeter Central School, founded in 1811, where about 430 boys and 270 girls are taught to read and write; and the Exeter British School, where about 130 boys and about the same number of girls are instructed, without regard to party or sect. The Devon and Exeter Hospital is supported by subscription, and has a considerable income arising from funded property: it now contains above 200 beds. There is a lunatic asylum admirably managed, as well as a dispensary, an eye infirmary, and an institution for the deaf and dumb. The workhouse forms a large range of buildings in the London road: it contains a governor's house, committee rooms, &c., and affords accommodation to several hundreds of the poor. A savings' bank was established in 1815, and a mechanics' institution, consisting of above 200 members, in 1825. Amongst other alms-houses and poor-houses are those respectively founded by Mr. John Stevens, Mr John Palmer, Sir Thomas Lethbridge, and Mr. John Webb. There are also numerous private donations and bequests for the instruction and benefit of the poor.

Many eminent men have been natives of Exeter; among the most distinguished are Josephus Iscanus or Joseph of Exeter, a Latin poet of the twelfth century, Baldwin, archbishop of Canterbury, Sir Thomas Bodley, founder of the Bodleian Library, Lord Chancellor King, Lord Gifford, and Sir Vicary Gibbs.

EXETER or EXON DOMESDAY, the name given to a record preserved among the muniments and charters belonging to the dean and chapter of Exeter cathedral, containing a description of the western parts of the kingdom, comprising the counties of Wilts, Dorset, Somerset, Devon, and Cornwall; supposed, as far as it extends, to contain an exact transcript of the original rolls or returns made by the Conqueror's commissioners at the time of forming the General Survey, from which the Great Domesday itself was compiled. It is written on vellum in the form of a book of the small folio size, containing 532 double pages. The skins or sheets of vellum of which it is composed vary in the number of leaves which they comprise from one to twenty; the lands of each of the more considerable tenants beginning a new sheet, and those of almost every tenant a new page. The lands in the counties of Devon, Somerset, and Cornwall belonging to one tenant, are classed together, the counties following each other, though not always in the same order; and, in like manner, the summaries of property in Wilts and Dorset are classed together.

The manuscript begins with the 'Inquisitio Geldi,' or taxation of the hundreds of Wiltshire; of which it contains no less than three copies, the third seeming to be a corrected edition of the other two. The taxation of the hundreds of Dorsetshire follows, and after it those of Devonshire, Cornwall, and Somersetshire. The Inquisition for each hundred states:—1. The total number of hides; 2. the number held by the king and his barons in demesne, with an enumeration of those for which the tax was not paid; 3. the number of hides for which the tax was paid, and its amount; 4. the tax in arrear, and the reasons for its so remaining. Throughout, the geld or tax is computed at the rate of 6*s.* for every hide.

Upon collating the returns of lands which form the great body of the Exeter Survey with the Exchequer Domesday, they have been found, with a few trifling variations, to coincide; one entry of property alone being discoverable in the Exeter which is omitted in the Exchequer Domesday, relating to Sotrebroc in Devonshire. The Exeter manuscript, however, is not complete in its contents. There are considerable omissions of lands in Wiltshire, Dorsetshire, and Devonshire; but these have evidently been cut out and lost. In Cornwall every manor mentioned in the Exchequer occurs in the Exeter Domesday. One leaf of this record was accidentally discovered in private possession within these few years, and has been restored to the manuscript. In the spelling of the names of places and persons there is a remarkable difference between the two records. Rilchetona, in the Exon Domesday, fol. 101, is Chichetone in the Great Domesday, tom. i., fol. 120. Modiforda, Exon, fol. 116, is Mundiforda in Domesday, tom. i., fol. 87. Pillanda, Exon, fol. 127 *b.*, is Welland, Domesday, tom. i., fol. 102 *b.* Illebera, Exon. fol. 139 *b.*, is Lilebere, Domesday, tom. i., fol. 88. There are also many observable differences in the names of persons, as Ulwardus Wite, mentioned in the Exon Domesday, fol. 116, is Vlwardus Albus in the Exchequer Domesday, tom. i., fol. 87. The Abbot of Battle in Sussex is called Abbas de Prelio in the Exon Domesday, fol. 195; but in the Exchequer Domesday, Abbas de Labatailge. Abbas de Aliennia, Exon, fol. 280, is Abbatia de Adelingi in Domesday. Adret, Exon, fol. 488, is both Eldred and Edred, Domesday, tom. i., fol. 118. Willielmus Capra of the Exon, fol. 398, is Willielmus Chievre in the Great Domesday. The names of tenants in King Edward's time are far more numerously preserved in the Exon than in the Exchequer Domesday. In the systematic arrangement of the subject matter the Exchequer Domesday bears unquestionably a decided preference over the Exon Domesday. Occasional insertions in the margin of the Exon Survey are entered in the text in that of the Exchequer. The lands of the great barons also in the Exon Survey are in a few instances intermixed. In folio 161 of the Exon, although the title of the lands described is 'Terra Abbatis Glastingheberiensis in Devenescira,' yet in fact there is only one of the manors in that county; the rest are all in Somersetshire, and are entered as such in the Great Domesday. On the contrary, in fol. 194 of Exon, the 'Terræ Ecclesiarum quæ datæ sunt Sanctis in Elemosina,' from all that appears on the face of the record are in Somersetshire; whereas they are really in Devonshire, and are so placed in the Exchequer Domesday.

The most striking feature however of the Exeter Domesday, in which it uniformly supplies us with additional knowledge to that in the Exchequer Survey, is the enumeration of live stock upon every estate; there is an account of the number of oxen, sheep, goats, horses, and pigs, exactly in the same manner as it is given in the second volume of the Great Domesday. The reason for omitting this enumeration in the breviated entries of the first volume of the Great Survey is self-evident. The live stock was altering every day and year; the enumeration of it therefore could be of no further use than for the exact time when the survey was made. A comparison of this part of the Exeter with the second volume of the Great Survey tends greatly to corroborate the notion that the returns of the counties of Essex, Norfolk, and Suffolk, were transcribed in full from the original rotuli, in the same manner as the Exeter Domesday. The difference between the two surveys as to diction, when they agree in sense, is likewise remarkable; as for instance,

Exchequer Domesday.	*Exeter Domesday.*
Acra	Agra
ad arsuram	ad combustionem
censores	gablatores
clerici	sacerdotes
geldabat	reddidit Gildum
leuca	leuga
manerium	mansio
ad opus militum	ad soldarios
molendinum	molinus
nummi	denarii

paragio	pariter
portarii	portatores
Exchequer Domesday.	*Exeter Domesday.*
pastura	pascua
poterat ire quo volebat (tom. i., fol. 97 *b.*)	poterat sibi eligere dominum secundum voluntatem suam cum terra sua (fol. 383).
quarentena	quadragenaria
sylva	nemusculum
T. R. E. (*tempore regis Edwardi*)	Die qua rex Edwardus fuit vivus et mortuus
tainus	tagnus
Terra est viii. car.	possunt arare viii. carr.
Terra Regis	Dominicatus Regis, (and in one instance) dominicatus Regis ad regnum pertinens
Totum valet xxi. lib.	Hæc mans. reddit ad opus abb. x. & viii. lib. et ad opus tagnorum iii. lib.

The utility of this record for the purpose of comparison with the Exchequer Domesday is obvious. The Exeter Domesday was published with several other surveys nearly contemporary, by order of the Commissioners upon the Public Records, under the direction of Sir Henry Ellis, in a volume supplementary to The Great Domesday, folio, London, 1816. Our account of this record is chiefly derived from the Introduction to that volume.

EXETER COLLEGE, OXFORD, was originally founded in 1314, by Walter de Stapledon, bishop of Exeter, and some time lord high treasurer of England, and was then called Stapledon Hall. The bishop removed hither his scholars from Hart Hall, and made a foundation for a rector and twelve fellows. Of these thirteen he directed that eight should be elected from the archdeaconries of Exeter, Totness, and Barnstaple; four from the archdeaconry of Cornwall; and that one should be nominated by the dean and chapter of Exeter, from any place they might deem most fit, provided that he was in priest's orders. In 1404 Edmund Stafford, bishop of Exeter, added two fellowships from the diocese of Salisbury, and obtained leave to give the college its present name. In 1565 Sir William Petre, knight, secretary of state, and privy counsellor to Henry VIII., Edward VI., Queen Mary, and Queen Elizabeth, added eight fellowships for the counties of Devon, Somerset, Dorset, Oxford, Essex, and any others in England in which he or his heirs might have lands or possessions. These counties at present are Norfolk, Suffolk, Middlesex, Hampshire, and Kent. Charles I., in 1636, annexed one fellowship for the islands of Jersey and Guernsey, the candidates for which are nominated by the dean and jurats of one of these islands alternately. Lastly, Mrs. Shiers, who died in 1700, left certain rents, out of which two fellowships were founded for the counties of Hertford and Surrey, to which the five senior fellows alone elect. The candidates for all fellowships in this college are required by the statute to be, at least, *Generales Sophistæ* in the university. The day of election is the 30th of June, except for the Hertford and Surrey vacancies, when it is on St. Stephen's day. The present foundation consists of a rector and twenty-five fellows, besides whom there are numerous scholarships and exhibitions: and among these, three Eton Collegers, appointed by the provost and fellows of Eton; three from Exeter school, nominated alternately by the dean and chapter and chamber of Exeter; two from Truro school, nominated by the trustees of that school; and two from Exeter school. Two scholarships have been more recently founded by a bequest of the late William Gifford, for natives of the county of Devon, with a preference to candidates from the school of Ashburton.

Among the eminent men who have received their education here may be enumerated John de Trevisa, Sir John Fortescue, Sir John Doddridge, Sir William Noy, Joseph Caryl, Anthony Ashley Cooper, Lord Shaftesbury, Maundrell the traveller, John and Charles Wesley, Toup, Tindal the continuator of Rapin, and Dr. Kennicot.

The front of the college, which is opposite Jesus College, extends two hundred and twenty feet, with a large central gateway, consisting of a rustic basement, from which spring four pilasters of the Ionic order, supporting a semicircular pediment, crowned by a balustrade. The greater part of this front was renewed in 1835 with Bath stone. The hall was erected by Sir John Acland in 1620. The chapel, begun in 1622-3, was completed by Dr. George Hakewill, afterwards rector. The library was erected in 1778, after a design of the late Rev. W. Crowe, public orator.

On the 31st December, 1836, there were 304 members upon the college books. There are twelve benefices in the patronage of this society, one of which, the vicarage of Kidlington, in Oxfordshire, is annexed to the rectorship. The bishop of Exeter is the visitor of this college.

(Chalmers's *Hist. of the Colleges and Halls of Oxford*, 8vo., Oxf., 1810, vol. i., p. 62-76; *Oxford Univ. and City Guide*, 8vo.; *Oxford Univ. Calendar*, 1837.)

EXETER. [NEW HAMPSHIRE.]

EXHAUSTIONS, METHOD OF. [GEOMETRY OF THE GREEKS.]

EXHIBIT, a deed or writing proved by a witness or admitted by the parties in a suit in chancery, in the equity side of the Court of Exchequer, or in bankruptcy.

EXHIBITION. [SCHOOL.]

EXILE. [BANISHMENT.]

EXMOUTH. [DEVONSHIRE.]

EXOCA'RPEÆ, a small division of Thymelaceous plants. [THYMELACEÆ.]

E'XODUS, THE BOOK OF, is the second of the Pentateuch, or Five Books of Moses, and derives its name from the principal event recorded in it, namely the departure of the Israelites from the land of Egypt, which, in the Greek Septuagint translation, is expressed by the word éxodos (Ἔξοδος), that is, the going out. In the original Hebrew it is named, according to the usual Jewish mode, from the initial words, ואלה שמות *ualh shmut*, or, as read with the Masoretic points, Ve-aleh Shemoth, 'These are the names.' This book records the slavery and cruelty endured by the descendants of Israel (Jacob) under the kings of Egypt; the birth, exposure, and preservation of Moses; his flight into Midian; his divine mission to Pharaoh (at the age of 80: vii. 7); the miracles performed by him and his elder brother, Aaron; the ten plagues inflicted on the Egyptians; the institution of the Passover; the departure of the Israelites from Egypt; their miraculous passage across the Red Sea; the destruction of the Egyptian army; the journeyings of the Israelites in the Arabian desert; their murmurings against God and Moses; their resumption of the Egyptian worship of the calf under the direction of Aaron, and their consequent punishment; the promulgation of the law from Mount Sinai; and the erection of the tabernacle, or portable temple. The king, Pharaoh (a general Egyptian appellation of royalty), for whom the Israelites built the treasure cities, and by whom their male children were ordered to be drowned (chap. i.) is usually considered by the commentators to be Rameses, the eldest son of Sesostris and the Pharaoh whose army perished in the Red Sea (xiv. 27) is supposed to be his son and successor, Amenophis the Second, or according to others, the Third. Le Père Pezron says he was Pharaoh Alisphragmuthosis, by whom the Hyksos, or Phœnician Shepherds, were expelled from Lower Egypt, whence the Israelites departed. The same chronologist makes the establishment of the Shepherd dynasty at Heliopolis coincident with the appearance there of Joseph from Canaan. (See the *Dissertation of Perizonius on the identity of the Hyksos and the Hebrews*.) The Mosaic exodus is noticed by several antient writers, but with brevity and apparent contempt. The Egyptian historians, Manethon and Chæremon, as cited by Josephus (*Against Apion*, l. i., c. 9, 11, 12), state that 250,000 leprous people, and others afflicted with contagious diseases were banished from Egypt (*Exod.* xii., 39, 'they were thrust out of Egypt') by king Amenophis; and that their chief was a priest of Heliopolis named Moses, who furnished them with a system of religion and laws. (See a similar account in Josephus, *Hist.*, l. v. c. 34; Tacitus, *Hist.*, l. v. c. 3; Diodorus Sic. *in Photii Biblioth.*, l. xxxiv.; Justin l. xxxvi. c. 2.)

The period over which the history in the book of Exodus extends consists of 145 years, that is, from the death of Joseph (B.C. 1635) to the formation of the tabernacle in the desert of Arabia (B.C. 1490), one year after the exode in the year B.C. 1491. Mr. Horne, in his 'Introduction to the Bible,' adopts the general opinion of commentators that the book was written by Moses, yet he thinks that it cannot be determined at what time of his life; but, as it is stated (xvi. 35) that 'the children of Israel did eat manna 40 years until they came unto the borders of the land of Canaan,' that is, on the banks of the Jordan, opposite Jericho, when and where Moses died (*Gen.* xxxiv.), and, 'as things cannot be historically related,' as Mr. Horne observes, 'until they have actually taken place,' it is evident that, if Moses is the author, he must have written it immediately before his death (B.C. 1451). It must be observed however that, among biblical critics and chronologists a great difference of opinion exists as to what date should be assigned to the departure of the Jews from Egypt, and as to the book of Exodus being written by Moses. In chronological works the exodus forms the fourth grand epocha in the antient history of the world: thus, 1. The creation of Adam. 2. The Deluge of Noah. 3. The call of Abraham (his emigration from Chaldæa into Canaan). 4. The Departure of the Israelites from Egypt. This last event, according to the Hebrew text of the Scriptures, took place B.C. 1491; but according to the Samaritan text, which is the primitive Hebrew (Dr. A. Clarke) it occurred 267 years earlier, that is, B.C. 1758. The learned Pezron ('Canon Chronologique,' in his 'Défense de l'Antiquité des Tems,' 4to, 1691) adopting, with improvements, the chronology of the Alexandrine version, or Greek Septuagint, which adds 1500 years to the Hebrew age of the world, determines the exodus to have taken place A.M. 3953, and B.C. 2019. Whiston, Kennicott, Jackson, Brett, Hay, Geddes, and other divines, adopt the Greek chronology. Archbishop Usher ('Annales Vet. et Nov. Test.') prefers that of the Hebrew text. Dr. Andrews, in his 'Heb. Dict. and Chronol.' 1823, puts the exodus B.C. 1677. (See Dr. Hales's *Analysis of Chronology;* Sir John Marsham's *Chronicon Egyptiacum*, Ed.; Simson's *Chronicon Catholicon*, Lugd., fol. 1752; J. G. Frankius, *Novum Systema Chronol.*, Götting., fol. 1778; R. C. Beningsen, *Biblische Zeitrechnung*, Leips., 1763; Walker's *Analysis of Time*, 1796; *Remarks on the Bible Chronology*, 1830; *Criteria for determining the accuracy of Scripture Chronol.*, by J. Cullimore, 1830, p. 13.)

Moses, according to St. Justin, Tatian, Clemens Alexandrinus, Tertullian, Julius Africanus, and other Christian Fathers, as well as Josephus, Justus, Manethon, Ptolemæus of Mendes, Apion of Alexandria, Porphyry, and others, is supposed to have been contemporary with Inachus, whom the chronologists place from 270 to 450 years earlier than the birth of Moses according to the Hebrew text. (Du Pin, *Biblioth. Univer.;* Du Fresnoy, *Chronol.*) In the chronicon of Eusebius, the author of the Pentateuch is made contemporaneous with Cecrops, who became king of Athens (*Arund. Marb.*) 11 years before the birth of Moses (*Heb. text*), and, according to Pezron, 130 years after the death of Moses. (*Heb. text.*)

That the Pentateuch is not the production of Moses has been the opinion of many learned critics, both Christians and Jews, as Aben Ezra, Maimonides, Le Clerc, Dr. Middleton, Newton; and in Germany it is generally prevalent among the philosophical theologists of the *rational* school of Eichhorn. Dr. Geddes, who was deeply imbued with the German rationalism, makes the following statement in the preface to his new translation of the Bible from the Hebrew in 2 vols. 4to.:—'From intrinsic evidence three things to me seem indubitable. 1. The Pentateuch in its present form was not written by Moses. 2. It was written in the land of Canaan, and most probably at Jerusalem. 3. It could not be written before the reign of David, nor after that of Hezekiah. I would refer it to the reign of Solomon.' That is, about B.C. 1000, in or near the age of Homer and 500 years after that of Moses. Eichhorn (*Einleitung in das Alte Test.*, vol. ii. p. 245,) believes the first two chapters of Exodus to have been taken from the historical documents out of which the book of Genesis apparently was compiled. (See Astruc, *Conjectures sur les Mémoires originaux dont il parait que Moise s'est servi pour composer la Génèse*, 12mo. Brussels, 1753.) By the Jews the Book of Exodus is divided into 11 parasches, or chapters, and 22 siderim, or sections. In English Bibles it is comprised in 40 chapters. Various passages and expressions in Exodus involve apparent difficulties which have exercised the critical skill of every commentator. All chronologists agree that from the time of the immigration into Egypt of Israel and his family (70 persons, chap. i.) to the exodus, was only 215 years; the 430 years mentioned xii. 40 signifying this period and a previous one of 215 years to the call of Abraham. The numeral increase of the children of Israel is therefore considered to be very unusual, since, in xii. 37, 38, it is said there were 600,000 men on foot, besides children and a mixed multitude, the total number, as computed by Dr. Adam Clarke in his Commentary, being 3,263,000. They are said to have been 'more and mightier' than the Egyptians, 'very mighty' (i. 9, 20), to have gone out with their 'armies' (xii. 51) 'harnessed,' that is, accoutred for battle (xiii. 18); and 'with a high hand' (xiv. 8), 'with flocks, and herds, and very much cattle' (xii. 38), but as they are also said to have been slaves to the Egyptians, who 'made them serve with rigour and hard bondage, in mortar, brick, and all manner of service in the field' (i. 14)—to have been led out of their nearest way to Canaan, lest, on seeing war with the Philistines, they should repent, and return to Egypt (xiii. 17), and to have been 'sore afraid' at the sight of the Egyptians marching after them (xiv. 10), some commentators understand the word חמשים *pmshim*, to mean not harnessed, but slung together five in a string. Concerning the criminality of the Israelite women in borrowing and appropriating jewels and raiment of the Egyptians by the divine direction (iii. 21, 22, and xi. 2), and God's hardening the heart of Pharaoh (iv. 21). see *Explanations of Scripture Difficulties*, compiled by W. Carpenter, p. 35, &c. In xvi. 15 it is stated that the Israelites, when they first saw the manna, said one to another, 'It is *manna*, for they wist not *what* it was;' and in xxxviii. 8 of the English translation, it is said that the laver of *brass* was made of the looking-*glasses* of the women who assembled at the door of the tabernacle. These inconsistencies are avoided by Dr. Geddes; and he observes that the word מראת, *mrath*, translated looking-glasses, occurs in a hundred other places, but in no instance signifies the antient metallic mirrors. The ten miraculous plagues inflicted on the Egyptians are described in the following places:—1. Water turned into blood, vii. 14—25. 2. The land covered with frogs, viii. 1—15. 3. The dust of the land turned to lice, viii. 16—19. 4. The swarms of flies, viii. 20—32. 5. The murrain and death of all the cattle. 6. Ashes produce boils and blains on man and beasts, ix. 8—12. 7. The storms of devastating hail, rain, and fire, ix. 13—35. 8. All the land covered with locusts, x. 1—20. 9. Three days of darkness which might be felt, x. 21—27. 10. The death of all the first born of man and beast, xi. 5—7 and xii. 29, 30. The learned writer in the 'Universal History,' vol. 3, p. 374, shows that the Egyptian magicians and sorcerers were permitted to exhibit the power of the devil for the sake of exposing his comparative impotence; thus, although 'they did in like manner with their enchantments,' (vii. and viii.) in making their rods become serpents, in turning the Nile into blood, and in covering the land with frogs, yet, they could not, as Aaron did, turn the dust of the land into lice (viii. 18.) Jacob Bryant in his 'Treatise on the Ten Plagues,' 8vo., 1810, explains their adaptation to the peculiar character, habits, and notions of the Egyptian people, so as to cause the greatest possible aggravation of suffering and misery. The latter half of the 40 chapters of Exodus are occupied in announcing the civil, moral, and ceremonial law, and in describing the numerous articles of furniture, utensils, and sacerdotal raiment, for the celebration of sacrificial service in the tabernacle, or moveable temple, erected as a tent in the desert. The value of the gold appropriated to the vessels and ornaments of the adytum, or holy place, is stated in xxxviii. 24 at 29 talents and 730 shekels of gold. Each of the former being 5464*l.* 5*s.* 8½*d.*, and each of the latter 1*l.* 16*s.* 5½*d.*, they amount to 159,793*l.* 11*s.* 3*d.*, that is, nearly 160,000*l.*

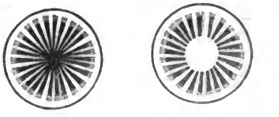
Many learned men, in observing the similarity of the Mosaic and Egyptian ritual and religious institutions as described in various antient writings, have assigned a greater antiquity to the latter, and contended that the former were a mere imitation. Dr. Geddes asserts that Moses made a selection and judicious composition from the antient Egyptian institutions. (See especially Spencer, *De Legibus Hebraicorum;* Sir John Marsham's *Chronicon Egyptiacum;* Jablonski's *Pantheon Ægyptiorum;* Ikenius, *Dissertatio de Institutis et Ceremoniis Legis.*) Plutarch (*De Iside*) and other antient authors prove that Jehovah or Jao was the sacred name of God among the Egyptian priests; and that it was not known to the Israelites before their residence in Egypt is stated in *Exod.* vi. 3. The 'I AM' of chap. iii. 14 is compared with the Egyptian inscription on the personification of the universe, 'I am all that is.' (See Plutarch, περὶ τοῦ Εἰ ἐν Δελφοῖς.) Aaron's oracular breast-plate (xxviii. 15—30) is thought to be identical with that of the Egyptian chief judge, as described by Diodorus Sic. l. i. c. 2, sec. 26.

The learned Huet, Vossius, and others give curious parallels of the birth, life, and deeds of Moses with the primitive Egyptian Bacchus, but this is not more strange than the statement of Origen, who says in his 'Homily on Exodus' that Pharaoh is the devil, his daughter the church, and the two midwives (i. 15) are the 'Old and New Testament.' (See *The Scholia* of Dathe, Rosemüller, Schulz, Bauer, and Eichhorn; Willet's *Hexapla or Sixfold Comment on Exodus; Translations and Comments*, by Ainsworth, Hopkins, and Bishop Kidder; Dr. A. Clarke's *Bible;* Horne's *Introduction*, and list in Watt's *Bibliotheca*.)

E'XOGENS, the largest primary class in the vegetable kingdom, are so named in consequence of their woody matter being augmented by additions to the outside of that which is first formed near the centre. As long as they continue to grow they add new wood to the outside of that formed in the previous year, in which respect they differ essentially from Endogens, whose wood is constructed by successive augmentations from the inside. [ENDOGENS.] All the trees of cold climates, and the principal part of those in hot latitudes, are exogenous. In many cases they are easily recognised by the wood of each different year forming a distinct zone, so that a section of their wood exhibits a number of concentric circles; but there are so many exceptions to this rule as to render it necessary to consider this character as by no means essential to them.

The nature of the exogenous mode of growth will be best compared with that of an Endogen, if we pursue the same mode of illustration as in the article which treats of the latter form. We will therefore proceed from an explanation of the typical mode of growth in a common Exogen to such remarks as we may have to offer upon deviations from it.

In an Exogen of ordinary structure the embryo consists of a cellular basis, in which there is usually no trace of woody or vascular tissue; but as soon as germination commences fine ligneous cords are seen proceeding from the cotyledons towards the radicles from the opposite sides of the young stem, meeting in the centre of the embryo, and forming a thread-like axis for the root.[*] As the parts grow the ligneous cords are increased in thickness and number, and having been introduced among the cellular basis of the embryo, are separated from each other by a portion of the cellular substance, which continues to augment both in length and breadth as the woody cords lengthen. By degrees the plumule or rudimentary stem becomes organized, and having lengthened a little, forms upon its surface one, two, or more true leaves, which gradually expand into thin plates of cellular substance traversed by ligneous cords or veins converging at the point of origin of the leaves. If at that time the interior of the young plant is again examined, it will be found that more ligneous cords have been added from the base of the new leaves down to the cotyledons, where they have formed a junction with the first wood, and have served to thicken the woody matter developed upon the first growth. Those ligneous cords which proceed from the base of the leaves do not unite in the centre of the new stem, there forming a solid axis, but pass down parallel with the outside, and leave a small space of cellular tissue in the middle; they themselves being collected into a hollow cylinder, and not uniting in the middle until they reach that point where the woody cords of the cotyledons meet to form the solid centre of the root. Subsequently the stem goes on lengthening and forming new leaves: from each leaf there may be again traced a formation of woody matter disposed cylindrically as before, and uniting with that previously formed, a cylinder of cellular substance being left in the middle; and the solid woody centre of the root proceeds in its growth in a corresponding ratio, lengthening as the stem lengthens, and increasing in diameter as the leaves unfold and new woody matter is produced; the result of which is, that when the young Exogen has arrived at the end of its first year's growth it has a root with a solid woody axis, and a stem with a hollow woody axis surrounding cellular tissue, the whole being covered in by a cellular integument. But as the woody cords are merely plunged into a cellular basis, the latter passes between them in a radiating manner, connecting the centre with the circumference by straight passages, often imperceptible to the naked eye, but always present. The following diagram illustrates this:—

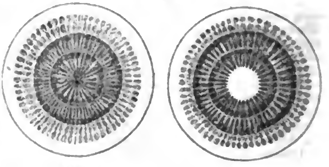


Root. Stem.

Here we have the origin of *pith* in the central cellular tissue of the stem, of *wood* in the woody axis, of *bark* in the cellular integument, and of *medullary processes* in the radiating passages of cellular tissue connecting the centre with the circumference.

The woody axis is not however quite homogeneous at this time. That part which is next the centre contains great numbers of vessels of different kinds, particularly dotted vessels (vasiform tissue); the part next the circumference is altogether destitute of vessels, and consists of woody tissue exclusively: of these two parts that with the vessels belongs to the wood, properly so called, and serves as a mould on which future wood is added; the other belongs to the bark, separates under the form of liber, and in like manner serves as a mould upon which future liber is disposed.

At the commencement of a second year's growth the liber separates spontaneously from the true wood, a viscid substance called *cambium* is secreted between them, and the stem again lengthens, forming new leaves over its surface. The ligneous cords in the leaves are prolonged into the stem, passing down among the cambium, and adhering in part to the wood and in part to the liber of the previous year, the former again having vessels intermingled with them, the latter having none. The cellular tissue that connected the wood and liber is softened by the cambium, and grows between them horizontally while they grow perpendicularly, extending to make room for them, and consequently interposed between the woody cords of which they each consist, forming in fact a new set of medullary processes terminating on the one hand in those of the first year's wood, and on the other in those of the first year's liber. This addition of new matter takes place equally in the stem and in the root, the latter extending and dividing at its points, and receiving the ends of the woody cords as they diverge from the main body. The following diagram illustrates this, and shows, when compared with the last, what difference there is in the appearance of the stem of an Exogen one and two years old.



Root. Stem.

And thus, year after year, the Exogen goes on, forming zone upon zone of wood, which is permanent, and zone within zone of liber, which perishes as the stem increases in diameter. [BARK.]

If this account is compared with that already given of Endogens, it must be obvious that the stem of these two great classes is formed from the very beginning in an essentially different manner. Endogens have no cylindrical column of pith; their woody arcs are never collected into a cylinder, through the sides of which the cellular tissue passes in the form of medullary processes; and the woody matter of their bark, so to call their cortical integument, is not parallel with that of the wood and spontaneously separable from it; not to speak of important anatomical differences, or of the concentric arrangement eventually assumed by the wood of Exogens. The only points in which the growth of the stem of Exogens corresponds with that of Endogens are the following: in both classes the woody matter is connected with the leaves; in both a cellular substance is the basis of the whole structure, and extends horizontally wherever it is necessary to do so; and in certain Exogens woody arcs, stated to be like those of Endogens, are found in the pith. These cases properly belong to anomalous forms, but nevertheless may be noticed here, in consequence of their direct connection with this branch of the subject. One case is that of Zamia: but as that genus now belongs to the new class of Gymnosperms and not to Exogens proper, it need not be considered here. The other cases are Piper, Nyctaginaceous plants, and some others. Professor Schultz states (*Natürliches System des Pflanzenreichs*, p. 320, &c.) that in Piper, Mirabilis, and Boerhaavia, the central part of the stem consists of cellular tissue, amongst which cords of spiral vessels and woody tissue are placed either without order, or (in Boerhaavia) in a cruciate manner as in tree-ferns, and that on the outside of this the woody bundles are arranged circularly into a cylinder. A similar statement had long previously been made by Mirbel, who ascribes to Mirabilis and some Umbelliferous plants longitudinal vessels in the pith (*Elém. de Physiol. Veget.* i. 112), and by Professor Meyer, who finds the pith of Mirabilis longiflora and dichotoma, Boerhaavia scandens, and Oxybaphus Cervantesii abounding in many large bundles of spiral vessels within the woody radiated zone. (*De Houttuynia atque Saurureis*, p. 40.) This, if correctly described, only shows that in certain Exogens a portion of the central tissue is placed at first in a confused manner, and that the wood does not assume a definite circular disposition till afterwards; that it does assume it eventually is admitted. We find in Piper nigrum and Lonchitis that from the beginning the woody bundles are placed circularly, but they are separated by a good deal of cellular tissue, and do not assume in the first zone the wedge-like or triangular form which is most common in Exogens, and which they themselves at last take on. In Boerhaavia repanda, a specimen of which is now before us, we find the wood regularly disposed in two zones, and instead of spiral vessels a very singular structure in the pith, which is filled with fistular passages of lax soft spheroidal cellular tissue surrounded by smaller, harder, and more cubical cellular tissue which passes off into the medullary processes. It is in such plants as Piper incanum that the organization of Exogens most nearly approaches that of Endogens; but in the first place the whole race of Pipers forms a sort of transition from Exogens to Araceous Endogens; and secondly, it is probable that when they are most endogenous in appearance they are not really so in regard to the final development of their woody tissue.

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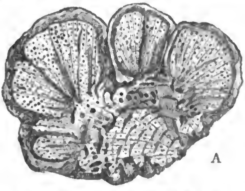
[*] In the article ENDOGENS the reader is requested to make the following correction in the early part of the fourth paragraph:—for (fig. A. p. 396) read (A); and twenty lines farther on, for (fig. A) read (A).

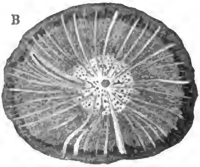
Let it however be admitted that in certain cases Exogens are, in the centre of their stem, organized less regularly than usual; this will offer no argument in favour of their analogy with Endogens. In all such cases it will be found that they eventually assume their typical conformation. We are acquainted with some striking proofs of this. Among twining plants of tropical countries, we occasionally find instances like the following—


A

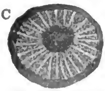
Beneath a most irregularly compressed and lobed bark there lies a mass of wood, apparently so confused and irregular in its arrangement in the centre, that nothing symmetrical can be made out by the most acute observer; but it will be seen that towards the circumference it distinctly assumes the radiated appearance of an Exogen. In other cases, where the structure is sufficiently regular, this circumstance is still more distinctly illustrated.

It is however more commonly at the centre that we look for typical structure, and at the circumference that we find irregularity; as if Exogens usually commenced their growth according to the plan to which nature has subjected them, and only deviated from it under the influence of unknown causes coming into operation and controlling their development after they have advanced to a certain stage in their growth. Thus in the singular instances shown in cuts D, E, F, and G, the principal part of the stem is so confused and irregular as to look more like an Endogen than an Exogen, and a fragment might easily be mistaken for the former; nevertheless in a young and tolerably regular shoot (D) the radiated appearance is sufficiently well marked; and in two others, irregular and distorted as they are (E and G), the central pith is visible, although far out of the centre; and in the fourth (F) the centre has not only pith, but a radiated structure that is quite regular.

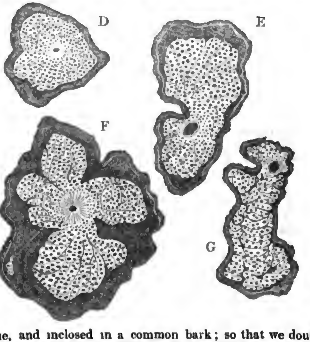
B



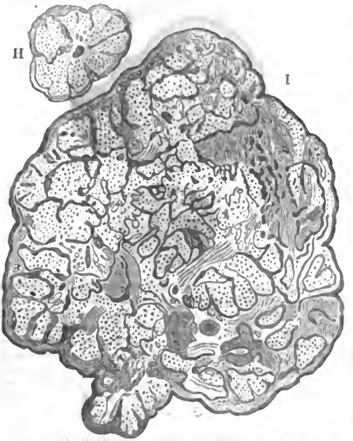
C



By far the most singular case of this sort is in an unknown twining plant in our possession from the Malayan Archipelago, of which the cuts H and I are representations In old stems of this plant a section exhibits a most irregular combination of wood, looking like palm wood, broken up into lobed cords lying amongst still more irregular cellular tissue, and inclosed in a common bark; so that we doubt whether it would be possible to tell to which class it really belongs, if it were not for its young shoots and the pith of the old ones. The latter may be seen lying quite out of the centre towards one side (near the bottom of our figure, a little to the right); and in the former (H) the pith is found with wood radiating around it, although still with sufficient irregularity.



The cases already given are evidences of exogenous wood being sometimes extremely different from the condition in which we see it in Europe, and attest the necessity of forming our ideas of its nature from a more extended examination than that which is commonly given to it. Several curious cases have been previously published by the author of this article (*Introduction to Botany*, edition 2, p. 77, &c.), and others have been noticed by other writers, but the subject has been so little investigated that we gladly avail our selves of the present opportunity of making known some additional facts.



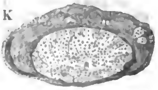
Irregularity in the structure of exogenous wood is usually owing either to a confused disposition of the tissue at some particular period of the growth, or to some derangement of the medullary processes, or to the absence of concentric circles, or to the formation of a deep zone of cellular tissue alternately with each zone of wood; or, finally, to the production of wood within the bark instead of beneath it. The first cause has been already sufficiently illustrated.

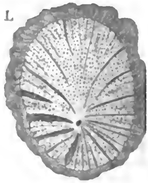
The sinuosity and partial obliteration of the medullary processes is a principal cause of the anomalous appearances at *figs.* D, E, F, G, where they are reduced to fine lines only visible beneath a microscope, and not radiating from the centre, but disposed in no certain manner, sometimes even transversely, owing to the excessive disturbance of the wood itself. In *fig.* I, the singularity of structure is owing in part to the excessive irregularity with which the wood has been developed, and in part to the looseness and irregular shape of the medullary rays, which seem huddled as it were round the woody cords; the latter are moreover extremely variable in size, some of them being as much as half an inch in diameter, and others so small as to consist of no more than a single vessel with its usual coating of woody tissue.

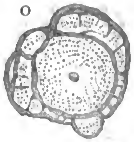
The absence of concentric circles is an extremely frequent occurrence in the wood of tropical countries, and it is almost certain that many families of Exogens never form them visibly under any circumstances. We say visibly, because in fact they must be annually formed in all cases, although we do not see them. The reason why Exogens have their wood marked by concentric circles is, that the ligneous tissue formed at the end of a season is more compact than that formed at the beginning, and hence, as the two are in juxtaposition, the difference in their density distinctly separates the one from the other. But if, from any cause,—whether proper to plants as species or owing to the external influence of an equable climate—the tissue of wood formed at all seasons is exactly alike, no zone will be visible, although in fact the formation of the wood is exogenous in the most regular manner. Such cases are seen at *figs.* K, L, S, and elsewhere in the illustrations of the present article.

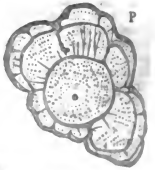
It is not a little remarkable however that while the wood in some cases has no trace of zones, the bark should show them most distinctly, as in the instance of *fig.* K.

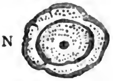
When a deep zone of cellular substance is formed between each zone of wood, a curious banded appearance is produced, as in the singular Indian climber marked N M O P Q, where extremely excentrical growth is combined with this peculiarity. At N we have the stem two years old, the second zone passing pretty regularly round the first and cut o from it by a broad deep band. At M the specimen is of t same age, but tho second zone is formed on one side onl

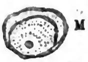


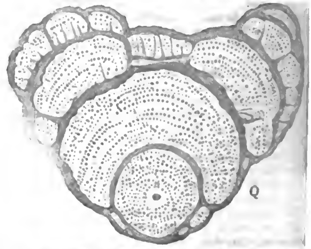










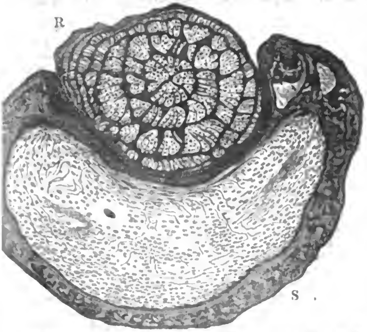


At O the specimen is two years old, with the first zone p fect, but the second broken up into a number of uneq irregular pieces, and it would seem as if a third growth h commenced on one side (to the left of the cut). At P growth is of three zones, both tho second and third b much lobed, and the third only extending three quar round the second. Finally, at Q, where the irregularit the greatest, there is a growth of four zones, the first s metrical, the second very much deeper on one side tha other, the third but half surrounding the second, and fourth formed only along two ridges on the third

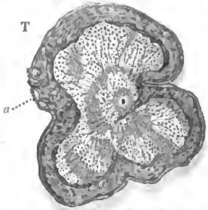
If it happens that, in addition to the presence of a t cellular layer between each zone, the medullary proc are also very thick, an appearance still different from last is produced, as at *fig.* R.

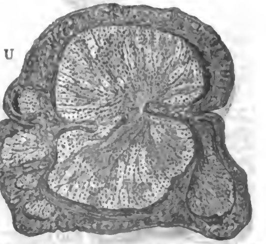
That wood is sometimes formed in the bark itself been long since shown by Mirbel, in the case of Calycan floridus, where four additional woody columns appear distant in the bark, without any separate pith, but radi from their first line of origin. We are now acquainted many such cases. In *fig.* T are the commencement of such columns at *a* on one side; but in that specime further indication of such a structure is visible; but at which is the same plant at a more advanced stage of g four such columns on one side and one on the other acquired considerable size, and each radiates towar circumference of tho stem. As in the Calycanthu in these and in all the other instances of the same which these cuts represent (see F, K, and S), the columns of the bark are destitute of pith.

Perhaps what we have called the separation of zo wood at N M O P Q R, by thick layers of cellular tissue, are rather to be considered as other instances of wood formed in bark, but in a regular and uniform manner. We are however uncertain how this may be, and prefer allowing the statement to stand in its present form until some one shall have examined such plants in their native forests at Sincapore.



In addition to such anomalous kinds of structure as those now described, Exogens, like Endogens, contain species, the organization of whose stem is so imperfect as to be reducible within no certain rules. Not to speak of Callitriche, Ceratophyllum, or Myriophyllum, wherein vessels are scarcely developed, and the woody matter merely forms a simple central axis of growth, we have in this class an exact parallel with Lemna among Endogens; some Podostemaceous plants have their leaves and stem completely fused together so as to resemble a Marchantia or an Alga. Such plants are to be regarded rather as instances of imperfect organization than as deviations from a typical form; and it is by no means a violent supposition to conclude that if their organization were more complete it would then become such as is characteristic of the class to which they belong.





From what has now been stated it will be obvious that the most essential features of exogenous vegetation are, not concentric circles in the wood, but an arrangement of the woody matter in a circular manner round pith, its augmentation by external additions, and the universal presence of medullary processes which give the wood a radiated character. With endogenous vegetation it agrees principally in the existence of two systems of growth; one original, cellular, and capable of extending and increasing in all directions; the other perpendicular, capable of augmentation in a longitudinal direction only, and developed subsequent to the first.

In both Exogens and Endogens therefore, the one system, which we have elsewhere called the fibro-vascular, but which may also be termed the woody, lies across the other by which it is held together, as the threads of the warp in linen are held together by the woof, as the writer of this has long since pointed out in another place. (*Introduction to Botany*, book ii., chap. 3.) This appears to be the circumstance upon which the real explanation of all the phenomena of growth in stems must necessarily turn. We find it is adopted by M. Gaudichaud in his theory of the development of stems, of which a brief notice has been published in the 'Annales des Sciences,' new series, vol. v., p. 24; and Mirbel, the reporter in the place referred to, calls it 'la pierre angulaire de la théorie.' Connected with this, however, are two other facts that require also to be rightly understood; the one, that buds are emanations of the horizontal cellular system; and the other, that roots are elongations of the descending woody system. Unless these are coupled with the first-named fact there will be no solidity in the theory of growth now about to be explained.

Keeping in view all the phenomena above referred to, it will be obvious that the origin of wood is to be sought in the action of leaves, or of buds which are collections of leaves; and the theory of the formation of wood may be thus expressed:—

1. Wood is a collection of thick-sided tubular tissue, united in different ways in different species of plants. It is usually combined with vascular tissue, but does not necessarily include that kind of tissue.

2. It is always mixed with cellular tissue; through which it passes, and which in Exogens is arranged in the form of radiating plates.

3. It proceeds downwards from the leaves to the roots; either in parallel series, as in Exogens, or in curving and intersecting lines, as in Endogens.

4. It has the power of lengthening at its lower extremity as soon as it has once been generated, without any further impulse from the leaf from which it emanated. (This undoubtedly happens by the formation of new woody tubes at the points of those previously created.)

5. It is, in fact, the nutrient system of the leaves, and may be regarded as their roots.

6. The quantity of wood in a given plant will therefore bear a direct proportion to the quantity of leaves, or to their size and vigour.

7. In general its development takes place beneath the bark or cortical integument; but it may be found within the bark itself, in which case it continues to follow the order of development proper to it in its ordinary situation.

The woody part of bark is also derived from the leaves, and may be in like manner considered a state of their roots; but the office of its tubes is excrementitious rather than nutrient.

This view of the nature of wood is much the same as that first brought to the notice of modern botanists by Du Petit Thouars, an ingenious French physiologist, who, during many years, sustained the opinion in opposition to all his countrymen. It did not however originate with him, for it had been previously taken by others, who did not persevere like himself in maintaining it against the prejudices of their day, and who, moreover, did not possess the skill and extensive acquaintance with vegetable organization requisite to sustain a theory to which so many specious objections could readily be offered. The great error committed by Du Petit Thouars, in which it is probable that the slow progress of his opinions is really to be found, was his mixing up notorious errors with the truths of his theory. He insisted, for example, that the moment leaves begin to grow, wood is formed 'with the rapidity of lightning,' in continuous threads passing from the extremities of branches to the roots: this was anatomically untrue, for the woody tissue consists of tubes adhering end to end, and not continuous, and the rapidity assigned to their development was altogether imaginary. He next insisted that new roots could not be developed till new leaves made their appearance this was disproved by the well-known fact that newly planted deciduous trees produce roots before their leaves appear. It may be doubted moreover whether he ever understood that buds originate exclusively from cellular tissue, and roots exclusively from fibro-vascular tissue; a fact, without attending to which, there is no possibility of explaining many common phenomena, but about which we conceive there is no sort of doubt.

It is not altogether a matter of theory that wood is formed of the roots of leaves imbedded in cellular tissue in a definite manner, according to the species: on the contrary, there are many curious facts to corroborate the supposition, The leaves of *Clianthus puniceus*, and many other plants. particularly *Gesneraceæ*, emit roots when cut off the stem to which they belong, and completely separated from the bud that is axillary to them. A knowledge of some such fact probably led to the absurd speculation, insisted upon by Bradley in the beginning of the last century, of forming plantations by sticking leaves in the ground. Du Petit Thouars found that the young leaves of *Dracænas* in the Isle of France root between the rind and old wood, forming rays of which the axis of the new shoot is the centre. The case of *Pandanus* we have adverted to elsewhere (*Introd. Bot.*, ed. 2nd, p. 262); and in the article Endogens of this Cyclopædia we have given a much more striking instance from *Barbacenia*. In that plant the cuts (which it should have been stated are representations magnified about three times) show that when undoubted roots proceeding from leaves are consolidated by passing down one above the other over the surface of the stem, precisely the appearance of palm-wood is produced. This we regard as conclusive as to the true nature of endogenous wood: and it would be unphilosophical to suppose that the wood of one great class of the vegetable kingdom is formed upon one plan, and of another class upon a totally different plan.

It must be highly satisfactory to those who have embraced the opinions of Du Petit Thouars, as modified by the writer of this and by others, to find how nearly they accord with what Mirbel represents to be the ideas of Gaudichaud upon the same subject. M. Gaudichaud is one of the very few physiologists who has studied this question with reference to tropical forms of vegetation. Most others have drawn their ideas exclusively from common European trees; in doing which, with all respect be it spoken, they appear to us to have begun at the wrong end. This distinguished botanist and traveller, in an unpublished memoir for which the Montyon prize was awarded by the French Academy in 1835, is represented as having collected a great mass of admirable observations upon the embryo, the germination, the mode of growth, the stem of a considerable variety of plants, and to have particularly adverted to the important phenomena of barking, striking from cuttings, grafting, pruning, and other horticultural operations; from all which he has deduced a theory of growth which M. Mirbel states to be substantially the same as that above explained. Among other curious facts, he mentions that he possesses a specimen of a cutting of *Cissus hydrophora*, with a bud upon it from whose base proceeds a woody network which partially invests the lower portion of the old wood, and afterwards escapes on all sides as root. (*Ann. Sc. N. S.* v. 29.)

We have in the first instance stated in what manner wood is formed according to our own views of the subject. It is now requisite that we should add the views of those who differ from us. That wood derives its origin directly from the leaves in any way whatever, is denied by some, who believe that it is a superficial deposit from the previously formed wood. But as those who entertain this opinion do not explain how the *first* wood originated, that theory need not be discussed. Mirbel seems to consider that both wood and the woody part of bark are independent formations created out of the cambium; but there is no cambium when the *first* wood of Exogens is generated, and that substance never makes its appearance at all in Endogens, which ne-

EXOGENOUS VEGETATION

vertheless form wood: we however think it may be doubted whether this is the present opinion of that great physiologist. De Candolle says, that the woody and cortical layers are formed laterally from the cambium supplied by preexisting layers, and nourished by the descending sap; but we again say that this is inapplicable to Endogens; and moreover, that it is inconceivable upon such a theory how the *first* of the woody and cortical layers originated. Besides, woody matter appears before the new leaves can be supposed to have generated descending sap: it is not probable that so heterogeneous a formation as that of the wood is a mere superficial deposit, in which case it might be expected to be homogeneous; and finally, we do not know how, upon the supposition of De Candolle, to explain in any intelligible way why wood is found in pith, and in bark, as we have already shown that it often is. It would take us too far if we were to discuss this subject at greater length; the reader is therefore referred for further information to De Candolle's *Physiologie Végétale*, p. 146; Mirbel in the *Annales des Sciences* above quoted; Henslow in the *Magazine of Zoology and Botany*, vol. i., p. 32; and to our own *Introduction to Botany*, ed. 2nd, p. 256, &c.

The age at which Exogens may arrive is closely connected with their mode of development, as already shown in this work. [AGE OF TREES.]

If Exogens are distinctly known from Endogens by their peculiar manner of growth and by the arrangement of their woody matter, they are not less clearly defined by external marks.

Their *leaves* have the veins ramifying from the midrib, or ribs if there are several, in so intricate a manner as to give the appearance of irregular net-work. Their veins never run parallel with each other without ramifications; for if, as sometimes happens, they appear to do so, it will be found that the appearance is confined to the principal veins or ribs, and that the secondary veins between them ramify in the usual way. The leaves are moreover in most cases articulated with the stem, leaving behind them a clean scar when they die, not rotting away and hanging upon the stem in the form of a ragged sheath, as is common in Endogens. Moreover, they are frequently furnished with stipules, an unusual circumstance in Endogens.

The *flowers* of Exogens are usually constructed upon a quinary type, that is, they have five sepals, five petals, and five stamens, or some power of that number; now and then they vary to a type of four, or they exceed the number five; but we very rarely find the ternary structure of Endogens present in them. If, as in Anonaceæ, Berberaceæ, and other orders, the sepals and petals follow a ternary type, the number three is lost in the stamens or the ovary. The natural order Menispermaceæ is the only one among Exogens in which the ternary type regularly pervades all the parts of the flower.

In their manner of growth they rarely resemble Endogens. The consequence of the ramification of the veins is to give their leaves a broad and rounded figure, the effect of which upon their general appearance is to produce the rounded lumpish aspect that we recognize in all the trees naturally inhabiting this country. In no known instance does the stem grow by the development of a single terminal bud; so that we never find in this class the columnar aspect of palm-trees [GYMNOSPERMS], unless the genus Theophrasta be considered an exception. Consequently, a landscape consisting of nothing but exogenous plants would resemble the imaginary scene that forms the subject of the preceding cut.

The differences between Exogens and Endogens, thus strongly marked in the stem, leaves, and flowers, are connected with others in the *embryo*. In Exogens of the common kind this organ has two lobes, held together by a minute central body, the upper end of which, between the lobes, is the plumule or rudimentary stem, the lower the radicle or rudimentary root; the lobes themselves, or cotyledons, are rudimentary leaves. This structure is readily seen in a hazel-nut or a garden-bean; the deviations from it are few and unimportant as compared with those of Endogens. Three or a greater number of cotyledons may be present in a whorl, instead of two opposite to each other. Or one of the two cotyledons may be much smaller than the other, as in Trapa; or they may be deeply lobed, as in the garden-cress. But in all these cases the deviations are obviously reconcileable with the typical character of being *dicotyledonous*.

When the embryo of an Exogen germinates, the radicle simply lengthens at its point, without having to break through the coat of the embryo; on this account Exogens have been named *exorhizæ*.

The result of this examination is, that the great class of Exogens has five important, and, in some measure, independent characters, by which its limits are settled.

1. The wood is exogenous.
2. The veins of the leaves are netted.
3. The fructification is formed upon a quinary or quaternary type.
4. The embryo is dicotyledonous.
5. The germination is *exorhizal*.

Hence Exogens have received two other names in allusion to such characters; they are commonly called *Dicotyledones*, and *Exorhizæ* is another but less common appellation. Moreover, they are the *Phanerocotyledoneæ* of Agardh, the *Anthophytæ* and *Carpophytæ* of Oken's school, the *Dichorgana* of Schultz, the *Phylloblastæ* of Reichenbach; not to mention other names still more obscure.

In consequence of imperfect development, and the abortion or multiplication of parts, many deviations occur from the above characters. But as in Endogens, so in these, there is not in consequence any real difficulty in distinguishing Exogens from other plants. Suppose the stem to be so slightly formed, as in Podostemaceæ or the aquatic Halorageæ, as not to arrive at a state in which the exogenous arrangement is perceptible, we have the dicotyledonous embryo, and the typical number of the floral organs to guide us. Let the leaves appear as scales, as in Lathræa, Orobanche, and the like; still there is the embryo or again the floral proportions. If the fructification is absolutely ternary as in Menispermaceæ, the organization of the stem, leaves, and embryo reveals the true nature of such plants. Or if the embryo is undivided, as in Cuscuta, and at the same time the veins of the leaves deficient, and all this with an incomplete formation of woody matter, then the number of parts in the flower remains to prevent our falling into error. It is therefore always to be remembered, that the limits of this great class are not exclusively determined by one single character, but by a combination of five; a part of which may be occasionally exceptional or undiscoverable.

Like all other natural assemblages, Exogens have many analogies with other parts of the vegetable kingdom. We have already adverted to the Podostemaceous order of this class representing distinctly the Pistiaceous order, or at least Lemna among Endogens. In speaking of the latter class (vol. ix., p. 398) other cases have been noticed, and we now add that Piperaceæ are distinct analogies here to the Araceæ of Endogens, Chenopodiales to Glumosæ, and possibly Menispermaceæ to Smilaceæ.

Whatever uses there may be in the vegetable kingdom are to be found in this class, which comprehends four-fifths of the natural orders, and probably not much less than the same proportion of species. Timber, in particular, is their exclusive produce, and if corn has no direct analogy in Exogens, at least a substitute for it is furnished by the potato and the cassava. To speak therefore of its useful products would be, in fact, to explain the utility of plants to man, and this we shall do in a more appropriate place. [PLANTS.]

Considering the very great numbers of Exogens,—they may be rated at 50 or 60,000 at a low computation,—it is not surprising that it should be here that the systematic botanist experiences his great difficulties. No embarrassment worth notice occurs in the arrangement of Endogens, as has already been shown; but in Exogens the difficulties are so great as to have hitherto baffled the most acute writers. We do not mean with regard to the natural orders themselves, for they are in general well understood and defined: our observation applies to a collocation of the orders, or, in other words, to the construction of groups of a secondary value which shall be as natural and as well defined as the orders themselves. In a recent enumeration we find no fewer than 231 orders of Exogens. It is obviously impracticable to study so large a number of combinations without breaking them into groups, and accordingly various methods have been proposed.

Jussieu, adopting, to a certain extent, the views of his predecessors, considered—1st, the separation of the petals; 2nd, their combination; or 3rd, their absence, of primary consequence; and adding to this, 4th, the separation of the sexes in flowers having no petals, he formed the four groups of—1st, *Polypetalous*; 2nd, *Monopetalous*; 3rd, *Apetalous;* and 4th, *Diclinous* plants. The three first of these he again subdivided according as their stamens or their corolla grew under the ovary (hypogynous), upon the calyx (perigynous), or upon the ovary (epigynous); then the monopetalous epigynous group was subdivided into plants having united stamens and those having them distinct; the result being 11 classes, which were placed by Jussieu in the following order:—

			Class.
Apetalous	Stamens epigynous		1
	„ perigynous		2
	„ hypogynous		3
Monopetalous	Corolla hypogynous		4
	„ perigynous		5
	„ epigynous	anthers united	6
		anthers distinct	7
Polypetalous	Stamens epigynous		8
	„ hypogynous		9
	„ perigynous		10
Diclinous			11

This was, however, so artificial a distribution, that botanists soon found it as unsatisfactory as it was simple. Various changes have therefore been recommended from time to time, some of which are the following:—

In 1813, De Candolle, dropping the names of all Jussieu's classes, and abolishing many of them, proposed to arrange as follows the 113 orders of Exogens with which he was at that time acquainted.

			Class.
Polypetalous	Petals hypogynous (*Thalamifloræ*)		1
	Petals perigynous (*Calycifloræ*)		2
Monopetalous	Corolla perigynous	*Corollifloræ*	3
	Corolla hypogynous		4
Apetalous		(*Monochlamydeæ*)	5

Thus the classes were reduced from eleven to five, which was a defect; but those which remained were supposed to be more natural, which would have been an advantage. Five years afterwards, in his 'Regni Vegetabilis Systema Naturale,' he added the names inclosed within brackets, and he broke up the Thalamifloræ into five cohorts, but without stating what orders he arranged under them. We do not find that he ever pursued the subject farther. Since that period this great botanist has occupied himself with the special study of the natural orders, and the public has derived no advantage from his general views, which is much to be regretted.

In 1825, Professor Agardh of Lund, now bishop of Carslbad, proposed a great change in the subordination of Exogens, retaining the principles of primary division recognized by Jussieu and De Candolle, but forming them into twenty subdivisions, defined by various characters analogous to those by which the orders themselves are circumscribed. This, we believe, is the first step of any consequence towards putting Exogens into a more natural grouping than that of Jussieu: in many respects the subdivisions are, as far as they go, unobjectionable; but they have excited scarcely any attention among systematic botanists. The necessity, however, of some better method of subordination than that of Jussieu and De Candolle has become evident to everybody; and attempts have been made to effect this by Drs. Bartling, Schultz, Von Martius, and others on the continent, and by the author of the present article; not to mention certain transcendental German writers, whose views, as we do not understand them, we will not attempt to explain. In our own arrangement the class is first broken into the Polypetalous, Monopetalous, and Incomplete *subclasses;* the latter are next distributed in *groups;* and finally, the groups themselves have a subordination of *alliances,* beneath which the orders are disposed in numbers varying from 1 to 8 or more, the general result being 17 groups or 80 alliances. The following table will show upon what principle the groups and alliances have been constructed. It will be remarked that the terminations of the names express their value; the groups or highest combinations end in *osæ;* the alliances, or combinations of a lower kind, in *ales;* the orders in *aceæ;* the suborders in *eæ.*

EXOGENS.

Table of Groups.

Subclass 1. Polypetalæ.

	Groups.
Albumen very considerably larger than the minute embryo.	ALBUMINOSÆ.
Albumen absent, or only forming a layer between the embryo and the seed-coat.	
Ovary inferior (often with an epigynous disk).	EPIGYNOSÆ.
Ovary superior.	
Placentæ parietal.	PARIETOSÆ.
Placentæ in the axis.	
Calyx dislocated.	CALYCOSÆ.
Calyx complete; its parts being all on the same plane.	
Carpels united in a solid pistil, parallel with each other.	SYNCARPOSÆ.
Carpels oblique, upon a gynobase.	GYNOBASEOSÆ.
Carpels disunited.	APOCARPOSÆ.

Subclass 2. Incompletæ (or Apetalæ).

Calyx altogether absent.	ACHLAMYDOSÆ.
Calyx present.	
Embryo curved round albumen.	CURVEMBRYOSÆ.
Embryo straight.	
Stamens monadelphous.	COLUMNOSÆ.
Stamens distinct.	
Calyx tubular, often resembling a corolla.	TUBIFEROSÆ.
Calyx very imperfect.	RECTEMBRYOSÆ.

Subclass 3. Monopetalæ.

Fruit consisting of but one perfect carpel.	AGGREGOSÆ.
Fruit of several carpels.	
Ovary inferior.	EPIGYNOSÆ.
Ovary superior.	
Carpels three or more.	POLYCARPOSÆ.
Carpels only two.	
Fruit nucamentaceous.	NUCAMENTOSÆ.
Fruit capsular.	DICARPOSÆ.

The orders are disposed under their several alliances in the following sequences.

Table of Alliances and Orders.

Subclass 1. Polypetalæ.

Group 1. ALBUMINOSÆ.

Alliance 1. Ranales. *Herbaceous plants: either with the carpels more or less distinct, or, if that is not the case, with parietal placentæ.* Ranunculaceæ, Podophylleæ, Papaveraceæ, Fumarieæ, Nymphæaceæ, Hydropeltideæ, Nelumbiaceæ, Cephalotaceæ, Droseraceæ.

Alliance 2. Anonales. *Woody plants, with distinct carpels, which are sometimes confluent. Anther-valves opening longitudinally.* Myristicaceæ, Magnoliaceæ, Winteraceæ, Anonaceæ, Schizandreæ, Dilleniaceæ.

Alliance 3. Umbellales. *Flowers umbellate. Calyx superior. Carpels one-seeded. Stem hollow.* Apiaceæ, Araliaceæ.

Alliance 4. Grossales. *Flowers never in umbels. Calyx superior. Carpels many-seeded. Stem solid.* Grossulaceæ, Escalloniaceæ, Bruniaceæ.

Alliance 5. Berberales. *Anthers bursting by recurred valves.* Berberaceæ.

Alliance 6. Pittosporales. *Calyx inferior. Carpels consolidated; style single.* Vitaceæ, Pittosporaceæ, Olacaceæ, Francoaceæ, Sarraceniaceæ.

Group 2. EPIGYNOSÆ.

Alliance 1. Onagrales. *Corolla not valvate. Placentæ central. Type of flowers binary throughout. Herbs* Onagraceæ, Circæeæ, Halorageæ, Hydrocaryes.

Alliance 2. Myrtales. *Corolla not valvate. Placentæ central. Type of flowers not binary throughout Shrubs or trees.* Combretaceæ, Alangiaceæ, Rhizophoraceæ, Memecylaceæ, Melastomaceæ, Myrtaceæ Barringtonieæ, Lecythidaceæ, Philadelphaceæ.

Alliance 3. Cornales. *Corolla valvate.* Hamamelaceæ, Cornaceæ, Helwingiaceæ, Loranthaceæ.

Alliance 4. Cucurbitales. *Placentæ parietal.* Cucurbitaceæ, Loasaceæ, Cactaceæ, Homaliaceæ.

Alliance 5. Ficoidales. *Petals indefinite.* Mesembryaceæ.

Alliance 6. Begoniales. *Flowers unisexual. Placentæ central.* Begoniaceæ.

Group 3. PARIETOSÆ

Alliance 1. Cruciales. *Embryo curved. Albumen none.* Brassicaceæ or Cruciferæ, Capparidaceæ, Resedaceæ.

Alliance 2. Violales. *Embryo straight. Stamens definite; none sterile.* Violaceæ, Sauvagesieæ, Samydaceæ, Moringaceæ, Frankeniaceæ.

Alliance 3. Passionales. *Embryo straight. Stamens definite; the sterile ones in a separate ring.* Passifloraceæ, Papayaceæ, Flacourtiaceæ, Malesherbiaceæ, Turneraceæ.

Alliance 4. Bixales. *Stamens indefinite; sterile none. Leaves dotted.* Bixaceæ.

Group 4. CALYCOSÆ.

Alliance 1. Guttales. *Stamens indefinite. Albumen none. Petals and sepals equal in number.* Clusiaceæ or Guttiferæ, Canelleæ, Rhizobolaceæ, Maregraaviaceæ, Hypericaceæ, Ochrantheæ.

Alliance 2. Theales. *Stamens indefinite. Albumen none. Petals and sepals unsymmetrical, passing one into the other.* Ternstromiaceæ.

Alliance 3. Acerales. *Stamens definite. Flowers unsymmetrical.* Aceraceæ, Sapindaceæ, Millingtonieæ, Æsculaceæ, Polygalaceæ, Vochyaceæ.

Alliance 4. Cistales. *Flowers symmetrical. Albumen present.* Elatinaceæ, Linaceæ, Hugoniaceæ, Chlenaceæ, Cistaceæ, Reaumuriaceæ.

Group 5. SYNCARPOSÆ.

Alliance 1. Malvales. *Calyx valvate. Carpels* 4 *or more. Stamens monadelphous more or less.* Sterculiaceæ, Malvaceæ, Elæocarpaceæ, Dipteraceæ, Tiliaceæ, Lythraceæ (?)

Alliance 2. Meliales. *Calyx imbricated. Carpels* 4 *or more. Stamens usually monadelphous.* Meliaceæ, Cedrelaceæ, Humiriaceæ, Aurantiaceæ, Spondiaceæ.

Alliance 3. Rhamnales. *Calyx valvate. Carpels fewer than* 4. *Shrubs.* Rhamnaceæ, Chailletiaceæ, Tremandraceæ, Nitrariaceæ, Burseraceæ.

Alliance 4. Euphorbiales. *Calyx imbricated. Carpels fewer than* 4. Euphorbiaceæ, Empetraceæ, Stackhousiaceæ, Fouquieraceæ, Celastraceæ, Hippocrateæ, Trigonieæ, Staphyleaceæ, Malpighiaceæ, Erythroxyleæ.

Alliance 5. Silenales. *Embryo rolled round albumen; or joints of stem tumid; or leaves minute and scale-like.* Silenaceæ, Alsinaceæ, Tamaricaceæ (?), Illecebraceæ.

Group 6. GYNOBASEOSÆ.

Alliance 1. Rutales. *Style single, or leaves marked with pellucid dots.* Ochnaceæ, Simarubaceæ, Rutaceæ, Zygophyllaceæ, Xanthoxylaceæ.

Alliance 2. Geraniales. *Styles distinct. Ovary consolidated. Stamens hypogynous.* Geraniaceæ, Viviamiaceæ, Balsaminaceæ, Tropæoleæ, Oxalidaceæ, Ledocarpeæ.

Alliance 3. Coriales. *Styles and carpels both distinct.* Coriariaceæ, Surianaceæ.

Alliance 4. Flörkeales. *Styles single. Fruit lobed. Stamens perigynous.* Limnanthaceæ.

Group 7. APOCARPOSÆ.

Alliance 4. Rosales. *Albumen wholly absent.* Rosaceæ, Pomeæ, Amygdaleæ, Sanguisorbeæ, Fabaceæ or Leguminosæ, Cæsalpinieæ, Mimoseæ, Connaraceæ, Chrysobalanaceæ, Calycanthaceæ.

Alliance 2. Saxales. *Carpels two, diverging at the end, many-seeded. Albumen present.* Baueraceæ, Cunoniaceæ, Saxifragaceæ.

Alliance 3. Crassales. *Carpels several, distinct, continuous with the styles. Seeds indefinite. Albumen.* Crassulaceæ.

Alliance 4. Balsamales. *Carpels neither two, nor divergent, nor numerous, with hypogynous scales. Leaves and bark balsamic.* Amyridaceæ, Anacardiaceæ.

Sub-class 2. Incompletæ.

Group 1. RECTEMBRYOSÆ.

Alliance 1. Amentales. *Catkins. Carpels two or more, combined. Trees or shrubs.* Corylaceæ or Cupuliferæ, Betulaceæ, Scepaceæ.

Alliance 2. Urticales. *Carpels solitary or syncarpous. Stems continuous, without sheaths. Never a cupule.* Garryaceæ, Hensloviaceæ, Trewiaceæ, Urticaceæ, Ceratophylleæ, Ulmaceæ, Stilaginaceæ, Myricaceæ, Juglandaceæ.

Alliance 3. Casuarales. *Carpels solitary. Stems jointed and with sheaths.* Casuaraceæ.

Alliance 4. Datiscales. *Carpels several. Seeds numerous. Leaves alternate.* Datiscaceæ, Lacistemaceæ.

Group 2. ACHLAMYDOSÆ.

Alliance 1. Piperales. *Carpels solitary or distinct. Flowers in spikes. Embryo minute, in the base of fleshy albumen.* Chloranthaceæ, Saururaceæ, Piperaceæ.

Alliance 2. Salicales. *Flowers amentaceous. Fruit mostly many-seeded; when one-seeded, in globular heads.* Salicaceæ, Platanaceæ, Balsamaceæ.

Alliance 3. Monimiales. *Flowers within an involucre. Sexes distinct.* Monimiaceæ, Atherospermaceæ.

Alliance 4. Podostemales. *Flowers solitary. Carpels two or three, combined. Seeds numerous and minute.* Podostemaceæ.

Alliance 5. Callitrichales. *Carpels several, combined single-seeded. Floaters.* Callitrichaceæ.

Group 3. TUBIFEROSÆ.

Alliance 1. Santalales. *Calyx superior. Anthers opening longitudinally.* Santalaceæ.

Alliance 2. Daphnales. *Calyx inferior, imbricated. Carpel solitary. Anthers opening longitudinally.* Elæagnaceæ, Thymelaceæ, Hernandiaceæ, Aquilariaceæ.

Alliance 3. Proteales. *Calyx valvate. Stamens opposite its lobes. Fruit simple, follicular.* Proteaceæ.

Alliance 4. Laureales. *Anthers opening by valves. Carpels solitary, superior, or inferior.* Lauraceæ, Illigeraceæ, Cassythaceæ.

Alliance 5. Penæales. *Carpels several. Calyx imbricated or valvate.* Penæaceæ.

Group 4. COLUMNOSÆ.

Alliance 1. Nepenthales. *Diœcious. Ovary superior* Nepenthaceæ.

Alliance 2. Aristolochiales. *Hermaphrodite. Ovary inferior.* Aristolochiaceæ.

Group 5. CURVEMBRYOSÆ.

Alliance 1. Chenopodiales. *Albumen. Radicle next the hilum.* Amarantaceæ, Chenopodiaceæ, Tetragoniaceæ, Phytolaccaceæ.

Alliance 2. Polygonales. *Albumen. Radicle remote from hilum.* Polygonaceæ.

Alliance 3. Petiveriales. *Albumen* 0. *Cotyledons spiral.* Petiveriaceæ.

Alliance 4. Sclerales. *Tube of calyx hardened.* Scleranthaceæ, Nyctaginaceæ.

Alliance 5. Cocculales. *Albumen. Flowers ternary. Calyx in two rows.* Menispermaceæ, Lardizabaleæ.

Sub-class 3. Monopetalæ.

Group 1. POLYCARPOSÆ.

Alliance 1. Brexiales. *Albumen* 0. *Carpels five Sterile stamens between fertile ones. Seeds indefinite.* Brexiaceæ.

Alliance 2. Ericales. *Anthers porous. Carpels four, five, or more.* Pyrolaceæ, Monotropaceæ, Ericaceæ, Vaccinaceæ, Epacridaceæ.

Alliance 3. Primulales. *Anthers opening longitudinally. Carpels four or five. Fruit often one-celled.* Primulaceæ, Myrsinaceæ, Sapotaceæ, Ebenaceæ, Styraceæ, Aquifoliaceæ.

Alliance 4. Nolanales. *Fruit lobed.* Nolanaceæ.

Alliance 5. Volvales. *Carpels two—four, combined. Anthers never porous.* Convolvulaceæ, Cuscutaceæ, Polemoniaceæ, Diapensiaceæ, Hydroleaceæ.

Group 2. EPIGYNOSÆ.

Alliance 1. Campanales. *Stipules none. Seeds indefinite.* Lobeliaceæ, Campanulaceæ, Sphenocleaceæ ?, Belvisiaceæ, Columelliaceæ, Stylidiaceæ.

Alliance 2. Goodeniales. *Stigma with an indusium.* Goodeniaceæ, Scævolaceæ.

Alliance 3. Cinchonales. *Stipules between the leaves.* Cinchonaceæ, Lygodysodeaceæ.

Alliance 4. Capriales. *Stipules none. Leaves opposite. Seeds definite.* Caprifoliaceæ.

Alliance 5. Stellales. *Fruit didymous. Leaves whorled. Stipules none. Stem angular.* Galiaceæ, or Stellatæ.

Group 3. AGGREGOSÆ.

Alliance 1. Asterales or Compositæ. *Anthers syngenesious. Ovary inferior.* Calyceraceæ, Mutisiaceæ, Cichoraceæ, Asteraceæ, Cynaraceæ.

Alliance 2. Dipsales. *Anthers distinct. Ovary inferior.* Dipsaceæ, Valerianaceæ.
Alliance 3. Brunoniales. *Ovary superior. Stigma with an indusium.* Brunoniaceæ.
Alliance 4. Plantales. *Ovary superior. Stigma naked. Style single.* Plantaginaceæ, Globulariaceæ, Salvadoraceæ.
Alliance 5. Plumbales. *Ovary superior Stigmas naked. Styles five.* Plumbaginaceæ.

Group 4. Nucamentosæ.
Alliance 1. Phaceliales. *Fruit capsular. Inflorescence gyrate.* Hydrophyllaceæ.
Alliance 2. Echiales. *Fruit nucamentaceous. Inflorescence gyrate. Flowers symmetrical.* Cordiaceæ, Ehretiaceæ, Boraginaceæ.
Alliance 3. Labiales. *Fruit nucamentaceous. Flowers unsymmetrical.* Lamiaceæ or Labiatæ, Verbenaceæ, Myoporaceæ, Selaginaceæ, Stilbaceæ.

Group 5. Dicarposæ.
Alliance 1. Bignoniales. *Flowers didynamous. Seeds winged. Albumen none. Calyx complete.* Pedaliaceæ, Bignoniaceæ, Cyrtandraceæ.
Alliance 2. Acanthales. *Flowers didynamous. Seeds adhering to hooks, not winged. Albumen none. Calyx dislocated.* Acanthaceæ.
Alliance 3. Lentibales. *Flowers subdidynamous. Fruit with a free central placenta.* Lentibulaceæ.
Alliance 4. Scrophulales. *Flowers didynamous. Albumen. Placenta parallel with axis.* Gesneraceæ, Orobanchaceæ, Scrophulariaceæ.
Alliance 5. Solanaceæ. *Flowers symmetrical. Albumen. Placenta parallel with the axis.* Solanaceæ, Cestraceæ.
Alliance 6. Gentianales. *Flowers symmetrical, tetrandrous or pentandrous. Placenta perpendicular to axis. Seeds often winged. Leaves opposite.* Gentianaceæ, Spigeliaceæ, Apocynaceæ, Asclepiadaceæ.
Alliance 7. Loganiales. *Flowers unsymmetrical. Stamens never two. Leaves always opposite.* Loganiaceæ, Potaliaceæ.
Alliance 8. Oleaceæ. *Flowers regular, unsymmetrical, diandrous.* Oleaceæ, Jasminaceæ.

We shall not be restrained by false delicacy from criticising this arrangement freely, with reference to its merits as well as its demerits. We will therefore at once say, that in several respects it is a decided advance in the grouping of the orders. By abandoning the artificial distinction of perigynous and hypogynous insertion, many orders naturally allied are brought into contact. The great mass of Polypetalous Exogens is analysed with tolerable precision; a great many of the alliances are, as far as we can discover, unobjectionable; and we can state, from the experience of four years' personal use, that the scheme is of great utility to students, in consequence of the power it gives them of combining the orders. The albuminous group in particular, although incompletely made out, may be regarded as an important elimination of orders which often had no obvious relation to any with which they were previously associated. It cannot be considered otherwise than a striking physiological peculiarity, that while the greater number of Exogens have an embryo so robust as to be able to spring at once into existence, and from the very beginning of its life capable of trusting to the atmosphere and the earth for its support, there should be others, and many of them among the most highly organized races, which are so feeble and puny in the beginning as to require from nature a large and abundant store of nutritive matter upon which they may feed until strong enough to contend with the elements among which they must eventually live. These latter form the albuminous group. Albumen occurs very often in other groups; but in such small quantity that it may be regarded as a mere residuum of the nutrient mucilage in which the embryo was originally developed, rather than a store of food provided for the young plant when it enters upon its first stage of growth. Among the former the presence or absence of albumen is of little or no consequence; Fabaceæ for example, and other equally well defined groups, possess it in some species, and want it in others. But in the orders collected in the albuminous group, its presence and its great disproportion to the embryo are identified with the reproduction of the species, and there is no instance known of its absence, except in Nelumbiaceæ, in which, if they really belong to the group, it may be supposed that the usual function of the albumen is performed by the excessively thickened cotyledons.

But, on the other hand, this system has defects in abundance; so many indeed, that we should say they outweighed its advantages, if they were not fully participated in by all other similar schemes; from a respect for which they have indeed been to a great extent produced. Among minor blemishes may be named the artificial collocation of the genera in some of the alliances, as, for example, the Passional, the Silenal, the Euphorbial, and the Primulal. In the next place, the alliances are excessively multiplied; as in the case of the Cinchonal, Caprial, and Stellal, of the Chenopodial, Petiverial, and Scleral, or of the Geranial and the Flörkeal; this however is a fault on the right side. Of much more consequence is the indefinite character of the Parietous and Gynobaseous groups. The first depends upon a distinction which sometimes exists in the fruit and not in the ovary of the same plant, and which may be destroyed by either the contraction or extension, in a slight degree, of the dissepiments: moreover, the orders collected under it, although to a certain extent naturally combined, yet in other instances, as Bixaceæ, Turneraceæ, Moringaceæ, and the whole Crucial alliance, agree less with each other than with other parts of the system. The Gynobaseous group is much more natural; that indeed is its merit; but the gynobasic character, strongly marked as it is in Geraniaceæ and many of the Rutal alliance, is, it must be confessed, too feeble to deserve to be considered of more than very subordinate importance; in fact, many of the Syncarpous group are gynobasic—Malva, for example. Then, among Monopetalæ, the Dicarpous and Nucamentous groups are not distinguishable, and should have been combined; each however is natural as far as it goes.

The great vice of the arrangement however is that which it owes to the adoption of the old practice of considering Polypetalæ, Monopetalæ, and Apetalæ, fundamental divisions. Every systematical writer at all known, down to the present time, has adopted them; so that their value has become a matter of prejudice, which it will be no easy task to remove from the minds of those who have all their lives been accustomed to look at botanical classifications in one and the same point of view. We will nevertheless attempt to show, firstly, that these divisions are essentially bad; and secondly, that a great advantage will be derived from their rejection. The Monopetalous sub-class depends entirely upon the circumstance of the petals adhering to each other by their edge; it has no accessory characters whatever to sustain it. Now the partial adhesion of contiguous organs is of no greater than ordinal importance when it takes place in other parts of the fructification, and is often not of so much. The sepals adhere or remain separate in the very same natural order, Urticaceæ and Chenopodiaceæ for example. The stamens adhere into a tube, and this sometimes gives a character to certain orders, but more often is a mere distinction of genera, as in Euphorbiaceæ, Iridaceæ, Aristolochiaceæ, &c. When the carpels unite and form a multiplex fruit, the ovaries, style, and stigma, being altogether consolidated, that character becomes of considerable value as contrasted with the complete or partial separation of the carpels, because it is found constant; and hence it has been employed by us as a distinction of a portion of the group of Polypetalæ. But we are persuaded that we have assigned it too high a value, and that it is only one degree better than an ordinal distinction. It is therefore improbable that the adhesion of the petals, organs not even essential to the fructification, but which may be wholly absent without the great functions of impregnation and reproduction being interfered with, should be of greater importance. The monopetalous corolla is not considered of any value in Endogens, even as an ordinal character, and nothing can justify our considering it of primary value among Exogens, except the constant and unvarying existence of that character throughout certain natural orders more nearly related to each other than to anything else. It will be found however upon strict inquiry, firstly, that the character is anything but constant, except in a portion of the Monopetalous sub-class; and secondly, that it combines dissimilar orders, separating them widely from their true affinities.

That the Monopetalous character is not constant hardly requires proof, so notorious is its instability. Pyrolaceæ, Monotropaceæ, Ericaceæ, Myrsinaceæ, Lobeliaceæ, Campanulaceæ, Plumbaginaceæ, and Oleaceæ, all offer instances of the polypetalous structure; and some Primulaceæ, Oleaceæ, and Monotropaceæ, are even apetalous; while on the other hand Rutaceæ, Anonaceæ, Stackhousiaceæ, Fouquieraceæ, Crassulaceæ, Loranthaceæ, Cucurbitaceæ, Cactaceæ, Papayaceæ, and many other natural orders, stationed in Polypetalæ, because of their affinity, are either partially or wholly Monopetalous. The Monopetalous character cannot then be defended because of its stability. Moreover, nothing can well be more arbitrary than the language of botanists in speaking of the corolla. In Delphinium, Trifolium, and many other plants, the corolla has all its petals in a state of adhesion; the same thing occurs in Loranthaceæ, and yet these are called Polypetalous. Still more strange is it that Malvaceæ, which have the petals adhering to the tube of the stamens, should be called Polypetalous, while Styraceæ, having precisely the same organization, are accounted Monopetalous.

It will also be found that the Monopetalous character is equally objectionable as a means of combining similar natural orders. So far is it, except in the case of the Dicarpous and Nucamentous groups, from complying with the conditions to be required of all characters employed for purposes of co-ordination, namely, combining genera more nearly allied to each other than to any thing else, that in fact it disunites plants closely akin, and interrupts series that would be otherwise as complete as series can be in the arrangement of living beings; as will be apparent from the following statement.

Pyrolaceæ and Monotropaceæ have a minute embryo, a large mass of albumen, a tendency to become leafless and parasitical, and in all their habits are at variance with the rest of Ericales.——The latter have no direct connection with any other Monopetalous order, but have all their affinities turning towards Rutaceæ, as is proved by Correa, Phebalium, and other genera.——Primulaceæ and Myrsinaceæ, with their large horny albumen, approach Cinchonales, and together with that, the Caprial and the Stellal alliances seem rather to belong to the Albuminous group.——Ebenaceæ and Aquifoliaceæ have an affinity with Myrsinaceæ. Dr. Royle has pointed out a connection between Ebenaceæ and Clusiaceæ; Adolphe Brongniart has shown that Aquifoliaceæ must stand near Ebenaceæ; and with regard to Styraceæ, Jussieu actually referred them to the polypetalous Meliaceæ, and De Candolle considers them nearly akin to Ternstromiaceæ.——Whatever the affinity of the Nolanal and Volval alliances may be, it is clear that in taking away the orders already mentioned, they will remain isolated among orders to which they have no direct relation. It will be seen that they fall naturally into their places in a re-distribution of Exogens upon other principles.——Columelliaceæ must be looked upon as a monopetalous form of Onagraceæ, and will connect the Campanal and Goodenial alliances with the series to which Onagraceæ belong.——The Cinchonal, Caprial, and Stellal alliances, which ought to be combined, are so closely united with Apiaceæ among Albuminosæ, that they may be naturally transferred to that group. Even De Candolle has found it necessary to approximate them by stationing Apiaceæ near the end of his polypetalous sub-class, and Cinchonaceæ near the beginning of his Monopetalæ. The connection of Apocynaceæ with these plants is perhaps more apparent than real.——Asterales and Dipsales necessarily follow the affinity of the Campanal alliance. ——The Brunonial, Plantal, and Plumbal alliances may be considered more properly analogous than allied to Asterales, and have no affinity of an obvious kind with any other monopetalous orders.——All the other orders are well combined, with the exception of Orobanchaceæ; the affinity of that order with Scrophulariaceæ and the remainder of the dicarpous group is extremely problematical. It has not, so far as we are aware, been before observed that the carpels in that order are right and left of the axis, and not anterior and posterior; a very important circumstance, which so much weakens its supposed affinity with Scrophulariaceæ as to remove many objections to its separation into a distinct part of the system. But if on the other hand we look to the aristate base of the anthers in Orobanche, the extreme resemblance of that genus to Monotropoceæ in habit, and the remarkable similarity between its placentation and that in the upper half of the ovary of Monotropa, to say nothing of its capitate stigma and calyx, the number of whose parts is at variance with that of the corolla, we incline to think that these two orders are more closely allied than they are usually supposed to be.

With regard to the Apetalous sub-class, it is even more objectionable than the Monopetalous. There is no end to the instances of Polypetalous orders being Apetalous; and in Thymelaceæ, Menispermaceæ, Polygonaceæ, and a few others, the denial of the presence of petals in particular genera is a mere arbitrary use of words. Many Apetalæ appear, in fact, to be imperfect forms of Polypetalous groups, and will naturally arrange themselves in the same series with what may be supposed to be their more perfect types. Piperales seem a degraded state of Anonales, Penæales of Onagrales, Daphnales and their allies of Rhamnales. But a large proportion of the Apetalous orders undoubtedly require to be located separately. They have distinct sexes and a peculiar habit, and must be considered a quite distinct group, as Jussieu originally stated them to be.

Having thus shown how unsatisfactory are the principles hitherto employed for classifying Exogens, we next proceed to show in what way it appears to us they may be arranged in a more natural and precise manner; the Polypetalous, Monopetalous, and Apetalous sub-classes being altogether abandoned.

In the first place, there are the orders whose embryo is, as has already been stated, furnished with an excessive quantity of albumen. This, as a great physiological distinction, may be considered to supersede all others, and to establish an *Albuminous* group.——The remainder consists of orders in which some have the sexes in distinct flowers, others combined with hermaphrodite flowers. We know of no character intimately connected with the reproduction of the species which is upon the whole so important as this; indeed, if it were not for the frequent occurrence of polygamous flowers throughout hermaphrodite orders, we should assign it a higher place than even the albuminous character; but the constant tendency of hermaphrodite flowers to become polygamous leads us necessarily to look upon sexuality as a secondary character only, especially since, if it were taken as a primary one, it would have the unnatural effect of separating Myristicaceæ and Schizandreæ from Anonales. For this reason a *Diclinous* group may be formed, into which nothing should be admitted except plants without any tendency to hermaphroditism.——The hermaphrodite orders may be separated into those with the calyx, corolla, and stamens confluent at the base with each other and with the ovary, that is, having an inferior ovary, and those in which those parts are distinct, either altogether or at least from each other: the former will constitute an *Epigynous* group.——Finally, the remainder of the orders may be divided into those with a monopetalous corolla combined with an ovary upon a binary plan (*Dicarpous*), and those which, if monopetalous, have the ovary simple or complex (*Polycarpous*).

The following table will put this in a clearer point of view.

- Albumen extremely abundant; embryo minute . . . . . 1. ALBUMINOSÆ.
- Albumen absent, or in small quantity.
  - Sexes in the same flower.
    - Ovary inferior. . . 2. EPIGYNOSÆ.
    - Ovary superior.
      - Flowers, if monopetalous, not with a bicarpellary ovary . 3. POLYCARPOSÆ.
      - Flowers monopetalous, with a bicarpellary ovary . . 4. DICARPOSÆ.
  - Sexes in different flowers . . 5. DICLINOSÆ.

Each of these groups will form a series by itself, the sequence of which ought to be natural, and to exhibit various lateral analogies with other groups. Possibly each group will comprehend within itself a maximum, a medium, and a minimum type of structure, the second being typical of the group, the first an exaggerated form of it, and the last a degraded form. This at least may be traced in the classes of Exogens, Endogens, and Acrogens; it frequently occurs in natural orders, is not uncommon in genera, and therefore may be expected in groups.

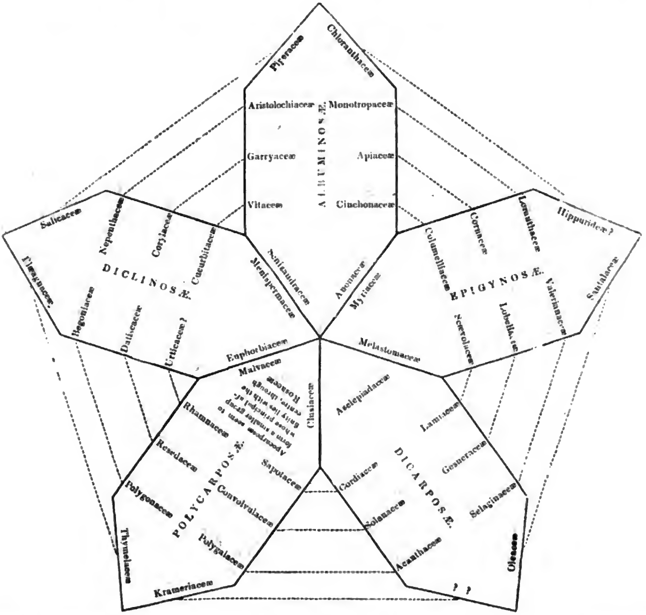
It is scarcely possible to undertake a more difficult task than that of disentangling and settling the perplexed and complicated web of natural affinities. Every order may be compared with so many other orders in one respect or another, and the value of characters is, as far as we yet know, so very unsettled, that the most skilful and experienced botanist is perpetually embarrassed at determining the fundamental question of which orders have more relation to each other than to anything else. Viewed in one direction, the subject has one aspect, from another position it often seems quite changed. We have no certain test by which affinity and analogy can be distinguished; and moreover, it is a most difficult thing to divest the mind of the prejudices that inevitably result from a long habit of thinking erroneously.

Nevertheless, in spite of all such obstacles, Truth is surely to be found; and when found, she will prove most richly worth the labour bestowed in searching for her. One great and immediate advantage that may be expected from a discovery of the true method of arranging exogens according to their real affinities will be a great simplification of the subject; and the extent to which this seems to be effected by the plan now proposed is much in favour of its being at least an approach to a discovery of the secret we are in search of. We will not here undertake to re-arrange all the orders already named according to the method now suggested; but the following table will serve to show that each of the five groups now proposed does exhibit distinct lateral analogies between its own series of orders and those of the groups standing next it.

ALBUMINOSÆ.	EPIGYNOSÆ.	DICARPOSÆ.	POLYCARPOSÆ.	DICLINOSÆ.
Anonaceæ	Myrtaceæ		Clusiaceæ	Menispermaceæ
Schizandraceæ	Melastomaceæ	Asclepiadaceæ	Malvaceæ	Euphorbiaceæ
Cinchonaceæ	Columelliaceæ	Cordiaceæ	Sapotaceæ	Cucurbitaceæ
Apiaceæ	Cornaceæ	Solanaceæ	Convolvulaceæ	Corylaceæ
Vitaceæ	Scævolaceæ	Lamiaceæ	Rhamnaceæ	Urticaceæ?
Monotropaceæ	Loranthaceæ	Acanthaceæ	Polygalaceæ	Nepenthaceæ
Garryaceæ	Lobeliaceæ	Gesneraceæ	Resedaceæ	Datiscaceæ?

ALBUMINOSÆ.	EPIGYNOSÆ.	DICARPOSÆ.	POLYCARPOSÆ.	DICLINOSÆ.
Aristolochiaceæ	Valerianaceæ	Selaginaceæ	Polygonaceæ	Begoniaceæ
Piperaceæ	Santalaceæ	Oleaceæ	Thymelaceæ	Elæagnaceæ
Chloranthaceæ	Hippurideæ	?	Krameriaceæ?	Salicaceæ.

Of course it is to be supposed that many of the orders or alliances introduced into this table are separated from those now placed next them by many, sometimes a great number of intervening orders, and that in fact what stands on paper as a series is an intricate combination of crossing and interfering analogies and affinities, which could only be expressed correctly by rays diverging from a common centre and intersecting or striking other rays of other centres, the points of intersection being what we call analogies. No diagram can exhibit these otherwise than very imperfectly; nevertheless, as it does show them better than mere lines of words, we have introduced into the following plan the analogous orders comprehended in the preceding table. The orders collected around the centre are all in close relation, and exhibit in their own series a degree of organization equivalent to what occurs at the same point in other series; those at the points of the rays of the diagram correspond in like manner with the other points; and the orders stationed along the sides of each ray are places at which the rays are laterally analogous; while the orders themselves are in direct affinity with each other through other orders not included in the diagram.



That these groups are all perfect in themselves, or nearly so, is sufficiently proved by Albuminosæ, the sequence of whose orders may be expressed as follows; the orders included in the diagram being marked with *.

1 *Anonales*. Magnoliaceæ
Winteraceæ
Dilleniaceæ
Berberaceæ
*Anonaceæ
Monimiaceæ
Atherospermaceæ
Myristicaceæ
*Schizandraceæ
2 *Ranales*. Nymphæaceæ
Ranales. Hydropeltideæ
Nelumbiaceæ
Ranunculaceæ
— Podophylleæ
Papaveraceæ
— Fumarieæ
Francoaceæ (?)
Sarraceniaceæ
Cephalotaceæ
Droseraceæ
3 *Primulales*. Primulaceæ
Myrsinaceæ
Ebenaceæ?
Aquifoliaceæ?
4 *Gentianales*. Apocynaceæ
Spigeliaceæ
Gentianaceæ
5 *Loganiales*. Loganiaceæ
Potaliaceæ

6 *Cinchonales.*	Caprifoliaceæ	10 *Lathræales.*	Pyrolaceæ
	*Cinchonaceæ		*Monotropaceæ
	Lygodysodeaceæ (?)		Orobanchaceæ
	Galiaceæ	?	?
7 *Umbellales.*	*Apiaceæ	11 . . .	*Garryaceæ
	Araliaceæ	12 . . .	*Aristolochiaceæ
8 *Pittosporales.*	*Vitaceæ		
	Olacaceæ	13 *Piperales.*	*Piperaceæ
	Pittosporaceæ		Sauruaceæ
9 *Grossales.* .	Grossulaceæ		*Chloranthaceæ.
	Bruniaceæ		
	Escalloniaceæ		

If we should find it necessary to recur to this subject, we shall do so when speaking of NATURAL ORDERS.

EXORCISM, (ἐξορκισμός) the form of adjuration, or charging upon oath, by which evil and malignant spirits are subjected to command, or driven away: from the Greek *exorkizen* (ἐξορκίζειν). See Joannis Wieri, *De Præstigiis Dæmonum et incantationibus ac veneficiis Libri* v., 8vo., Bas. 1566 and 1583; and the *Manuale Exorcismorum*, by Maximilian ab Eynatten, 8vo., Antw., 1619.

EXORHIZÆ. [EXOGENS.]

EXOTERIC and ESOTERIC (ἐξωτερικός and ἐσωτερικός), literally 'external' and 'internal,' were two terms used in reference to the writings and doctrines of many of the antient Greek philosophers. The general distinction between the classes of works called by these respective names is this: the 'exoteric' were those writings which were in a more popular form; the 'esoteric' those which were written in a scientific and more exact form. The 'esoteric' would of course contain a true investigation of principles as then understood; the 'exoteric' would exhibit philosophical systems in such a form as the mass were able and willing to receive. The 'exoteric' writings consequently accommodated themselves to popular prejudices and superstitions, this being the only safe way in which a certain amount of philosophical truth could be conveyed to the vulgar. The 'esoteric' writings and doctrines were reserved for those who were far enough advanced to understand them, and to form a just notion as to the prevalent false opinions of the mass of the people. It is important to bear in mind this distinction between 'exoteric' and 'esoteric doctrines in forming our judgment of the character and writings of the antient philosophers. [ARISTOTLE, p. 334.]

EXPANSION. [HEAT.]

EXPECTATION OF LIFE, a term applied to the mean or average duration of the life of individuals of any given age. [LIFE, MEAN DURATION OF.]

EXPECTORANTS (from *ex*, out of, and *pectus*, the chest) are medicinal agents, which, in certain conditions of the system, will, either by promoting or repressing the secretion of the air-passages and of the lungs, facilitate its expulsion. The articles which bear this name differ considerably as to the means by which this end is accomplished. They are chiefly derived from the vegetable kingdom, some being gum-resins, or balsams, of a stimulating quality, while others are possessed of nauseating or sedative properties; vapours also are expectorants, and may be either simple, as that of warm water, or medicated with different impregnations. Vapours alone reach the organs to be affected, and are therefore the only *direct* expectorants; the others being taken into the stomach must operate by sympathy or some other obscure agency.

From the differences in the nature of the substances regarded as expectorants it is clear that they must operate in a very different manner, according to the state of the system, the pathological condition of the lungs, and the stage of the complaint. Great care is necessary in selecting the particular agent suited to each case, and in no set of diseases are greater errors committed by unprofessional persons by an injudicious employment of these agents, than in those of the lungs, from common colds to the more serious and fatal affections of these vital organs. The slight nature of many of the common maladies of the throat and lungs, and the fatality of consumption, which is generally though most erroneously regarded as an affection of the lungs themselves, while it is truly an affection of the whole constitution, have led to a degree of interference with the treatment of diseases of these organs not attempted in any other cases, as the multitude of popular remedies for *coughs*, *colds*, and *consumptions*, attest.

Those who regard their health and wish to prolong their lives should beware of tampering with such important organs by means of any of the numerous *nostrums* vended to the public. To treat satisfactorily the diseases of the lungs it is necessary to know their structure, and the relations they have to the other parts of the body. The bronchia (or air-passages) and air-cells of the lungs are lined by a *mucous* membrane, and have of consequence relations of sympathy with the skin and intestinal canal more close than with any other part of the system. A vicarious discharge or secretion is thrown off by the internal (pneumogastric) or external surface (*i.e.* the skin), and any considerable diminution of this discharge on the part of either is in some degree compensated for by augmented secretion of the other. Hence when the insensible perspiration of the skin is suddenly checked by exposure to cold, a double duty is thrown upon the internal membrane, sometimes of the intestines, when diarrhœa may result, sometimes of the lungs, when catarrh (common cold), or pneumonia may ensue. This fact enables us both to comprehend the cause of some of the diseases in which expectorants are proper, and their mode of aiding the cure.

A certain exhalation from the internal surface of the lungs and air-passages constantly goes on in a state of health—any considerable diminution or augmentation of this secretion may require the assistance of medicines to raise it to the proper quantity in the one instance, or to evacuate the superfluity and repress the tendency to its excessive formation in the other. The chief causes which lead to diminished secretion are inflammation and spasm—hence at the commencement of inflammatory affections of the air-passages and of the lungs the inner membrane is dry, and by the stethoscope what is called the crepitating *râle* is heard; in asthma and hooping-cough, while the spasm lasts, there is an absence of secretion, which becomes abundant when the spasm yields.

To obviate these states very different means must be employed from what are necessary in the later stages of an inflammatory affection, or where there was extreme relaxation of the vessels of the lungs, and the exhaled fluid redundant in quantity. One of the terminations of inflammation being by effusion, when the increased action of the vessels has lasted for some time a state of the lungs occurs which is precisely the reverse of what it was before, and an extreme quantity of mucus obstructs the access of air to the blood circulating through the cells of the lungs: if this continue to accumulate, suffocation must follow. Too great an accumulation sometimes takes place, especially in elderly people, not from excessive secretion but from deficient absorption.

These are a few of the different states for which expectorants are used, but much circumspection is required to accommodate the means to the end. Where there is decided inflammation the best expectorants are those which lessen the inflammatory state, such as venesection and nauseating doses of tartrate of antimony or of ipecacuanha, and the inhalation of the vapour of warm water, simple or medicated, by means of Mudge's Inhaler. But as the use of any such instrument requires considerable exertion of the respiratory organs, where the inflammation is violent it is inadmissible, as the lungs must be kept in as tranquil a state as possible; but the head may be held over a basin of warm water, the vapour of which will be received by the lungs in the ordinary course of respiration.

When the inflammation has subsided, the more stimulating expectorants may be used. Where there is first spasm hindering secretion, and ultimately an excessive exhalation which must be cleared away, a combination of a sedative or antispasmodic medicine with the expectorant is best.

These are the principles which should regulate our choice in the more acute affections of the chest; but as no set of organs are so subject to chronic disorders as the lungs and their appendages, we frequently have recourse to expectorants to alleviate many of the symptoms attendant on them.

Lessening the tendency of blood towards the lungs, and directing it more towards the skin, is of service both in acute and chronic affections of the chest. Hence bathing the feet in warm water on the first feeling of an attack of cold, followed by antimonials or other diaphoretics, is of much utility, if the patient go into a warm bed immediately; while, on the same principle, the use of flannel next the skin is the best preventive, and is indispensable for all delicate persons, particularly if predisposed to diseases of the lungs.

EXPLANA'RIA. [MADREPHYLLICEA.]

EXPONENT; EXPONENTS, NOTATION OF. In the algebraical expression a^x, x is called the exponent of a. If we were strictly to preserve the most antient meaning of the term, x would be called the exponent of the whole symbol a^x: but it is usual to call x the exponent of a, and the logarithm of a^x.

From the time of Descartes it has been usual to employ exponents in abbreviation of repeated symbols of multiplication: but this was only the beginning of a series of extensions which have made the theory of exponents a fundamental part of analysis. Beginning with the simple substitution of a^2 instead of $a \times a$, a^3 instead of $a \times a \times a$, and so on, we have a succession of new symbols suggested by the processes of algebra, namely, that a^1 should stand for a, a^0 for unity, a^{-x} for the reciprocal of a^x, and $a^{\frac{m}{n}}$ for the nth root of the mth power of a. These conventions being made, the common algebraical theory of exponents is complete; and the student will find in works on algebra an account of the manner in which the necessity for these extensions appears. The theory of logarithms flows naturally from this notation and the binomial theorem.

Looking at the notation of exponents in another point of view, we see that a^1, or a, signifying the performance of a certain operation on the unit, a^2, or aa, signifies the repetition of the same operation upon a itself; a^3 denotes the repetition of the same operation upon a^2, and so on. Hence by analogy, whenever, in the higher parts of analysis, ϕx signifies an operation performed upon x, $\phi^2 x$ signifies the repetition of the operation upon ϕx. Thus if ϕx signify $1 + 2x$, then

$$\phi^2 x \quad \text{is} \quad 1+2\,(1+2x) \quad \text{or} \quad 3+4x.$$
$$\phi^3 x \quad \text{is} \quad 1+2\,(3+4x) \quad \text{or} \quad 7+8x, \text{ \&c.}$$

It appears by reasoning analogous to that which establishes the meaning of exponents in algebra, that $\phi^0 x$ must stand for x itself. Also $\phi^{-1} x$ must signify the operation inverse to (or which destroys the effect of) ϕx; thus if ϕx signify x^2, $\phi^{-1} x$ must be $\sqrt{x}$. Also $\phi^{\frac{m}{n}} x$ means that operation which performed n times in succession, gives the same result as ϕx performed m times.

The Differential Calculus and the Calculus of Differences furnish striking examples of the notation of exponents. As soon as the student arrives at the higher parts of these subjects, he should pay particular attention to the structure of the notation, and in particular to the meaning of those theorems in which the symbols of operation are separated from those of quantity.

EXPORTS. [IMPORTS AND EXPORTS.]

EXTENT (Lat. *extenta*) is a writ of execution (sometimes called an *extendi facias*), which is directed to the sheriff against the body, lands, and goods, or the lands only, of a debtor; and it is also used as signifying the act of the sheriff or officer upon the writ itself.

The king by antient prerogative is entitled to this writ, either in chief or in aid for the purpose of obtaining satisfaction of debts originally due to him or assigned to the crown. *The writ of extent in chief* is an adverse proceeding by the king for the recovery of his own debt, and in which he is the real plaintiff. This writ is issued out of the equity side of the Court of Exchequer; and the sheriff, for the purpose of executing it, may break open the defendant's doors, when purposely closed, either to arrest him or to take his goods. If however the defendant cannot be found, or is not meant to be arrested, the sheriff impanels a jury to inquire as to the debtor's lands and tenements, goods and chattels; and after the inquisition is made, the lands then become bound to the crown until the debt is satisfied. *The writ of extent in aid* is also sued out at the instance and for the benefit of the crown against the debtor of a crown debtor: in this proceeding the king is the nominal plaintiff only. This writ is in effect an extent in the second degree, and in order to obtain it an extent *pro formâ* is sued out against the debtor to the crown, upon which an inquisition is taken; and if it be thereupon found that another person is indebted to him, the Court of Exchequer, on an affidavit to that effect, and also to the effect that the crown debt is in danger, will grant a fiat or warrant for an immediate extent in aid. Under this writ, the body of the defendant may in strictness be taken in execution as well as his lands, tenements, goods, and chattels, &c.; but where there are effects sufficient to satisfy the debt, the court seems generally disposed to give the defendant his discharge.

On the return of the writ of extent in chief or in aid to the court from whence they are issued, an order is endorsed on the back of it, 'that if no one shall appear and claim the property of the goods, &c. mentioned in the inquisition, on or before that day se'nnight, a writ of venditioni exponas shall issue to sell the same.' If the produce of the goods sold be not sufficient to pay the debt, the court will make an order for the sale of the debtor's lands under the 25th George III., c. 35.

There are various means of resisting the execution of the above writs, on the ground of informality or want of title in the crown; which may be referred to in the second volume of Mr. Tidd's work on the practice of the superior courts.

The writ of extent for the subject is founded upon a recognizance at common law or by statute, or upon a judgment in an action of debt against an heir, on the obligation of his ancestor. It is very similar in its effects and mode of execution to the other writs of extent already specified. [ELEGIT.]

When lands are delivered over to a creditor upon an extent, a reasonable but not the real value is set upon them; and the effect is the same as if the creditor took a lease of the lands until his debt is satisfied. The time during which the creditor will hold the lands will of course be determined by a comparison of the value set on the lands with the amount of the debt. (Coke *on Littleton*; Tidd's *Practice*; Blackstone's *Commentaries*.)

EXTORTION; any oppression under colour or pretence of right. In its more common acceptation, extortion is applied to the unlawful taking by an officer, under colour of his office, of any money or valuable thing where none at all is due, or not so much is due, or before it is due. The officer is punished by fine and imprisonment, and by removal from office. Where no fee at all is due, the offence is more properly exaction—the distinction is thus made in the *Termes de la Ley*: 'Extortion is where an officer demandeth and wresteth a greater sum or reward than his just fee: and exaction is where an officer or other man demandeth and wresteth a fee or reward where no fee or reward is due at all.'

EXTRACTION OF ROOTS. [INVOLUTION AND EVOLUTION.]

EXTRACTS are medicinal preparations of vegetable principles, obtained in various ways. Sometimes they are merely the juices expressed from the fresh plants, brought by careful evaporation to the consistence of honey, and then more properly denominated *inspissated juices;* at other times they consist of certain principles of the fresh or dried plant extracted by some menstruum in which they are soluble, such as water, proof spirit, or vinegar, and afterwards evaporated, as in the former case. According to the nature of the menstruum employed the extract is called *watery, alcoholic,* or *acetous.* The objects proposed in such proceedings are, to ensure the preservation of the active principles of the plant by removing the fluid in which they are dissolved, or the materials with which they are associated, that have a greater tendency to fermentation or putrefaction; to bring the valuable portion into the smallest possible compass; and to facilitate the administration of them by thus rendering them capable of being made into pills, &c.

The preparation of extracts requires the greatest care. The plants must be in every respect of the best quality, as regards the place of their growth, season when collected, &c., and the evaporation must be conducted rapidly, yet at a low temperature. Orfila found that the excellence of preparations of this kind was always in the reverse ratio of the temperature employed to form them. Mr. Barry effected a great improvement in the mode of preparing extracts by evaporating *in vacuo.* During the preparation, and especially towards the end of the operation, frequent stirring the contents of the evaporating-pan is necessary to prevent burning or decomposition of any portion of the mass. Extracts may also be formed from dried plants, barks, roots, &c., by reducing them to fine powder and macerating it for 24 or 48 hours in sixteen times its weight of water. In general cold water is now employed, but in some cases it is proper to employ warm. The extract of cinchona, prepared with cold water, is less powerful than that prepared with warm.

Extracts are simple or compound, according as they are prepared from one plant or from several different kinds.

This mode of preparing vegetable principles is generally unsuitable where a volatile oil is the active agent, unless great care and a very low temperature be used.

A well-prepared extract should possess in a great degree the odour, and especially the taste, of the plant from which it is obtained; it should not have either an empyreumatic smell or taste, and it should have a proper and uniform consistence. It is necessary to preserve extracts in a dry situation: to assist in keeping watery extracts, it is customary to sprinkle a little alcohol over the surface before covering them up; but watery extracts, if made with cold water and due care, rarely require this precaution. It is proper to examine the condition of all extracts very frequently, both during very warm and very wet weather: any portion which seems spoiled should be immediately thrown out.

Formerly, from the careless or unskilful mode of their preparation, extracts were the most uncertain and useless form of vegetable remedies; but since competent practical and scientific chemists have given their attention to the subject, they are now, in many instances, the most valuable contributions which chemistry has made to practical medicine.

EXTRAVASATION (*extra*, without, *vas*, a vessel), in medicine, signifies the escape of any of the fluids from its natural reservoir or canal into some neighbouring cavity or texture. The term is nearly synonymous with effusion, but less comprehensive, as it does not include the case of fluids poured out by secretion, such as dropsies, or any of the products of inflammation. It is most commonly employed in designating effusions of blood or of urine; and we shall therefore confine what we have to say on the subject to a brief notice of the principal varieties of these accidents, referring the reader for more complete information to other parts of the work.

Extravasations of blood are always serious and often fatal when the larger vessels and more important organs are concerned in them. Thus if blood escape in consequence of the rupture of an aneurism of the aorta into the bag which encloses the heart, the circulation is immediately arrested, and sudden death ensues. Such an accident is said to be 'an extravasation of blood into or within the pericardium.' [ANEURISM.]

Blood is sometimes driven with great force from a ruptured or wounded artery into the loose spongy substance consisting of connected cells which surrounds and separates the various organs, and is found in great abundance in every part of the body. This is called 'extravasation of blood into the cellular tissue' of the part. In such cases, if the vessel be a large one, the extravasation may be so considerable as to occasion enormous swelling and distension of the contiguous parts; and it may be fatal from the amount of the hæmorrhage, or from pressure upon some vital organ, or from mortification. [HÆMORRHAGE.] This is a frequent source of danger in gunshot wounds. Fractures also are generally followed by considerable effusions of the same kind, which however are soon absorbed, and are not often attended with serious consequences, except in fractures of the skull: in that case they compress the brain, and produce the symptoms of apoplexy. [HEAD, INJURIES OF THE.] The *thrombus*, or swelling beneath the skin, so frequently observed after bleeding from the arm, is also formed by extravasation of blood into the cellular tissue. It arises from the puncture in the skin not corresponding with the opening in the vein, or not being sufficiently large. It soon disperses, and is of little importance. [BLEEDING.] Contusions are likewise followed by extravasation of blood into the cellular tissue under the skin and in the skin itself from the rupture of small vessels; and this is the reason of the dark colour assumed by the bruised parts, which often extends to a considerable distance from them; as in the familiar instance of a black eye. This superficial extravasation is generally called *ecchymosis*, a word of the same import.

Spontaneous extravasations of blood, allied to those last mentioned, frequently take place in the progress of various diseases, of which they may be causes or symptoms. The spots which appear under the skin and beneath the membranes which line the internal cavities and tubes, in plague, typhus fever, sea-scurvy, and other complaints, are of the symptomatic kind; and these as well as the discolorations after contusions are included in the general term *ecchymosis*; they are also known by various other names, as *vibices* (wheals), *petechiæ*, and *purpura*. They are frequently attended with bleeding from the mucous membranes of the intestines and bladder, and of the nose; and they often occur, in the lower extremities especially, when the liver is enlarged, or otherwise diseased. They are supposed in general to indicate a want of tone in the system, and are attributed by some to a *dissolved* and semiputrescent condition of the blood; but they arise in some instances from a plethoric habit, and require bleeding for their cure.

One of the most common causes of apoplexy is an extravasation of blood in the substance of the brain, or between its membranes, from the simultaneous rupture of many minute arteries. It happens for the most part suddenly, when the vessels of the head are preternaturally distended, but yet not without some premonitory signs; and as the affection occurs most frequently at an advanced period of life, when the arterial system in general is disposed to disease, it is probable that the rupture is often preceded by some morbid change which renders the capillary vessels more than usually fragile. [APOPLEXY.] The term *apoplexy* has been extended by modern pathologists to similar extravasations occurring in the texture of other organs besides the brain; it may take place in the liver when the venous system of the abdomen is loaded with blood, and from other causes; and it frequently happens in the lungs when their circulation is either obstructed or too forcibly urged in various diseases of the heart. [HEART.] It likewise happens very commonly in the early stage of consumption, when the body is yet full of blood, and the substance of the lungs is rendered brittle and inelastic by the deposit of tuberculous matter. [PHTHISIS.] When it occurs in the lungs, the injury is attended with *hæmoptysis*, or spitting of blood. In this, as in many extravasations of the same kind, it is probable that the blood is effused rather in consequence of a *rent*, or breach of continuity in the structure concerned, than from what is implied in the common notion of the breaking of a blood-vessel.

The presence of extravasated blood does not in itself produce much irritation, and the coagulum is soon absorbed when the quantity is not very great, and the vital powers are not depressed by concomitant causes. Where pressure is applicable, the absorption is much quickened by a bandage put on after the immediate effects of the injury have subsided, as in sprains and bruises of the limbs: friction and embrocations have the same effect.

Extravasations of urine may take place in consequence of rupture of the bladder or urinary passages from ulceration, mechanical injuries, or any cause that produces distension to a great degree. If the fluid escape into the cavity of the abdomen, the result is uniformly and speedily fatal. If it insinuates itself into the cellular tissue in the neighbourhood of the neck of the bladder or the urethra, the accident is still a very serious one, though it generally admits of cure if the nature of it be immediately recognized. The fluid, which is highly deleterious, must be promptly evacuated by free incisions, and care must be taken to prevent further infiltration. If this be neglected, unhealthy suppuration is sure to take place, accompanied by fever of a typhoid character, and followed by extensive mortification.

The most common causes of infiltration of urine are abscesses of the prostate gland, and neglected or mismanaged strictures; and a very frequent consequence is the establishment of a urinary fistula in the perineum. [URINARY ORGANS.]

It may be remarked that the bile is sometimes extravasated in the same way from the gall-ducts or bladder. If it escape into the abdomen, it is followed by a similar fatal result from inflammation of the *peritoneum*. [ABDOMEN: CALCULI, BILIARY.]

EXUMA. [BAHAMAS.]

EYCK, JOHN VAN, the improver and supposed inventor of oil-painting, sometimes called John of Bruges from his having settled at that place, was born at Maaseyck as is generally said, in 1370, and studied with his elder brother Hubert (born in 1366), an artist of reputation, but now rarely mentioned except in conjunction with himself. There are however some reasons for supposing John to have been born much later than 1370. There are very contradictory accounts of his merits. Some extol him as a various and expressive designer; others say he had no claim to repute, except as a colourist; others again found his whole fame upon his discovery of the art of painting in oil; and it was concluded by most, till lately, chiefly on the authority of Sir Joshua Reynolds, that Raspe the antiquary, in a treatise on the question, had deprived him even of this last remnant of his renown. Raspe certainly proved that he did not make the discovery; but he surmised, what Lanzi has since shown to be the probable conclusion, that although Van Eyck did not invent, he greatly improved the art of oil-painting, and brought it into general use. This was effected by his discovering the means of giving consistency to colours without drying them in the sun, and of adding to them clearness and brilliancy by a water-proof varnish. After having long resided in the rich and flourishing city of Bruges, the two brothers removed about 1420 to Ghent, where their greatest and most renowned work, the adoration of the Lamb, was painted between the years 1420 and 1432. Some say it was painted for Iodceus Vyts, a rich citizen of Ghent, while others affirm that it was by order of Philip, duke of Burgundy, count of Flanders, who came to the government in 1420. It is certain however that John Van Eyck was long attached to the brilliant court of Philip. This often described picture contains no fewer than 330 figures. It is with folding-doors, filling in all twelve panels. It was so highly prized that it was shown only on particular occasions. Philip II., king of Spain, thought of removing it to Madrid, but was prevailed upon to content himself with a copy by Michael Coxis of Malines. This copy has in our days found its way back to the Netherlands, and thence, as it should seem, to Berlin. The fate of the original is remarkable, and much to be regretted. It remained entire till the French, getting possession of Belgium, of course turned their eyes to so rich a prize. The clergy of the cathedral of St. Bavon succeeded however in concealing eight of the twelve panels, so that only four were taken to Paris, whence they were brought back in 1815. The clergy have since sold six of the panels which were concealed, and they are now in the Royal Museum at Berlin, where they are united with a part of the copy made by Coxis for Philip II. Hubert Van Eyck died in 1426. John is generally said to have died in 1441, but the date of his death is uncertain. (Raspe, Descamps, Lanzi, &c.)

EYE. The organs appropriated to the sense of sight are distributed very extensively, yet with that frugality which always regulates the operations of nature in the construction of animals. All the active species which live in the light are furnished with them; the rest are disqualified to possess as well as to profit by them, by their limited powers of locomotion, or by constant residence in the dark. In conformity with this rule, to which there are few, if any, exceptions, these organs are occasionally associated with the lowest types of animal development, and are sometimes absent in the highest. Thus some radiated animals, most of the articulated tribes, and many of the mollusca, have manifest organs of vision, and some of them are of the most curious and artificial construction; on the other hand, the mole and the shrew-mouse*, both vertebrated animals, and belonging to the highest order of that class, the mammalia, are blind. They have eyes, it is true; but those of the mole are not larger than the head of a pin, and are unprovided with optic nerves; and the equally imperfect eye of the shrew is covered with skin, from which hair grows as on the rest of the body. Hence, even in the absence of further evidence, we might conclude that if these animals have any perception of light, it can only be sufficient to warn them back to their haunts when by any accident they emerge to the day. But it is more probable that they do not see at all; and that these rudimentary organs, like the male nipple, exist only in conformity with the general model of vertebrated construction.

The structural peculiarities of the eye, as well as the presence of that organ, may be inferred with more certainty from the circumstances of an animal, than from the place it occupies in any zoological scale: in fact, no part has a closer relation to the habits and mode of existence. The eye may be simple or compound, single or multiplied, fixed or moveable: it may be encased in a hard transparent shell; or lie deeply imbedded within the protection of a bony socket; or project from the surface of the head at the extremity of a sensitive and retractile horn: it may be adapted for near or distant, oblique or direct vision; for seeing in a strong or a weak light, in a dense or in a rare medium; or it may be formed so as to accommodate itself to each of these conditions in its turn: and these peculiarities will all be found upon examination to be in strict accordance with the exigencies of the animal. Mere difference in bodily size, and the proportionate reduction or increase in the bulk of the eye, is sufficient to constitute a reason for a difference in its structure, and may suggest an explanation when such discrepancies are observed to exist in animals otherwise alike.

Yet, with all the varieties in configuration to which we have alluded, it is rather in form than in substance that the eyes of animals differ from each other. The organ has always a common purpose, and is essentially the same in all cases: that is, we find an assemblage of the same fundamental parts, generally arranged in the same order, even when our powers of observation are assisted by the microscope, and until all traces of organization are lost in extreme tenuity of texture and the transparency which results from it. And although there are refinements in the structure of the organ of which we do not know the purpose, and certain delicate adjustments in the exercise of the faculty of which we do not know the instruments, yet upon the whole we can deduce the principles upon which the eye is constructed, and assign the uses of its several parts with great certainty from our knowledge of optical and physiological laws.

Having offered these prefatory remarks on the organ in general, we now proceed to the most interesting of its varieties—the human eye. We propose, in the first place, to describe its anatomical structure at some length, noticing as we proceed, or subsequently, some of the most remarkable peculiarities in the eyes of other animals. We shall then add a few observations on the physiology of vision, and complete our account of the organ with an outline of its most important diseases in the human subject.

The object, or what may be called the *general problem*, of the beautiful mechanism we have to consider, is to combine distinctness and extent of vision with the security and maintenance of the organ, and the utmost convenience in using it. The parts associated for these purposes are the *orbits*, or sockets, of the eye; the *optic nerve;* the *eyeball*, or globe, with its contents, and the external muscles which move and suspend it; the *eyelids;* the *lacrymal apparatus;* the nerves and vessels which supply these parts, and the mass of fatty and cellular substance which isolates and supports them. We shall describe these parts nearly in the order in which they have been enumerated.

Orbits.—The eyes with their appendages are lodged in two symmetrical roomy cavities in the skull, completed in front by the eyelids, but elsewhere entirely circumscribed by bone, the office of which, it need hardly be said, is to protect them from injury, and from any pressure that might embarrass the perfect freedom and precision of their movements. These cavities are called the orbits, orbital fossæ, or sockets of the eye. Seven bones of the cranium or face, which we need not enumerate, enter into the composition of each. They are separated from each other in their whole depth, which is about two inches, by the posterior chambers of the nose. They are conical in shape, or, more strictly speaking, pyramidal, and obscurely quadrangular. The apex is directed backwards; the base, about an inch and a quarter in width, is directed forwards, with a considerable inclination outwards or towards the temple. The margin is less prominent at the outer side than elsewhere, so that when viewed laterally it presents a wide semicircular notch, with the concavity forwards. One object of the divergence of the orbits, and of this retreating curvature of the outer margin, is obviously to increase the extent of vision. If the point of the finger be held before the eye, and carried gradually back towards the ear, it will be observed that, in consequence of this arrangement, it can be seen long after it has got behind a vertical plane touching the front of both eyes, which, taken together, are thus enabled to sweep over an angle of about 220°, or 20° on each side behind the tangent plane. Above and below, the edge is undercut as well as prominent, and the socket is therefore a little wider within than at the margin itself, so that it slightly overhangs the eyeball at these points. The inner or nasal sides pass directly backwards and are parallel to each other, and the roof is horizontal; consequently the conical form of the cavity arises from the inclination of the outer side and floor. In the angle between these sides, and in that between the first and the roof, there are two long irregular slits. The former opens into the deep hollow between the

temple and the back of the upper jaw; it is called the *foramen lacerum inferius*, or *spheno-maxillary fissure*, and gives passage to a branch from the fifth pair of nerves, which piercing the bone, passes beneath the floor of the orbit, and emerges upon the cheek through a hole just beneath the lower edge of the orbit, about a third part from the inner angle of the eye. The other slit, which is called the *sphenoidal fissure*, or *foramen lacerum superius*, opens into the cavity of the head, and transmits another branch of the fifth pair, which passing within the orbit, along the roof, comes out through an opposite notch in its upper margin, and is distributed upon the forehead and upper lid. These branches of the fifth pair, called the *supra* and *infra-orbitary* nerves, are the most frequent seats of that excruciating affliction the *tic-douloureux*. Through the sphenoidal fissure are likewise transmitted the ophthalmic veins, and all the other nerves except the optic destined to the eye and its appendages. A third opening, which is circular, called the *foramen opticum*, of the size of a large quill, and leading also from the cavity of the skull, gives passage through the sphenoid bone to the ophthalmic artery and the optic nerve. It is directed obliquely outwards and forwards, and is situated at the apex or back part of the orbit, in the angle between the nasal side and the roof. In the same angle, close to the margin, that is just within the corner of the eye near the nose, there is a deep groove leading into the lacrymal canal, to which we shall have occasion to recur hereafter.

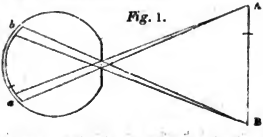
Optic nerves.—The optic nerves, arising at the back part of the brain, with which they have extensive and important connections, not only where they seem to originate, in the *corpora quadrigemina*, but throughout the whole of the first part of their course within the cranium, pass horizontally forward above the floor of that cavity, converging towards each other till they meet, when they become closely united. It is probable that they not merely meet, but cross each other, the greater part, if not the whole, of the nerve from the *right* side of the brain going to the *left* eye, and *vice versâ*. It has been ingeniously supposed by Dr. Wollaston (*Phil. Trans.* 1824), in order to account for some singular phenomena of disordered and healthy vision, that this *decussation* or crossing takes place only with respect to those parts of each nerve which lie towards the other; so that each supplies the outer half of one eye and the inner half of the other. This he conceives would explain, among other things, the correspondence between the *homologous points* of the two eyes, which may be defined as those points which see the same object at the same time. It is scarcely possible to verify such speculations by dissection, from the softness and apparent homogeneity of the parts. In fish* the optic nerves cross each other entirely without touching; and in man, when the sight of one eye has been lost, the nerve beyond the point of union within the cranium has been observed to be wasted or diseased on the side opposite to that of the affected eye. [BRAIN; NERVE.] Beyond the point of junction the nerves again diverge from each other, and passing into the *optic foramen*, become invested in a tough, flexible, and fibrous sheath, which is a tubular production of the strong membrane called the *dura mater* which lines the cavity of the skull. The outer part of this sheath is reflected off as the nerve enters the orbit, and expanding, adheres to the bony surface of that cavity throughout, becoming its *periosteum*. The nerves, continuing to diverge, reach the eye-ball after a somewhat tortuous course of an inch in length. The curvature and laxity of the optic never give facility to the movements of the globe, and preserve the delicate structures within it as well as the nerve itself from the injurious effects of tension. Its length is such as to allow the eyeball to project slightly beyond the edge of the socket in front and to afford space behind for the action of the muscles which move it, and a suitable distance between their points of attachment. Including the thickness of the sheath, it is about one-sixth of an inch in diameter. It does not consist, like other nerves, of a bundle of distinct fibres, but of a medullary pulp inclosed in minute transparent tubes. The sheath is pierced half an inch from the globe by a vessel called the *arteria centralis retinæ*, which, accompanied by several small veins, reaches the axis of the nerve, and passes with it into the interior of the eye. The nerve does not enter the back of the globe exactly in the axis of vision, but about the fifth part of an inch from it, in a horizontal line, on the inner or nasal side, and subtending an angle of about 23° at the centre of the eye. At this point the dimensions of the sheath are suddenly contracted, and it terminates in a thin cul-de-sac, pierced with minute holes or pores, hence called the *lamina cribrosa* (sieve-like plate) Through these pores the pulp of the nerve, divested of its tubular involucra, passes into the interior of the globe in divided portions; but immediately reuniting, expands at the back of the eye into a delicate cup-shaped membrane, with the concavity directed forwards. This expansion of the optic nerve is called the *retina*; it is the most important part of the eye, having a peculiar and exclusive sensibility to the impressions of light, of which immediate notice is conveyed from it along the collected nerve to the brain. All other parts of the mechanism of vision are subordinate to this; and their whole office, independently of the conservation of the organ as a part of a living body, is to regulate the quantity of light admitted into the eye, and to distribute it in such a way upon the surface of the retina, that the impression, which, if immediately received, would be confused and general, may be an exact counterpart of the visible surface of the object.

Mechanism of distinct Vision.—A specific account of the several provisions which conduce to this end will be more readily apprehended if the circumstances which make each of them necessary be first briefly passed under review, and the requisite parts be supposed to be added to the retina in succession.

The most elementary fact that we know respecting light is, that it proceeds in straight lines or rays from every point of a luminous or illuminated body. A sensitive surface or retina presented nakedly to such a body would therefore intercept innumerable cones or pencils of light, each diverging from a different point of the object. But each point of the retina must also be considered in that case as the apex of a cone of rays *converging* upon it from *every* part of the object; and it is manifest that the various impressions thus received upon the same point at the same time would be undistinguishable from each other. All therefore that we can conceive to be communicated to the mind by the sum of such indefinite impressions over the whole retina, is a knowledge of the prevailing colour of the object, and possibly a general idea of its direction. But if there were more objects than one, or that one had 'parts or magnitude,' even this inconsiderable addition to the mere sense of light and colour would be impossible. The confusion resulting from the simultaneous impressions of a multitude of pencils of light on the same surface would be partly removed if the seat of perception were placed at the bottom of a cavity capable of being turned to each object or each part of the same object in succession, inasmuch as this would prevent the interference of rays proceeding from parts not actually under contemplation; but an indistinctness would still remain in proportion to the magnitude of the field of view, only remediable by narrowing the cavity to a mere capillary tube, upon the inconvenience of which we need not enlarge.

Let us consider what would be the effect of a very simple addition to the cavity. We will suppose it to be closed in front by a dark screen, perforated with a small central hole as in the section represented in *fig.* 1.

Fig. 1.



In this case pencils of rays crossing each other from A and B, the top and bottom of an object, would inpinge at *a* and *b* upon different parts of the retina. By this means the advantages of a large and a small field of view would be combined, a *distributed* impression of the object would be produced, and its several parts would be seen separately and in their proper relative situations. The effect may be easily shown by holding a card, pierced with a smooth circular hole, near a taper, and throwing the spectrum upon a wall at a little distance. Such a screen is termed the *iris*.

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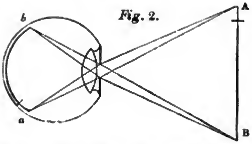
* Except in the haddock (*gadus morrhua*., D. W. Soemmering, 'Sect. Horizont. Ocul.' In this fish they do not cross each other, but pass to the orbit on the same side.

But still the rays from each point of the object would be diffused over a *space*, instead of being collected upon a separate *point* of the surface, and the impressions of contiguous pencils would in some degree overlap and confuse each other. This inconvenience might be lessened by contracting the opening, but another cause of indistinctness would then be introduced in the diminished admission of light.

Fig. 2.

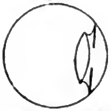


Both evils might be avoided if a *lens* of a proper construction were fixed behind the screen (as in *fig.* 2). Pencils diverging from single points of the object would thus be admitted through the opening, which we will call the *pupil*, and would be made to *converge* to single points on the surface, and the impression would now be an exact counterpart of the object, A being distinctly seen in its true place and direction from *a*, and B from *b*.

But additional provisions would be necessary to bring this arrangement to the requisite degree of perfection. In the first place the retina must be adjusted to correspond in shape with the focal distance of the lens. This purpose might be accomplished, if the walls of the cavity were composed of flexible materials, by interposing a transparent fluid between the lens and the retina, which, by its uniform distension, would constrain the latter to take and retain the form of a portion of a sphere.

Again, although the diagram has been otherwise drawn for an obvious reason, our arrangement hitherto supposes the object to be very small, and to be seen directly in front of the eye; but if oblique as well as direct pencils are to be brought to a focus, that the lateral vision may be also *distinct*, a second refracting body, of a proper form, must be placed in front of the lens. This may be done very conveniently, with the further advantage of completing the cavity, by adding a transparent portion to its walls in front of the screen, to be likewise distended with fluid in order to keep it in the shape of a segment of a sphere (*fig*. 3.)

Fig. 3.



It is also desirable that the back of the screen and the interior of the cavity should be blackened, that the rays may be extinguished after impact upon the retina, lest any internal reflection should interfere with the impressions on other parts. The expediency of this provision is always kept in view in the construction of optical instruments, and may be made evident by looking at a bright object through a polished metal tube. The colouring matter is called the *pigmentum nigrum*, or, simply, the *pigment*.

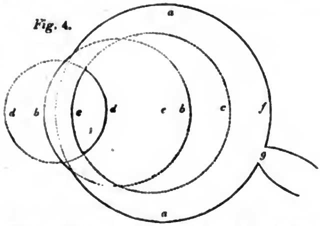
The only remaining artifice to secure the perfection of the organ that need be mentioned in this synopsis of its most essential provisions, is to endow the pupil with the faculty of contraction and enlargement according to the quantity of light. If it were of a constant size, more light would be concentrated upon the retina from a bright or a near object than from one comparatively distant or faintly illuminated; and as the sensibility of the retina must remain the same, the disproportion would occasion dimness of sight in one case and dazzling in the other, and might even impair the nerve.

We have thus imagined all the parts to be built up in succession that are of primary importance (as far as we know) in the construction of an organ of *distinct vision*, and the figure to which we have arrived might pass as a tolerably correct diagram of the human eye.

The laws of light and sensation require that there should be a general type in the structure of these parts, and a mutual relation among them as to density, form, and position. But this does not preclude much variety; a difference of position, for instance, may be, and frequently is, compensated by a corresponding difference in form or density either of the same or other parts. Hence the problem of distinct vision has many solutions, each perfect in its kind. In fact nothing can be more diversified in unimportant particulars, or more uniform in those which are essential, than the interior constitution of the eye in different animals: it is never precisely the same in any two species, however closely they may be allied; but we constantly find the retina, the lens, and the pigment, and generally the iris, enclosed of course in some kind of capsule, transparent in front, and partly occupied by complementary fluids. To this there are some exceptions, which however we believe to be only apparent. Thus the larvæ of many insects, the *cercariæ*, and other microscopic animalcules, and some of the molluscs, have red or black spots upon their surface, which are undoubtedly eyes, and are thought by some to be little more than expansions of an optic nerve beneath a thin coloured membrane to absorb the light, and in some unknown way to distribute its impressions. But when observation fails us, our presumptions with respect to natural phenomena should be guided by analogy and accord with known principles; and as nothing that we know of light enables us to conceive how so inartificial a construction as this can account for the acute vision obviously enjoyed by some of these animals, we are disposed to adopt another view of such coloured points, and to consider them as a congeries of extremely minute but perfectly formed eyes of the usual construction, of which the pigment alone is visible from its opacity and abundance. The myriads of simple eyes observed under the microscope to be grouped together in the compound organs of the perfect insect and other articulated animals, as the scorpion and crab, afford strong analogical grounds for this opinion.

We now resume our account of the anatomical structure of the human eye.

Fig. 4.



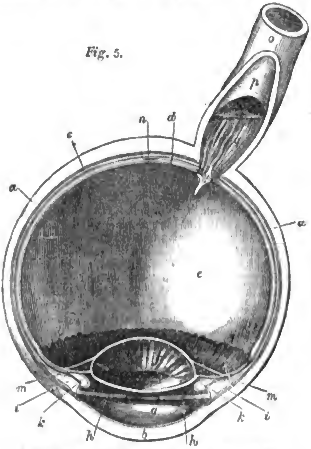
Section of the spherical surfaces of the eye, twice the natural size; the circles completed in dotted lines.

a, Sclerotic. *b*, Cornea. *c*, Anterior surface of lens. *d*, Posterior surface of lens. *e*, Centre of the eye. *f*, Intersection of the axis of direct vision with the back of the eye. *g*, Entrance of the optic nerve.

Globe.—The globe, or eyeball, contains the parts immediately concerned in vision. It consists of very unequal portions of two spheres of a different size, which have a common circular intersection in a transverse vertical plane, much nearer the front than the back of the eye. The iris, or coloured screen, perforated centrally by the pupil, nearly occupies the situation of this imaginary plane, but is, strictly speaking, behind it. The posterior and larger portion is circumscribed by the sclerotic membrane, except in front, where it may be considered as bounded by the iris: it is rather less than an inch in diameter, and constitutes about five-sixths of the surface of the globe. (*Fig*. 4, *a*.) The included space is occupied by the choroid membrane and retina, the vitreous and crystalline humours, the ciliary body and processes, and a small part of the aqueous humour. The anterior portion, which forms about a quarter of a sphere, thirteen-twentieths of an inch in diameter (*Fig*. 4, *b*), and occupies the remaining sixth part of the surface of the globe, contains the rest of the aqueous humour, and is bounded in front by the transparent and slightly prominent disc set in the sclerotic like a watch-glass in its metallic rim, and known as the *cornea* from its horny texture. Its transverse chord, or the diameter of the circle of union between the cornea and sclerotic is nine-twentieths, or nearly half an inch in length.

The globe derives its firmness to the touch from the distension of the contained fluids: its capability to bear that distension, which insures the permanence of its shape, is due to the flexible but strong and inelastic outer covering or tunic, consisting as we have said of the sclerotic and cornea.

Fig. 5.



Section of the globe of the right eye through the optic nerve.

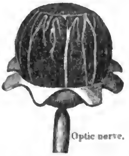
a, sclerotic; *b*, cornea; *c*, choroid; *d*, retina; *e*, vitreous humour; *f*, crystalline humour or *lens*; *g*, aqueous humour; *h*, iris; *i*, ciliary ligament; *k*, ciliary processes; *l*, ora serrata of the ciliary body; *m*, canal of Petit; *n*, foramen of Soemmering; *o*, sheath of the optic nerve; *p*, substance of the nerve; *q*, arteria centralis retinæ.

Sclerotic. (*Fig.* 5, *a.*) The sclerotic membrane is so called from its toughness (σκληρός, hard, rigid). It may be considered as an expanded prolongation of the sheath of the optic nerve, which it resembles in its interwoven fibrous texture. Its inner surface is continuous with the lamina cribrosa already mentioned. Immediately around this part it is about an eighth of an inch thick, and gradually becomes thinner as it approaches the cornea, which it slightly overlaps. The two structures are not separated by an abrupt line, but are blended together, and adhere so closely that they cannot be torn asunder without great force. The thin glistening tendons of the muscles which move the globe, or rather their smooth outer laminæ, are spread over and incorporated with the sclerotic in front, approaching each other till they unite near its junction with the cornea. They render it somewhat thicker in this situation than in the spaces between them or behind the line where they begin to be inserted. This front part of the capsule of the eye is called the *tunica albuginea*, from the whiteness characteristic of all tendinous parts.

Conjunctiva. The albuginea is defended from contact with the air by a transparent mucous membrane, continuous with that which lines the interior of the eye-lids. It is called the *conjunctiva reflexa* or *adnata*, to distinguish it from the *conjunctiva propria* of the lids. It is very loosely connected to the sclerotic at first to facilitate the movement of the globe: as it advances forward it becomes more closely attached to the albuginea; and hence extending to the cornea, adheres intimately to its margin and over its whole surface. The conjunctiva is the most sensitive external part of the body to all painful impressions, except cold, especially where it invests the cornea. The smallest particle of foreign matter in contact with it gives intolerable pain, and makes the act of winking to clear it away imperative on the will; and hence its chief and most essential use as part of the delicate organ of which it may be considered as the guardian. If the nerve which supplies it with sensibility be divided or injured, incidental causes of irritation are suffered to produce their injurious effects unheeded, and the eye soon becomes inflamed, ulcerates, and is destroyed.

Cornea. (*Fig.* 5, *b.*) The cornea is somewhat thicker than the sclerotic except at the back of the eye, is equally tough though rather more flexible, and of a much closer and more even texture. Its inner surface is concave, and nearly parallel to its outer surface; it is however rather thicker in the middle than elsewhere, and the general statement that it has no share in effecting the convergence of incident rays on account of the parallelism of its surfaces is therefore not quite correct. It is covered externally, as we have already mentioned, by the conjunctiva, and is lined internally by a delicate elastic membrane. The bulk of the tunic, or cornea proper, consists of several layers which slide upon each other when the membrane is rubbed between the finger and thumb, and are separated in the natural state by a limpid fluid contained in a delicate cellular structure. This fluid gives plumpness to the outer surface, which is represented by some authorities to be not *exactly* spherical, but of that kind which would be formed by the revolution of an ellipse of small excentricity about its long axis.

Fig. 6



The sclerotic partly removed, and the rest turned back, showing the Choroid Coat and Iris.

Chorioid or Choroid membrane. (*Fig* 5, *c*, *Fig.* 6.) We have now to consider the internal tunics of the eye, the first of which is the choroid, or, more properly, *chorioid* membrane, so called from some resemblance in the flocculence of its outer surface to the *chorion*, or external investment of the ovum. This is a thin soft dark-brown structure in contact with or lining nearly the whole concave surface of the sclerotic. It may be said to originate around the entrance of the optic nerve, which passes through it before it expands into the retina; and it terminates in the posterior margin of the ciliary ligament or circle (*fig.* 5, *i*),—a flattened band of grey matter, about the seventh part of an inch in breadth, attached to the sclerotic internally near its junction with the cornea. In these situations the two membranes adhere with some firmness; they are elsewhere connected by vessels which pierce the outer and ramify upon the inner membrane, and by the filaments of a fine intermediate cellular tissue. But the connexion is so slight that it may be readily broken by gentle inflation with a blow-pipe insinuated through a puncture in the sclerotic, without injury to the fragile texture of the choroid. The choroid consists almost entirely of a multitude of minute vessels, curiously interlaced, and communicating freely with each other. It is supplied with blood by 15 or 20 branches of the ophthalmic artery, which pierce the sclerotic round the entrance of the nerve, and are at first distributed externally on the posterior part of the sphere; but they finally pass inwards, and terminate in a close and uniform vascular expansion over the whole concave surface. This is called the tunic of Ruysch, who erroneously considered it as a distinct membrane. The innumerable veins of the choroid, or *venæ vorticosæ*, are arranged with great elegance and regularity in arched and drooping branches, like the boughs of the weeping willow; they are very conspicuous upon the outer surface, above the first exterior ramifications of the arteries. (*Fig.* 6.) They unite in four or five common trunks, which emerge through the sclerotic at equal intervals behind the middle of the eye-ball. The outer surface of the choroid is somewhat rough and flocculent; the inner surface, upon which the retina is expanded, is delicately smooth and even. Both are abundantly covered with the pigment, which is secreted by every part of the choroid, and pervades its loose and porous texture.

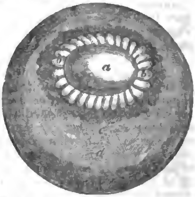
Pigment.—In man this matter is of a deep brown colour, in most other animals it is black, and hence is very commonly called the *pigmentum nigrum.* It appears under the microscope to consist of hexagonal particles arranged side by side like the cells of a honeycomb. It adheres very loosely, so that when the surfaces covered with it are drawn to and fro in water, it becomes diffused, and may be washed off. The choroid thus treated is found to be of the same whitish or grey colour which characterizes the ciliary ligament. In the natural state of the parts, not only the choroid, but the cellular tissue on its external surface, and the inside of the sclerotic, are deeply stained by the pigment, which shows through, and occasions the bluish tint of the white of the eye in persons of delicate complexion. But on the inner surface of the choroid the pigment is retained by an expansion finer than a spider's web, yet of close texture, which may be called after its discoverer the membrane of Dalrymple. By this means the transparency of the retina is preserved. It is probable that this membrane of the pigment is of a *serous* kind, and that it is reflected at the optic and ciliary margins of the choroid, and passes over the whole posterior surface of the retina,—thus doubly defended from absolute contact with the pigment. The choroid is not the only part which secretes this coloring matter. It is found in equal or greater abundance upon the back of the iris, on the surfaces of the ciliary processes, and in fact wherever it is wanted to facilitate vision.

Tapetum Lucidum. In many animals, especially the nocturnal and carnivorous tribes, the pigment is deficient at the bottom of the eye, and the surface of the choroid in that situation presents a brilliant colour and almost metallic lustre. This is called the *tapetum* (tapestry of divers colours). It is of various shades of blue, green, and yellow; sometimes changeable like shot silk, and sometimes of a silvery whiteness. The tint occupies various proportions of the surface; it is most brilliant immediately opposite the pupil, and passes gradually into the dark hue of the pigment. There is no vestige of a tapetum in the human eye: the use of it is not well known. It probably causes the animal to see better in the dusk and less clearly in the day, by reflecting the rays a second time through the retina. This reflection from a very effective concave mirror produces a strong convergence of the rays which come back through the pupil, and is the cause of the well-known glare of the eyes of cats and other animals seen in an obscure light from that particular distance at which the emerging rays are most completely brought to a focus upon the eye of the observer. The breadth of this luminous appearance arises from the great dilatation of the pupil under the circumstances in which it is seen.

Retina. The optic nerve, having entered the interior of the globe through the sclerotic and choroid membranes, forms a slight prominence at the point of union of its several portions, and thence spreads out in the form of a fine transparent membrane over the whole concave surface of the choroid, embracing the translucent body called the vitreous humour. Towards the choroid it appears to consist of a mere homogeneous pulp not very different from the medullary matter of the brain; but it is undoubtedly most elaborately and minutely organized. Analogy would lead us to suppose it to have a fibrous arrangement, and recent observations of great nicety with the microscope appear to lead to the same conclusion.* Towards the vitreous humour it has the structure of a most delicate vascular web, consisting of innumerable ramifications of the central artery (which, as we have already mentioned, accompanies it into the interior of the globe) and of its associated veins Its name may have been derived from the *net-work* formed by the visible branches of these vessels; at least it is not otherwise applicable to the structure of the membrane. The distribution of the central artery may be made visible to an observer in his own eye by a curious experiment first suggested by Purkinjè. One eye being steadily directed to a surface of some uniform dark or neutral tint, such as a wall painted of a lead colour, and the other eye closed by the hand, the flame of a small wax taper is to be slowly waved round and round, so as to be brought at every turn at a little distance over the front of the eye. The central artery will gradually come into view, at first obscurely, and afterwards more clearly. The experiment succeeds best after the experience of several trials on successive nights. The form is such as might be expected from a branching net-work of vessels: the lines are dark, with bright edges on a faintly illuminated ground. There are other modes of making the experiment, which show the appearance more distinctly, but they are less simple. We shall offer an explanation of this experiment in treating on the physiology of vision. The retina terminates anteriorly in a thin scalloped edge, fitting into corresponding irregularities called the *ora serrata* in the posterior margin of the ciliary body. (*Fig.* 5, *l* and 9, *d.*) Exactly opposite the pupil there is a bright yellow spot, fading gradually off at the edges, and having a black point in the centre precisely where the axis of direct vision intersects the back of the eye. (*Fig.* 5, *n.*) This central point was believed by its discoverer, Soemmering, to be an actual deficiency of the substance of the retina; and it is generally called in consequence the *foramen* of Soemmering. But it is now known to be merely a central absence of the yellow colour of that part of the retina rendered conspicuous by the pigment seen through the ordinary transparent texture. These appearances are lost very shortly after death, and are replaced by a minute fold, into which the retina gathers itself, reaching from the place of the central point to the prominence which marks the union of the divided portions of the nerve.* The use of this yellow spot and central point, and of the tendency of the retina to assume a folded shape in this situation, is not understood. It has been suggested that the group of appearances is a rudiment of the yellow dye of the retina and of the *pecten* in birds, of which we shall give some account in a future part of the article. They are met with only in the eyes of man, the quadrumana, and some lizards. We have already described sufficiently the serous membrane which lines the posterior surface of the retina, supposed to be a reduplication of that which retains the pigment on the opposed surface of the choroid. Whatever may be the truth as to this supposition, there is no doubt of the existence of the retinal membrane, which was discovered by Dr. Jacob of Dublin, and has been named after him.

Vitreous Humour. (*Fig.* 5, *e* and 7, *d.*) The part next in order to be described is the vitreous humour, behind which the retina is disposed. It is a transparent fluid of semigelatinous consistence and high refractive power, constituting about five-sixths of the bulk of the globe. It consists of a fluid differing in no great degree from water, contained in a cellulated structure called the *hyaloid* membrane (ὕαλος, *glass*), from its perfect translucency. The minute cells are connected together; for if the external part be punctured, the fluid contained in them gradually drains away. This cellular structure is so delicate and fragile that it is almost impossible to obtain it separately; but the membranous partitions are rendered slightly opaline by strong spirit or diluted acids, and may thus be made evident. It is condensed into a membrane of a firmer consistence upon the surface, which serves the general purpose of a containing capsule for the vitreous humour, and is strong enough to cause it to preserve its shape in some degree when the stronger tunics of the eye are removed. There is a narrow tubular dimple of some depth in the vitreous humour opposite the entrance of the nerve, lined by a trumpet-shaped production into it of the external membrane, called the *hyaloid canal.* (*Fig.* 5. It serves to transmit a branch of the retinal artery and associated veins for the nourishment of the capsule of the

Fig. 7.



This figure, from the work of Zinn, represents the vitreous humour in its hyaloid membrane. The lens, imbedded in its upper surface, is surrounded by the canal of Petit. The dark border beyond is the plaited portion of the hyaloid membrane called the *zone of Zinn*, stained with the pigment left by the ciliary body, which in the natural state of the parts rests upon that portion of the surface of the hyaloid. The outer edge of the zone is marked by a waved outline, corresponding with the *ora serrata* of the ciliary body.

a, crystalline lens; *b*, canal of Petit; *c*, zone of Zinn; *d*, vitreous humour.

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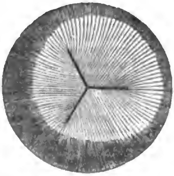
* Müller's Physiology

* Dalrymple.

ens in the fœtus, and perhaps also of the hyaloid membrane, and of the substance of the lens itself. There can be no doubt that the vitreous humour is secreted by the surfaces of the hyaloid cells, but this fœtal artery is the only vestige of a vascular arrangement yet discovered in the part.

Fig. 8.



Magnified view of the lens, showing its laminated and fibrous structure, and the direction of its planes of cleavage.

Lens, or Crystalline Humour. (*Figs.* 5, *f*; 7, *a*; 8.) The crystalline (*κρύσταλλος, crystal*) is imbedded in a deep depression in the front of the vitreous humour, a little nearer the nasal than the temporal side of the globe. It has the form and function of a double convex lens. The surfaces may be considered as portions of two unequal spheres, the anterior being considerably flatter than the posterior. The diameter of the sphere of which the former is a segment is about eight-twelfths, of the latter five-twelfths of an inch. The thickness of the lens, measured in the axis of vision, is about the sixth part of an inch, and its transverse diameter is about twice that length. (*Fig.* 4, *c c, d d.*) In refractive power it is superior to the other transparent substances contained in the eye. Its consistence is gelatinous, increasing in density from the circumference towards a central nucleus, which has the tenacity of soft wax. It is composed of an infinite succession of thin concentric laminæ, arranged with the utmost regularity one within another like the coats of an onion; and every such stratum or elliptic shell is made up of a series of exquisitely minute fibres laid side by side, forming three *septa* like the cloves of an orange, of which the bounding or cleavage planes diverge from the axis of the lens at angles of 120° in the manner represented in the annexed figure. (*Fig.* 8.) If the lens be hardened in strong spirit, the result of this curious arrangement is, that it partly cleaves into three portions made up of layers which may be peeled off one after another, each further separable to a certain extent into its component parallel fibres. The spirit not only hardens the crystalline humour, but renders it opaque; and the same effect is produced by plunging it in boiling water, as every one must have observed in the eyes of dressed fish. In fact it consists chiefly of the transparent substance called *albumen* found in eggs, and is coagulated by heat in the same way. The lens is similarly constructed in the eyes of other mammalia; and analogous, though not identical, arrangements are observed in other classes. In fish the fibres we have spoken of are curiously hooked together by fine teeth, resembling those of a saw. We chiefly owe the discovery of these facts respecting the intimate structure of the lens to the labours of Leeuwenhoek, Young, and Brewster, whose writings may be consulted for much further interesting information on the subject. The crystalline is enclosed in a transparent and highly elastic membranous capsule, represented in *fig.* 5 by a white line, to the regulated pressure of which the preservation of its true shape, so important to the purposes of vision, is mainly attributable. There is no analogous structure in the body, except the internal lining of the cornea already mentioned, which closely resembles it in its function with reference to the surface of the aqueous humour. When the lens is hardened in spirit or boiling water, this capsule retains its nature; and if peeled off, shrivels up and curls upon itself. It may be easily detached with a pin from the hard spherical lens of a boiled fish, and will be found still possessed of its peculiar qualities of transparency and elasticity. The capsule is firmly attached to the hyaloid membrane behind, from which it is not easy to separate it neatly. Whether it has any further connection than that of mere contact with its own contents, is not easy to show, or to doubt; but the nature of that connection, if any exists, might be expected to be obscure, considering that both the parts are diaphanous, and one of them almost liquid at the surface of contact. Indeed it has been supposed that a small quantity of limpid fluid was actually interposed between the lens and its capsule, but this is now shown to be the result of imbibition after death.

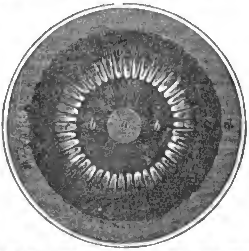
Besides its posterior attachment to the hyaloid membrane, the lens, or rather its capsule, has connections with other parts which adjoin it laterally in front: the nature of these will be best understood if those parts be first briefly described. At present, we shall only remark upon it further, that the gradual increase in its density from the circumference to the centre is a provision for correcting what is called the *aberration of sphericity*, or that impairment of focalising power which results from the too great refraction of the lateral rays of a pencil of light in passing through a homogeneous medium, such as glass, if bounded by spherical surfaces.

Aqueous humour.—This fluid, in no respect distinguishable from water except in holding a minute proportion of several saline ingredients in solution, occupies the space between the lens and the cornea. The iris divides this space into two unequal portions called the *anterior* and *posterior chambers* of the eye, and so closely approaches the lens that near the margin of the pupil the two surfaces are separated by a mere film of aqueous humour. The cavity is lined throughout by a serous membrane which secretes and limits the fluid, and prevents it from acting injuriously upon subjacent parts of importance. At least a membrane of this kind may be peeled off in some animals; its existence in the human eye is rather a matter of inference than proof.

Several parts of much interest besides those we have already noticed are contained in the cavity of the aqueous humour, or form part of its boundaries. These are the iris, the ciliary body and processes, the zone of Zinn, and the canal of Petit.

Iris. (*Fig.* 5, *h*; 9, *b*.) In speaking of the choroid we have already adverted to the flattened ring called the ciliary ligament (*Fig.* 5, *i*) which connects it in front with the sclerotic. The iris arises from the anterior margin of this ring, and is extended, as we have seen, across the aqueous humour in the form of a thin partition with a round aperture, or *pupil*, of variable size in the centre, or a little nearer the inner side, the function of which, we need hardly repeat, is to regulate the quantity of light admitted into the eye, by contracting when it is in excess, and dilating when it falls short of the due amount.

Fig. 9.



Magnified view of a vertical section of the globe, showing the ciliary body and processes with the uvea, as seen from behind when the lens is removed.

a, Pupil; *b*, uvea, or back part of the iris; *c*, processes of the ciliary body; *d*, ora serrata of the ciliary body, to which a few shreds of the vascular web of the retina remain attached.

The external appearance of the iris is too familiar to need a particular description. It is covered in front with a glistening polished membrane. The brilliancy of the eye depends in a great measure upon the light reflected by this surface, and is lost when its smoothness and transparency are impaired by inflammation. The posterior surface of the iris is called the *uvea*. (*Fig.* 9, *b.*) It is thickly coated with pigment, which is prevented from diffusing itself in the aqueous humour by a membrane like that of Dalrymple on the choroid. Such a provision is particularly needed here on account of the quick movements of the part in a watery fluid. The colouring matter of the iris has much analogy with the pigment. Like that substance, it forms no part of the texture it pervades, and when the outer membranes are removed by maceration in water, it may be washed away. Both have a relation in quantity as well as in depth of tint to the complexion and colour of the hair. In the negro the iris is of so dark a hue that it can scarcely be distinguished from the pupil; while in the white rabbit and other albinoes, including the human variety, where the pigment is entirely wanting from some original malformation, the substance of the iris is transparent, and reflects only the pink colour of the circulating blood. Such eyes are dazzled by a strong light, and probably see better than others in the dusk. The iris, if minutely injected, appears, like the choroid, to be composed almost entirely of vessels. It is principally supplied by the two long ciliary arteries (*Fig.* 6)* which pierce the sclerotic about half an inch from the optic nerve on either side; and passing between that membrane and the choroid, divide near the edge and in the substance of the ciliary ligament, and are wholly distributed to the iris. Their branches are disposed in two conspicuous circles on the front surface, one near the outer or ciliary margin, the other not far from the pupil. But though the iris resembles the choroid in vascularity, it differs essentially from it in other respects. It is richly supplied with nerves, which proceed to the iris and are distributed upon it much in the same way as the arteries, and are the medium of its sympathy with the retina, and the source of its irritability. It also possesses a peculiar contractile power, thought by some to reside in fibres which they represent to be muscular, and to be disposed circularly in front and at the fore edge, and in a radiated form behind. (*Fig.* 9, *b.*) The former of these layers is supposed to contract and the latter to dilate the pupil. But this fibrous appearance may be deceptive, and is attributed by others to circular arrangements of the vessels and nerves, and to streaks and minute folds in the membrane itself.

Pupil. (*Fig.* 9, *a.*) The pupil in the human eye is bounded by a sharp well-defined circular edge. In other animals its shape is subject to many varieties which may often be explained by a reference to their habits and circumstances. In fish it is generally crescentic or imperfectly quadrangular. In herbivorous animals, which often continue to browse during the night, it is oblong and obliquely transverse, as in the horse and sheep. In most serpents and many rapacious quadrupeds, both aquatic and terrestrial, the pupil, though round and large at night, is a mere vertical slit when seen by day, especially in the smaller species of each genus, as in the common cat. It is curious that in the larger cats, as the lion and tiger, as well as in some of the larger four-footed reptiles, the pupil again becomes circular. In all birds, we believe, the pupil is round; and it may be observed that, with few exceptions, they all sleep after night-fall. In the few nocturnal species, as the owls, the pupil is very large though still round, and these birds always shun the day. The long narrow pupil is in fact a provision for a greater variation in size than the circular form permits, and is generally found in those animals which roam at night and also see well by day. When absent in such animals the bulk of the organ is commonly sufficient to secure the admission of a sufficient quantity of light after sunset without this provision. In the fœtus the pupil is closed by a vascular film called the *membrana pupillaris*, one function of which is precisely that of the centering of a bridge, to support and extend it during the process of its construction. A tubular film of the same kind has been lately discovered by Müller stretched between the margin of the pupil and the ciliary body. Both these films are absorbed before birth.

Ciliary body and processes. (*Fig.* 5, *l*; 9, *d c*). Upon the compressed anterior surface of the vitreous humour where it curves inwards from the sclerotic towards the lens rests the ciliary body, a thin, dark, annular band, about the fifth part of an inch in breadth, consisting of a frill of flat converging plaits, which encircle but do not reach the circumference of the lens. The posterior aspect is concave, and adheres loosely over the rounded vitreous humour; the front is convex, and is firmly attached to the whole breadth of the ciliary ligament, and to a small portion of the back of the iris near its junction with the ligament. It appears to be a continuation of the inner layer of the choroid, or tunic of Ruysch, but is rather thicker, and resembles it in extreme vascularity. The medullary matter of the retina terminates, as we have seen, at the indented posterior margin (*ora serrata*) of this membranous band. The ciliary body is everywhere thickly coated and pervaded with pigment, except at the extremities of about seventy minute unattached points which fringe the inner margin, and radiate towards the lens like the florets of a marigold round its central disc. These are the *ciliary processes.* (*Fig.* 5, *k*; 9, *c.*) They are separated from the uvea by the fluid of the posterior chamber, and are received behind into corresponding depressions in the vitreous humour.

Zone of Zinn.—If the ciliary body be carefully peeled off, and the thick radiated masses of pigment it leaves behind be washed away, a thin, transparent, and puckered membranous surface is exposed, extending from the indented margin of the retina nearly to the capsule of the lens, which appears to be something more than the mere external surface of the hyaloid membrane. This is called the *zone of Zinn*, from the anatomist who first drew attention to it. Various opinions are entertained of the nature of this zone. By some it is supposed to be a continuation of the vascular web, which may be called the internal tunic of the retina, arching round from the ora serrata, just as the tunic of Ruysch is continued into the ciliary body which lies upon the zone and corresponds with it in extent. The question is more curious than important in the present state of our knowledge of the functions of both of these delicate and elaborately constructed parts of the eye. The same remark may be extended to the controversies that subsist with respect to the part we have next to describe.

Canal of Petit (*Fig.* 7, *b*; 5, *m*). If the transparent membrane between the zone of Zinn and the margin of the lens be slightly punctured, and the point of a small blow-pipe be gently introduced, a canal may be inflated extending all round the lens in close proximity with the capsule, resembling a string of small glass beads laid in a circle. This is the *canal of Petit.* Whether the hyaloid membrane here separates into two layers, or whether the membrane of the aqueous humour lies upon it in this situation for a certain space without adhering, or how otherwise this canal is formed, it is not easy to say. In the natural state of parts it is empty and flaccid. When it is inflated the fine white triangular tips of the ciliary processes are seen to be received between its minute protuberances. But the points are loose and floating, and are not attached, as was formerly supposed, to the capsule of the lens.

Dr. Brewster has stated an opinion that the ciliary body is a muscular organ calculated to effect certain changes of curvature in the surfaces of the lens, or in its position, which seem to be required by the laws of refraction to account for the adjustment of the eye to different distances. Dr. Thomas Young was no less confident that the true solution of this optical enigma was to be found in the imagined muscularity of the fibrous structure of the lens itself. Both are high authorities, but neither opinion appears to have gained any ground.

Appendages of the Globe.—The eye-ball, of which we have thus described the contents, is lodged in the cavity of the orbit, a little nearer the inner than the outer side. In front, where the protection of bone is wanting, the two moveable and muscular eye-lids supply a sufficient defence, and contribute, by their gentle and constant pressure, to keep the eye in that state of equilibrium between opposite forces upon which the steadiness and precision of its rapid motions in a great measure depend. The space in the socket not occupied by the globe and its appendages is completely filled by a cushion of soft fat contained in elastic membranous cells, which permits the free movement of the several parts, while it keeps them separate, and affords them all, as well as the globe itself, a suitable and uniform support. Varieties in the quantity of this substance, in the capacity of the orbit, and in the development of the lids, determine the different degrees of prominence and of apparent size observed in the eyes of different persons; for the globe itself is nearly of the same size in all.

Muscles of the Eye-ball.—The movements of the globe are effected by six muscles arising from the bony surface of the orbit, and inserted into different parts of the sclerotic. Four are called *recti*, that is straight or direct muscles; the fifth and sixth are the *obliqui superior* and *inferior*, so called from the obliquity of their insertion, and their respective positions above and below the globe. The fifth, or superior oblique, is also called the *trochlearis*, from the *trochlea* or pulley through which the tendon passes.

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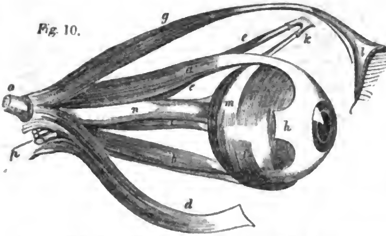
* One of the long ciliary arteries is represented in the figure by the middle white line: the narrower lines are the ciliary or iridian nerves.

Fig. 10.

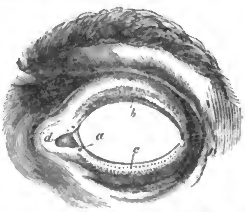


a, Rectus superior; *b*, Rectus inferior; *c*, Rectus internus, *d*, Rectus externus, arising by a double head. It is represented as cut off from *h*, its insertion into the eye-ball, and turned aside to show the parts behind it; *e*, Obliquus superior, a round and tapering muscle terminating in a round tendon, which passes through a pulley or loop (*k*), and is reflected under the flat tendon of the rectus superior, and, becoming flat, is inserted at (*m*) into the sclerotic; *f*, Obliquus inferior coming round over the tendon of the rectus inferior from the front and inner edge of the orbit, near the inner corner of the eye, and inserted into the sclerotic opposite the insertion of the superior oblique; *g*, Levator palpebræ superioris, ending in a flat tendon, which is inserted into (*l*) the crescentic tarsal cartilage of the upper lid; *o*, *n*, the optic nerve; *p*, the nerves of the 3rd, 5th, and 6th pair, which pass between the two heads of the rectus externus. The rest of their course is not shown.

Lateral view of the right eye-ball, seen from the outer side, with its muscles. (This cut is to be considered only as a diagram, the proportions of the parts having been much altered to make them more distinct.)

The recti (*Fig.* 10, *a*, *b*, *c*, *d*) are four flat ribbon-like muscles, each about half an inch broad, which arise together round the edge of the foramen opticum, and embrace the nerve at its exit from the skull. They end in broad, thin, glistening tendons, attached to the sclerotic at four equidistant points, about a quarter of an inch from the edge of the cornea, above, below, and on either side. Hence they are designated as the superior, inferior, internal, and external straight muscles. We have already explained how the outer surfaces of their tendons are blended, and form the tunica albuginea. Each turns the pupil towards the side of its insertion; and it is easy to see how by their single actions, or by a proper combination of two that are contiguous, the pupil may be turned in any required direction. The rectus externus, from its position on the diverging side of the orbit, is necessarily the longest of these muscles. It has also a double origin, arising not only in common with the rest from the edge of the optic foramen, but also from the edge of the sphenoid fissure, and arches over several nerves which enter the orbit by that passage (*p*). The superior oblique or trochlearis (*e*) is a round tapering muscle, which arises near and on the nasal side of the rectus internus (*c*), and ends in a smooth round tendon. The pulley (*k*) through which this tendon passes is a small loop of cartilage fixed to the roof of the orbit towards the nasal side, just within the margin. In this situation the tendon is enveloped in a lubricated extensible sheath called *bursa mucosa;* thence spreading into a thin fan-like expansion, it is reflected obliquely backwards and outwards between the globe and the tendon of the rectus superior (*a*), and is inserted into the back part of the sclerotic at a point (*m*), intermediate between the optic nerve and the insertion (*h*) of the rectus externus, and nearer the former. Its separate action turns the pupil downwards and outwards. The inferior oblique (*f*) arises broad within the lower edge of the orbit towards the nasal or inner side, and passing obliquely backwards over the tendon of the rectus inferior (*b*), is attached to the sclerotic at the outer and back part opposite the insertion of the trochlearis. It directs the pupil upwards and outwards, supposing the eye to look originally straight forwards: if the pupil be inclined either way, to the nose or to the temple, the inferior oblique increases that inclination, being equipoised as to lateral action when the eye is slightly turned inwards, as in reading. But its tendency is always to turn the pupil upwards. To a certain extent the same remark is applicable (*mutatis mutandis*) to the action of the antagonist muscle, the superior oblique, which if exerted at the same time would counteract the tendency upwards, so that both taken together would keep the eye in that easy position so often assumed by man and animals in looking without much effort yet steadily at near objects, as in taking food, reading, and most other quiet occupations. The position we mean is that in which the axes of vision are directed slightly towards each other and a little downwards, and the eye-balls are gently pressed against the lids and by them, and thus are kept in a convenient and steady equilibrium. When the oblique muscles act together with force, they hold the eye-ball firmly against the lids and to the nasal side of the orbit. One or both of these muscles, as well as the rectus externus, are supposed to be endowed with certain automatic or involuntary actions, very useful in the economy of vision. Their functions in this and other respects have given occasion to much curious disquisition.

Fig. 11.



View of the left eyebrow and lids, showing their tarsal margins.

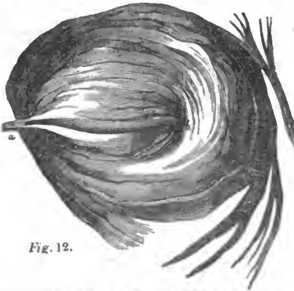
a, Lower *punctum lachrymale*; *b*, tarsal edge of the upper lid; *c*, orifices of the ducts of the Meibomian glands (those on the upper lid are similar); *d*, *caruncle*, situated at the inner *canthus*, or corner of the eye.

The double line of points external to the Meibomian orifices marks the situation of the eye-lashes, which are removed.

The Eyelids or Palpebræ. (*Figs.* 11, 12, 13.) The textures which enter into the composition of the eyelids are included between a soft external skin and a moist smooth internal surface, called the *conjunctiva palpebralis* or *propria*. (*Fig.* 13, *a a*.) The latter is a membrane of the mucous kind, which, as we have already mentioned, after lining the interior of the lids, passes across in a loose circular scroll or fold to the sclerotic, and is reflected back again over the front of the eye, where it is called the *adnata* or *conjunctiva reflexa*. The name is derived from the junction thus effected between the ocular and palpebral surfaces. The outer skin of the eyelids, which is extremely soft and delicate, yet capable to a considerable extent of adapting itself to different degrees of extension, is loosely connected to the subjacent parts, except at the margin (where it adheres more closely), by a moist and abundant cellular tissue, entirely devoid of fat. By means of this connection, when the upper lid is raised and these under-lying parts are retracted under the edge of the orbit, the superfluous skin is gently drawn after them, and is disposed of conveniently under the brow (*supercilium*). The eye-lids meet, when closed, by two narrow flat surfaces, accurately applied to each other, called their *ciliary* or *tarsal* margins. These epithets are respectively derived from the *tarsi* or thin concave and crescentic shells of smooth and elastic cartilage which give form to the lids, and firmness and outline to their opposed edges (*Fig.* 10, *l*); and from the lashes or *cilia*, which grow in several rows at the margins of both lids, from their extreme outward verge, and in the direction of the flat surfaces. The angles in which the margins of the eye-lids meet towards the nose and temple are called the *canthi*. The outer canthus is kept in its place during the motions of the part by a tendinous expansion or *aponeurosis*, which, adhering to the thin crescentic edges of both tarsi on their outer or convex surface, attaches them, and most closely on this (the temporal) side, to the margin of the orbit. It is called the broad ligament of the tarsi. The nasal extremities of the tarsi are confined to the side of the nose by two slips which are given off behind from the tendon of the orbicular muscle.

Muscles of the Eyelids.—Immediately beneath the subcutaneous cellular tissue there is a broad layer of muscular fibres arranged elliptically round the transverse fissure of the eyelids, the disposition of which is well shown in the annexed figure. (*Fig.* 12.) The office of this muscle, which is called the *orbicularis*, is to close the lids; and it is capable of acting under certain circumstances with great force. It is collected at the inner angle or canthus of the eye into a round short tendon, which is attached in that situation to the bone. Elsewhere it is connected with the skin, and aponeurotic expansions of the face and forehead. It is also connected with the *occipito-frontalis muscle*, which elevates the eye-brows, and with the *corrugator supercilii*, which wrinkles and knits them in the act of frowning. A person acquainted with mechanics will have no difficulty in perceiving the advantage derived from the oblique, or, as it might almost be called, the *incidental* action of the orbicularis in closing the lids, to the edges of which its fibres are parallel. A more direct application of muscular force would have been more powerful; but the actual arrangement secures a rapidity incomparably more conducive to the function of the eyelids, which is to cleanse and moisten the surface of the eye.

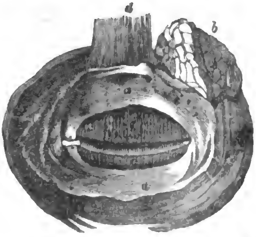
Fig. 12.



View of the orbicular muscle of the left eyelid, as it appears when denuded of the integuments.

a, The tendon at the inner angle, or *canthus* of the eye; *b*, the outer canthus drawn in by the ligamentous attachment of the tarsal cartilage to the temporal side of the orbit.

Fig. 13.



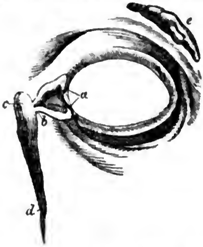
View of the internal surface of the right eyelid and lachrymal gland.

a, Conjunctiva propria, or mucous lining of the lid. The edges of the fold which passes to the sclerotic are seen loose and floating; *b*, lachrymal gland; *c*, orifices of the lachrymal ducts; *d*, tendon of the elevator muscle of the upper lid; *e e*, parallel rows or clusters of the Meibomian glands; *f*, the semilunar fold of the conjunctiva at the inner canthus, which is the rudiment of the third eyelid of birds and other animals. Near *f*, on the right, are seen the two puncta lachrymalia.

Levator Palpebræ superioris. Below the orbicularis, in the upper lid, is the broad tendon of the muscle which elevates the upper lid. (*Figs.* 13, *d*; 10, *g*.) This muscle arises from the edge of the optic foramen, just above the rectus superior, and passing over it along the roof of the orbit, forms the thin tendon we have mentioned, which is inserted into the inner surface, or rather the thin upper edge of the tarsal cartilage. There is no such provision for depressing the lower lid, which is rendered unnecessary by its inferior extent. Moreover the muscle we have just described sufficiently answers the purpose, by pressing down the globe and causing it to slide a little forwards; as may be easily felt if a finger be placed against the lower lid when the eye is closed, and suffered to remain while the upper lid is slowly raised.

Meibomian Glands. (*Fig.* 13, *e e*.) Between the tarsus of either lid and the conjunctiva are disposed numerous vertical rows of minute whitish grains, which appear through the semi-transparent mucous membrane, and occupy an elliptic space, taking both lids together, of about half an inch in width, exactly in front of the globe. These are called the Meibomian glands, from their discoverer. They secrete an unctuous matter which passes into tubes centrally placed in each row, and exudes from as many minute orifices on the ciliary margin of the lid. (*Fig.* 11, *c*.) There are about forty of these parallel clusters in the upper lid: in the lower there are not so many, nor are they individually so long. We need not dilate upon the use of this secretion, which often collects in a sensible quantity upon the edges of the lids during sleep, especially when the glandular action is excited by slight inflammatory irritation of the part. The palpebral conjunctiva, already described, immediately covers these glandular corpuscles. The *caruncle*, a small red prominence at the inner angle of the eye (*Fig.* 11, *d*) consists of a number of similar bodies.

Fig. 14.



a, The two puncta leading into the lachrymal ducts; *b*, the common entrance of these ducts into the lachrymal sac; *c*, the head of the lachrymal sac; *d*, the narrow portion of the sac, or membranous lachrymal canal passing downwards to the nose; *e*, the lachrymal gland.

Lachrymal Apparatus. (*Figs.* 13, 14.) At the upper and outer part of the interior of the eyelid are several minute orifices (*Fig.* 13, *c*), generally seven in number, arranged in a half-circle, which lead into the secretory ducts of the lachrymal gland. (*Fig.* 13, *b*; 14, *e*.) This is a white flattened lobulated body, of the size of a large bean, lodged in a depression just within the margin of the orbit, and covered externally by the orbicular muscle. The function of this gland is to secrete the tears; and is probably always going on, although not in a degree sufficient to be remarked, except in weeping, or when some foreign body or acrid vapour stimulates the surface of the eye, and by sympathy excites the gland to unusual secretion.

The involuntary actions of the rectus externus and inferior oblique muscles, to which we have alluded, are supposed to have a relation to the lachrymal secretion. In the act of winking, the eye-ball is thrown up in an outward direction, as it would be by the action of these muscles, which not only brings the cornea into the vicinity of the ducts, but makes pressure upon the gland, while it relatively increases the rapidity with which the lids, drawn in winking towards the fixed nasal tendon are swept over the surface of the globe. That there is such a movement, however produced is certain: the motion of the prominent cornea may be felt by the finger gently pressed upon the half-shut lid if it be completely and suddenly closed. The approximation of the lids towards the nose in winking is one of several provisions by which offending particles or superfluous fluids are brought to the inner canthus of the eye to be protruded or absorbed. In this situation there is a vacant space partly occupied by the caruncle, called the *lacus lachrymalis* (*Fig.* 11, *d*); it is a sort of reservoir or rather *sink* for the tears. Above and below, at the entrance to this space where the ciliary margins terminate, there is a small prominence on the inner edge of both, (*Fig.* 11, *a*; 14, *a*,) centrally punctured by small orifices. These are the *puncta lachrymalia.* Their *inward* aspect is well shown in *Fig.* 13. They are the emunctories of the eye; and their function is to absorb the fluids presented to them, and convey them by two converging canals (*Fig.* 14, *a*) to the *lachrymal sac* (*Fig.* 14, *c*), which they enter by a common orifice, (*Fig.* 14, *b*). This is a membranous bag about as large as a kidney-bean lodged in a groove in the lachrymal bone, behind the tendon of the orbicular muscle. The lachrymal sac entering a vertical channel in the bone at the end of the groove is narrowed into the *lachrymal canal* (*fig.* 14, *d*), and passes directly downwards into the inferior meatus or chamber of the nose which it enters on the outer side by a slit in the mucous lining. It is not exactly understood in what way the puncta absorb,—whether by capillary attraction or by some vital force of suction. The side of the lachrymal sac is connected with the tendon of the orbicularis, which may aid in producing the effect by suddenly drawing its membranous surfaces apart. We all know the effect of repeated winking when the eyes are filled with tears.

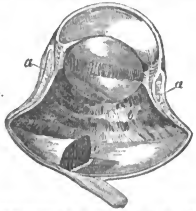
Nervous and vascular constitution of the Eye.—Enough has been already said, for general information, with respect to the blood-vessels distributed to the eyeball, and it is not necessary to mention those which supply the appendages. With respect therefore to vascular arrangements we have only to add, that although there are abundant proofs of the existence of an active absorption within the globe, no lymphatic vessels especially destined to that function have been hitherto found in it. The optic or second cerebral nerve has been already described. All the straight muscles, with the exception of the rectus externus, the inferior oblique, and the levator palpebræ, are supplied by the third nerve. The fourth is wholly distributed to the trochlearis, and the sixth to the rectus externus. The orbicular muscle is supplied, like most of those of the face, by the *portio dura* of the seventh pair. All these, except the optic, are muscular or motor nerves. The fifth nerve supplies the whole organ in common with many other parts with ordinary sensation. Any account of the intricate nervous constitution of the iris would be here quite out of place. The third and sixth nerves are mainly concerned in it. Thus of the ten cerebral nerves, the second, third, fourth, and sixth are wholly, and the fifth and seventh partially distributed to the organ of vision; a fact which may give some idea of the elaborate organization and varied exigencies of the parts which compose it.

Comparative Anatomy of the Eye.—The eyes of insects and many other articulated animals, often consist (as we have mentioned before) of myriads of simple eyes grouped in one compound organ. The eye of the lobster is said to contain at least 5,000. Such organs are commonly placed one on each side of the head. The horny, rounded, naked, and transparent part seen externally represents the cornea. Its surface when viewed by the microscope displays as many hexagonal *facettes* as the organ contains simple eyes. Beneath each facette is applied the base of a minute transparent cone which constitutes the lens. These cones are arranged side by side with their acute angles directed inwards to the terminations of as many fibrils of an optic nerve. A choroid pigment is spread beneath, and often separates the lenticular cones. Vestiges of the aqueous and vitreous humours are also frequently present. When the eyes are simple, as in the spiders, there are generally several, from two to twelve, placed on different parts of the head and thorax. The lens is of the usual spherical shape, hard and sparkling, and highly refractive. In fish and other aquatic animals the lens is dense, hard, and spherical, to make up in refractive power for the density of the medium through which light reaches the eye. On the other hand the cornea is flat, and there is little aqueous humour. Such provisions would be of no value; for as the refractive power of water is the same as that of aqueous humour, rays penetrating the surface, however shaped, would pass on in the direction of their entrance. Fish are unprovided with eyelids, and the eyeball has but little independent motion. There is a red gelatinous structure near the optic nerve between the layers of the choroid, the use of which is unknown. It is called the choroid gland. The ciliary body and processes are generally absent; but there is a rudiment in the eyes of fish of that part called the *pecten* in birds.

The eyeballs of quadrupeds and other mammalia resemble the human organ in structure, and differ from it, but not essentially, in form. This is not the case with the appendages. One of the most remarkable additions commonly found to the parts we have described is that of a strong retractor muscle in the shape of a hollow cone attached at the apex to the bottom of the orbit, and by the marginal base to the sclerotic, which it embraces, lying under the recti muscles. Its use is to draw back the eye in the orbit; a gesture which gives a very peculiar expression of hollowness to the organ in beasts of prey.

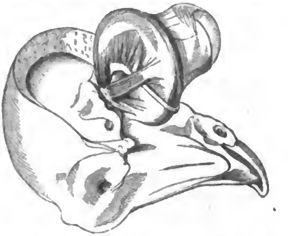
We subjoin the following account of the eye of the common owl (*strix bubo*), chiefly for the purpose of explaining the *pecten* and the curious mechanism of the third eyelid, or *nictitating membrane*, in birds.

Fig. 15.



Horizontal section of the eye of an owl (strix bubo).
a a, Bony plates in the sclerotic; *b*, ciliary body; *c*, pecten.

Fig. 16.



Head of the same bird. A portion of the bony margin of the orbit having been removed, the eyeball is turned forward so as to show the recti and other muscles.

The general shape of the organ represented in the annexed figures resembles a bell. This arises from the disposition of a series of quadrangular bony scales (*fig.* 15, *a*) within the substance of the sclerotic, concave on their outer aspect, and overlapping and accurately fitted to each other. The rigidity thus communicated to the external case which contains the fluid media prevents their pressure from distending the eye into a spherical shape. The ciliary body (*fig.* 15, *b*) extends over the whole of this portion of the surface. A curious membrane called the *pecten* or comb (*fig.* 15, *c*), from some resemblance to that implement, projects through the choroid into the vitreous humour, and in some birds is attached to the side of the lens. In the owl it is comparatively short. It resembles a quadrangular piece of choroid folded backwards and forwards upon itself like the paper of a lady's fan. Of its use little is known. The foramen of Soemmering, described in the account of the human retina, is thought to be a rudiment of the pecten. In birds the retina has *generally* the yellow colour seen only *partially* in man round the central spot miscalled a *foramen*.

At the back of the globe there are two muscles which originate from the sclerotic, and are applied to its curved surface round the entrance of the optic nerve (*fig.* 17, *a*). The larger represents rather more than half of what if completed would be a broad circular ring (*fig.* 17, *b*). It is called the *Quadratus*. Attached by its wider edge near the margin of this part of the sclerotic, its fibres converge to the narrower edge, and terminate in a narrow tendon (*fig.* 17, *c*), perforated through its whole length like the hem of an apron. The second smaller muscle, called the *pyramidalis* from its shape (*fig.* 17, *d*), at an opposite part of the circumference. Its fibres converge, and are fixed into a long round tendon (*figs.* 17 and 18, *e*), which passes through the loop or *hem* (*c*) of the Quadratus, and hence turning over the edge of the broad part of the sclerotic, is continued along th

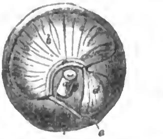


Fig. 18.

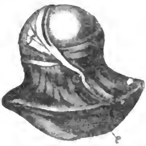


Fig. 17. Posterior view of the sclerotic of the same bird, showing the muscles of the nictitating membrane. *a*. Optic nerve; *b*, quadratus muscle; *c*, its looped tendon; *d*, pyramidalis muscle; *e*, its tendon—having passed through the loop in that of the quadratus—turning over the edge of the sclerotic.

Fig. 18. Lateral view of the same part. *e*. The tendon of the pyramidalis, attached to the concave part of the sclerotic by tendinous loops, and passing round a prominent bony tubercle, is seen inserted into the nictitating membrane at *f*.

surface of its bell-shaped portion, where it passes through several thread-like loops or pulleys which keep it applied to the concavity, and round a bony point which projects from the surface, and is attached near the edge of the cornea to the edge of an elastic fold (*fig.* 18, *f*) of the conjunctive which is called the third eyelid or nictitating (i.e. *winking*) membrane. It will be easily seen by the help of the figures, from this description, that the effect of the simultaneous contraction of the two muscles will be to draw the membrane with great rapidity, making it sweep over the surface of the cornea. It returns by its own elasticity with nearly equal quickness. A bird may be seen to use this mechanism twenty times in a minute; in fact, as often as it may be necessary to cleanse the surface of the eye. The colour of the membrane is milky; and it is seen to pass from the upper and inner to the outer and lower corner of the eye with the speed for which the act of *winking* is proverbial. There is a rudiment of this third eyelid in the human organ. It is a small crescentic fold of conjunctiva situated at the inner canthus behind the caruncle. (*Fig.* 13, *f*.) The *haw* is also a rudiment of it, in the eyes of quadrupeds; it is occasionally forced out by the pressure of the globe against the nasal side of the orbit, being unprovided with muscles.

Seat of Vision.—The retina in one sense is not the seat of vision. It is necessary to the perception that the impression of light should be received on another part not endowed with sensibility, namely the surface of the choroid; and that the vibration or other effect thus impressed should be transferred to the retina in front of that surface; for where the choroid is deficient at the entrance of the nerve, there is no perception of light. This may be easily shown by a very common and conclusive experiment. If two discs of white paper be fixed upon a wall at the distance of two feet from each other, and an observer, having closed one eye (the left), continues to gaze attentively at the left-hand disc, at the same time slowly retreating from the wall, he will for a time continue to see them both; the rays from the right-hand object entering of course laterally, and impinging upon the retina nearer and nearer to the entrance of the nerve as he goes backward. At length when he has reached the distance of about 6½ feet from the wall, the right-hand object will suddenly disappear, and remain invisible (the observer still retreating) till he has gained a distance of about eight feet. During this period the spectrum has been passing over the circular aperture in the choroid through which the nerve enters. The insensible portion of the retina is found to extend horizontally over five degrees and a half of the angular range of vision. The eyes are generally unequal in power, and the experiment succeeds best in the weaker organ, in which the obscuration is more sudden and complete. In the experiment previously mentioned, showing the distribution of the central artery of the retina, the surface of the choroid is faintly illuminated through the transparent nervous expansion by what is called the *dispersion* of part of the light admitted through the pupil; but the rays thus scattered are locally intercepted by the opaque blood contained in the minute branches of the artery; hence, after several repetitions, when the eye has become accustomed to neglect the taper, and attend to the fainter internal illumination, the *shadow* of the vascular net-work upon the choroid becomes perceptible in dark lines.

Apparent direction of objects seen obliquely.—A body in motion, as a ball, striking the surface of another, impresses it in a line perpendicular to the surface at the point of impact. This rule appears to hold good with respect to the action of light upon the retina. Indeed if impressions of any kind be made upon it, the sensation is that of light, and the direction suggested is that of a line joining the centre of the sphere of which the retina forms a part with the point impressed,—in other words, a line perpendicular to it. This may be shown in several ways: if we excite the nerve by pressing far back upon the eyeball with the finger nail, especially if the eye be closed or light otherwise excluded, a bright ring appears to be seen in a diametrically opposite quarter.

Erect Vision.—If the sclerotic and choroid be carefully removed under water from the back of an eye, an inverted picture of any object held before the cornea is seen upon the now milky surface of the retina. Hence the celebrated question raised in the age of philosophical barbarism, how is it that we see objects erect when the image on the retina is inverted? The question is an idle one, which is perhaps hardly worth answering. The mind judges of the apparent place of objects or of parts of an object by the *direction* of the impressions made upon the retina, not by the part of it which may happen to be affected by these impressions. The shadow of the central artery is an example of an impression necessarily received always upon the same parts; yet the *apparent*, or in other words the *relative*, place of the shadow will be found to vary with every movement of the eye.

Single Vision.—Another question, not so trivial as the last, has been raised with respect to single vision with *two* eyes, as the impression must be twofold. But perhaps it will not require an answer if the reader will try to imagine double vision of the same object, or rather of the same *point*, for the question resolves itself into that. Let the two supposed images approach each other, still remaining double, till they are in contact. Another step in the imaginary approximation, and they are one. The truth is, that both eyes see the object in the same place; and as two images, no more than two material substances, can occupy the same place at the same time, the impressions coincide and are single.

Diseases of the Eye.—We shall content ourselves in speaking of the diseases of the eye, with a few remarks which may serve as an index to the separate articles upon the most important of those diseases.

Blindness may be produced in various degrees by injury or disease of the retina, as by lightning. Such affections are technically known as *amaurosis*, but will be mentioned under the more familiar title of GUTTA SERENA. The sight may also be lost by anything which destroys the transparency of any of the refracting media. [CATARACT; GLAUCOMA; LEUCOMA.] Closure of the pupil is of course attended with loss of vision. It arises from diseases of the iris and may sometimes be remedied by an operation. Information with respect to inflammations and other diseases of the iris, sclerotic, and choroid, will be found under GOUT; IRITIS; PUPIL, ARTIFICIAL; RHEUMATISM; SYPHILIS. Inflammatory and ulcerative affections of the conjunctiva, whether of the eye or lid, are called OPHTHALMIA. The diseases of the lachrymal organs, and a peculiar paralytic affection of the muscle which elevates the upper eyelid will be mentioned respectively under the heads of FISTULA LACHRYMALIS and PTOSIS. Almost all affections of the eye, whether they result from injury or spontaneously, are liable to be extended from one eye to the other, so close is the sympathy between these organs. When the contents of the eyeball have been by any means evacuated, which may arise either from accident or disease, or operations which disease sometimes renders necessary, the sclerotic shrinks into a tubercle at the bottom of the eye, which produces of course a very unsightly effect, as well as no little inconvenience. It is common in these cases to resort to the introduction of what is called an artificial eye, consisting of a smooth shell of glass or enamel, suited in size and shape to the circumstances of the case, and coloured in exact imitation of the remaining organ. It is difficult when this is well made to distinguish it from a natural eye, and the illusion is much more complete from the circumstance that the muscles, still attached to the shrunk sclerotic, are capable of moving the artificial eye in correspondence with the other to an extent which would hardly be believed.

EYE (in Optics). [LIGHT; OPTICS.]

EYE, in horticulture, the name technically given to the bud of a plant.

EYE. [SUFFOLK.]

EYEMOUTH. [BERWICKSHIRE.]

EYLAU, more properly **PREUSSISCH-EILAU** (Prussian Eilau), is a circle in the Prussian administrative circle of Königsberg, having an area of about 460 square miles, which is partially wooded, is well cultivated, and has good pasture land and productive fisheries on its western boundary, the Frische Haff. Population about 37,000.

Preussisch-Eilau, the chief town, built in 1336, is situated on the Pasmer, in 54° 25′ N. lat. and 20° 35′ E. long. It has an old castle, a church, about 200 houses, and about 2150 inhabitants, who manufacture woollen cloths, hats, leather, &c. The name it bears has been given to it in order to distinguish it from Deutsch-Eilau, a town in the Prussian administrative circle of Marienwerder. An obstinate engagement took place near Preussisch-Eilau between the French forces under Napoleon and the Russian under Bennigsen on the 7th and 8th February, 1807. After the combatants had lost 30,000 in killed and 50,000 in wounded, they withdrew their troops from the field.

EYRE (from the old French *eyre*, a journey), the court of the justices itinerant who were regularly established, if not first appointed by the parliament of Northampton, A.D. 1176—22 Hen. II.—with a delegated power from the king's great court, or Aula Regis, being looked upon as members thereof. They were first appointed to make their circuit round the kingdom once in seven years, but by Magna Charta, c. 12, it was provided that they should be sent into every county once a year. Their jurisdiction and mode of proceeding are laid down 4 Inst., 184. These judges itinerant have been long superseded by the modern justices of assize. There was also a court so called which was held before the chief justices of the several forests, under the old Forest Laws. These courts were instituted A.D. 1184 by Hen. II., and were formerly very regularly held; but the last of any note that was holden was in the reign of Charles I., before the Earl of Holland, the rigorous proceedings at which are reported by Sir William Jones (Jones, i. 266). Charles I. endeavoured to make these odious forest laws a source of revenue independent of the parliament; and though, after the Restoration, another Court of Eyre was held before the earl of Oxford (North's *Life of Lord Guildford*, 45), it was merely *pro formâ*, and since the Revolution, 1688, they have fallen into total disuse. There are still two officers appointed by letters patent (4 Inst. 291), who are called Chief Justices in Eyre, the one south, the other north, of Trent, whose deputies perform some trifling and harmless functions connected with the royal forests in their respective districts:—the offices themselves are sinecures.

EZEKIEL, the Book of the Prophet, is a canonical book of the Old Testament, divided, in our English version, into 48 chapters, and placed next after Jeremiah's Book of Lamentations, and before the book of Daniel. Ezekiel was partially contemporaneous with Jeremiah, and is one of the prophets called 'The Greater,' a distinction which relates to the comparative magnitude and importance of their books. He was a priest, the son of Buzi (i. 3), and, according to the account of his life ascribed (erroneously) to Epiphanius, he was born at a place called Saresa. In the first Babylonian captivity he was carried away by Nebuchadnezzar into Mesopotamia, with the Kings Jeconiah and Jehoiachim, and all the principal inhabitants of Jerusalem, who were stationed at Tel-abib (iii. 15) and at other places on the river Chebar (i. 1, 3), the Chaboras of Ptolemy, which flows into the east side of the Euphrates at Carchemish, about 300 miles north-west of Babylon. He is stated to have commenced his prophesying in the fifth year of his captivity (i. 2), about B.C. 598, and to have continued it during more than 22 years, that is, until the fourteenth year after the destruction of Jerusalem by Nebuchadnezzar. The pseudo-Epiphanius says that Ezekiel, on account of his aversion to adopt the Chaldæan idolatry, was put to death by the Jewish prince or commander of the captives. Rabbi Benjamin of Tudela states that his tomb is between the Euphrates and the Chebar, in a vault built by King Jehoiachim, and that within it the Jews keep a lamp perpetually burning. The same writer asserts, with equal appearance of traditional falsehood, that the Jews possess the book of Ezekiel in the original autograph, which they read every year on the great day of expiation. Greatly inconsistent with such veneration is the fact related by Calmet, that the Jews speak of this prophet very contemptuously as having been Jeremiah's servant boy, and the object of popular ridicule and raillery, whence his name 'son of Buzi' (בז *buz*, contempt). Josephus speaks of two books of Ezekiel, but commentators understand him to mean the present book, divided at the end of chapter xxxix., for the nine remaining chapters are distinctly different with regard both to subject and style. The first 39 chapters are occupied with the prophet's highly poetic and impassioned announcement of God's wrath and vengeance against the rebellious idolatry, perverseness, and sensuality of the Jews, as well as against their enemies, the surrounding nations. All this portion is replete with dreadful pictures of the calamities of war—of ruin, desolation, death, and destruction—slaughter, pestilence, famine, and every imaginable state of misery; but in the nine chapters of the latter portion the prophet describes, in a more prosaic style, his visions of the new temple and city of Jerusalem. In visionary presence he walks about the holy metropolis of Judæa as raised from its ruins in which it was left by the Chaldæan conqueror, and restored to the splendor which it displayed in the reign of Solomon. He measures and observes minutely all the dimensions of the Temple and city; gives directions for the celebration of sacrificial rites, feasts, and ceremonies; partitions the country among the several tribes; and enumerates the duties of priests, king, and people. Dr. A. Clarke, in his edition of the Bible, gives a plate of the Temple according to Ezekiel's description, and a map of Judæa as allotted by this prophet to the different tribes. A full and particular analysis of the contents of the whole 48 chapters is given in Mr. Horne's 'Introduction to the Bible.' The following is a brief and general survey. Chapters i. to iii. (and see chap. 10) describe the vision of the wheels and cherubim, called 'Jehovah's Chariot,' and the prophet's reception of the divine instructions and commission. Chapters iv. to xxiv. reiterate reproaches and denunciations against the Israelites and their prophets, announcing, in various visions and parables, the numerous calamities about to come upon them as a punishment of their rebellious idolatry and depravity. The species of idolatry adopted by the Jews in preference to the religious system of Moses appears, by the declarations of Ezekiel and the other prophets, to have been Sabism, or the worship of the sun on high places planted with trees. (See chapters viii. xiv. xvi. xvii. xx. xxviii. &c.) Dr. A. Clarke quotes Palladius 'De Re Rustica' to show that the 'tile' (iv. 1) on which the prophet portrayed the city of Jerusalem was a brick, two feet long and one foot broad, and he supposes that the mimic apparatus of war (v. 2) were made by the prophet with clay. The 390 years signified by the prophet's lying as many days (v. 4 and 5) on his left side, are said by biblical chronologists to be the period from B.C. 970 to 580; and the 40 years signified by his lying 40 days on his right side (v. 6) is the period from B.C. 580 to 540. Concerning the fact of baking bread with human and other excrement (v. 12 and 15), see Calmet's Dict. by Taylor, vol. iii.; Fragments, p. 9, &c., where the oriental custom of using dung for fuel is explained. Chapters xxiv. to xxxii. declare the dreadful judgments of God against the enemies of the Jews, namely, the surrounding nations of Ammonites, Moabites, Edomites, and Philistines; against the cities of Tyre and Zidon; and against all the land of Egypt. It may suffice to remark here that all these manifestations of the divine anger towards the nations of Palestine, Phœnicia, and Egypt, relate to the slaughter and devastation which attended the conquests of Nebuchadnezzar, king of Babylon; and that in order properly to understand the prophet's descriptions, it is necessary to consider particularly the circumstances and character of the Jews, and all the collateral history of the period. Of these an abstract is given by Bishop Newcome in the Introduction to his Translation of Ezekiel, and more particular and critical accounts are supplied in the scholia and prolegomena of the various commentators named at the end of the article.

Chapters xxxiii. to xxxvii. are occupied with declarations of the justice and forgiveness of God to the repentant—the fall of Jerusalem—a severe rebuke (chap. xxxiv.) of the avarice, idleness, and cruelty of the shepherds or priests of Israel—and consolatory promises of the people's restoration and return to Palestine. Chapters xxxviii. and xxxix. contain the Prophecy of Gog and Magog; and the nine concluding chapters, as already stated, contain the prophet's visions of the temple and city of Jerusalem—their dimensions, structure, embellishments, &c.—the ceremonial arrangements of the hierarchy, and the allotment of the land of Judæa among the several tribes on their return from captivity. The subject matter of Ezekiel is, for the most part, identical with that of his contemporary Jeremiah, and much similarity is observable in their declarations. The conquests and devastations of Nebuchadnezzar form the principal theme of each; but Ezekiel views them chiefly as affecting Israel, while Jeremiah describes them with especial reference to Judah. Both declaim with vehement indignation against the depravity of the priests, and against the 'lying divinations' of the prophets who sought to induce the people to shake off their Babylonian slavery. (Compare Jeremiah, chapters xxiii., xxvii., xxviii., xxix. with Ezekiel, chapters xiii., xxxiv.) Parts of the book of Revelations may be compared with some portions of Ezekiel: Rev. iv. with Ezek. i. and x., respecting the cherubim with wings full of eyes; and Rev. xi., xxi., xxii., with Ezek. xl. to xliii., describing the New Jerusalem.

That Ezekiel is a very obscure writer is asserted by all who have attempted to explain his prophecies. The antient Jews considered them as inexplicable, and the council of the Sanhedrim once deliberated long on the propriety of excluding them, on this account, from the canon (Calmet, præf. ad Ezech.); but to prevent this exclusion Rabbi Ananias undertook to explain completely the vision of Jehovah's chariot (i. and x.). His proposal was accepted by the council, and in order to enable him to accomplish his task without interruption they furnished him with 300 barrels of oil to supply his lamp during the course of his studies. Dr. Adam Clarke relates this marvellous anecdote in his Comment on the Bible, and in repeating it in his 'Succession of Sacred Literature,' he says the quantity of oil was 300 *tons*. It was also alleged as a reason for rejecting Ezekiel from the canon that he teaches, in direct contradiction to the Mosaic doctrine, that children shall *not* suffer punishment for the offences of their parents (xviii., 2-20). (See Hueti 'Demonstratio Evang., prop. 4, de Prophot. Ezech.') St. Jerome considers Ezekiel's visions and expressions very difficult to be understood, and says that no one under the age of 30 was permitted to read them. (Hieron. proem. in lib. Ezech.) It is astonishing, says Dr. Clarke, how difficult it is to settle the text by a collation of MSS.; and, in accordance with the opinion of many other interpreters, he adds, that much remains to be done to restore the original Hebrew text to a state of purity. Michaelis, Eichhorn, Newcome, and many other commentators, have written copiously on the peculiarities of Ezekiel's style. Grotius (Præf. ad Ezech.) speaks of it with the highest admiration, and compares the prophet to Homer. Michaelis admits its bold and striking originality, but denies that sublimity is any part of its character, though the passion of terror is highly excited. Bishop Lowth (Prælect. Heb. Poet.) regards Ezekiel as bold, vehement, tragical; wholly intent on exaggeration; in sentiment fervid, bitter, indignant; in imagery magnificent, harsh, and almost deformed; in diction grand, austere, rough, rude, uncultivated; abounding in repetitions from indignation and violence. This eminent judge of Hebrew literature assigns to the poetry of Ezekiel the same rank among the Jewish writers as that of Æschylus among the Greeks; and in speaking of the great obscurity of his visions, he believes it to consist not so much in the language as in the conception. Eichhorn (the peculiar character of whose criticism we have noticed under that article) regards the Book of Ezekiel as a series of highly-wrought and extremely artificial poetical pictures. No other prophet, he says, has given such freedom to imagination. 'Every thing is dressed in fables, allegories, and visionary poetry. He is so used to ecstasies and visionaries that he adopts their appropriate language when he has no vision to describe.' In accordance with the doctrines of the German rationalism he considers the prophecies as nothing more than the poetical fictions of a heated oriental imagination of a similar nature with the poetry of the book of Revelations. A remarkable characteristic of the poems of Ezekiel, observes the same critic, is the painful detail and minuteness of his descriptions. He considers the prophet as a great original poet, but from his turgid and hyperbolical style he assigns him to the *silver* age of Hebrew literature.

In rude indignation, violent energy, and disregard of delicacy and disguise, the denunciations and descriptions of Ezekiel are said by Dr. Clarke to resemble the satires of Juvenal. The same character of thought and expression is exhibited in the writings of the two other Greater Prophets, Isaiah and Jeremiah. (Compare Ezek. xvi. 4 to 37; xxiii. 17-21; Isaiah, xxviii. 7, 8; xxxvi. 12. Ezekiel's remarkable prophecy of Gog and Magog, xxxviii. and xxxix., has always been a subject of learned controversy, and the explanations are nearly as numerous as the expositors. However, only two appear to possess any considerable probability. Gog, according to the first, was Antiochus Epiphanes; according to the second, he was Cambyses, king of Persia. In modern times it has been elaborately shown by Mr. Granville Penn that Gog is to be recognized in the person of the Emperor Napoleon, and Magog in the people or nation of France. His treatise on the subject, entitled 'The Prophecy of Ezekiel, concerning Gogue, the last tyrant of the church,' &c., published in 1815, is a production replete with curious learning and argumentative ingenuity.

(*Commentaries* of Bauer, Doederlein, Hezel, Michaelis; Dathe, *Propnetæ Majores*, 1785; Dr. Seiler, *Ueber die Weissagungen und ihre Erfüllung*, 1795; Volborth, *Ezechiel aufs neue aus dem Hebräischen übersetzt*, 1787; Bishop Newcome's *Improved Version, Metrical Arrangement, and Explanation of Ezekiel*, 4to., 1788; Venema *Lectiones Academicæ ad Ezechielem*, 2 vols., 4to., 1791; Rosenmüller, *Scholia in Ezechielem*, 2 vols., 4to., 1826; Agier, *Les Prophètes nouvellement traduits sur l'Hebreu, avec des Explications et Notes Critiques*, 10 vols., 8vo., 1822; Noyes, *New Translation of the Prophets in Chronological Order*, 1833, Boston; Keith *On Prophecy*; Eichhorn's *Einleitung in das Alte Test.*, vol. iii.; Beverley, *Visions of Ezekiel*, 4to.; Prideaux's *Connection*, vol. i.; Bishop Lowth's *Prelectiones*; Dr. Gill's *Exposition of the Prophets*, 2 vols. fol. 1757; Bishop Lowth's *Comment. on the Prophets*, 4to. 1822; Greenhill's *Exposition of Ezekiel*, 5 vols. 4to. 1649. The most learned and elaborate commentary on Ezekiel is by two Spanish Jesuits, Pradus and Villalpandus, in 3 vols., folio.)

EZEKIEL. [DRAMATIC ART AND LITERATURE.]

EZRA, the Book of, is a canonical book of the Old Testament, placed next after the second book of Chronicles and before the book of Nehemiah, and, in the English version is divided into ten chapters. By Jews and Christians it has generally been attributed to the priest whose name it bears, chiefly because throughout chapters viii. and ix. the actions of Ezra are related in the first person. He is supposed t have written the two books of Chronicles and the book o Esther. It is remarkable that the first two verses of Ezr and a part of the third form the conclusion of the secon book of Chronicles. [CHRONICLES.] Ezra, Esdras, o Esdra in the Hebrew is אזרה, *azrh*, signifying 'help' o 'succour.' His genealogy up to Aaron is given in chap. v 1-5. In verses 6 and 11 he is said to have been a pri and ready scribe of the words of the law of Moses; an he appears to have been an able and important agent i the principal events of his age and nation. The prophet Haggai and Zechariah were contemporary with Ezra. (Compare Hagg. i. 12, Zech. iii. 4, and Ezra v.) There are fou books of Ezra so called; namely, the canonical one bearin his name, the book of Nehemiah, which by the antient Jew and by the Greek and Roman churches is considered as th second book of Ezra, and two books of Ezra or Esdras in th Apocrypha. The first of the two apocryphal books contai the substance of the canonical one, with many circumsta tial additions, and in the Greek church it is read as can nical; but the second exhibits a more decided appearan of fiction, and by no church is regarded as a work of insp ration, though it is cited by several of the antient fathe The first six chapters of the canonical book are regard by some biblical critics as improperly ascribed to Ezra, f between the event with which the seventh chapter commences, that is, the commission from Artaxerxes Long manus, in the seventh year of his reign, to Ezra to go t to Jerusalem, B.C. 458, and that which terminates t sixth chapter, namely, the completion of the second temp in the sixth year of the reign of Darius Hystaspes, B.C. 51 there is a chasm of fifty-eight years. The events record in the whole ten chapters of the canonical book of Ez embrace a period of ninety-one years, that is, from the edi of Cyrus issued in the first year of his reign, B.C. 536, f the return of the captive Jews to Jerusalem, to the term nation of Ezra's government by the mission of Nehemiah to Jerusalem from Artaxerxes Longimanus, in the twentieth year of his reign, B.C. 445. As Daniel's seventy prophetic weeks commence at the going forth of the edict of Cyrus to Zerubbabel or of that of Artaxerxes to Ezra, these events have been the subject of much critical investigation among biblical critics.

The contents of the first six chapters are briefly as follow. Chap. i. gives an account of the proclamation of Cyrus concerning his release of the captive Jews, permitting them to go from Babylon to Jerusalem to rebuild the temple; of the restoration of their property, sacred vessels and utensils; and of presents made by the Chaldæans of money and various provisions. Chap. ii. states the numbers of each of the families composing the multitude which returned to Judæa with Zerubbabel, and the number of their beasts of burden. All this account, excepting some of the numbers, is repeated word for word in the seventh chapter of Nehemiah, beginning at ver. 6. In ver. 64 and 65 of Ezra, the total number of the people is said to have been 42,360, which appears not to agree with the preceding particulars, since the addition of these produces only 29,818, that is, a deficiency of 12,542. The numbers given in Nehemiah occasionally differ very widely from those in Ezra: for instance, the children of Azgad are said in Ezra (ii. 12) to have been 1222; but in Nehemiah (vii. 17) they are said to have been 2322, or 1100 more. Nehemiah repeats precisely the total given by Ezra, 42,360; but the addition of Nehemiah's particular numbers makes 31,089, or a deficiency of 11,271. The numbers of horses, 736, mules 245, camels 435, and asses 6,720, exactly agree in the two accounts; but in Ezra, ver. 69, the chief fathers give to the treasury 61,000 drams of gold; in Nehemiah, ver. 71, they give only 20,000. Chap. iii. records the events of setting up the altar at Jerusalem and re-establishing the Jewish sacrificial worship. An account of the interruption of the building of the Temple by the decree of Artaxerxes, and its completion by a subsequent decree of the same monarch, with transcripts of the documents written on these occasions, occupy chapters iv., v., and vi. Chapters vii. and viii. contain an account of Ezra's commission from Artaxerxes to undertake the government of Judæa, his preparations and reception of presents for his journey thither, with a multitude of Jews, who it appears still remained in Babylon after the return to Judæa of the multitude under Zerubbabel; an enumeration of the people and families who returned, and the weight of gold and silver contributed by the king, his councillors, and the Israelites, for the use of the Temple at Jerusalem (viii. 25-28). The value of these presents amounts to 803,600*l*. Chapters ix. and x. relate the proceedings of Ezra in separating from their wives and children all the Israelites who had married women from among the surrounding nations, and thus 'mingled the holy seed with the abominations of the Gentiles.' Ezra (x. 3, 5, 19, 44) made all the Israelites who had 'strange wives and children' swear, and give their hands, that they would put them away, which accordingly was done. The latter half of the last chapter contains a long list of the husbands and fathers who were the subjects of this national renovation. The part from iv. 8 to vii. 27 is written in the Chaldee idiom, the rest in Hebrew. The period to which the four last chapters relate, comprising the Jewish history from B.C. 458 to B.C. 445, is coeval with the age of Pericles. The subject matter of the book of Nehemiah being identical with that of Ezra, the collation of the two affords a mutual illustration. Chapter viii. of Nehemiah relates circumstantially the fact of Ezra's solemn reading and exposition of the law to the assembled Israelites, who, according to Dr. Prideaux, were taught the signification of the Hebrew words by means of Chaldaic interpreters (8); for, since their seventy years' captivity in Babylon, the Chaldee instead of the Hebrew had become their vernacular language. (Dean Prideaux's *Connection*, fol., p. 263.) The critical arguments adduced in opposition to the opinion that the Israelites lost the Hebrew language, and understood only the Chaldæan, are well exhibited in Dr. Gill's learned 'Dissertation on the Antiquity of the Hebrew Language,' 8vo., 1767. The two principal undertakings of Ezra were—1. The restoration of the Jewish law and ritual, according to the modes observed before the captivity; and 2. The collection and rectification of the Sacred Scriptures. On account of these important services the Jews regarded him as a second Moses. It was commonly believed by the antient fathers of the Christian church that all the Sacred Scriptures of the Jews were entirely destroyed in the conflagration of the temple and city of Jerusalem by the king of Babylon, and that, on the return of the Jews from the Chaldæan captivity, these writings were wholly reproduced by a divine inspiration of Ezra. (See Irenæus, *Adversus Hæres*, l. iii. c. 25; Tertullian, *De Habitu Mulierum*, c. iii.; Clemens Alexandrinus, *Strom.* i.; Basil, *in Epist. ad Chilonem.*) The following passages from the second Apocryphal book of Ezra, xiv. 26, 45, 46, 47, appear to sanction this opinion. 'Behold, Lord,' says Ezra, 'I will go as thou hast commanded me, and reprove the people. The world is set in darkness, and they that dwell therein are without light, for *thy law is burnt*; therefore no man knoweth the things that are done of thee; but if I have found grace before thee, send the Holy Ghost into me, and I shall write all things that have been done in the world since the beginning, which were written in the law; And God said, Go, prepare to write swiftly, and when thou hast done, some things shalt thou publish, and some things shalt thou show secretly to the wise.' The learned Dr. Prideaux (*Connection*, p. 260, fol.) remarks, that 'in the time of king Josiah (B.C. 640), through the impiety of the two preceding reigns of Manasseh and Ammon (a period of sixty years), the book of the law was so destroyed and lost; that, besides the copy of it which Hilkiah, the high-priest, accidentally found in the Temple (2 Kings xxii. 8, &c.; 2 Chron. xxxiv. 14, &c.), there was then no other to be had; for Hilkiah's surprise in finding it, and Josiah's grief in hearing it read, do plainly show that neither of them had ever seen it before; and if this pious king and the high-priest were without it, it cannot be thought that any one else had it.' If this were the authentic copy laid up before the Lord in the Temple, it was burned, as believed by all Jewish and Christian writers, in the burning of the Temple, fifty-two years afterwards, by Nebuchadnezzar. Dr. Prideaux takes it to be implied in several passages which he cites that, from the copy accidentally found by the high-priest Hilkiah, some transcriptions were made previous to the destruction of the Temple, and that from these scattered copies Ezra formed his improved edition of the sacred text. In common with most other modern divines, he rejects the opinion of the fathers respecting the restoration of the Scriptures by a new revelation to Ezra, observing (p. 261) that 'it would very much shock the faith of many should it be held that the sacred writings owe their present being to such a revival; it being obvious for sceptical persons to object that he who is said thus to have revived them forged the whole.' All, he continues, that Ezra did was—'he got together as many copies of the sacred writings as he could, and out of them all he set forth a corrected edition, in which he took care of the following particulars:—1. He corrected all the errors introduced into these copies by the negligence or mistakes of transcribers; for, by comparing them, he found out the true reading, and set all to rights. 2. He collected together all the books of which the sacred Scriptures did then consist, disposed them in proper order, and settled the canon of scripture up to that time.' The Jewish writers state that the canon was decided by a congress of 120 elders under the presidency of Ezra; but since they mention as members of it, not only the contemporaries of Ezra, as Daniel, Shadrach, Meschech, and Abednego, but the high-priest Simon the Just, who lived 250 years later, it is evident that they mean the number of those who *successively* arranged and rectified the canonical books. Ezra divided all the books he collected into three parts; the law, that is, the Pentateuch; the prophets, containing all the historical and prophetical books; and the hagiographa, which comprised all the writings not included in the two other divisions. (Josephus, *advers. Apion.*) He divided the Pentateuch into 54 sections, one of which was read every Sabbath; and, according to the Jewish authorities, he was also the author of the smaller divisions called Pesukim, or verses, and of the various readings and suggested corrections inserted in the margins of the Hebrew copies. These, called Keri Cetib (that which is read and that which is written), appear however in the books attributed to Ezra himself. (On these particulars see the remarks of Prideaux; Buxtorf, *Vindiciæ Veritatis Hebraicæ*, par. ii. c. 4; Walton's *Prolegom.*, viii. § 18· and Dr. Gill's *Dissertation on the Hebrew Language.*) Most biblical critics state that Ezra changed the antient names of places for those by which these places were known in his time, and some say that he wrote out all the Scriptures in the Chaldee character, which alone was used and understood by the Jews after the Chaldæan captivity. Whether Ezra added the vowel-points, and whether they were invented by the Masorite grammarians at a period far posterior to the rise of Christianity, are subjects of great controversy among Hebrew critics. A concise and able view of this dispute is contained in Houbigant's 'Racines Hebraiques,' 1732. The Jewish commentators assert that all the rules and observances preserved by tradition from the time anterior to the captivity were carefully collected by Ezra, and that having reviewed them, those which he sanctioned by his authority henceforth constituted the oral law, in contradistinction to that which is written; the church of Jerusalem, like the church of Rome, regarding Scripture and tradition of equal authority, and believing the latter to be highly necessary for clearing the obscurities, supplying the defects, and solving the difficulties of the former. (See the Rabbinical authorities cited by Dr. Prideaux.) It is a theory suggested by this learned divine, and since adopted by many others, that all the numerous passages of the Hebrew Scriptures which involve chronological inconsistencies were interpolations made by Ezra, and that this is the only possible way to solve the difficulties which arise from considering the several books as the productions of the persons to whom they are commonly ascribed. The Book of Ezra, with the two Books of Chronicles, Nehemiah, Esther, and Malachi, are supposed by Dr. Prideaux to have been added to the sacred canon by the high-priest Simon the Just, in the year B.C. 150.

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F.

F is a labio-dental aspirate bearing the same relation to the other labio-dental aspirate V which the letters called *tenues*, *p*, *k*, *t*, bear to the *mediæ*, *b*, *g*, *d*. It occupies the sixth place in the English as in the Latin alphabet, thus corresponding with the digamma of the old Greek alphabet, and the vau of the Hebrew. In power and form it is likewise closely related to those two letters. [ALPHABET.]

The letter F is interchangeable with the other aspirates *ch* or *h* and *th*, and also with the lip-letters *p* and *b*.

1. F in Latin corresponds to *h* in Spanish, as Latin *formoso*, beautiful; Spanish *hermoso;* Latin *femina*, female; Spanish *hembra;* Latin *fugere*, fly; Spanish *huir*. Other examples may readily be found in a Spanish Dictionary under the letter *h*. The same change prevailed between the Latin of Rome and the Sabine dialect of that language.

2. F in Latin corresponds to *th* in Greek, as Latin *fera*, a wild beast; Greek θηρ. Latin *fle*, weep; Greek θρε, as seen in θρηνος. Indeed this interchange prevailed among the dialects of the Greek language itself as in ουφαρ and ουθαρ; φλᾳν and θλᾳν; φλιβω and θλιβω. This however seems to depend on the proximity of the letters *l* and *r*. (See L.)

3. F in Latin corresponds to *b* in German and English, as *frang-ere*, brech-en, to break; *frater*, bruder, brother; *fago*, buche, beech, &c.

4. F in English and German to *p* in Latin, as *pelli*, fell, fell (comp. fellmonger); *ped*, fuss, foot; *pug-na-re*, fechten, to fight, &c.

F, in Music, is the fourth note, or degree, of the diatonic scale, answering to the *fa* of the Italians and French. It was originally used as the base clef, to which it gives a name; but while serving as a sign, time has gradually altered its form into that which as a clef it now takes. This letter is also an abbreviation of the Italian word *Forte*, strong, or loud. The double F signifies the superlative of *Forte,—Fortissimo*.

FABA'CEÆ. [LEGUMINOSÆ.]

FA'BIUS MA'XIMUS and the FABII FAMILY. The Fabii were a numerous and powerful gens or patrician house of antient Rome, which became subdivided into several families or branches distinguished by their respective cognomina, such as Fabii Maximi, Fabii Ambusti, Fabii Vibulani, &c. They were of Sabine origin, and settled on the Quirinal from the time of the earliest kings. After the expulsion of the Tarquinii, the Fabii as one of the older houses exercised considerable influence in the senate. Cæso Fabius being Quæstor with L. Valerius, impeached Spurius Cassius in the year of Rome 268, 486 B.C., and had him executed. It has been noted as a remarkable fact, that for seven consecutive years from that time, one of the two annual consulships was filled by three brothers Fabii in rotation. Niebuhr has particularly investigated this period of Roman history, and speculated on the causes of this long retention of office by the Fabii as connected with the struggle then pending between the patricians and the plebeians, and the attempt of the former to monopolize the elections. (*History of Rome*, vol. ii., *The Seven Consulships of the Fabii*.) One of the three brothers, Quintus Fabius Vibulanus, fell in battle against the Veientes, in the year 274 of Rome. In the following year, under the consulship of Cæso Fabius and Titus Virginius, the whole house of the Fabii proposed to leave Rome and settle on the borders of the territory of Veii, in order to take the war against the Veientes entirely into their hands. After performing solemn sacrifices, they left Rome in a body, mustering 306 patricians, besides their families, clients, and freedmen, and encamped on the banks of the Cremera in sight of Veii. There they fortified themselves, and maintained for nearly two years a harassing warfare against the Veientes and other people of Etruria. At last in one of their predatory incursions they fell into an ambuscade, and fighting desperately, were all exterminated. (Livy, ii. 48. 50; and Niebuhr's *History, on the Veientine War*.) One only of the house, Quintus Fabius Vibulanus, who had remained at Rome, escaped, and became the parent stock of all the subsequent Fabii. He was repeatedly consul, and was afterwards one of the decemviri with Appius Claudius for two consecutive years, in which office he disgraced himself by his connivance at the oppressions of his colleague, which caused the fall of the decemvirate. In subsequent years we find several Fabii filling the consulship, until we come to M. Fabius Ambustus, who was consul in the year 393 of Rome, and again several times after. He fought against the Hernici and the Tarquinians, and left several sons, one of whom, known by the name of Quintus Fabius Maximus Rullianus, attacked and defeated the Samnites (429 of Rome) in the absence and against the orders of his commanding officer, the Dictator Papirius, who would have brought him to punishment for disobedience, but was prevented by the intercession of the soldiers and the people. This Fabius was five times consul, and dictator twice.' He triumphed over the Samnites, Marsi, Gauls, and Tuscans. His son, Quintus Fabius Gurges, was thrice consul, and was the grandfather of QUINTUS FABIUS MAXIMUS VERRUCOSUS, one of the most celebrated generals of Rome. In his first consulate he triumphed over the Ligurians. After the Thrasymenian defeat he was named Prodictator by the unanimous voice of the people, and was intrusted with the salvation of the Republic. The system which he adopted to check the advance of Hannibal is well known. By a succession of skilful movements, marches, and counter-marches, always choosing good defensive positions, he harassed his antagonist, who could never draw him into ground favourable for his attack, while Fabius watched every opportunity of availing himself of any error or neglect on the part of the Carthaginians.

This mode of warfare, which was new to the Romans, acquired for Fabius the name of Cunctator, or 'temporizer,' and was censured by the young, the rash, and the ignorant; but it probably was the means of saving Rome from ruin. Minucius, who shared with Fabius the command of the army, having imprudently engaged Hannibal, was saved from total destruction by the timely assistance of the dictator. In the following year however, 536 of Rome, Fabius being recalled to Rome, the command of the army was intrusted to the consul T. Varro, who rushed imprudently to battle, when the defeat of Cannæ made manifest the wisdom of the dictator's previous caution. Fabius was made consul in the next year, and was again employed in keeping Hannibal in check. In 543 of Rome, being consul for the fifth time, he re-took Tarentum by stratagem, after which he narrowly escaped being caught himself in a snare by Hannibal near Metapontum. (Livy, xxvii. 15, 16.) When some years after the question was discussed in the senate of sending P. Scipio with an army into Africa, Fabius opposed it, saying that Italy ought first to be rid of Hannibal. Fabius died some time after at a very advanced age. His son, called likewise Quintus Fabius Maximus, who had also been consul, died before him. His grandson Quintus Fabius Maximus Servilianus, being proconsul, fought against Viriatus in Spain, and concluded with him an honourable peace. (Livy, *Epitome*, 54.) He was afterwards consul repeatedly, and also censor. He wrote Annals, which are quoted by Macrobius. (*Saturn.* i. 16.) His brother by adoption Quintus Fabius Maximus Æmilianus, the son of Paulus Æmilius (Livy, xlv. 41), was consul in 609 of Rome, and was the father of Fabius, called Allobrogicus, who subdued not only the Allobroges, but also the people of Southern Gaul, which he reduced into a Roman province, called from that time 'provincia,' or 'Gallia ulterior.' Quintus Fabius Maximus, a grandson of Fabius Maximus Servilianus, served in Spain under Julius Cæsar, and was made consul in the year 709 of Rome. Two of his sons or nephews, Paulus Fabius Maximus and Quintus Fabius Maximus were consuls in succession under Augustus. There was also a Fabius consul under Tiberius. Panvinius and others have reckoned that during a period of about five centuries, from the time of the first Fabius, who is mentioned as consul, to the reign of Tiberius, 48 consulships, 7 dictatorships, 8 censorships, 7 augurships, besides the offices of master of the horse and military tribune with consular power, were filled by individuals of the Fabian house. It also could boast of thirteen triumphs and two ovations. (Augustinus *de Familiis Romanorum*.)

FABIUS PICTOR, the historian, was descended from Marcus Fabius Ambustus, the consul. Caius Fabius, one of the sons of Ambustus, was called Pictor, because about B.C. 304 he painted the temple of the goddess of health, which painting existed till the reign of Claudius, when the temple was burnt. (Pliny, xxxv. c. 4.) The surname of Pictor was continued to his children, one of whom, Caius Fabius Pictor, was consul with Ogulnius Gallus B.C. 271, and was the father of the historian. Quintus Fabius Pictor, the historian, lived in the time of the second Punic war, according to the testimony of Livy (xxi.), who says, in speaking of the battle of the Thrasymene lake, that he followed in his narrative the authority of Fabius Pictor, who was contemporary with that memorable event. Fabius appears, from the testimony of Dionysius and Cicero, to have written both in Greek and in Latin. Of the extracts from or references to his 'Annals,' which have been transmitted to us, some concern the antiquities of Italy, and the beginning of Rome, others the subsequent fasti, or history of the Romans. He was the first who compiled a history of his country from the records of the pontiffs, and from popular tradition. He is spoken of with praise by Livy, who evidently borrowed largely from him, and by Cicero, Pliny, Appian, and others. Polybius however censures his obvious partiality for the Romans, and his unfairness towards the Carthaginians, in his account of the second Punic war. His Annals are lost, with the exception of some fragments, which have been preserved by subsequent writers, and are printed in the collections of Antonius Augustinus, Antwerp, 1595, Antonius Riccobonus, Venice, 1568, and others. The well-known impostor, Annio da Viterbo, published a small work on the origin of Rome, under the name of Fabius Pictor, but the fraud was discovered. Quintus Fabius Pictor was sent by the senate to Delphi after the battle of Cannæ, to consult the Oracle about the ultimate result of the war. He must not be confounded with Servius Fabius Pictor, who lived in the time of Cato the Elder, and who is praised by Cicero for his knowledge of jurisprudence, literature, and antiquity. (Vossius, *De Historicis Latinis;* Fabricius, *Bibliotheca Latina.*)

FABLE, Fábula in Latin, in its general sense means a fictitious narrative, but it also means more particularly a species of didactic composition, consisting of a short fictitious tale inculcating a moral truth or precept. As such it is divided into two sorts, the parable and the apologue. The former narrates some incident, which, although it may not have happened exactly as the narrator supposes, yet could have happened at any time, there being nothing impossible or improbable in it. Of this description are many of the parables contained in the Scriptures, and especially in the New Testament, it being a favourite mode with our Saviour of illustrating his precepts by similitudes. When, for instance, he spoke of the master who, before setting out on a long journey, intrusted certain talents or sums of money to each of his three servants, he did not mean that such a fact had occurred at any particular time, though it might have occurred, but he chose this figure as presenting the ways of God with regard to the mental or spiritual talents he has gifted men with, and which he expects them to cultivate and render useful in proportion to their capacities. The second species of moral fable, called apologue, relates facts which are evidently untrue, and cannot have happened; such as animals, or even inanimate things, speaking, but which serve as comparisons for the actions of men. Such was the well-known apologue of Menenius Agrippa, addressed to the plebs of Rome, who had revolted against the patricians, in which he told them of the various limbs of the human body having once revolted against the belly. (Livy, ii. 32.) Most of the fables which are called Æsopian are apologues, although some are of the parable kind; for example, that of Æsop and the villain who threw a stone at him. (Phædrus, iii. 5.)

The apologue is one of the oldest forms of composition, being well calculated to strike the minds of men in a rude state. Homer's War of the Mice and the Frogs is a composition of the nature of the apologue; only being extended to a considerable length, and including a succession of incidents, it is classed among the heroicocomic poems, whilst the apologue, or fable properly so called, points out only one particular incident from which it draws a moral. In the same manner, in modern times, the 'Animali Parlanti,' or 'Court and Parliament of Beasts' of Casti must be classed among the mock epic poems, although it may be said to consist of a series of apologues, each pointing to some particular error, or abuse, in the state of society, and in the conduct of men. It is probable that the older and simpler mythological fables of the gods and heroes among the antients were originally intended by the early patriarchs or priests to illustrate by allegory the attributes of the Creator, the phenomena of nature, and the progress of social life; but that in course of time people lost sight of the moral, and believed the fiction in its literal sense.

The oldest collection of fables in any European language is in Greek prose: the fables are attributed to Æsop, but much doubt exists as to the real author or authors of them. [ÆSOP.] Babrias wrote a metrical version of Æsopian fables, only a few of which have come down to us. [BABRIAS.] The fables called the fables of Bidpai [BIDPAI] are derived from a collection in the Sanscrit language, and Lokman is said to have written fables in Arabic; but several of the fables attributed to the latter appear to be the same as some of those attributed to Æsop, and it has been supposed that Lokman and Æsop were one and the same personage. [LOKMAN.]

Among the Latins, Phædrus, who lived under Tiberius, is the most celebrated. he professes to have taken his subjects from Æsop. The MS. of Phædrus was not discovered before the end of the sixteenth century. Avianus, or Avienus, who (supposing the two names to mean the same individual) lived under the elder Theodosius, wrote a collection of fables in Latin verse. (*Edition of Avienus*, Leyden, 1731, with a *Dissertation on the Identity of Avianus and Avienus.*) Faerno of Cremona, who lived about the middle of the sixteenth century, made a collection of Æsopian fables, which he turned into Latin verse, and which were published at Rome after his death in 1564. He was accused of plagiarism, as having found a MS. of Phædrus in some library, and borrowed his subjects from it.

In the modern languages, among the original writers of fables or apologues, La Fontaine has been generally considered as rivalling or surpassing Phædrus in this kind of composition; and indeed he may be fairly placed above all writers of this class. Among the English, Gay and Moore have written fables. The Germans have had Lessing, Gellert, and others; and the Spaniards have Yriarte and Samaniego. Among the Italians, Firenzuola, Crudeli, Baldi, Capaccio, in the sixteenth and seventeenth centuries, wrote chiefly translations or paraphrases from the Greek and Latin fabulists. In the eighteenth century Pignotti, a native of Tuscany, wrote original fables in verse, which were published at Pisa in 1782, and have been often reprinted since. Bertola also wrote fables (Pavia, 1788), with an essay on fables. Luigi Fiacchi published, under the name of 'Clasio,' a collection of fables (Florence, 1807).

FABRETTI, RAFFAELE, born at Urbino in 1619, was secretary of Pope Alexander VIII., and præfect of the papal archives in the castle St. Angelo under Innocent XII. Fabretti spent most of his time in searching the ruins which are scattered about Rome and its neighbourhood, and digging for those which were under ground. He explored catacombs, columbaria, sepulchres, and other subterraneous receptacles; and he gathered an abundant harvest of antiquities, and chiefly of inscriptions, which he ranged in a collection at his house at Urbino, which collection has been since transferred to the ducal palace of the same town. It is related that the horse upon which he rode for many years in his perambulations through the Campagna, and which his friends had nicknamed Marco Polo, became so accustomed to his master's hunting after inscriptions that he used to stop of himself whenever he met with any. Fabretti wrote, 1°, 'Inscriptionum Antiquarum Explicatio,' fol., 1699; 2°, 'De Columnâ Trajani,' fol., 1683, an elaborate work, in which he illustrated with much erudition and judgment the sculptures of that celebrated monument. He added to it an explanation of the Iliac table which is in the Capitoline Museum. 3°, 'De Aquis et Aquæductibus Veteris Romæ,' 4to., 1680, reprinted with notes and additions in 1788. Fabretti rendered great services to archæology by his system of illustrating one monument by the help of another. He had a controversy with James Gronovius about the interpretation of some passages of classical writers, in which both resorted to discreditable scurrilities. Fabretti died at Rome in January, 1700, at the age of eighty. He may be considered as the predecessor of Bianchini, Bottari, and other archæologists who illustrated the antiquities of Rome during the eighteenth century.

FABRIA'NO. [Macerata.]

FABRI'CIUS, CAIUS, surnamed Luscinus, was consul for the first time in the year 471 of Rome, 283 B.C., when he triumphed over the Boii and the Etruscans. After the defeat of the Romans under the consul Lævinus by Pyrrhus (B.C. 281), Fabricius was sent by the senate as legate to the king to treat for the ransom of the prisoners, or, according to others, to propose terms of peace. Pyrrhus is said to have endeavoured to bribe him by large offers, which Fabricius, poor as he was, rejected with scorn, to the great admiration of the king. Fabricius being again consul (B.C. 279) was sent against Pyrrhus, who was then encamped near Tarentum. The physician to the king is said to have come secretly to the Roman camp, and to have proposed to Fabricius to poison his master for a bribe, at which the consul, indignant, had him put in fetters and sent back to Pyrrhus, upon whom this instance of Roman integrity made a great impression. Pyrrhus soon after sailed for Sicily, where he was called by the Syracusans, then hard pressed by the Carthaginians. Fabricius having defeated the Samnites, Lucanians, and Bruttii, who had joined Pyrrhus against Rome, triumphed over those people. Pyrrhus, afterwards returning to Italy, was finally defeated and driven away by M. Curius Dentatus (B.C. 276). Two years after, Fabricius being consul for the third time, with Claudius Cinna for his colleague, legates came from king Ptolemy of Egypt to contract an alliance with Rome. Several instances are related of the extreme frugality and simplicity of the manners of Fabricius, which are conformable to what is recorded of the austerity of Roman life previous to the Punic wars. When censor, he dismissed from the senate P. Cornelius Rufinus because he had in his possession ten pounds' weight of silver plate. Fabricius died poor, and the senate was obliged to make provision for his daughters. (Plutarch, *Life of Pyrrhus*; Livy, *Epitome* xiii., xiv.; Eutropius; Justinus.)

FABRI'CIUS, JOANNES ALBERTUS, born at Leipzig in 1667, early distinguished himself by his proficiency in classical literature, and his penetration and judgment, assisted by an excellent memory. Having finished his studies at Leipzig, he went to Hamburg, where I. F. Meyer appointed him his librarian. He was afterwards appointed professor in the college of Hamburg, where he remained to the end of his life, having refused several advantageous offers made to him by the landgrave of Hesse Cassel and others. He was the author of many elaborate works, the principal of which are:—I. 'Bibliotheca Græca,' 14 vols. 4to., Hamburg, 1705-28. A new edition, with considerable improvements, was published by Harles, Hamburg, 1790-1809. The 'Bibliotheca Græca' is a most valuable work; it contains notices of all the Greek authors, from the oldest known down to those who flourished in the last period of the Byzantine empire, with lists of their works and remarks on them. II. 'Bibliotheca Latina,' 3 vols. 4to., 1708-21. Ernesti published a new and much improved edition of the same at Leipzig, 1773. The 'Bibliotheca Latina' is inferior in research and copiousness to the 'Bibliotheca Græca,' but is still a useful work, especially in the new form given to it by Ernesti. III. 'Bibliotheca Latina Ecclesiastica,' fol., Hamburg, 1718. IV. 'Bibliotheca Latina mediæ et infimæ Ætatis, cum Supplemento C. Schoettgenii, ex recensione Dominici Mansi,' Padua, 6 vols. 4to., 1754. V. 'Memoriæ Hamburgenses, 7 vols. 8vo.; to which Reimar, the son-in-law of Fabricius, added an eighth volume in 1745. VI. 'Codex Apocryphus Novi Testamenti,' 2 vols. 8vo., 1719; being a Collection of the false Gospels, Acts of the Apostles, and other apocryphal books which appeared in the early ages of Christianity. VII. 'Bibliographia Antiquaria,' 4to., 1760; being notices of the authors who have written upon Hebrew, Greek, Roman, and ecclesiastical antiquities. VIII. 'Delectus Argumentorum et Syllabus Scriptorum qui veritatem Religionis Christianæ lucubrationibus suis asseruerunt,' 4to., 1725. IX. 'Hydrotheologia,' written in German, and translated into French under the title 'Théologie de l'Eau, ou Essai sur la Bonté, la Sagesse, et la Puissance de Dieu, manifestées dans la Création de l'Eau,' 8vo., La Haye, 1741. X. 'Codex pseudepigraphus Veteris Testamenti,' being a counterpart of his work on the Apocrypha of the New Testament. XI. 'Conspectus Thesauri Litterarii Italiæ,' 8vo., 1749, or notices of the principal collections of the Historians of Italy, as well as of other writers who have illustrated the antiquities, geography, &c., of that country, including the great works of Burmannus and Grævius, with an account of the Italian literary journals existing or which had existed before the time of Fabricius, of the Italian academies, and a catalogue of Italian bibliographers and biographers classed according to the particular towns which they have illustrated. XII. 'Imp. Cæs. Augusti Temporum Notatio, Genus et Scriptorum Fragmenta,' with 'Nicolai Damasceni De Institutione Augusti,' 4to., 1727. XIII. 'Salutaris Lux Evangelii, sive Notitia Propagatorum per Orbem totum Sacrorum: accedunt Epistolæ quædam ineditæ Juliani Imperatoris, Gregorii Habessini Theologia Æthiopica, necnon Index geographicus Episcopatuum Orbis Christiani,' 4to., 1731; a work which contains useful information for students of ecclesiastical history. XIV. 'Centifolium Lutheranum, sive Notitia Literaria Scriptorum omnis generis de Martino Luthero, ejus Vita, Scriptis, et Reformatione Ecclesiæ editorum,' two vols. 8vo. 1730. XV. 'Centuria Fabriciorum Scriptis clarorum qui jam diem suam obierunt collecta,' 8vo., 1709, with a continuation in 1727. The author has included in his list not only the authors whose name or sirname was Fabricius, but also those whose names may be turned into the Latin Fabricius; such as Le Fevre, Fabri, the German Schmidts, &c. Independently of the above and other minor works, Fabricius published editions of Sextus Empiricus, of the Gallia Orientalis of Father Colomiès, of the works of St. Hippolytus, and many others. The catalogue of the works published by him exceeds 100. Fabricius died at Hamburg in April, 1736, in his 69th year. His private character was as praiseworthy as his learning was great. He was modest, hospitable to strangers who came to visit him, indefatigable in the duties of his professorship and rectorship, and yet he found time for the compilation of the numerous works already mentioned. Reimar, his son-in-law, wrote his biography in Latin, 8vo. 1732.

FABRI'CIUS, JOHANN CHRIST, was born in the year 1742, at Tundern, in the duchy of Sleswick. He was brought up to the medical profession, and at the age of twenty-three was made professor of natural history and rural economy at Kiel.

Fabricius studied under Linnæus, and afterwards enjoyed perhaps a more brilliant reputation than any other pupil of that great naturalist. Having been filled with emulation by the circumstance of Linnæus quoting him in his 'Systema Naturæ,' he resolved to make an especial study of entomology, a science at that time in its infancy. The first results of his investigations were shortly after (1775) made known in his 'Systema Entomologiæ,' where he proposed a new arrangement of the insect tribe, the novelty of which consisted in choosing for his divisions the modifications observable in the parts of the mouth. The two methods previously adopted were founded, the one upon the metamorphoses of the various tribes, the other upon their organs of motion. The latter was first pointed out by Aristotle, and was that adopted by Linnæus.

Fabricius subsequently published numerous other works of still greater importance, a list of which is given at the end of this article. Possessing a great knowledge of languages, Fabricius travelled through the northern and middle states of Europe, collecting new materials, and frequenting the various museums, from which he described all such insects as had hitherto been unpublished. Accounts of his travels in Norway, Russia, and England, were published by him. He visited England seven times, and received great assistance from inspecting the collections of Sir Joseph Banks*, John Hunter, Drury, Francillon, and others.

Far from being jealous of those naturalists who, in his day, enjoyed reputation in the same branches which he more particularly attended to, Fabricius, upon seeing the beautiful work of Walckenaer on spiders, expressed great delight; and although no request had been made, he hastened to convey to that author all the specimens which he possessed of the spider tribe. Fabricius was of an amiable disposition; and is said to have been reproached by a fellow professor for his extreme modesty, which his friend urged would retard his advancement. Although so well versed in entomology, Fabricius was not a stranger to other branches of zoology; he was also versed in botany and mineralogy. He died of dropsy, in his sixty-fifth year, much regretted by all naturalists. His principal works are as follows:—

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* Numerous insects in the collection of Sir Joseph Banks (which is now the property of the Linnæan Society) still have names attached to them in the handwriting of Fabricius.

1, 'Systema Entomologiæ, sistens Insectorum Classes,' &c., 1 vol., 8vo., Flensburgi et Lipsiæ, 1775; 2, 'Philosophia Entomologica,' 8vo., Hamburgi et Kilonii, 1778; 3, Reise nach Norwegen, mit Bemerkungen aus der Natur Historie und Œconomie,' 8vo., Hamburg, 1779; 4, 'Species Insectorum, sistens eorum differentias specificas, synonymia auctorum, loca natalia, metamorphosis,' &c., 2 vols., 8vo., Hamburg et Kilonii, 1781; 5, 'Mantissa Insectorum; sistens species nuper detectas,' &c., 2 vols., 8vo., Hafniæ, 1787; 6, 'Genera Insectorum,' 1 vol., 8vo. (Chilonii), Kiel, 1776; 7, 'Entomologia Systematica, emendata et aucta,' 4 vols., 8vo., Hafniæ, 1792, 93, 94; 8, 'Index Alphabeticus, .796; 9, 'Supplementum Entomologiæ Systematicæ,' 1 vol., 8vo., Hafniæ, 1798; 10, 'Systema *Eleuteratorum*,' 2 vols., 8vo., Kiliæ, 1801; 11, 'Index,' 8vo., Kiliæ, 1802; 12, 'Systema *Rhyngotorum*,' 8vo., Brunsvigæ, 1801; 13, 'Index Alphabeticus Rhyngotorum, genera et species continens,' 4to., Brunswick, 1803; 14, 'Systema *Piezatorum*,' 8vo., Brunsvigæ, 1804; 15, 'Systema *Antliatorum*,' 8vo., Brunsvigæ, 1805.

FABRI'ZIO, GERO'NIMO, commonly called **FABRICIUS AB AQUAPENDENTE**, was born in 1537 at Acquapendente in Italy, a city near Orvieto, in the States of the Church. His parents, although poor, contrived to furnish him with the means of obtaining an excellent education at Padua, which was then rapidly approaching the eminence it long held, especially as a school of medicine, among the universities of Europe. It appears to have been a favourite object with the Venetian government to encourage the study of the medical sciences. Vesalius and Fallopius had been successively invited to fill the chair of anatomy and surgery, then conjoined, and reaped a rich harvest of public emolument and honour; and Fabricius himself, who did much to extend the reputation of the school formed by these leaders in the restoration of anatomy, was afterwards still more munificently rewarded, though equal to neither in merit or posthumous fame. He became a pupil of Fallopius at an early age, and speedily attracted the attention and good-will of his instructor. He thus secured many peculiar advantages, of which he availed himself so well, that having taken his degrees in medicine with much credit, he was appointed on the death of Fallopius in 1562 to succeed him in the direction of the anatomical studies of the university, and three years later to the full emoluments of the professorship. The growing perception of the importance of anatomical knowledge led, in 1584, to the institution of a separate chair for the teaching of that branch of medicine, which, however, Fabricius appears to have still held in conjunction with that of surgery up to a late period of his life, with the able assistance of Casserius.

His reputation as a teacher drew students from all parts of Europe; till at length the theatre of anatomy, built originally by himself, became so crowded, that the Venetian senate provided him, in 1593, with another of ample dimensions at the public expense; and at the same time added largely to his salary, and granted him many exclusive privileges and titles of honour. The fame and wealth he derived from his practice as a surgeon was even more than equal to that which he enjoyed as an anatomist; and after upwards of fifty years of uninterrupted and well-deserved prosperity, he retired from public life the possessor of an enormous fortune and the object of universal esteem. Yet he does not appear to have found the contentment he sought in his retirement. His latter years were embittered by domestic dissensions and the unfeeling conduct of those who expected to become his heirs; and he died in 1619, at the age of eighty-two, not without the suspicion of poison, at his country-seat on the banks of the Brenta, still known as the Montagnuola d'Acquapendente.

The name of Fabricius is endeared to the cultivators of his science by the circumstance of his having been the tutor of William Harvey, whose discovery of the circulation of the blood (by far the most important yet achieved in physiology) was suggested, according to his own statement, by the remarks of Fabricius on the valvular structure of the veins. The title of Fabricius to the minor discovery has been disputed, though strongly asserted by some anatomists. The truth is, that his merit did not so much consist in original discovery as in the systematic arrangement and dissemination of the knowledge acquired by his predecessors. We have mentioned that he had more contemporary reputation as a practical surgeon than as an anatomist; and it is as a surgeon that he is still chiefly remembered. The observations recorded in his works having, however, been since wrought up in the general body of surgical knowledge, are now seldom consulted or quoted specifically as derived from himself.

He published many tracts on both departments. Those on anatomy and physiology, often referred to, but not with unmixed praise, by Harvey and the writers of the period immediately subsequent to his own, were collected in one volume folio, and republished, with a biographical memoir of the author, by Albinus at Leyden in 1738. The best edition of his surgical works, the twenty-fifth, was printed, also in one folio volume, at Padua in 1666. His writings are all in Latin, and display a considerable knowledge of the literature, general and medical, of that language and of the Greek.

FABYAN, ROBERT, the historian, was descended of a respectable family of Essex. Bishop Tanner says he was born in London. We have no dates of his early life, but he is known to have belonged, as a citizen, to the Company of Drapers. From records in the city archives, it appears that he was alderman of the ward of Farringdon Without, and in 1493 served the office of sheriff. In 1496, in the mayoralty of Sir Henry Colet, we find him 'assigned and chosen,' with Mr. Recorder and certain commoners, to ride to the king 'for redress of the new impositions raised and levied upon English cloths in the archduke's land,' (that is, the Low Countries) an exaction which was desisted from in the following year. In 1502, on the plea of poverty, he resigned the alderman's gown, not willing to take the mayoralty, and probably retired to the mansion in Essex, mentioned in his will, at Theydon Gernon. That he was opulent at this period cannot be doubted, but he seems to have considered that the expenses of the chief magistracy, even at that time, were too great to be sustained by a man who had a numerous family. He ordered the figures, as may be seen in his will, of sixteen children, in brass, to be placed upon his monument. Stowe, in his 'Survey of London' (edit. 1603, p. 198), gives the English part of the epitaph on Fabyan's tomb, from the church of St. Michael Cornhill, and says he died in 1511, adding that his monument was gone. Bale, who places Fabyan's death on February 28th, 1512, is probably nearest to the truth, as his will, though dated July 11, 1511, was not proved till July 12, 1513. Fabyan's will, printed with the last edition of his 'Chronicle,' affords a curious comment on the manners of the time of Henry VIII.

There have been printed five editions of Fabyan's 'Chronicle.' The first was printed by Pynson in 1516, and is of great rarity, in a perfect state. Bale says that Wolsey ordered many copies of it ('exemplaria nonnulla') to be burnt. The second was printed by Rastell in 1533. The third in 1542, by Reynes. The fourth in 1559, by Kyngeston. The changes of religion gave rise to many alterations and omissions in the third and fourth editions; but all the editions, as well as a manuscript of the second part of the book, were collated by Sir H. Ellis for the fifth edition, 4to., London, 1811, from the preface to which the present account of the historian has been principally taken. Fabyan, whose object it was to reconcile the discordant testimonies of historians, named his book 'The Concordance of Histories,' adding the fruits of personal observation in the latter part of his Chronicle. The first edition had no regular title; the latest is called 'The New Chronicles of England and France, in two parts, by Robert Fabyan, named by himself the Concordance of Histories.' The first edition, which may be considered as Fabyan's genuine work, extends from the time when 'Brute entryd firste the Ile of Albion,' to 1485; the second continued the history to 1509; the third to 1541; and the fourth to the month of May, 1559. The names of the several authors who were the continuators are unknown.

FAÇADE, a French term of modern introduction into the English language. It expresses the face, or front view of an edifice, and is often used in speaking of architectural buildings, as the façade of the Louvre, or the façade of St. Peter's at Rome. Façade was applied originally to denote the principal front of a building: the term Facciata, used by the Italians, is, for the most part, applied to such fronts as have a principal entrance.

FACCIOLA'TI, JA'COPO, was born at Toriggia on the

Euganean hills, in the province of Padua, in 1682. He studied first in the college of Este, and was afterwards placed by Cardinal Barbarigo, bishop of Padua, in the clerical seminary of that city, where he completed his studies and was admitted into holy orders. He was then appointed teacher and afterwards præfect or chief superior of the same establishment. The seminary of Padua had and still has a high reputation as a place for the study of Latin and for the numerous and generally accurate editions of the classics and other school books which have come from its press. Facciolati contributed to support this reputation by his labours. Among other works, he published improved editions of the Lexicon of Schrevelius, of the Thesaurus Ciceronianus of Nizolius, and of the vocabulary of seven languages known by the name of 'Calepino,' 2 vols. fol., 1731. In this last undertaking he was greatly assisted by his pupil, Egidio Forcellini, although he was not willing to acknowledge the obligation. The work however being still incomplete, J. B. Gallizioli made a new edition of the 'Calepino,' 2 vols. fol., Venice, 1778, and added many oriental and other words. It was in the course of his joint labours with Facciolati that Forcellini conceived the plan of a totally new Latin Dictionary, which, after more than 30 years' assiduous application, he brought to light under the title of 'Totius Latinitatis Lexicon,' 4 vols. fol., Padua, 1771. This work has superseded all other Latin Dictionaries. Forcellini, more generous than Facciolati, acknowledged in the title-page of his work that its production was in great measure due to the advice and instruction of his deceased master. In the introductory address to the pupils of the seminary of Padua, he tells them with a touching simplicity that when he undertook his work he was in the prime of youth, but that in the course of its compilation he had grown old and infirm as they then beheld him. The MS. of his 'Lexicon,' in 12 vols. fol., is preserved in the library of the seminary. A new edition of Forcellini's Lexicon has been lately published by the Abate Furlanetto of the same institution.

In 1722, Facciolati being appointed professor of logic in the university of Padua, delivered a series of introductory Latin discourses to the students of his class, which were received with considerable applause. In 1739 he began to write in Latin the 'Fasti of the University of Padua:' the introductory part, in which he describes the origin, the laws and regulations, and the object of that celebrated institution, is very well written, but the Fasti themselves contain little more than dry lists of the successive professors with few and unimportant remarks. His Latin epistles, as well as his Orations or discourses, have been admired for the purity of their diction. Indeed Facciolati's latinity was much praised by competent judges, such as Roberti and others of his countrymen, as well as by Brucker, the historian of philosophy, and other learned foreigners. The king of Portugal sent him a flattering invitation to Lisbon to take the direction of the public studies in his kingdom, but Facciolati declined the offer on account of his advanced age. He however wrote instructions for the re-organization of the scholastic establishments of that country, which had become necessary after the expulsion of the Jesuits. Facciolati died at Padua in 1769, in his 88th year. He left numerous works, mostly in Latin, besides those already mentioned; among others, some allegorical and satirical dialogues on the occasion of a funeral oration which he had written for the late Doge Pisani, being suppressed by the Padua Riformatori, or Censors.

FACIA. [CIVIL ARCHITECTURE; COLUMN.]

FACTOR, a name given to any algebraical expression considered as part of a product. Thus, a and $a+x$ are the factors of the product $a(a+x)$, or a^2+ax.

The term *factorial expression* has been in some instances applied to an expression of which the factors are in arithmetical progression; such as—

$$(x+1)(x+2)(x+3)(x+4).$$

See Herschel, *Examples of the Calculus of Finite Differences*.

FACTOR is a mercantile agent, who buys and sells the goods of others, and transacts their ordinary business on commission. He is entrusted with the possession, management, and disposal of the goods, and buys and sells in his own name, in which particulars consists the main difference between factors and brokers. [BROKER.]

The chief part of the foreign trade of every country is carried on through the medium of factors, who generally reside in a foreign country, or in a mercantile town at a distance from the merchants or manufacturers who employ them; and they differ from mere agents in being entrusted with a general authority to transact the affairs of their employers. The common duty of a factor is to receive consignments of goods and make sales and remittances either in money, bills, or purchased goods in return; and he is paid by means of a per-centage or commission upon the money passing through his hands. It is usual for a factor to make advances upon the goods consigned to him, for which, and also for his commission, he has a general lien upon all the property of his employer which may at any time be in his hands.

It is the duty of a factor to keep the goods with which he is entrusted free from injury, to keep a clear account of his dealings in the affairs of his employer, and at proper times to transmit it to him, together with information of all the transactions and liabilities which he has entered into and incurred in the course of his employment, and by which his principal can be affected; also to send him advice of all bills accepted or drawn upon his credit, and generally to act with fidelity to him, strictly observing the letter or the spirit of his instructions, and where they are silent, following the ordinary prudent course of other merchants dealing in like commodities as to time and mode of sale, credit, &c. A factor is not answerable against all events for the safety of the goods in his care: it is sufficient if he does all that a man of average prudence would do in the care of his own goods. He is not answerable in cases of robbery, fire, or other accidental damage happening without his default. He is bound, upon receiving notice from his principal, to insure the goods consigned to him (provided he has effects of his principal in his hands of sufficient amount to defray the premium), to discharge the duties payable upon the exportation or importation of the goods, or to cause the regular and necessary entries to be made at the custom-house, and do all other things necessary for the safety and preservation of the goods. His liability in this respect is ably explained by Sir William Jones in his *Treatise on Bailments;* and see BAILMENTS, fifth division, 'Locatum,' second subdivision.

Where general and unlimited orders are given to a factor, he is left to buy and sell on the best conditions he can; and if detriment arise to the principal, he has no redress, unless he can show that the factor acted fraudulently or with gross negligence.

In accordance with the general rule that a principal can only be bound by the acts of his agent while acting within the scope of his authority, it was held, previously to the passing of the recent stat. 6 George IV., c. 94, that a factor had only authority to sell the goods of his principal, and that if he pledged them, the principal might recover them from the pledgee. This was productive of considerable hardship in many cases; for, besides that by the mercantile law of every other country except England and America, the pledgee might retain the goods as security for his advances to the factor, it was urged, and with great reason, that, as between the principal and the pledgee of the factor, the principal ought to bear the loss. He it was who placed confidence in the factor, and who enabled him to appear the actual owner of the goods: he might have controlled the authority and limited the operations of his factor; but the pledgee knew nothing of his employment; he saw only the factor in the possession of the goods, and advanced his money on what appeared a sufficient security for repayment. In accordance with views like these, that statute was passed, and now the pledgee of a factor, when he lends his money without notice that the factor is not the actual owner of the goods, is enabled to retain them for his security; and even when he has such notice, the lender has a lien upon the goods to the same amount as the factor was entitled to.

A sale by a factor creates a contract between the principal and the buyer, and the principal may maintain an action against the buyer for the price, and may by notice direct him not to pay the money to the factor, which notice the buyer is bound to attend to. So a purchase by a factor for his principal renders the latter liable to the vendor, though a payment to the factor is a sufficient discharge, unless notice to the contrary has been given by the principal. And this holds good in both cases, even when the name of the principal is not disclosed at the time of the contract, but is afterwards discovered; though, where a factor conceals the name of his principal and buys or sells apparently on his own account, the buyer or seller may treat the factor as the principal so far as any other liability of the factor may exist to him; as where a factor sells goods in his own name, being indebted to the purchaser, the latter may set off the amount of debt due to him from the factor against the price of the goods.

There is another description of factor, who acts under what is called a del credere commission, where, for an additional per-centage he engages for the solvency of the purchasers of the goods consigned to him. This contract, it is evident, arises on the supposition that the factor being resident among the purchasers, must be better able to judge of their solvency than the principal, residing in a foreign country. For a long time it was considered that under this arrangement those who dealt with the factor were liable to him alone, and that he was liable, in the first instance, to his employer; it has, however, been decided that the factor stands in the relation of a surety for the persons with whom he deals on account of the employer, and that he is liable to his employer only in case of their default. Del credere is an Italian mercantile phrase, of the same signification as the English word guarantee, and the Scotch warrandice.

When goods are consigned to joint factors they are answerable for one another for the whole, and by the law of merchants, as factors, are oftentimes dispersed, one may account without his companion.

The principal may recover against his factor by action for the neglect of his duty, or disobedience to his instructions if loss occur thereby, as if he purchases goods at a limited price, and fraudulently sells them again for his own profit. If a factor, without the orders of his principal, exports goods prohibited by the Customs' laws, and the same are seized, the loss is the factor's; and so, if he pay money without the direction of his employer, or sells his goods at an undervalue, or exports goods of an improper quality, he is answerable for the damage. And if a factor exports goods of a different quality or kind from those he was directed to purchase, or sends them to a place other than that to which he was ordered to send them, the merchant may refuse to accept them, and may recover any damage he has sustained, in consequence of his neglect, from the factor. The rights and liabilities of merchants and factors are governed by the laws of the place in which they are domiciled, and any contract which may be made by either of them must be governed by the law of the place where it is made, and these rules are acted upon by the courts of justice of every civilized nation. Thus, since the passing of the above-mentioned statute, a foreign merchant cannot recover his goods from the pledgee of his factor in England, though he may be totally ignorant of the change which has taken place in the law. And again, if a bill be accepted in Leghorn by an Englishman, and the drawer fails, and the acceptor has not sufficient effects of the drawer in his hands at the time of acceptance, the acceptance becomes void by the law of Leghorn, and the acceptor is discharged from all liability, though by the law of England he would be bound. (See 2 Strange's *Reports*, 733; Beawe's *Lex Merc.*; Bell's *Commentaries*; Paley, *Principal and Agent*; M'Culloch's *Commercial Dict.*)

FACTORY. FACTORY SYSTEM. The name of factory was formerly given only to establishments of merchants and factors resident in foreign countries, who were governed by certain regulations adopted for their mutual support and assistance against the undue encroachments or interference of the governments of the countries in which they resided. In modern times these factories have, in a great measure, ceased to exist, because of the greater degree of security which merchants feel as regards both the justice of those governments and the protection, when needed, of their own country. In its usual acceptation, the word factory is now employed to denote an establishment in which a considerable number of workmen or artizans are employed together for the production of some article of manufacture, most commonly with the assistance of machinery. The factory-system of England owes its origin to the invention and skill of Arkwright. It is true the name of factory is equally applied to various establishments for the operations of which those inventions are inapplicable, but it is probable that but for the invention of spinning-machinery, and the consequent necessary aggregation of large numbers of workmen in cotton-mills, the name would never have been thus applied. It is in these cotton-mills that the factory system has been brought to its highest state of perfection, and it cannot therefore be necessary to extend our description to the operations of any other branch of manufacture.

The first cotton-factory was established by Arkwright in connection with Messrs. Need and Strutt, of Derby, and was situated at Cromford, on the river Derwent. It was built in 1771, and continues still in operation, with the original spinning-frames of the great inventor. It is not the least among the merits of that extraordinary man, that being the first to employ the combined labour of numerous workmen for the production of that which had previously resulted from individual employment, he was able to arrange and establish the details of the processes with so great a regard to order, economy, and simplicity of action, that with but few and unimportant modifications, his plans are continued to the present day. [ARKWRIGHT.] The operations of Arkwright and his partners were for many years met by a spirit of opposition on the part of other manufacturers, who foresaw that the success of the new machinery would speedily destroy the value of the hand spinning implements which they employed. Their combinations to destroy his patent rights have already been described. Taking advantage of the prejudices of the workmen, they had no difficulty in producing the belief that the new machines would soon entirely supersede manual labour, and the consequence of this delusion was a general crusade of the workmen against all spinning-machinery set in motion by horse or water-power. The principal effect of the riots thus occasioned was the removal of establishments to other and more peaceable parts of the country. For a considerable time Arkwright and his partners had an interest in the greater part of the cotton factories that were erected. The first of these establishments brought to use in Manchester was built in 1780, and had its machinery impelled by an hydraulic wheel, the water for which was furnished by a single-stroke atmospheric pumping steam-engine. The progress of these new establishments was so rapid that in 1787 there were 145 cotton-spinning factories in England and Wales, containing nearly two millions of spindles, and estimated to produce as much yarn as could have been spun by a million of persons using the old domestic wheel.

A return called for by the House of Commons in the last session states the number of factories which, in the month of February, 1837, were under the regulations imposed by the 'Factory Act.' From this return, it appears that the establishments at that time subject to the visits of the parliamentary inspectors amounted to 4160, showing an increase of 1000 factories upon the numbers given above. This great increase may be owing in part to the circumstance of some establishments existing in 1835 having since been brought under the regulations. The return does not apportion the different manufactures to which those 4160 establishments are applied. In a report made by Dr. Kay, one of the assistant Poor Law Commissioners, in July, 1835, it is stated that in the cotton manufacturing districts of Lancashire and their immediate vicinity steam power equivalent to 7507 horses was then either erected or in the course of being erected, but the establishments for the use of which that additional machinery was destined were not yet supplied with hands. At the ordinary ascertained rate this amount of mechanical power would call for the employment of 45,042 hands, exclusive of mechanics, labourers, handicraftsmen, and others employed out of the factories. The activity that up to the close of 1836 was experienced in this branch of national industry must have occasioned even a still greater extension than is mentioned by Dr. Kay, and we shall probably be within the mark if we estimate the number of hands employed in cotton factories in the autumn of 1836 at considerably more than 300,000. The check to commercial operations then experienced has probably prevented any fresh extension of the manufacture, but at this time (October, 1837) the cotton factories throughout the kingdom are in full operation in order to answer the demand for goods in almost every market in the civilized world.

The number of cotton, wool, silk, and flax-spinning factories worked by steam or water-power in the United Kingdom, with the number and ages of persons employed therein in the year 1835, was stated in the Statistical Tables published by the Board of Trade to be as follows:—

DIVISIONS OF THE KINGDOM.	Number of Factories.		NUMBER AND AGES OF PERSONS EMPLOYED.														
			Between 8 and 12 years.			Between 12 and 13 years.			Between 13 and 18 years.			Above 18 years.			Total Persons.		
	At Work.	Emp-ty.	Males.	Fem.	Total.	Males.	Fem.	Total.	Males.	Fem.	Total.	Males.	Fem.	Total.	Males.	Fem.	Total.
COTTON.																	
England	1,070	42	4,030	3,073	7,103	9,196	7,865	17,061	23,974	29,869	53,843	50,675	53,410	104,085	87,875	94,217	182,092
Wales	5	..	..	..	..	56	33	89	146	208	354	250	458	708	452	699	1,151
Scotland	159	..	454	538	992	1,258	1,832	3,090	2,845	7,597	10,442	6,168	12,403	18,571	10,529	22,051	32,580
Ireland	25	..	44	58	102	153	181	334	286	561	847	960	1,553	2,513	1,639	2,672	4,311
Total of Cotton Factories	1,262	42	4,528	3,669	8,197	10,663	9,911	20,574	27,251	38,235	65,486	58,053	67,824	125,877	100,495	119,639	220,134
WOOL.																	
England	1,169	9	2,317	2,158	4,475	3,936	3,835	7,771	9,497	10,064	19,561	18,613	15,041	33,654	34,363	31,098	65,461
Wales	85	..	47	29	76	119	61	180	164	101	265	198	66	264	528	257	785
Scotland	90	..	104	77	181	210	332	542	315	698	1,013	1,083	686	1,769	1,712	1,793	3,505
Ireland	36	..	13	19	32	25	40	65	162	249	411	674	341	1,015	874	649	1,523
Total of Woollen Factories	1,313	9	2,481	2,283	4,764	4,290	4,268	8,558	10,138	11,112	21,250	20,568	16,134	36,702	37,477	33,797	71,274
SILK.																	
England	231	25	2,458	3,871	6,329	938	1,674	2,612	2,596	6,546	9,142	4,009	7,855	11,864	10,001	19,946	29,947
Scotland	6	..	28	52	80	14	37	51	40	244	284	103	168	271	185	501	686
Ireland	1	..	..	2	2	..	..	..	..	25	25	2	20	22	2	47	49
Total of Silk Factories	238	25	2,486	3,925	6,411	952	1,711	2,663	2,636	6,815	9,451	4,114	8,043	12,157	10,188	20,494	30,682
FLAX.																	
England	152	..	487	434	921	1,048	1,173	2,221	1,929	4,192	6,121	2,551	4,379	6,930	6,015	10,178	16,193
Scotland	170	..	104	175	279	609	918	1,527	1,129	3,064	4,193	1,550	5,860	7,410	3,392	10,017	13,409
Ireland	25	..	1	15	16	125	199	324	399	1,308	1,707	463	1,171	1,634	988	2,693	3,681
Total of Flax Factories	347	..	592	624	1,216	1,782	2,290	4,072	3,457	8,564	12,021	4,564	11,410	15,974	10,395	22,888	33,283
Total of the four branches of manufacture	3,160	76	10,087	10,501	20,588	17,687	18,180	35,867	43,482	64,726	108,208	87,299	103,411	190,710	158,555	196,818	355,373

It will be seen from the foregoing table, that a very large proportion of the hands employed in factories consist of children and young persons. The large sums invested in machinery make it a matter of great importance to the owners to keep their works in motion as constantly as possible, and, unless prevented by legislative interference, there is too much reason to believe that children may be tasked beyond their strength, to the permanent injury of their constitutions. This abuse was the more to be apprehended, because a large proportion of the children engaged in cotton-spinning are not directly employed by the masters, but are under the control of the spinners, a highly-paid class of workmen, whose earnings depend greatly upon the length of time during which they can keep their young assistants at work. Although the recitals of cruelties alleged to exist were shown upon investigation to have been very greatly exaggerated, it cannot be denied that enough of misery was produced to render it imperative upon the legislature to interfere. A parliamentary committee sat for the investigation of this subject in 1832, and subsequently a commission was issued by the crown for ascertaining, by examinations at the factories themselves, the kind and degree of abuses that prevailed, and for suggesting the proper remedies. In consequence of these inquiries an act was passed in 1833, (2 and 3 Wm. IV., c. 103,) the provisions of which, it is generally believed, have effected all the good which it is in the power of the legislature to do, consistently with the prosecution of the branches of industry to which the provisions of the act apply: the principal of those provisions are as follows:—

After the 1st January, 1834, no person under the age of 18 years is allowed to work in any cotton, woollen, flax, or silk factory worked by the aid of steam or water-power, between the hours of half-past eight in the evening and half-past five in the morning.

No person under 18 years of age is allowed to work more than 12 hours in any one day, nor more than 69 hours in the week. In factories worked by the aid of water-power, time lost through the deficiency of water may be made up at the rate of three hours additional labour in the week. In factories where the steam-engine is employed, lost time occurring through any accident happening to the machinery may be made up at the rate of one hour per day. One hour and a half to be allowed in each day for meals.

Except in silk-mills, no children under nine years of age are allowed to be employed.

Children under 11 years old are not to be worked more than nine hours in any one day, nor more than 48 hours in one week. This clause came into operation six months after the passing of the act. At the expiration of another 12 months its restriction was applied to children under 12 years old, and when 30 months from the passing of the act had elapsed the restriction was applied to all children under 13 years old. As the act was passed on the 30th August, 1833, this clause came fully into operation on the 1st of March, 1836. In silk-mills, children under 13 years of age are allowed to work 10 hours per day. The children whose hours of work are regulated by the act are entitled as holidays to the whole day on Christmas-day and Good-Friday, and besides to eight half days in the year. It is made illegal for any mill-owner to have in his employ any child who has not completed 11 years of age without a certificate by a surgeon or physician, 'that such child is of the ordinary strength and appearance of children of or exceeding the age of nine years.' In 18 months from the passing of the act this provision was made to apply to all children under 12 years of age, and upon the first March, 1836, the provision was made to include all children under the age of 13. Four persons were appointed under the act to be Inspectors of Factories, in order to carry into effect the various provisions which it contains, with power to make such rules and orders for the purpose as they should see necessary; and in order to assist the inspectors in the performance of their duties, an adequate number of superintendents were appointed to act under their directions.

After the expiration of six months from the passing of the act, it was declared unlawful to employ in any factory any child under the ages restricted to forty-eight hours' labour in the week, unless on every Monday the employer should receive a ticket from some schoolmaster, certifying that such child has 'for two hours at least for six out of seven days of the week next preceding attended his school. The school to be chosen by the parents or guardians of the child; but in case of their omitting to appoint any school, or in case of the child being without parent or guardian, the inspector may appoint some school in which the child may be taught, and the employer may be allowed to deduct from its weekly earnings any sum not exceeding one penny in every shilling, to pay for the schooling of such child.'

The full and perfect carrying out of the intention of the legislature in passing this act is provided for as far as possible by various penalties, which it is not necessary further to particularise. One half of the penalties are, as is usual, awarded to the informers, and the remainder is to be applied towards the support of schools in which children employed in factories are educated.

The faithful discharge of their duties on the part of the inspectors is provided for, by requiring them twice in every year, and oftener, if called upon, to deliver in a report to the secretary of state, detailing the condition of the factories, and of the children employed therein.

FACULTIES. [University.]

FÆ'CULA. [Starch.]

FAE'NZA (formerly Faventia), a town and bishop's see of the papal state north of the Apennines, in the delegazione or province of Ravenna. It is situated in a well-cultivated plain watered by the river Lamone, which rises in the Apennines of Tuscany and runs to the Adriatic. A naviglio or navigable canal communicates between Faenza and the Po di Primaro, or southernmost branch of the Po. Faenza is a well-built, modern-looking town, with about 15,000 inhabitants. The streets are regular; there is a fine market-place surrounded by arcades, many palaces, churches rich in paintings, convents, a fine bridge on the Lamone, a theatre, and a Lyceum. There are several manufactories of a kind of coloured and glazed earthenware, which is called Majolica in Italy, and Faience in France, where it was introduced from Faenza, and which, before the manufacture of china or porcelain became established in Europe, was in greater repute than it is at present. There are also manufactories for spinning and weaving silk, and some paper-mills. Faventia was antiently a town of the Boii, and afterwards a municipium under the Romans. It was near Faventia that Sulla defeated the consul Carbo and drove him out of Italy. (Livy, *Epitome*, 88.) It was afterwards ruined by the Goths, was restored under the Exarchs, but its walls were not raised until A.D. 1286. It was then for some time subject to the Bolognese, but was afterwards ruled by the house of Manfredi to the end of the fifteenth century. Galeotto Manfredi being murdered by his wife left two infant sons, Astorre and Evangelista, the elder of whom, a remarkably handsome youth, was proclaimed by the inhabitants lord of Faenza; but a few years after, Cesare Borgia, as captain-general of his father, Pope Alexander VI., besieged the town, and the inhabitants surrendered on condition that Astorre and his brother should be free. He however sent them prisoners to Rome, where they were cruelly put to death in the Castle Sant' Angelo, and their bodies thrown into the Tiber, in the year 1501. This was one of the most atrocious transactions in the life of Borgia. Since that time Faenza has been annexed to the papal state. Faenza lies on the Via Æmilia, 30 miles south-east of Bologna, 40 north-west of Rimini, and 20 south-west of Ravenna. In the Roman times, a road led from Faventia to the south, which ascending the valley of the Anemo, now Lamone, and crossing the ridge of the Apennines, descended to Fæsulæ. By this road some have supposed that Hannibal crossed the Apennines into Etruria. A new carriage-road in a parallel direction, but more to the eastward, has been completed by the present grand-duke of Tuscany: it leads from Dicomano, in the valley of the Sieve, north of Florence, crosses the Apennines of San Benedetto, 6000 feet above the sea, and then following the course of the river Montone, joins the Via Æmilia near Forli.

FA'GUS, the beech, is a genus of Corylaceous exogens, having triangular nuts enclosed within a spiny capsule or husk. There are several species, some of which are mere bushes; the only one known in Europe of any importance is the *Fagus sylvatica*, or common beech, a native of various parts of the world in temperate climates. In Europe it is found as far north as 58° in Norway: it is met with in Palestine and Armenia, all over the south of Europe, and in the United States of America. It is one of the most handsome of our trees on dry sandy or chalky situations; its meat or nuts not only furnish food for swine, but yield by pressure after pounding a useful oil; and its timber, although not of good quality where strength and durability are required, is very extensively used for a variety of purposes, particularly for boat-building, work under water, carving and chair-making; it is also one of the best kinds of wood for fuel. Several varieties are propagated by the nurserymen, the *purple* and the *fern-leaved* being beautiful, and the *crested* very much the contrary. (See Loudon's *Arboretum and Fruticetum Britannicum*, p. 1949, for a copious account of this tree.)

The common beech is multiplied by sowing its mast; the varieties by grafting upon the wild sort. To effect this successfully, it is necessary that the scions should be of at least two years' old wood, and the grafts must be clayed first and then earthed up. If one year old wood is used the scions rarely take.

There is no doubt that the beech is the plant called Fagus by Virgil; but the Fegus (φηγός) of Theophrastus seems to have been some sort of oak with sweet acorns, and is by most botanical commentators referred to the Quercus Esculus of Linnæus.

FAHLORE, *Fahlerz*, grey copper ore. Of this there are two varieties, the *arsenical* and the *antimonial;* the former occurs crystallized and massive; the primary form of the crystal is a cube, but the regular tetrahedron is the predominating crystal. Colour steel-grey. Opaque. Lustre metallic. Sp. gr. 4·8, 5·1. Hardness 3·0,4·0. Brittle. Cleavage parallel to the planes of the tetrahedron, very indistinct. Fracture conchoidal.

Massive Variety.—Amorphous. Structure, granular to compact.

It occurs in Cornwall, Hungary, Saxony, &c. A specimen from Freiberg, analyzed by Klaproth, yielded—

Arsenic	24·10
Copper	41·
Iron	22·50
Sulphur	10·
Silver	·40
Loss	2·
	100·

It frequently contains a much larger quantity of silver, and not uncommonly zinc.

Antimonical Fahlore.—Occurs crystallized in modified tetrahedrons. Colour dark lead-grey, approaching to iron-black, both externally and internally; not very brittle.

Analysis of a specimen from Kapnic by Klaproth:—

Antimony	22·
Copper	37·75
Iron	3·25
Sulphur	28·
Silver and a trace of manganese	·25
Zinc	5·
Loss	3·75
	100·

FAHLUNITE, *Tricklasite*. Occurs crystallized and massive. Primary form of the crystal a right rhombic prism, but it usually occurs in imbedded, regular, hexagonal prisms. Colour yellowish, greenish, and blackish-brown. Nearly or quite opaque. Lustre resinous. Sp. gr. 2·66. Hardness 5·0, 5·5. Streak greyish-white. Cleavage perpendicular to the axis of the prism.

It is found at Fahlun, in Sweden.

Before the blow-pipe alone it becomes grey, and fuses on its thinnest edges; with borax it melts slowly into a coloured glass.

According to Hissinger it consists of—

Silica	46·74
Alumina	26·73
Magnesia	2·97
Oxide of iron	5·11
Oxide of manganese	0.43
Water	13·50
	95·48

FAHRENHEIT. [Thermometer.]

FAINTING. [Syncope.]

FAIOUM, a province of Egypt to the west of the Libyan ridge which bounds the valley of the Nile on the west. About 12 miles north-west of Benisouef there is a depression in the ridge about six miles in length, which leads to the plain of the Faïoum. This plain is of a circular form, about 40 miles from east to west and about 30 from north to south. The northern and north-western part of this plain is occupied by the lake called Birket el Keroun, which spreads in the form of a crescent about 30 miles in length and about five miles broad towards the middle. A range of naked rocks bounds the lake to the north and joins towards the east the Libyan ridge which skirts the valley of the Nile. To the west and south the plain is bounded by lower hills which divide it from the Libyan desert. It forms in fact a basin with only one opening or outlet to the east towards the Nile. The Bahr Yussouf, or great canal, which runs parallel to the Nile and skirts the Libyan ridge, on arriving at the gap above mentioned, at a village called Howarah Illahoun, turns to the west, passing under a bridge of three arches through which the water flows and forms a fall of about three feet at low water. It then runs along the valley, and, on reaching the entrance of the Faïoum, at the village of Howarah el Soghair, a wide cut branches off from it to the right, running first north and then north-west, and passing by Tamieh meets the north-east extremity of the lake. About two miles below Howarah el Soghair another deep ravine opens to the south, and then turning south-west, passes by Nezleh, and enters the south-west part of the lake. Between these two branches the cultivated part of the Faïoum is contained. But these two cuts have been long dyked across at their beginning, in order to economize the water of the Nile, which, owing to the rising of the bed of the Bahr Yussouf, flows less copiously than formerly. Only a small part of the water finds its way to the lake by the Tamieh and Nezleh cuts. The main stream continues its course westwards towards the middle of the plain and the town of Medinet el Faïoum, the capital of the province. Here the water becomes distributed into a multitude of small canals for irrigation, which spread in every direction through the central part of the plain, and which are the cause of its extraordinary fertility, for the Bahr Yussouf contains water all the year round. But that fertility exists only within the range of the canals. All the part west of Nezleh is arid and sandy, and only inhabited by a few nomade Arabs, though it bears the traces of former cultivation. The strip of land which borders the lake Keroun is low and marshy, marking the original basin of the lake which is separated from the cultivated lands by a considerable rise all along, reckoned by Jomard to be about 20 feet above the level of the lake. The village of Senhour, which is now some miles distant from the lake, was, in 1673, when Vansleb visited it, close to the water. Jomard reckons that when the water covered the whole of the low land below the rise above mentioned, its circumference must have been above 100 miles. [Birket el Keroun.] It is calculated that the land susceptible of cultivation in the Faïoum is about 450 square miles, of which hardly one-half is now cultivated. The villages, which are said to have been at one time above 300, are now reduced to less than 70. Still the cultivated part is superior in fertility to every other province of Egypt, from which it differs in the greater variety of its products, and the better appearance of its villages. In addition to corn, cotton, and the other cultivated plants, it produces in abundance apricots, figs, grapes, and olives, and other fruit-trees, which thrive here better than in the valley of the Nile. This was also the case in antient times, for Strabo says that 'the Arsinoite nome (the antient name of the Faïoum) excelled all others in appearance and condition, and that it alone produced olive trees, which were not found, elsewhere in Egypt except in the gardens of Alexandria. A vast quantity of roses also grow in the Faïoum, and this district is celebrated for making rose-water, which is sold at Cairo and all over Egypt for the use of the wealthy.

The remains of antiquities in the Faïoum are few. Two pyramids of some baked bricks about 70 feet high stand at the entrance of the valley, one near Howarah Illahoun, and the other near Howarah el Soghaïr. There is an obelisk of red granite 43 feet high, with two sides narrower than the others and a circular top, sculptured with numerous hieroglyphics, near the village of Bijige, a few miles south of Medinet el Faïoum. In Burton's *Excerpta* there is a drawing of it. Pococke i., 59, also gives a description of it. It is said to be of the same age as that of Heliopolis, bearing the name of Osirtesen I. (See an account of this obelisk in the *Library of Entertaining Knowledge, British Museum, Egyptian Antiquities*, vol. i., pp. 318—21.) Near Medinet el Faioum are some remains of the antient Arsinoe or Crocodilopolis, consisting of fragments of granite columns and statues, described by Belzoni. At Kasr Keroun, near the south-west extremity of the lake, is a temple 94 feet by 63 and about 40 feet high, which contains 14 chambers, and appears to be of the Roman period. On the north-west bank of the lake, at a place called Denay, a raised pavement or dromos, about 1300 feet in length, leads to a building, partly of stone and partly of brick, 109 feet by 67, divided into several apartments and surrounded by an outer wall of crude brick 370 feet by 270. This is supposed to be the site of the antient Dionysias. Further to the east, but on the same bank of the lake, at a place called Kom Waseem el Hogar, are the ruins of Bacchis. The direction of the principal streets and the plans of many of the houses may be distinctly traced. The site of the antient labyrinth has not yet been ascertained; Wilkinson thinks it was near Howarah el Soghaïr, at the entrance of the plain. At Fedmin el Kunoïs, or 'the place of churches' in Coptic, near the south-east bank of the lake, are some remains of early Christian monuments: the village is now occupied one half by Copts and the other half by Mohammedans, who seem to live in harmony together.

The mountains along the north bank of the lake Keroun, on which the rains fall annually, are said to contain salt, and to this circumstance the saltness of the waters of the lake is attributed by some. As the lake now receives but little of the waters of the Nile, the bitterness of its waters must have increased. No fish is said to be found in it, and Belzoni, at the time of his visit, saw nothing upon it except a crazy kind of ferry-boat.

South of the Faïoum there is an opening through the ridge of low hills leading into a smaller circular plain or basin, with a small lake called Birket el Garaq, which has one or two hamlets on its banks. A small stream from the Bahr Yussouf runs into it. The road-track of the caravans to the smaller oasis passes through this place. (*Description of Egypt and Map* in the French work; Browne; Belzoni; and Wilkinson's *Topography of Thebes*.)

FAIR, an annual or fixed meeting of buyers and sellers; from the Latin *feria*, a holiday. Fairs in antient times were chiefly held on holidays.

Antiently before many flourishing towns were established, and the necessaries or ornaments of life, from the convenience of communication and the increase of provincial civility, could be procured in various places, goods and commodities of every kind were chiefly sold at fairs; to which as to one universal mart, the people resorted periodically and supplied most of their wants for the ensuing year. The display of merchandise, and the conflux of customers at these principal and almost only emporia of domestic commerce, was prodigious; and they were therefore often held on open and extensive plains. Warton, in his 'History of English Poetry,' has given us a curious account of that of St. Giles's hill or down, near Winchester. It was instituted and given as a kind of revenue to the bishop of Winchester by William the Conqueror, who, by his charter, permitted it to continue for three days. But in consequence of new royal grants, Henry the Third prolonged its continuance to sixteen days. Its jurisdiction extended seven miles round, and comprehended even Southampton, then a capital trading town; and all merchants who sold wares within that circuit, unless at the fair, forfeited them to the bishop. Officers were placed at a considerable distance, at bridges, and other avenues of access to it, to exact toll of all merchandize passing that way. In the mean time, all shops in the city of Winchester were shut. In the fair was a court called the pavilion, at which the bishop's justiciaries and other officers assisted, with power to try causes of various sorts for seven miles round. Nor could any lord of a manor hold a court-baron within the said circuit without license from the pavilion. During this time the bishop was empowered to take toll of every load or parcel of goods passing through the gates of the city. On Saint Giles's eve, the mayor, bailiffs, and citizens of the city of Winchester delivered the keys of the four city gates to the bishop's officers; who, during the said sixteen days, appointed a mayor and bailiff of their own to govern the city, and also a coroner to act within it. Numerous foreign merchants frequented this fair; and it appears that the justiciaries of the pavilion and the treasurer of the bishop's palace of Wolvesey received annually for a fee, according to antient custom, four basons and ewers of those foreign merchants who sold brazen vessels in the fair, and were called *mercatores diaunteres*. In the fair several streets were formed, assigned to the sale of different commodities, and called the *Drapery*, the *Pottery*, the *Spicery*, &c. Many monasteries in and about Winchester had shops or houses in these streets used only at the fair, which they held under the bishop, and often let by lease for a term of years. As late as 1512, as we learn from the Northumberland Household-book, fairs still continued to be the principal marts for pur chasing necessaries in large quantities, which are now supplied by the numerous trading towns.

Philip, king of France, complained in very strong terms to Edward II. A.D. 1314, that the merchants of England had desisted from frequenting the fairs in his dominions with their wood and other goods, to the great loss of his subjects; and entreated him to persuade, and, if necessary, to compel them to frequent the fairs of France as formerly, promising them all possible security and encouragement. (See Rym. *Fœd.*, tom. iii., p. 482.)

When a town or village had been consumed, by way of assisting to re-establish it, a fair, among other privileges, was sometimes granted. This was the case at Burley, in Rutlandshire, 49th Edw. III. (*Abbrev. Rot. Orig.*, vol. ii., p. 338.)

The different abridgments of Stowe and Grafton's Chronicles, published by themselves in Queen Elizabeth's time, contain lists of the fairs of England according to the months. There is also 'An authentic Account published by the king's authority of all the Fairs in England and Wales, as they have been settled to be held since the alteration of the style; noting likewise the Commodities which each of the said Fairs is remarkable for furnishing;' by William Owen, 12mo. Lond. 1756.

No fair or market can be held but by a grant from the crown, or by prescription supposed to take its rise from some antient grant, of which no record can be found. (2 *Inst.* 220.)

(See Dugdale's *Hist. Warw.*, pp. 514, 515; Warton's *Hist. Engl. Poet.*, vol. i., p. 279; Henry, *Hist. Brit.*, 8vo. edit., vol. viii., p. 325; Brand's *Popular Antiq.*, 4to. edit., vol. ii., p. 215.)

The fairs of Frankfort on the Mayn and Leipzig are still pre-eminent in Europe; the former held at Easter and in the months of August and September; the latter at Easter, Michaelmas, and the New Year. Leipzig at these times is the mart and exchange of Central Europe, and is visited by merchants and foreigners, from the most distant parts of the globe, sometimes to the number of thirty or forty thousand. The whole book-trade of Germany is centred in the Easter fair at Leipzig.

FAIRFAX, EDWARD, was the second son of Sir Thomas Fairfax, of Denton in Yorkshire[*]. The date of his birth is unknown; but as his translation of Tasso's 'Jerusalem Delivered' was published in 1600, we may suppose that it fell some time in the reign of Queen Elizabeth.

Contrary to the habits of his family, who were of a military turn, he led a life of complete retirement at his native place, where his time was spent in literary pursuits and in the education, as is said, of his own children and those of his brother, one of whom became the celebrated Lord Fairfax. We learn from his own writings that he was neither 'a superstitious Papist nor a fantastic Puritan;' but farther particulars of his life there are none. He is supposed to have died about the year 1632.

Fairfax is now known only for his translation of Tasso's 'Jerusalem Delivered,' which is executed in a manner which makes it wonderful how the frigid, jingling, and affected version by Hoole ever survived its birth. The measure which he chose for his work (that of the original Italian) is one less stately perhaps than the Spenserian stanza, but not less fitted for heroic subjects. It consists of eight-line stanzas, of which the first six lines are in *terza rima* and the last two rhyme with each other. It has this great superiority over the common heroic couplet, that all jingle is avoided by the occasional introduction of a different species of rhyme. Moreover, the verses are much more harmonious than those of Hoole; the diction is more simple, and the English more pure. As the time is now gone by when Johnson gave the law in criticism, and Pope's method of versifying was the only one in repute, we may hope to see Fairfax's translation regain its ascendancy. We may now smile at the critic who asserts that Fairfax's translation 'is in stanzas that cannot be read with pleasure by the generality of those who have a taste for English poetry[†];' but we must at the same time regret that a literary school like that of the followers of Pope should have usurped for so long a time such entire dominion as to enable one of its humblest members to make assertions so sweeping and insolent as those contained in the preface from which we have just quoted. (*Biographia Britannica; Preface* to Fairfax's *Tasso*, edition 1749; *Preface* to Hoole's *Tasso*.)

FAIRFAX, SIR THOMAS, afterwards Lord Fairfax the son of Ferdinando Lord Fairfax and his wife, Mary, daughter of Edmund Sheffield, Lord Mulgrave, was born in the parish of Otley, at Denton, which is situated about 12 miles north-west of Leeds. He was sent from school to St. John's College, Cambridge; but we do not find that he was eminent as a scholar, for his disposition was inclined to military employment rather than to study. Accordingly, as soon as he left college, he enlisted in the army of Lord Vere, and served under his command in Holland. The connexion of Fairfax with Lord Vere afterwards became more close. When he returned to England, he married Anne, the fourth daughter of that peer, who, like her father, was a zealous Presbyterian, and disaffected to the king. If Fairfax did not already possess the same religious and political feelings, he soon imbibed the principles of his wife. When the king began to raise troops, as it was said, for the defence of his person, Fairfax, who foresaw that it was intended to collect an army, in the presence of nearly 100,000 people assembled on Heyworth Moor, presented a petition to the king in person, praying that he would listen to his parliament and refrain from raising forces. In 1642, when the civil wars broke out, he accepted a commission of general of the horse under his father, who was general of the parliamentary forces in the north. His first employment was in the county of York, where at first the greater number of actions between the parliamentary and royalist troops were in favour of the king, whose army was under the conduct of the earl of Newcastle. Sir Thomas Fairfax, somewhat dispirited, was despatched from Lincoln, where he was in quarters, to raise the siege of Nantwich, in Cheshire. In this expedition he was successful, not only in the main object, but he also took several garrisons, and on his return defeated the troops under Colonel Bellasis, the governor of York, and effected a junction with his father's forces (April, 1644). Thus Fairfax became master of the field, and, in obedience to his orders, proceeded towards Northumberland, to enable the Scots to march southwards, in spite of the king's forces, which were quartered at Durham. A junction took place between the Scots and Fairfax, who acted in concert during the spring (1644), and fought together in the memorable battle of Marston Moor (July 2, 1644), where the king's troops experienced such a signal defeat that the whole north, excepting a few garrisons, submitted to the parliament. Before Helmesley Castle, one of these fortresses, which Sir Thomas Fairfax was afterwards (September) sent to besiege, he received a wound in his shoulder that caused his life to be despaired of. When the earl of Essex ceased to be parliamentary general [ESSEX], it was unanimously voted that Fairfax should be his successor (January, 1644-5), and Cromwell by whom his actions were afterwards so greatly influenced, was appointed his lieutenant-general. Fairfax hastened to London, where, upon the receipt of his commission, the speaker paid him the highest compliments. After having been nominated governor of Hull, he marched to the succour of Taunton, in which place the parliamentary troops were closely besieged; but upon the king's leaving Oxford and taking the field with Prince Rupert, he was recalled before he had proceeded farther than Blandford, and received orders to join Cromwell and watchfully attend upon the movements of the king. On the 14th of June the decisive battle of Naseby was fought; and when the king had fled into Wales, Fairfax, marching through Gloucestershire, possessed himself of Bath, Bristol, and other important posts in Somersetshire. From thence, by the way of Dorsetshire, he carried his arms into Cornwall, and entirely dispersed the forces of the king.

After the surrender of Exeter, which was the last event of this western campaign, Fairfax returned to Oxford, which, as well as Wallingford, surrendered upon articles. In the autumn, after further active and successful employment, he was seized with a fit of illness, under which he laboured for some weeks. In November, when he returned to London, he was welcomed by crowds who came out to meet him on his road, was publicly thanked for his services, and received from the parliament a jewel of great value set with diamonds, together with a considerable grant of money. The payment of the 200,000*l.* to the Scottish army, in consideration of which they delivered up the king, was entrusted to Fairfax, who marched northward for this pur pose. The discontent of the army, who were fearful either that they should be disbanded or sent to Ireland, now rose to a great height. Their complaints were encouraged by Cromwell and Ireton; a council was formed in the army by selecting two soldiers from each troop, and the Independents showed an evident desire to form a party distinct from the Presbyterians and the parliament, and to usurp for themselves a greater authority. Although Fairfax was in his heart opposed to these violent proceedings, and saw them with regret, yet he had not the resolution to resign his command. He remained the tool of Cromwell, following his counsels, until the army had become master both of the parliament and the kingdom.

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[*] He is said to have been illegitimate, but without sufficient proof.

[†] Hoole, Preface to his Translation of Tasso p. xviii.

In 1647 he was made Constable of the Tower; and in the following year, at his father's death, he inherited his titles, appointments, and estates. The difference of his condition made no alteration in his life; he continued to attack or besiege the royalist troops wherever they were mustered or entrenched. Many towns in the east, and among them Colchester, which he treated with great severity, yielded to his arms. In December he marched to London, menaced the parliament, and quartered himself in the palace at Whitehall. He was named one of the king's judges, but refused to act; and he was voted one of the new council of state (February, 1648-9), but refused to subscribe the test. In May he marched against the Levellers, who were numerous in Oxfordshire. He continued in command of the army until June, 1650, when, upon the Scots declaring for the king, he declined marching against them, and consequently resigned his commission. He now retired to his house at Nun Appleton, in Yorkshire, which for some years he made his principal residence. He left it (in 1659) to assist General Monk against Lambert's forces. In January, 1659-60, he made himself master of York. In the same month and in the February following he was chosen one of the council of state by the Rump Parliament, was elected one of the members for the county of York, and formed one of the committee appointed to promote the return and restoration of Charles II. In November, 1671, while residing privately at his country-house, he was seized with an illness, which terminated in his death. He was buried at Bilburgh, near York. He left issue two daughters, Mary and Elizabeth. Mary married the duke of Buckingham; of Elizabeth we have no account.

The character of Fairfax was not distinguished for many vigorous qualities; the key to it may be found in the words of Clarendon: 'Fairfax wished nothing that Cromwell did, and yet contributed to bring it all to pass. He was courageous in battle, and sincere in his professions. He had an impediment in his speech: as an orator was not eloquent; as an author was indifferent: his love of literature was of no further benefit than as it served for the encouragement of others.' (Clarendon's *Hist.*; Whitelock's *Memorials*; Rushworth's *Coll.*; *Biog. Brit.*)

FAIRIES, a small sort of imaginary spirits of both sexes in human shape, who are fabled to haunt houses in companies, to reward cleanliness, to dance and revel in meadows in the night-time, and to play a thousand freakish pranks. Both sexes are represented generally as clothed in green, and the traces of their tiny feet are supposed to remain visible on the grass for a long time after their dances: these are still called fairy rings or circles. They are also fabled to be in the practice of stealing unbaptized infants and leaving their own progeny in their stead. Besides these terrestrial fairies there was a species who dwelt in the mines, where they were often heard to imitate the actions of the workmen, to whom they were thought to be inclined to do service. In Wales this kind of fairies were called 'knockers,' and were said to point out the rich veins of silver and lead. Some fairies are fabled to have resided in wells. It was also believed that there was a sort of domestic fairies, called, from their sun-burnt complexions, *Brownies*, who were extremely useful and who performed all sorts of domestic drudgery. The words fairy and browny seem at once to point out their own etymologies.

Bourne, in his 'Antiquitates Vulgares,' supposes the superstition relating to fairies to have been conveyed down to us by tradition from the Lamiæ, or antient sorceresses; others have deduced them from the lares and larvæ of the Romans. Dr. Percy tells us, on the assurance of a learned friend in Wales, that the existence of fairies is alluded to by the most antient British bards, among whom their commonest name was that of the Spirits of the Mountains. The most general conjecture, however, is, that these imaginary people are of oriental origin, and that the notion of them was first entertained by the Persians and Arabs, whose traditions and stories abound with the adventures of these imaginary beings. The Persians called them *Peris*, the Arabs *Ginn*; and the Arabs assigned them a peculiar country to inhabit, which they called *Ginnistan*, or fairy-land.

Shakspeare has been singularly happy in his dramatic exhibition of fairies. The belief in these fabled beings has still a fast hold upon the minds of many of our rustics, which may perhaps be considered as a remnant of that ignorant credulity which was once almost universal. Poole, in his 'English Parnassus,' has given the names of the fairy court: Oberon the emperor; Mab the empress: Perriwiggin, Perriwinckle, Puck, Hobgoblin, Tomalin, Tom Thumb, courtiers; Hop, Mop, Drop, Pip, Trip, Skip, Tub, Tib, Tick, Pink, Pin, Quick, Gill, Im, Tit, Wap, Win, Nit, the maids of honour; Nymphidia, the mother of the maids. Dr. Grey, in his Notes on Shakspeare, vol. i. p. 50, gives us a description, from other writers, of fairy-land, a fairy entertainment, and fairy hunting. Dr. King's description of Orpheus' fairy entertainment (*Works*, edit. 1776, vol. iii. p. 112), and 'Oberon's clothing' and 'Oberon's diet,' in Poole's 'English Parnassus,' almost exhaust the subject of fairy economy. A charm against fairies was *turning the cloak*. See Bishop Corbet's *Iter Boreale*. Anquetil du Perron's *Zend-Avesta*; Brand's *Popular Antiquities*, vol. ii. p. 327-350; Percy's *Reliques of Antient English Poetry*, 8vo. Lond. 1794, vol. iii. p. 207-215. The reader who would look further into fairy mythology may consult Sir Walter Scott's *Essay on the Fairy Superstition*, in the *Minstrelsy of the Scottish Border*; and more especially Keightley's *Fairy Mythology*, 2 vols. 8vo. 1828, in which the legends of different countries are collected.

FAITH (fides, in Latin), means belief or trust in a fact or doctrine, and is more especially used to express the belief of Christians in the tenets of their religion, and also by figure to mean that religion itself. The great divisions of Christianity, the Roman, the Greek, the Jacobite, the Reformed, or Calvinist, the Episcopal English, and the Protestant or Lutheran churches, have each separate confessions of faith, but they all acknowledge the great fundamental points of the Christian faith or religion, namely, the inspiration of the Scriptures, and the divinity of Jesus Christ. [Confession.] In the earlier ages of the church the chief controversies of theologians, especially in the East, ran upon metaphysical questions concerning the mysteries of the Trinity, the Incarnation, and the divine nature of the Saviour. In modern times controversy has run more frequently upon moral questions concerning the conduct of men, the requisites of salvation, and the discipline of the Church. Faith, the necessity of which is acknowledged by all Christians, has been viewed in various lights with respect to its efficacy. From the earliest ages the Church has taught that faith, or belief in the Redeemer, joined with good works, was necessary for the justification of man; that good works, that is, works acceptable to God, could only be produced by the Spirit of God influencing the heart, but that the human will must co-operate with grace in producing them, though the human will alone is powerless to good unless assisted by divine grace. Still, man being a free agent, the will can call on God, through the merits of the Saviour, for a measure of his grace to assist its own efforts. Thus the co-operation of God and man was held as the means of the justification and salvation of the latter. Luther however and Calvin denied the power of the will to call on God for his grace; they substituted faith, and faith alone, in the merits of the Redeemer, as the means of salvation, by which faith man firmly believes that his sins are at once remitted. But this faith must be sincere, absolute, without a shadow of doubt or distrust; and as man cannot of himself obtain this, it can only be given to him by inspiration of the Spirit of God. Here the question of faith becomes involved with those of grace and predestination. As for our works, both Luther and Calvin look upon them as absolutely worthless for our salvation. Some fanatics, and the Anabaptists among the rest, drew from these premises of the leading reformers some very dangerous consequences, which Luther and Calvin had not anticipated, such as that men might live as profligately as they pleased, and yet, by the inspiration of divine grace, might obtain the faith requisite for their salvation.

The opinions of Luther and Calvin on the subject of faith and predestination have been since considerably modified by many Protestant divines, who have admitted that the will of man must co-operate in order to obtain the grace necessary for justification. The Roman Catholic church admits the merit of good works and repentance, united with faith, for the purpose of salvation. But then, it requires an absolute faith in all the decisions of its General Councils in matters of dogma, without the least liberty of investigation on the part of the laity, and without any doubt, for doubt itself is held to be sinful. The Reformed and Protestant churches, generally speaking, hold faith in the fundamental dogmas of Christianity as an essential requisite for salvation.

FAKENHAM. [NORFOLK.]

FAKI'R, an Arabic word meaning poor, which is applied to the ascetics of several parts of the eastern world. In this sense it is synonymous with the Persian and Turkish derwish. The word fakir is chiefly used in India. There are fakirs who live in communities like the monks of the western world, and others who live singly as hermits, or wander about exhibiting strange displays of self-penance and mortification. Many of them are considered as hypocrites, and others are fanatics or idiots. [DERWISH.]

FALAISE, a town in France, the capital of an arrondissement, in the department of Calvados, near the source of the river Anté, which flows into the Dives: it is 127 miles from Paris, through Versailles, Dreux, Verneuil, and Argentan; in 48° 53′ N. lat. and in 0° 14′ W. long. The antient castle of Falaise was one of the residences and strong-holds of the dukes of Normandie, and here William the Conqueror was born: it sustained fourteen sieges at different times, in the early troubles of the duchy of Normandie; in the wars of Henry I. of England with his brother Duke Robert and the Norman lords; in the invasion of France by Henry V. (A.D. 1417); in the expulsion of the English from France (A.D. 1450); and in the war of the League, in which Falaise was taken by Henri IV. in person (A.D. 1589). The fortifications, which were much injured in these attacks, are at present in a very dilapidated state: the donjon of the castle, situated on a bold and lofty rock, in the suburb of Guibray, is one of the proudest relics of Norman antiquity: its walls are in some parts eight or nine feet thick.

The town stretches along the top of a rocky ridge which rises abruptly from a fertile and well-wooded valley. The streets are wide, and the public fountains impart a freshness to the appearance of the place. Before the Revolution, there were twelve churches: there are now only four; two in the town, and two in the suburbs.

The population in 1832 was 9419 for the town, or 9581 for the whole commune. The inhabitants carry on a considerable manufacture of cotton yarn and hosiery. There is a large fair held in the suburb of Guibray, which is much frequented: it continues from the 15th to the 30th of August: many Norman horses are sold. This town has a tribunal de commerce, or court for commercial affairs, a high school, an agricultural society, and a theatre.

The arrondissement of Falaise contained, in 1832, a population of 62,349. The chief manufactures carried on in it are leather and paper: there are also many oil-mills.

FALAJAS. [ABYSSINIA, p. 58.]

FALCO. [FALCONIDÆ.]

FALCON. [FALCONIDÆ.]

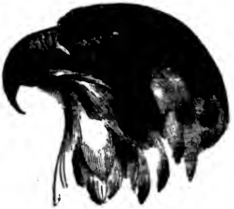
FALCONER, WILLIAM, was born about the year 1730, being one of a large family, all of whom, except himself, were deaf and dumb. When very young, he served his apprenticeship on board a merchantman, and was afterwards second mate of a vessel in the Levant trade, which was shipwrecked on the coast of Attica, himself with two others being the only survivors. This event laid the foundation of Falconer's fame, by forming the groundwork of 'The Shipwreck,' which poem he published in 1762. The notice which the poem received enabled him to enter the navy, during the ensuing year, as midshipman in the Royal George. After some other appointments, he became purser to the Aurora frigate, and was lost in her somewhere in the Mozambique Channel, during the outward voyage to India, in the winter of 1769.

Falconer was the author of a 'Nautical Dictionary' of considerable merit, as well as of some minor poems; but his chief claim to reputation consists in 'The Shipwreck,' the merit of which is owing to the vividness and power of description which pervade the work, and to the facility the author has shown in introducing nautical language. His style is formed on a model which may now be thought erroneous, and is certainly the most artificial imaginable—that of Pope; and the mixture of phrases, such as 'weather back-stays,' 'parrels, lifts, and clew-lines,' with the affectations of 'nymph,' 'swain,' 'Paphian graces,' &c., form rather a ludicrous contrast. To call 'The Shipwreck' a first-rate poem, or to compare it with the Æneid of Virgil, would not now enter into many men's thoughts, although this was done at the time when it first appeared. Some might even assert that where there is no imagination, there is no poetry; but with all these limitations we must allow that Falconer has done what no one else ever attempted, and we must give him a high place among the writers of didactic poems.

(See Clarke's and Pickering's editions of *The Shipwreck*; Irving's *Life of Falconer*; Chalmers's *Biog. Dict.*)

FALCONET, ETIENNE, was born at Paris in 1716, of poor parents, of a family originally from Savoy. He studied sculpture under Lemoyne, whom he soon surpassed. He executed several groups and statues, which are at Paris, in the church of St. Roch, in the Musée des Monumens Francais, and in several private collections. In 1766 he accepted the invitation of Catherine II. to repair to Petersburg, in order to execute the colossal statue of Peter the Great. He remained in that capital twelve years, during which he completed his work, which is now in the square called the Square of the Senate, and is perhaps the finest specimen of an equestrian statue existing. As he and the Russian founder appointed to cast the statue could not agree, Falconet cast it himself. He placed it upon an enormous block of granite, weighing about 1700 tons, which was found in some marshy ground at a considerable distance from Petersburg, and was brought to the capital by machinery. Catherine, who had shown him the greatest attention during the first years of his residence in the Russian capital, grew cool towards him at last, owing to the misrepresentations of some of her courtiers. Falconet returned to Paris in 1778. In May, 1783, as he was going to set off for Italy, a country which he had never visited, he had a paralytic stroke. He survived this misfortune several years, and died in January, 1791. In temper he was eccentric and blunt, but generous and warm-hearted. While at Petersburg he kept up a correspondence with Diderot, which is printed in Diderot's works. He wrote strictures and commentaries on the books of Pliny which treat of the sculpture and painting of the antients: he also wrote 'Observations sur la statue de Marc Aurèle,' in which he does not share in the admiration expressed by many for that work. In general, Falconet had no great veneration for antient art. All his writings were published under the title, 'Œuvres Complètes de Falconet,' 3 vols., 8vo., Paris, 1808, to which is prefixed an account of his life.

FALC'ONIDÆ, Leach's name for a family of *Raptorial Birds*, or birds of prey. (*Raptores* of Illiger.) In this family the destructive power is considered by all zoologists to be most perfectly developed; and we find in the birds composing it natural instruments for striking, trussing, and dissecting their prey, combined with a power of flight and strength of limbs equivalent to the necessities of the case, whether the prey be aërial, that is, whether it be the habit of the raptorial bird in question to strike down its quarry while the latter is in the act of flight, or whether the prey be terrestrial, or, in other words, captured on the ground. Of these natural weapons some idea may be formed from the cuts here given.—



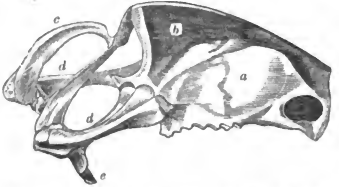
Bill of the Peregrine Falcon.

Foot of the Peregrine Falcon.

and they are rendered still more formidable by the organization of the whole animal, which is calculated to give them the greatest possible effect. The nails or claws, to be available, must be sharp; and in order that they may be kept in this state and fit for duty, there is a provision to enable the bird to prevent them from coming in contact with the ground or other foreign hard bodies: for the claws are retractile, not indeed in the same manner as those of the cats [Felis], which have the power of withdrawing or sheathing theirs within the integuments, but by a conformation which gives the bird of prey the power of elevating its claws at pleasure. The claws of falcons when sitting on stones or large branches of trees have often a cramped appearance; but this arises in most instances from the care of the bird so to arrange its talons that their points may not be blunted against the perch.

Anatomy.

The power of flight, as Mr. Yarrell observes in his memoir *On the Anatomy of Birds of Prey* (Zool. Journ. vol. iii. p. 181), is one of the decided marks of the distinct organization of birds; and, as one division of the first genus, *Falco*, appears to possess this power in the highest degree of perfection, he proceeds to consider the conditions necessary to produce such a degree. These, he observes, are large and powerful pectoral muscles; great extent of surface, as well as peculiarity of form in the wing; and feathers of firm texture, strong in the shaft, with the filaments of the plume arranged and connected to resist pressure from below. 'A certain degree of specific gravity,' continues Mr. Yarrell, 'is necessarily imparted by large pectoral muscles, and the power of these muscles may be estimated by the breadth of the sternum and the depth of its keel, as affording extent of surface for the attachment of the large muscle by which the wing is depressed. As an illustration of this form the breast-bone of the peregrine falcon (*Falco peregrinus*) is represented, which exhibits the breadth of the sternum, the depth of the keel, as well as the strength of the clavicles; and the power of flight peculiar to all the species of true falcons is still further illustrated by the form and substance of the *os furcatorius*, which is circular, broad, and strong, affording a permanent support to the shoulders. That the long and acuminated form of the wing in the true falcons, with each feather narrow, firm in consistence, the second the longest, and all gradually tapering to a point, is also best adapted for rapidity of motion, may be inferred from the example in the various species of the genera *Hirundo*, *Scolopax*, *Tringa*, *Charadrius*, *Procellaria*, *Sterna*, &c.; but that extent of surface and this peculiarity of form in the wing are not in themselves sufficient alone to afford rapid flight, is proved in the genus *Larus*, the species of which, though capable of exercising their immense pinions with graceful ease for hours in succession, without any apparent lassitude, are still incapable of rapid flight, for want of strong pectoral muscles. The numerous examples also furnished by the *Gallinaceous* tribe sufficiently evince that immense pectoral muscles are insufficient when coupled with a small round wing, and afford but a short flight, sustained with great labour, rapid in a small proportion only to the strength and repetition of the impulse, and accompanied by a vibration too well known to need further remark. So material also is the perfection of the feather in the genus *Falco*, that when any of those of the wing or tail are broken, the flight of the bird is so injured that falconers find it necessary to repair them. For this purpose they are always provided with pinion and tail feathers accurately numbered, and the mode of uniting the more perfect feather to the injured stump is described in Sir John Sebright's excellent observations on hawking.' The reader who is disposed to go farther back will find in the 'Booke of Falconrie or Hawking,' &c., &c., 'heretofore published by George Turbervile, Gentleman,' (London, small 4to., 1611,) the following chapters:—'Of Accidents that happen and light uppon a hawkes feathers, and first how to use the matter when a feather cannot be ymped.' 'The way and manner how to ympe a hawks feather, howsoever it be broken or bruised;' and four methods of operating, according to the circumstances, are detailed. 'How to ympe the traine of a hawke beeing all broken, and never a feather whole or sound.' Mr. Yarrell proceeds to observe that it is difficult to estimate the comparative rapidity of flight in different birds, and that our pigeons may appear to possess this advantage in a degree little inferior to the true falcons; but, he adds, the fact is that these birds are deficient in natural courage, and are unable, under circumstances, to avail themselves of those powers with which they are gifted.



Breast-bone of the Peregrine Falcon (Yarrell) reduced. *a*, the sternum; *b*, the keel; *c*, the furcula, or os furcatorius; *d d*, the clavicles; *e*, the scapula broken off.

'The bodies of all the species of true falcons,' writes Mr. Yarrell in continuation, 'when denuded of their feathers, are triangular in form, broad at the shoulders and tapering gradually to the tail, the muscles of the thighs and legs of great size; but these characters are less prominent in the hawks, the bodies of which are more lengthened, the legs long and slender, the pectoral muscles smaller, the wing rounded in form, the fourth feather the longest, the wing primaries broad in the middle, the inner webs overlapping the feather next in succession, and emarginated towards the end. These two divisions of the genus *Falco* although the latter are unequal to the former in powers, are remarkable for their bold character and rapid flight, their invariable mode of striking their prey on the wing, as well as the instinctive knowledge by which they are directed to destroy life, attacking the most vital part, and penetrating the brain with their sharp hooked beak, either by one of the orbits where the bone is very thin, or at the junction of the cervical vertebræ with the occiput.

'On comparing the bones of our two British eagles, the greater power of flight appears to belong to the *Albicilla*, that of prehension to the golden eagle, but both exhibit various indications of great strength.

'By an extended examination of the different species of buzzards and harriers, it will be found that the characters described as necessary to produce rapid motion decline gradually. The sternum decreases in size, the keel loses part of its depth, the clavicles and furcula become more slight, while the form of the cranium, the loose ruffled feathers of the neck, as well as the general downy texture of the plumage, indicate the approach to the genus next in succession. Of the bones of the different species of the genus *Falco* generally, it may be added, that they are remarkable for their strength, such as are cylindrical being furnished with numerous transverse bony processes within the tubes, and the distribution of air throughout their internal cavities. The humerus is supplied with air through several orifices upon its inner and upper surface, and some difference will be found in the angle at which this bone is articulated with the clavicle to accomplish the ascending flight of the sky-lark, in contradistinction to the precipitous horizontal direction of the falcons. The thigh bone is also supplied with air by an orifice at the situation which answers to the front of the great trochanter; the large bones forming the pelvis, the vertebræ, sternum, furcula, clavicles, scapulæ, and even the ribs, are all furnished with apertures for the admission of air, supplied from the various cells of the abdomen, sides, and thorax. This distribution of air to the bones does not seem however to be absolutely necessary for flight, since the young birds of our summer visitors appear to perform their first autumnal migration with perfect ease and celerity, at an age when the cavities of their bones are filled with marrow.

'The various characters of the feet are too obvious to require particular notice.'

The reader is referred to the article BIRDS for the details of the rest of the skeleton of the *Falconidæ*, as exemplified in the *Sparrow Hawk* (vol. iv., pp. 424, 425); and we shall now endeavour to give a sketch of the other internal parts worthy of notice, and especially of the organs of the senses.

Organs of Digestion.—In the Museum of the Royal College of Surgeons in London (Physiological Series), the reader will find a preparation (Gallery, 522 A.) of the stomach of the golden eagle. It is laid open, so as to show the orifices of the numerous gastric glands of the proventriculus, the smooth lining membrane of the gizzard, and the valvular structure of the pylorus. The œsophagus is very wide, so that externally it appears to form one continued cavity with the proventriculus and stomach. On the outer surface of the latter may be observed the two shining tendons from which the muscular fibres radiate; these however form a very thin layer in this and other carnivorous birds. A small quill is passed through the pylorus, which is guarded within by three cuticular tubercles, two on the upper side of the orifice and one below which fits into the interspace of the preceding. The crop has not been preserved in this preparation. (*Cat., Physiol. Series*, vol. i.) John Hunter, in his 'Observations on Digestion' (*Animal Œconomy*), says, 'There are few animals that do not eat flesh in some form or other, while there are many who do not eat vegetables at all; and therefore the difficulty to make the herbivorous eat meat is not so great as to make the carnivorous eat vegetables. Where there is an instinctive principle in an animal, directing it either to the one species of food or the other, the animal will certainly die rather than break through of its own accord that natural law; but it may be made to violate every natural principle by artificial means. That the hawk tribe can be made to feed upon bread I have known these thirty years; for to a tame kite I first gave fat, which it ate very readily; then tallow and butter; and afterwards small balls of bread rolled in fat or butter; and by decreasing the fat gradually, it at last ate bread alone, and seemed to thrive as well as when fed with meat. This, however, produced a difference in the consistence of the excrements; for when it ate meat, they were thin, and it had the power of throwing them to some distance; but when it ate bread, they became firmer in texture, and dropped like the excrement of a common fowl. Spallanzani attempted in vain to make an eagle eat bread by itself; but by inclosing the bread in meat, so as to deceive the eagle, the bread was swallowed and digested in the stomach.'

Mr. Yarrell observes, that the œsophagus offers nothing peculiar beyond that of other birds not possessing the power of minutely dividing their food. It is plicated lengthways, allowing great extension, and its separation from the stomach is marked by a zone of gastric rings. The same author notices an opportunity which occurred to him of observing the castings or pellets of some eagles, which had been occasionally fed with dead pigeons. These castings showed that the vegetable food, such as pease, wheat, and barley, which had been swallowed by the eagles in the crops of the pigeons, remained entire, but somewhat enlarged and softened by heat and moisture. In these cases no part of the bones remained.

The intestines of the *Falconidæ* are in general short and large, but Mr. Yarrell remarks that the Osprey is an exception to this rule, and that to the thin membranous stomach of this bird there is attached an intestinal canal measuring 10 feet 8 inches in length, and in some parts scarcely exceeding a crow-quill in size. The canal in most of the species, he adds, is in length, compared with that of the bird itself, as three to one; but in the Osprey it is as eight to one: and he observes that in the otter the intestinal canal is very long, equal in size, and without cæcal appendage; the seal, too, has long intestines with a small cæcum. Mr. Yarrell inquires therefore if it may not be concluded that the small quantity of nutriment which fish, as an article of food, is known to afford, renders this extent of canal necessary in order that every portion may be extracted. The cæca of the *Falconidæ* amount to no more than minute rudiments.

Organs of Respiration.—There is nothing very remarkable in these organs among the Falconidæ. The trachea is composed of two membranes, inclosing between them numerous bony rings, forming a more or less perfect tube. The rings are strong and compressed. The point of divarication, the cross-bone and bronchiæ constituting together the inferior larynx, are of the most common form, having but one pair of muscles attached; and the voice, though powerful, possesses, as might be expected, but little variation. (Yarrell.) *Falco musicus* seems, however, to be an exception, and it would be desirable to examine its trachea for the purpose of ascertaining whether it is not organized more after the fashion of that of the singing birds.

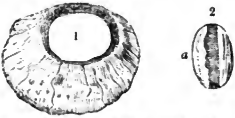
Organs of Sense.—Touch.—It might be expected that in the *Falconidæ* the soles of the feet and lower surfaces of the toes which come so closely into contact with the living prey would be endowed somewhat more largely with the sense of touch than those of birds which have no such habits; accordingly, we find in the Museum of the College of Surgeons (Physiological Series) a preparation (No. 1400) of one of the feet of an eagle, with the cuticle removed, showing the papillæ and cushions of the cutis on the under surface of the foot.

Taste.—In the same Museum (same series, No. 1482) will be found the tongue, larynx, and lower jaw of the Golden Eagle (*Aquila chrysaëtos*). The tongue is fleshy and large, divided into two lateral portions by a deep longitudinal furrow; at its base is a series of small retroverted spines, arranged in the form of a chevron, between which and the larynx the surface is studded with the orifices of numerous glandular follicles: two rows of retroverted spines again occur behind the larynx. There is a row of glandular follicles on either side of the frænum linguæ, and a large cluster of similar orifices immediately anterior to it. The preparations No. 1483 and 1484 exhibit respectively the tongue and fauces of an Erne (*Haliæetus albicilla*), and the tongue and larynx of an Osprey (*Pandion haliæetus*).

Smell.—A longitudinal section of the anterior part of the head of the Golden Eagle will be found in the same Museum and series (No. 1538). The preparation shows the turbinated cartilages and cavity of the nose, together with part of the orbit and the air-cell continued from it anteriorly, and situated below the nose. The parts are minutely injected, and the vascularity of the pituitary membrane covering the middle turbinated cartilage is well displayed No. 1539 is a transverse section of the head of an Erne (*Haliæetus albicilla*), showing the convolutions of the middle turbinated cartilages, and the disposition of the pituitary membrane, which is thickest on the convex or mesial side of the convolutions. The air-cells in the superior maxillary bones, and their communications with those which are situated in front of the eye-ball, are well seen in this preparation. Bristles have been inserted into the lachrymal ducts, and into the common termination of the Eustachian tubes, the respective conduits of the eye and ear for conducting their superfluous moisture to the nasal passages. An anterior transverse section of the head of the same eagle is shown in No. 1540, which exhibits the external nostrils, the anterior terminations of the middle turbinated cartilages, and of the lachrymal ducts, in which bristles are placed; together with the communications of the maxillary air-cells with the cancellous structure of the upper mandible. (*Cat. Gallery*, vol. iii.)

Hearing.—Nothing remarkable.

Sight.—'The extraordinary powers of vision' says Mr Yarrell, 'which birds are known to exercise beyond any other class of animals are in no genus more conspicuous than in that of *Falco*. Their destination, elevating themselves as they occasionally do into the highest regions, and the power required of perceiving objects at very different distances and in various directions, as well as the rapidity of their flight, seem to render such a provision necessary. The eyes of birds are much larger in proportion than those of quadrupeds, and exhibit also two other peculiarities. The one is the marsupium, a delicate membrane arising at the bottom of the eye, and terminating at or near the edge of the crystalline lens: the other is a ring of thin bony plates, enveloped by the sclerotic coat. Comparative anatomists do not seem to be agreed as to the means by which birds obtain their power of vision, whether by an alteration in the form or situation of the crystalline lens, or by both, either or both of which, the greater quantity of aqueous humour which birds are known to possess would seem to facilitate. The existence of muscle attached to the inner surface of the bony hoop of the sclerotica, and inserted by a tendinous ring into the internal surface of the cornea, as shown by Mr. Crampton,* by which the convexity of the cornea may be altered, gives a still greater scope of action, since with two or at the utmost three varieties of powers, the sphere of distinct vision may be indefinitely extended. Whether the five species called the True Falcons possess, with their exclusive rapidity of flight, any power of vision beyond their generic companions, would be difficult to ascertain; but it may, while on this subject, be worthy of remark, that the irides of the *Gyrfalcon*, *Peregrine*, *Hobby*, *Merlin*, and *Kestrel*, are hazel-brown, or still darker, while those of all the hawks, buzzards, harriers, and kites, are of various shades of yellow. I refer only to adult birds, and do not remember a single exception.'



1, bony ring of a Golden Eagle; 2, crystalline lens of the same bird; *a*, the anterior surface, somewhat less convex than the posterior one (Yarrell).

Mr. Yarrell observes, that the number of bony plates forming this circle in the Golden Eagle is fifteen; in the White-tailed Eagle there are but fourteen: and he adds, that the external convex form of the bony ring in the Golden Eagle will be found to extend through all the species of every genus of British birds, except the owls, in all of which it is concave.

In the Museum of the College of Surgeons (*Physiological Series, Gallery*) are the following preparations illustrative of this part of the subject. No. 1741. The head of an eagle, with the eyes *in situ*. In the left eye the anterior part of the tunics and the humours have been removed to show the retina expanding from the oblique line by which the optic nerve terminates, and the vascular processes of the *marsupium* extending forwards from the centre of the optic fissure. In the right eye a lateral section of the coats has been removed, together with the humours and a great part of the *retina*, showing the uniformly dark-coloured choroid, the thin but dense texture of the *sclerotica*, and the zone of osseous plates which supports the projecting *cornea*. The *marsupium* is preserved *in situ*. It is of an unequal quadrilateral figure, broadest below, and extending upwards and inclined a little backwards, with a slight convexity towards the nasal side of the eye-ball. The large size of the eyes is worthy of notice. No. 1742 exhibits a longitudinal section of the eye of an eagle, showing the oblique manner in which the optic nerve perforates the *sclerotica* and its extended termination, from which the *retina* expands in a plicated manner: only the folds at its origin are here preserved. The parts being minutely injected, the vascularity of the choroid is shown; also the breadth of the ciliary zone, the breadth and thickness of the bony imbricated hoop surrounding the base of the *cornea*, the thickness of the *cornea* itself, and the large size of the anterior chamber of the eye. No. 1743 is the eye of an eagle, with a portion of the coats removed from one side, showing the folds of the marsupial membrane, from which the colouring matter has been removed. In No. 1538 above alluded to portions of the eye and eye-lids with the nictitating membrane are preserved, showing the situation of the two *puncta lachrymalia*, through which bristles are passed along the ducts to the nose; and in No. 1539, at the back part of the preparation, the left eye-ball is laid open, showing the marsupial membrane. The right eye-ball is entire, and the *abductor*, *attollens*, and *deprimens oculi*, together with the *quadratus* and *pyramidalis* muscles of the *membrana nictitans*, are well displayed. See also No. 1540, as referrible to the organs of vision. No. 1796 exhibits the eye-ball, with portions of the horizontal eye-lids, the vertical eye-lid, or *membrana nictitans*, of an eagle. The *quadratus nictitantis* may be observed to have a more extensive origin than in the ostrich, and both muscles of the third eye-lid are relatively larger. The *cornea* is cut away, and the nictitating membrane raised. to show the termination of the duct of the Harderian gland, in which a bristle is placed. Bristles are also placed through the two *puncta lachrymalia*. The round and slightly concave tarsal cartilage of the lower eye-lid may be observed. the upper lid has no tarsal cartilage. In No. 1797 the three eye-lids of an eagle are exhibited, and the tarsal cartilage, which is raised as in the act of closing the eyes, is shown (*Cat. Gallery*, Physiol. Series, vol. iii.)

NATURAL HISTORY.

Aristotle divided tho *Falconidæ* into 'Αετοὶ or Αἰετοὶ' (Eagles), 'Ιέρακες (Hawks), and 'Ικτῖνοι (Kites), with many subdivisions. Mr. Vigors is of opinion that the division 'Ιέραξ (Hierax) of Aristotle comprises all the Falconidæ of Vigors which belong to the stirpes or sub-families of *Hawks*, *Falcons*, and *Buzzards*. Pliny separates the group into *Aquilæ* (Eagles) and *Accipitres*, a general term comprising, as used by him, the rest of the *Falconidæ*. The subdivisions of both Aristotle and Pliny do not differ much from the subdivisions of some of the modern zoologists.

Belon, beginning with the Vultures, proceeds from them to the Eagles; thence to the *Gerfault*, which he gives as the *Morphnos*, *Morphna*, *Nittophonos*, *Plangos*, *Plancus*, *Plangus*, and *Clangus* of the Greeks, and *Anataria* of the Latins; next he places the *Orfraye*, which he makes the *Haliæetus* of the Greeks, the *Aguista piombina* of the modern Italians, and gives *Aquila marina* as the Latin name. He then treats of the *Ossifragus* as the *Phinis* of the Greeks, *Aquila barbata* in Latin, recording it provisionally as a species of *Vulture* (*Petit vautour*), and next describes the *Buzzard* (Buse ou Busard) as a kind of *bastard Eagle*, and as the *Gypäetos*, *Percnopterus*, or *Oripelargus* of the Greeks. Then comes the *Goirun* or *Boudree*, which he describes as living upon rats, mice, frogs, lizards, &c., caterpillars, and sometimes slugs and serpents, asserting that it becomes very fat, and that it is taken frequently in winter for the sake of its flesh, which is good for food. This he supposes to be the *Hierax*, called *Phrynolochos* by the Greeks, and gives *Rubetarius Accipiter* as the Latin name. *Jean le Blanc*, or *Oyseau Saint Martin*, which he considers to be the *Pygargus* of the Greeks, follows, and is succeeded by another *Oyseau Saint Martin*, or *Blanche-queuë*. Belon then gives an account of the birds of prey employed in falconry. The *Sacre* and her *Sacret*, the *Autour* and her *Tiercelet*, the *Fau-perdrieux* (Circus?), and the *Falcons* generally, with their *Tiercelets*.* He then describes the *Hobreau* (Hobby?), the *Esmerillon* (Merlin?), the *Espervier* (Sparrowhawk?), the *Lanier* and *Laneret*, and the *Cresserelle* (Kestrel?). Next follow the *Butcher-birds*, then come the *Kites* (Milan Royal, Milan Noir—Milvus), and (the *Cuckoo* intervening from a supposed similitude to the Birds of Prey) the *Owls*.

Passing by Gesner, Aldrovandus, and Jonston, we pause to notice Willughby's arrangement. He separates the carnivorous and rapacious birds, called *Birds of Prey*, into the *Diurnal* (those that prey in the day-time) and the *Nocturnal* (those that fly and prey by night). The following is his table of the *Diurnal* section.

Diurnal	The *Greater*, and these either .	The *more generous*, called *Eagles*: the *Golden Eagle*, the *Sea-Eagle*, the *Black Eagle*, &c.		
		The *more cowardly* and *sluggish*, called *Vultures*.		
	The *Lesser*, called in Latin *Accipitres* . .	The *more generous*, that are wont to be reclaimed and manned for fowling, called *Hawks*, which our falconers distinguish into . .	*Long-winged*, whose wings reach almost as far as the end of their train, as the *Falcon*, *Lanner*, &c.	
			Short-winged, whose wings when closed fall much short of the end of their trains, as the *Goshawk* and *Sparrowhawk*.	
		The *more cowardly* and *sluggish*, or else *indocile*, and therefore by our falconers neglected, and permitted to live at large . . .	The *Greater*.—The *Common Buzzard*, *Bald Buzzard*, &c.	
			The *Lesser*	*European*; BUTCHER BIRDS or SHRIKES
				Exotic; BIRDS OF PARADISE.

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* Annals of Philosophy for March, 1812

* It is a general rule that, in the *Falconidæ*, especially among the nobler birds of prey, the female is larger than the male.

Ray, in his 'Synopsis,' follows Willughby, and both Ray and Willughby place the Cuckoo after their Diurnal Birds of Prey and immediately before the Nocturnal.

Brisson's third order consists of birds with a short and crooked beak, and the first section contains the genera *Epervier* (Hawk), *Aigle* (Eagle), and *Vautour* (Vulture).

Linnæus makes his first order, *Accipitres*, consist of the genera *Vultur, Falco, Strix*, and *Lanius*. The genus *Falco* contains the elements of the different branches of the family of *Falconidæ*.

Without entering into the methods of Buffon, Schœffer, and Scopoli, we proceed to that of Latham, who made the *Accipitres* his first order of Terrestrial Birds, containing the genera *Vulture, Falcon*, and *Owl*.

Pennant makes the *Rapacious Birds* (his first section) consist of two genera only, viz. *Falcon* and *Owl*.

M. de Lacépède placed the *Birds of Prey* (his seventh order) at the head of his second Division of Birds. His genera are *Vultur, Gypaëtos* (Griffon), *Aquila, Astur, Nisus, Buteo, Circus, Milvus, Falco*, and *Strix* (Owl).

M. Duméril divided his first order, *Rapaces*, into three families; the first *Nudicolles* or *Ptilodères*, consisting of the genera *Sarcoramphus* and *Vultur;* the second *Plumicolles* or *Cruphodères*, containing the genera *Griffon, Messager, Aigle, Buse, Autour*, and *Faucon;* and the third the *Nocturnes* or *Nycterins* (Owls).

Blumenbach's first order, *Accipitres* (Birds of Prey, with strong hooked bills and large curved talons, a membranous stomach, and short cæca) consists of the genera *Vultur, Falco, Strix*, and *Lanius*.

Meyer's first order, *Rapaces*, is divided into two suborders: first, the *Scleropteræ*, or *Diurnal Birds of Prey;* second, the *Malacopteræ*, the *Nocturnal Birds of Prey*.

The third order of Illiger, *Raptatores*, is composed of the *Nocturni* (Strix), the *Accipitrini* (Falco, Gypogeranus, Gypaëtus), and the *Vulturini* (Vultur, Cathartes).

Cuvier divides his first order (the Birds of Prey) into *Diurnal* and *Nocturnal*. The first are subdivided into the *Vultures* and the *Falcons* (Falco, Linn.), which last are separated into the *Noble Birds of Prey*, or *Falcons properly so called* (Falco of Bechstein), comprising the genera *Faucon* (Falco) and the *Gerfaults* (Gyr-falcons, *Hierofalco* of Cuvier); and the *Ignoble Birds of Prey*, consisting of the *Eagles* (Aquila of Brisson), which are subdivided into the *Eagles properly so called* (Aquila of Cuvier), the *Aigles-Pêcheurs* (Fishing Eagles, with comparatively long wings, *Haliæetus* of Savigny), the *Balbusards* (Pandion of Savigny), the *Circaètes* (Circaetus, Vieillot, *Jean le Blanc*, &c.), the *Caracaras*, (Polyborus, Vieillot, and Ibycter, Vieillot), and the *Harpies* or Fishing Eagles, with short wings, (Harpyia of Cuvier; the tribe *Cymindis* of Cuvier; the *Aigles-Autours* (Morphnus of Cuvier, Spizaëtos of Vieillot); the *Autours* (Astur of Bechstein, Dædalion of Savigny); the *Milans* (Milvus of Bechstein, Elanus of Savigny); the *Bondrées* (Pernis of Cuvier, Honey Buzzard); the *Buses*, Buteo of Bechstein; the *Busards* (Circus of Bechstein); and the *Messager* or *Secrétaire* (Serpentarius of Cuvier, Gypogeranus of Illiger).

Vieillot divides his first order, *Accipitres*, into the *Diurnal* and *Nocturnal* tribes, making the first tribe to consist of three families; 1st. *Vautourins*, among which he places the *Caracara;* 2nd. *Gypaëtes;* 3rd. *Accipitrins*, consisting of the genera *Aigles, Pygargue, Balbuzard, Circaëte, Busard, Buse, Milan, Elanus, Ictinie, Faucon, Physète, Harpie, Spizaëte, Asturine, Epervier*.

Temminck's first order, *Rapaces*, comprises the genera *Vautour, Catharte, Gypaëte, Messager, Faucon, Chouette*.

Mr. Vigors thus arranges the *Falconidæ*.

	TYPICAL GROUPS.	
Beaks short, strongly toothed. Prey aërial.	Wings short.	Sub-family, *Accipitrina*. HAWKS.
	Wings long.	Sub-family, *Falconina*. FALCONS.
	ABERRANT GROUPS.	
Beaks long, or sublong, not toothed. Prey terrestrial.	Beaks hooked (adunca) from the base. Wings long.	Sub-family, *Buteonina*. BUZZARDS.
	Beaks hooked from the base; Tail forked. Wings very long.	Sub-family, *Milvina*. KITES.
	Beaks hooked at the apex only. * Long-winged. ** Short-winged.	Sub-family, *Aquilina*. EAGLES.

De Blainville divides the *Raptatores* into the *Diurnal* and the *Nocturnal*. The former he divides into the *Anomalous* (the Secretary, Serpentarius); and the *Normal* (Falco, Linn.).

M. Latreille separates his first order of terrestrial birds (*Rapaces*) into two tribes—the diurnal and the nocturnal. The first contains two families: 1st, The *Vautourins* (Vultures); 2nd, The *Accipitrins*. The latter consists of the genera *Aigle, Pygargue, Balbuzard, Harpie, Aigle-Autour. Asturine, Messager, Autour, Epervier, Elane, Milan, Bondrée, Buse, Busard, Faucon, Gerfault*.

C. L. Bonaparte (Prince of Musignano), in his 'Tabella Analitica,' divides his 'Ordine' *Accipitres* into the 'Famiglia *Vulturini*,' and the 'Famiglia *Rapaces*.' These last he separates into the *Diurni*, with eyes on the sides of the head, 'Occhi nei lati,' and the *Nocturni*, with eyes in the face, 'Occhi sulla faccia.' His diurnal rapacious birds consist of two genera, viz., *Gypaëtos* and *Falco*. The latter comprises the following sub-genera:—*Aquila, Haliaëtos, Pandion, Falco, Astur, Milvus, Elanus, Buteo, Circus*.

M. Lesson, in common with other zoologists, separates his first order, the *Birds of Prey, Accipitres*, or *Rapaces*, into the diurnal and nocturnal. The first embraces three families:—1st, The Vultures; 2nd, The Falcons, or *Falconidæ*, which he subdivides into the *Noble Birds of Prey*, viz. the genera *Falco, Hiero-Falco, Physeta*, and *Gampsonyx;* and the *Ignoble Birds of Prey*, viz. the genera *Aquila, Haliæetus, Pandion, Circaëtus, Caracara, Harpya, Morphnus, Cymindis, Astur, Nisus, Milvus, Ictinia, Elanus, Nauclerus, Pernis, Buteo, Circus*. 3rd, The *Messagers*, or *Serpentarii*, consisting of one genus only, *Serpentarius*, the Secretary Falcon.

Mr. Swainson (*Fauna Boreali-Americana*) remarks that in contemplating the *diurnal birds of prey*, arranged by Linnæus under the genus *Falco*, we can be at no loss to discover the two typical forms in the *Toothed-billed Falcons* and the *Sparrow-hawks*. Their peculiarities, he adds, did not escape the notice even of the earliest systematic writers, and the moderns, he observes, have only confirmed the justness of the distinction. But with regard to the remaining groups, he states that much diversity of opinion still exists; not, indeed, as regards the leading divisions, for here likewise the antients had long ago anticipated our distinctions between the *Eagles, Kites*, and *Buzzards*. It is not, therefore, to these groups, taken *per se*, that any doubts can attach on their respective peculiarities, but rather as to their relative rank with those that are considered typical. These doubts, in Mr. Swainson's opinion, can only be solved by analysis; and from an attentive consideration of the difficulties arising from the want of materials in our museums, and other causes, he has been induced to dissent from several modern writers upon this family. He admits that it has been sufficiently proved that the various forms of which it is composed exhibit, as a whole, a circular succession of affinities; but the true series of the secondary groups, among themselves, has not, he asserts, yet been made out: he adds however, that the inability to state in what way the falcons or hawks form their own respective circles cannot militate against the belief that such is their true distribution. 'It remains, therefore,' continues Mr. Swainson, 'to be considered whether there is presumptive evidence to believe that the three remaining divisions, namely the *Buzzards, Kites*, and *Eagles*, form one circular group, independent of their affinity to the two former. The true *Buzzards*, of which the *Vulgaris* and the *Lagopus* may probably be types, are slender long-winged birds; the bill is small, short, and considerably curved: in this structure they agree with the true falcons, yet they are well known to be distinguished from them by wanting the toothed-bill, and by the shortness and graduated abbreviation of the exterior quill-feathers. Now, if Nature had proceeded in a simple course from the buzzards to the falcons, we should have had birds uniting the distinctions of both variously modified. Both these groups being composed, in their typical examples, of slender long-winged birds, with short bills, any species exhibiting the reverse of such characters, and intervening between the two forms, would certainly appear anomalous, on the supposition of a simple series of affinities being aimed at. Yet, that such birds are to be found, even among the few that we are subsequently to notice, is unquestionable. Let us then take the *Buteo borealis*, which, as being more allied to the falcons than to the kites, may be considered an intervening form between the *Buteo vulgaris* and *Falco*. We here see a large-sized, heavy bird with shortened wings, not reaching to more than half the length of the tail; while the elongated bill, unlike either that of *Buteo* or *Falco*, obviously assimilates to that lengthened form which belongs to the eagles. Now, upon the supposition that a bird so constructed is intended to fill up the interval between *Buteo* and *Falco*, and at the same time to unite the former with the *Eagles*, the singularity of its structure is no longer surprising: but if we consider it with a simple reference to the passage between *Buteo* and *Falco*, we are almost tempted to suspect that, in this instance, a real *saltus* has been made. While upon this subject we may cite an acute observation made by Prince C. Bonaparte, that 'the *Borealis* is almost as much an *Astur* of the first section as a *Buteo*;' a proof, at least, that its affinities to *Astur* and to the aberrant eagles adjoining that group have not escaped observation. Our idea that the buzzards are truly united to the eagles is still further strengthened by the *Buteo pterocles*, Temm. * * *. In this species the wings, as in *Buteo*, are remarkably long, but the bill is so considerably lengthened, that were we to judge alone from this member, we should have no scruple in placing the bird among the *Aquilæ*. On the other hand, it must be remembered that, as every group, from the highest to the lowest denomination, when perfect, contains a representation of the other four, united to a form peculiar to itself, so we might naturally expect that one division of the buzzards would represent the true eagles. To ascertain, therefore, whether the resemblances above stated are those of analogy or of real affinity, recourse must be had to strict analysis. Now this, in our present state of knowledge, cannot be done, at least from the resources to be found in this country. We have thought it advisable to cite the above facts, drawn from the structure of the birds themselves, as likely to awaken the attention of ornithologists to a further investigation of the subject; they will, at least, show that our opinion on the unity of the three aberrant groups is not entirely without foundation. Mr. Swainson considers the relative value of the whole group equivalent to that of *Vultur* or *Strix* in its own order, and to the families composing the *Rasores*, *Grallatores*, and *Natatores*, and he contemplates the five principal divisions as *genera*, arranging the subordinate forms as *sub-genera;* but in considering the five forms of the *Falconidæ* as genera, rather than sub-families, he guards himself against the supposition that he may mean to insinuate that the minor distinctions which have been dwelt upon by several able ornithologists who have investigated this family, are either trivial, or that they deserve not to be brought immediately before us. On the contrary he recommends to others the plan adopted by himself, viz. the minute examination of every change of structure, and the assembling together in minor groups such species as agree in certain peculiarities. Further, he would proceed, in certain cases, even to impose a name upon such groups. but in a family already so crowded by generic names he considers it essential to preserve a distinction between groups of unequal value; and not to elevate sub-genera, or forms of transition, to a rank they do not hold. *Milvago*, *Polyborus*, *Daptrius*, and *Ibycter*, are, unquestionably, in his opinion, of the latter description, each confined but to one species, and he says that he has another of the same natural group in his cabinet, equally deserving a patronymic name. By regarding these as genera, each, as he thinks, is made equivalent to the whole genus of typical falcons; whereas, by representing them as lesser variations, which he considers them in truth to be, the student immediately perceives that their station is subordinate.

The genera into which Mr. Swainson divides the *Falconidæ* are *Falco*, *Accipiter*, *Buteo*, *Cymindis*, and *Aquila;* and he gives the following table as the concentration of his remarks in reference to the sub-genera of *Falco*:*

Sub-genera of Falco.		Genera of the Falconidæ.
	1. Typical group.	
Falco.	Pre-eminently typical; bill acutely toothed; wings pointed, rather long.	FALCO.
	2. Sub-typical group.	
Harpagus.	Wings shorter, rounded; tarsi with entire transverse scales.	ACCIPITER.
	3. Aberrant group.	
Lophotes.	Feet short; head crested.	AQUILA.
Aviceda.	Feet small, very short; soles broad and flattened; outer toe and claw shortest.	CYMINDIS.
Gampsonyx.	Bill neither notched or (nor) festooned; head small; feet strong.	BUTEO.

By throwing each of these columns into their respective circles, and then bringing them into juxtaposition (which he does in the work quoted) the same results, he remarks, will follow. Into the accipitrine circle he admits *Ictinia*, provisionally, *Accipiter* (type), *Astur* (Goshawks), *Haliæetus* (*H. Pondicerianus*), and no more. In the Aquiline circle he retains four 'types,' viz. *Pandion*, *Harpyia*, *Aquila*, and *Ibycter*. In the Cymindian or Milvine circle he places *Polyborus*, *Cymindis*, *Elanus*, *Nauclerus*, and *Circetus*, the last with a query, and in the cut of the circle it is not mentioned. In the Buteonine circle *Milvus*, *Circus*, and *Buteo*.

Mr. Vigors who, as we have seen, first proposed the application of the Quinary System to the *Falconidæ*, and indeed to the birds in general, thus defines the family which is the subject of our inquiry, and thus follows out his arrangement

FALCONIDÆ. (Leach.)

Head plumose. *Beak* strong, hooked, with a cere at the base. *Nostrils* lateral, more or less rounded, open and situated in the cere. External *toes* especially connected with the middle toes. *Claws* or *nails* strong, very sharp, very much incurved, and retractile:*

1st. Sub-family, *Aquilina*.

Beak long, hooked at the apex only. Fourth quill the longest.

*

Long-winged Eagles.

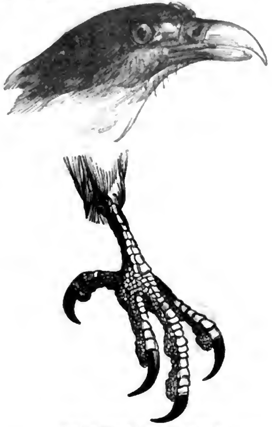
Genera. Ibycter. (Vieillot.)

Beak convex above. Lower *mandiole* notched at the apex, and subacute. *Cere* naked. *Cheeks*, *throat* (gula) and *crop* (jugulum) featherless. *Claws* acute.

Mr. Vigors remarks that the type of this genus is *Falco aquilinus* of Gmelin, *Petit Aigle d Amerique* of Buffon, and that he believes it still stands single in the genus.

Description. *Beak* cærulean; *cere* and *feet* yellow; *orbits* yellow; *irides* orange; *body*, above, cærulean; below red going into white; *neck* purplish to rufous; *claws* black. Gmelin gives it as the *Red-throated Falcon* of Latham

Locality, South America.



Head and Foot of Ibycter Aquilinus.

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* Natural History and Classification of Birds. London, 1836.

* The characters of the sub-families and genera are from those given by Mr. Vigors.

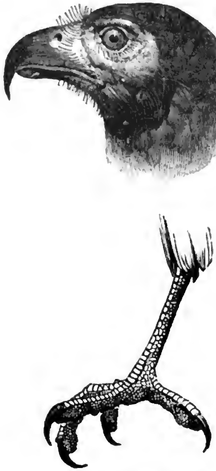
Daptrius. (Vieillot.)

Beak convex above. Lower *mandible* angular beneath, notched at the apex, obtuse. *Cere* with scattered hairs. *Orbits, throat,* and *crop,* featherless. *Claws* acute.

'How far,' writes Mr. Vigors, 'the two preceding genera of M. Vieillot are sufficiently distinct from each other, or from the remainder of the naked-cheeked *Eagles*, it is not for me to hazard an opinion, without the opportunity of more accurate examination of the birds than is at present within our power, and a more accurate knowledge of them than a mere description affords us. It would appear, however, that one group at least, that of *Ibycter*, is sufficiently distinguished from the other *Falconidæ* with the naked cheeks, by the difference of its food and habits. The accounts which have reached Europe of its mild and gentle manners and vegetable food have even induced some naturalists to refer it to the Gallinaceous Birds. I have strong doubts indeed whether the birds that compose this genus may not belong to quite a distinct station from the present, and be referrible to one of those groups which I have elsewhere observed to be wanting among the Birds of Prey, to perfect that chain of affinities which is to be found complete in all the other orders. It is impossible, however, at present, to come to any decision on the subject. While our materials for classification are so scanty, the most that is in our power is to conjecture the place which more perfect information will enable us to assign any group hereafter. For the present we may leave the genus before us in that situation, between the *Vulturidæ* and the *Falconidæ*, which they have hitherto been generally supposed to fill.'

Example, *Daptrius ater*.

Description.—Black with bluish reflections; *tail* white at its base above, and rounded; *beak* and *claws* black; *cere* blackish ash, space round the eyes naked and of a flesh-colour; *feet* yellow. Length from 14 to 15 inches French. This is the *Iribin noir* of Vieillot, and the *Caracara noir, Falco aterrimus*, of Temminck. *Locality*, Brazil and Guiana. M. Lesson notes it as probably a genus for suppression



Head and Foot of Daptrius Ater.

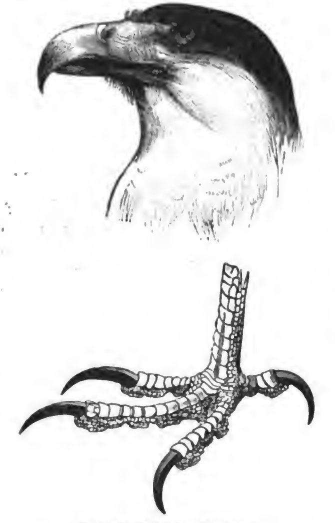
Polyborus. (Vieillot.)

Beak compressed above. Lower *mandible* entire and obtuse; *cere* covered with hairs, large; *cheeks* and *throat* featherless; *crop* woolly. Example, *Polyborus Brasiliensis*, *Polyborus vulgaris*. Vieillot. The ***Brazilian Caracara Eagle***.

We select Mr. Bennett's *Description* and general history of this species as the most complete. After giving the generic characters, and observing that the wings nearly equal the tail in length, that they are of a rounded form with the third and fourth quills longest; that the legs are rather long, naked, and reticulated, and the claws of moderate length and curvature, but with little acuteness or power of grasping, the last-named author thus proceeds:—'In the Brazilian Caracara the whole upper surface of the head is black, with the feathers slightly elongated backwards, and capable of being partially elevated in the shape of a pointed crest. The entire neck is of a light brownish gray, which also forms the ground colour on the breast and shoulders, but with the addition on these parts of numerous transverse wavy bars of a deeper brown. Nearly all the rest of the plumage is of a tolerably uniform shade of blackish brown, with the exception of the tail, which is at the base of a dirty white, with numerous narrow, transverse, undulated bands of a dusky hue, and, in its terminal third, black without any appearance of banding. The beak is horn-coloured at the tip and bluish at the base; the iris hazel; the cere and naked cheeks of a dull red; the legs yellow, and the claws black. Such at least are the colours of tho living specimen in the Society's garden. Several changes, however, take place in the plumage of the bird as it advances in age, and these are well illustrated by an extensive series of specimens in the Museum in Bruton-street,' —now in Leicester Square. 'So great in fact is the variation of colours in this species that scarcely any two descriptions of it correspond throughout, and the figures by which it has been illustrated differ from each other even more remarkably than the descriptions by which they are accompanied.' (*The Gardens and Menagerie of the Zoological Society delineated*, vol. ii.)

The same author observes that Marcgrave was the first to introduce into Europe the name of Caracara, the vulgar appellation of the bird in Brazil, derived from its hoarse and peculiar cry. But although M. Cuvier regards Marcgrave's Caracara as identical with the species described by Mr. Bennett, the latter remarks that both the figure and description are so much at variance with it that he feels himself compelled to adopt in preference the opinion of Professor Lichtenstein, founded upon the original drawing, that they belong to a totally different bird. Mr. Bennett is consequently unable to trace the history of the true Caracara beyond the year 1784, when a figure and description were published at Vienna by the younger Jacquin, from his father's papers, under the name of *Falco cheriway*. These Mr. Bennett has no hesitation in referring to the present species. The principal differences between them consist, he states, in the markings on the breast and neck, which in the figure are more longitudinal than transverse; and in the very awkward foreshortening of the beak, which completely distorts its natural form. The former appears, from the specimens in the Society's Museum, to be one of the distinctive marks of the young bird. Cuvier, in the last edition of the *Règne Animal*, observes that the *Falco cheriway* of Jacquin may be nothing but a variety of age. Mr. Bennett then notices the very complete description of the adult Caracara in D'Azara. According to this author, the full-grown bird measures 21½ inches in length and 50 in the expanse of the wings. Its colours agree with the description above given, excepting that the first six quill-feathers of the wings are white, marked with rays and spots of brown, and become blackish towards the point; the back is transversely rayed with brown and white, the latter predominating on its upper half, and *vice versâ;* the fore part of the neck and breast are traversed by dusky lines mixed with a larger proportion of white; the cere is of an orange hue; and the throat and sides of the head are almost white. This description, Mr. Bennett remarks, very nearly coincides with that of M. Cuvier, taken from specimens in the Paris Museum, and with the figure of one of these specimens given by M. Vieillot in his 'Galerie des Oiseaux,' and Mr. Bennett then refers to the figure given by M. Spix in his 'Birds of Brazil,' as the young of this species, which resembles M. Vieillot's in its form, except that the legs are longer and thicker, and the tips of the wings reach to the extremity of the tail. In colour it is rather of a darker brown, approaching more nearly to the Society's specimen alluded to by Mr. Bennett; the throat is light brown instead of white; and the transverse waves of the breast and shoulders are replaced by longitudinal brown dashes upon a light ground. The cere and naked cheeks are in both of a bright yellow; indeed Mr. Bennett states that he has nowhere met with them of the same hue with those of the Society's living specimen, except in the figure and description of Jacquin.

Habits, Food, Reproduction. The *Caracara* is said to live either alone or in pairs. But D'Azara states that he has seen them join in companies of four or five to hunt down prey which a single caracara would find a difficulty in mastering, such as red buzzards, herons, and other large birds, and it is believed that they will even destroy the American ostrich, young fawns, and lambs, when so associated. In its *food* it seems to be content with any animal substance. Carrion (for if a caracara see a vulture devour a piece of flesh he is said to pursue him and compel him to disgorge it), toads, frogs, worms, snails, lizards, grubs, grasshoppers, winged ants, snakes, and flies, birds—in short the general prey of buzzards, hawks, falcons, and insectivorous birds,—all suit its appetite. Two of the specimens obtained by M. Spix were shot in the act of extracting insects from the hides of oxen. D'Azara will not allow that the caracara preys on the smaller birds, because, he says, that it is unable to catch them; but Prince Maximilian found in the stomachs of those which he opened the remains of small birds and insects, especially grasshoppers, which abound in its haunts. It is by no means shy, and advances like the vultures to inhabited places, perching on trees and house-tops and not caring to conceal itself. It is seldom attacked, for it rarely molests domestic poultry, but it is stated that it will sometimes carry off the sportsman's game. The *nest*, according to D'Azara, is built on the tops of trees, especially those round which the climbing plants are most luxuriant, or in a bushy thicket. It is large, and composed of sticks and twining branches laid nearly flat, and lined, inartificially, thickly with hairs. The eggs, which are laid in August, September, or October, are two in number, pointed at one end, and dotted and blotched with crimson on a brownish-red ground.



Head and foot of Polyborus Brasiliensis.

Locality. The bird extends over a considerable part of South America; the island of Aruba, on the coast of Venezuela (Jacquin); Brazil and Paraguay (Cuvier): most abundant in the south and east of Brazil (Prince of Neuwied); Spix's specimens were from the northern provinces; less numerous on the Rio de la Plata than in Paraguay, where it is almost equal in number to all the other birds of prey put together (D'Azara); Straits of Magalhaens (Capt. Phillip Parker King, R.N.).

N.B.—There are now (1837) two fine specimens in the garden of the Zoological Society in the Regent's Park.

Mr. Bennett's provisional species *Polyborus* (?) (*hypoleucus*) was founded on the *Angola Vulture* of Pennant, *Vultur Angolensis* of Gmelin, in an immature state of plumage.

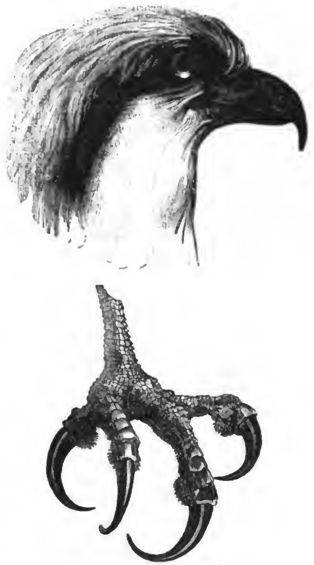
Dr. Smith proposed the genus *Polyboroïdes* on the *Falco Gymnogenys* of Temminck in the South African Journal, in April, 1830, and M. Lesson, in the November of that year, separated the same form under the generic title *Gymnogenys*.

From *Ibycter* and *Polyborus* Mr. Vigors passes to the *Fishing Eagles*, and particularizes as the first

Pandion (Savigny).

Beak rounded above. *Cere* hispid. *Nostrils* lunulated and membranaceous on the upper margin. *Tarsi* naked. *Acrotarsia* covered with rigid, reticulated scales. *Toes* free, the external toes versatile. *Claws* equal, rounded underneath. 2d. *quill* longest.

Example, *Pandion Haliætus*.



Head and foot of Pandion Haliætus.

Mr. Vigors is of opinion that this group presents us with a decidedly characteristic difference from all the other species of the family, except those of *Elanus*, in the internal parts of the nails being rounded instead of grooved. The *culmen* of the bill, he observes, is also more broad than usual and much rounded; the toes are entirely separated, and the tarsi are covered with strong, prominent, and thickly reticulated scales. The same author remarks that the well-known *Osprey* of our coasts, *Falco Haliætus* of Linnæus, is the type of the genus to which the valuable researches of Dr. Horsfield in Java have added a second species, *P. Ichthyætus*. In this species, however, which agrees with *Pandion* in the more essential characters, Mr. Vigors finds a strong approximation to the following genus, *Haliætus*.

Its bill, he adds, is more compressed than that of *Pandion*, its *acrotarsia* are scutellated, and the 4th quill feather, as in *Haliæetus*, is the longest. It thus stands, in the opinion of Mr. Vigors, osculant between the two groups. For the description and natural history of Pandion Haliæetus see Bald Buzzard, vol. iii. p. 316.

The last group of the *Fishing Eagles*, according to Mr. Vigors, is comprised in the genus

Haliæetus (Savigny).

Beak convex above. *Nostrils* lunulated, transverse. *Cere* sub-hispid. *Tarsi* semiplumed. *Acrotarsia* scutellated. *Toes* free, the external toe versatile. *Claws* unequal.

Mr. Vigors notices the difference of this form from *Pandion* in the structure of the nails and the more compressed culmen of the bill; in the *tarsi*, also, which have the acrotarsia scutellated and are feathered half way below the knee. There are several species; for instance, *F. leucocephalus*, *F. albicilla*, *F. Pondicerianus*, *F. blagrus*, *F. vocifer*, &c., &c.

Example, *Haliæetus leucocephalus*.

Before we proceed to the description of our example, it may be necessary with Mr. Bennett's assistance to clear up the confusion which, as he observes, has existed in the synonymy of *Haliæetus albicilla*, the difference of the colours of the plumage in the various stages of its growth having induced authors to record it under several distinct names. Three of these were almost universally admitted till about 26 years ago, when the result of M. F. Cuvier's observations on the individuals kept in the Jardin des Plantes led him to unite *Falco ossifragus*, *albicaudus*, and *albicilla* of Gmelin under one name: subsequent inquiry has confirmed this conclusion. In the earlier stages of life the beak of *H. albicilla* is of a bluish horn-colour; its head and neck deep brown; the plumage above, brownish-black mixed with whitish or ash-coloured spots on the back and tail. In this state it is *Falco ossifragus* of systematists. About the third or fourth year the head and neck become ashy-brown; the beak gradually changes from bluish to pale-yellow, the white spots on the back vanish, and the tail becomes uniformly grayish-white. It is now *Falco albicaudus* of Gmelin, *Petit Pygargue* of Buffon, and the *Lesser White-tailed Eagle* of Latham. In its fifth yearit is come to maturity, and the change is complete. The head and neck have little of the brown tinge left, the back is through out of a dusky-brown intermingled with ashy-gray, and the tail is quite white. In this its perfect state it is *Falco albicilla*, the *Grande Pygargue*, the *White-tailed* or *Cinereous Eagle*. In all the stages of this, *The Great Sea Eagle*, which inhabits nearly the whole of Europe and of Northern Asia, the cere and naked parts of the legs are yellow; the under part of the body is of a lighter hue than the upper, and more thickly interspersed with pale cinereous spots; the claws are completely black. (*Gardens and Menagerie of the Zool. Soc. delineated*, vol. ii.)

We now return to *Haliæetus leucocephalus*, the *Sea Eagle*, *Bald Eagle*, *White-headed Eagle*, the symbol of the United States of America.

Mr Bennett, in the work last quoted, remarks, that in the earlier stages of its growth there is little to distinguish this species from the *Great Sea Eagle*. M. Vieillot, indeed, following the example of Daudin, has united the *White-headed Eagle* to the list of synonyms of the *Great Sea Eagle*. 'That such a union, writes Mr. Bennett, 'is founded upon insufficient data is proved by the gradual development in the bird under consideration of a character which, after a certain age, at once distinguishes it from the remainder of its tribe. This character consists in the pure whiteness of its head and neck, from whence it has derived the popular but inappropriate title of the *Bald Eagle*, by which it is most commonly known.' The young are clothed at first with a thick whitish or cream-coloured cotton-like down, and they become gradually gray as the development of the true plumage goes on. In the third year the white may be traced upon the head, neck, tail-coverts, and tail; and by the end of the fourth year these parts become completely white, or sometimes tinged slightly with cream-colour. The eye, which is at first hazel, changes to a brilliant straw-colour as the head whitens (Wilson). 'This account of the metamorphoses in colour of the white-headed sea eagle,' says Mr. Bennett, 'derived from the personal observations of the accurate author of the *American Ornithology*, has been in a great measure verified under our own inspection in the specimen now before us, which remained for several years in the possession of Mr. Brookes, before it was presented by him to the Society.

'During a considerable part of the time it was regarded as the *Common Sea Eagle*; and it was not until its gradual change of plumage had at length rendered obvious its true character, that it was ascertained to be in reality a distinct species. The same error appears frequently to have existed with regard to it; and M. Temminck observes that the only mark of distinction that can be traced in it until it has assumed the adult colouring, consists in the somewhat greater length of its tail. He might however have added its smaller size, which is probably one-fourth less than that of the preceding bird, at the same age and under similar circumstances. From the observations which we have been enabled to make upon the subject, we should be led to conclude that the period in which it attains its full growth and perfect colouring is, in this country at least and in captivity, two or three years longer than that stated by Wilson. In its immature state, that is to say about the third year, the upper parts of the head and body exhibit a mixture of brown and dirty white, the separate feathers having a ground of the latter colour, and being deeply tipped and broadly barred along the centre with the former. The quill-feathers and primary wing-coverts are black, with their shafts of a pale brown; the secondary are considerably lighter; and the tail, which projects in a trifling degree beyond the extremities of the wings, is brown on the outer quills and of a mixed white and brown on the inner. The under surface, as far backwards as the middle of the belly, is of a much lighter shade than the upper, being of a dull white, with numerous broad streaks of pale brown. In the posterior part it is of a deep brown, the feathers being only slightly margined with white. A similar hue prevails on the upper parts of the legs, which are plumed somewhat below the knees. The beak is of a dusky brown; the cere and legs of a golden yellow; the iris somewhat lighter; and the talons deep blackish-brown. The latter are long, strongly curved, of considerable power, and extremely sharp at the points. The full-grown bird measures upwards of three feet in length from beak to tail, and more than seven in the expanse of its wings. Its beak is changed to a bright yellow; and its head, a greater or less proportion of the neck (according as the bird is more or less advanced in age), and the entire tail, are become perfectly white. An analogous change, as we have before seen, takes place in the plumage of the preceding species; but the head and neck of that bird always retain more or less of a brownish tinge, seldom changing fully into grey, and never turning completely white. These observations have been made upon numerous individuals, many of them placed for upwards of ten years under the eyes of various scientific observers: their accuracy may therefore be regarded as unquestionable. The remainder of the plumage in this state is of a deep brown, approaching to black, and strongly contrasted with the head and tail. The colour of the legs, feet, and talons remains nearly the same; but the iris generally continues to assume a lighter and a lighter hue. The eyes, it should be observed, are deeply sunk in the head, and instead of being placed in a line parallel with that of the cheeks, are directed forwards, so as to form with them a considerable angle.'

Habits, Food, Reproduction.—The reader will find in the article Bald Buzzard an account of the robberies committed by the *Bald Eagle* on the latter: nor are its acts of plunder confined to that bird, for it will rob the vultures, and even, in hard times, make them disgorge their carrion to satiate its appetite. According to Audubon, it will strike down a swan and other aquatic birds, and now and then procure fish for itself by pursuing them in shallow creeks; it also devours young pigs, lambs, fawns, and putrid flesh of every description. Niagara is one of its favourite haunts, where it watches for the swollen carcasses that the cataract has precipitated down the falls. Wilson saw one seated on a dead horse, keeping a whole flock of vultures at a distance till it had satisfied itself; and, on another occasion, when many thousands of tree-squirrels had been drowned in their migration across the Ohio, and had collected hosts of vultures, the sudden appearance of a *Bald Eagle* sent them all off, and the eagle kept sole possession for many days.

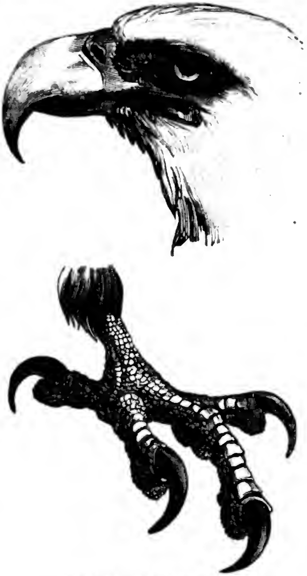
Benjamin Franklin thus speaks of this emblem of the United States of America:—'For my part, I wish the Bald

Eagle has not been chosen as the representative of our country. He is a bird of bad moral character; he does not get his living honestly. You may have seen him perched on some dead tree, where, too lazy to fish for himself, he watches the labours of the fishing-hawk; and when that diligent bird has at length taken a fish, and is bearing it to his nest for the support of his mate and young ones, the Bald Eagle pursues him and takes it from him. With all this injustice, he is never in good case, but, like those among men who live by sharping and robbing, he is generally poor, and often very lousy. Besides, he is a rank coward: the little King-Bird, not bigger than a sparrow, attacks him boldly, and drives him out of the district. He is therefore by no means a proper emblem for the brave and honest Cincinnati of America, who have driven all the *King Birds* from our country; though exactly fit for that order of knights which the French call *Chevaliers d'Industrie*.'

With regard to the *Reproduction*, M. Audubon says that incubation commences in the beginning of January. He shot a female on the 17th of that month, as she sat on her eggs, in which the chicks had made great progress. 'The nest,' says that author, 'which in some instances is of great size, is usually placed on a very tall tree, destitute of branches to a considerable height, but by no means always a dead one. It is never seen on rocks. It is composed of sticks from three to five feet in length, large pieces of turf, rank weeds, and Spanish moss in abundance, whenever that substance happens to be near. When finished, it measures from five to six feet in diameter, and so great is the accumulation of materials, that it sometimes measures the same in depth, it being occupied for a great number of years in succession, and receiving some augmentation each season. When placed in a naked tree, between the forks of the branches, it is conspicuously seen at a great distance. The eggs, which are from two to four, more commonly two or three, are of a dull white colour, and equally rounded at both ends, some of them being occasionally granulated. Incubation lasts for more than three weeks, but I have not been able to ascertain its precise duration, as I have observed the female on different occasions sit for a few days in the nest before laying the first egg. Of this I assured myself by climbing to the nest every day in succession, during her temporary absence.' (*Ornithological Biography*, vol. i.)

Locality.—In every part of the United States of America, seldom appearing, according to Audubon, in very mountainous districts, but preferring the low lands of the seashores, those of the larger lakes, and the borders of rivers. Mr. Bennett remarks, that the *White-headed Eagle* is usually spoken of as inhabiting the northern parts both of the old and new continent; but that it appears to be only a rare and occasional visitant of the former. It is probable, he adds, that some of the varieties of the *Common Sea-Eagle* of this quarter of the globe have been frequently mistaken for it, and remarks, that throughout nearly the whole of North America, on the contrary, where the European species seems to be unknown, it is met with in great abundance. Dr. Richardson says that it is the earliest of the summer visitors to the fur countries, and the period of its arrival has given the name of *Meekeeshew espeeshim*, or Eagle Moon, to the month of March. 'Temminck,' says Dr. Richardson (*Fauna Boreali-Americana*), 'assigns for its habitual residence the regions within the Arctic Circle; and Wilson observes, that it is found at all seasons in the countries it inhabits. Both these assertions however require, I apprehend, to be taken with considerable latitude. We did not, on the late expeditions, meet with it to the north of the Great Slave Lake (62° N. lat.), although it is common in the summer, in the country extending from thence to Lake Superior, and its breeding-places in the latter district are numerous. But in the month of October, when the rivers from which it draws its principal supply of food are frozen over, it entirely quits the Hudson's Bay lands; and if, after that period, it is to be seen in the northern regions, it can only be on the sea-coast, and for a limited time, while the sea continues unfrozen. . . . It is known to breed as far south as Virginia, but its nests do not appear to be so common within any part of the United States as they are in the fur countries.' The bird is not mentioned in the Supplement to Captain (now Sir W. E.) Parry's First Voyage, nor in that to Captain (now Sir John) Ross's Last Voyage.

This bird is the *Meekeeshew* (name for the species), *Wapustiquan-Meekeeshew* (White-headed Eagle—mature bird), *Appisk-Meekeeshew* (Black-headed Eagle—immature bird) and *Meekeesseeseesh* (Yearling birds) of the Cree Indians.



Head and foot of Haliæetus leucocephalus.

Colonel Sykes notes among the birds of Dukhun (Deccan) *Haliæetus Ponticerianus*, *Falco Ponticerianus* of Latham, *Bruhmuny Kite* of the Europeans in India. The Colonel says that it is seen constantly passing up and down rivers at a considerable height, but prepared to fall at an instant on its prey. Usually it seizes while on the wing, but occasionally dips entirely under water, appearing to rise again with difficulty. It is quite a mistake, he adds, to suppose it feeds on carrion. On the examination of the stomach and craw of many specimens, the contents were found to be fish, and fish only, excepting on one occasion, when a crab was met with. (*Zool. Proc.*, April, 1832.)

There is a beautiful specimen of *Haliæetus Aguia*, *Chilian Sea-eagle*, now (1837) in the gardens of the Zoological Society, in the Regent's Park; and there is a specimen of *Haliæetus vocifer*, the *Fishing Eagle* of the Cape colonists, in the South African Museum, now (1837) exhibiting in the Egyptian Hall, Piccadilly. The last bird is only met with in the neighbourhood of the sea, or upon the banks of large rivers. See the interesting Catalogue, where it is also stated that *Aquila vulturina*, also in the Museum, resorts exclusively to high rugged mountains, where it preys upon the *Hyrax Capensis*—the *Dassie* of the Cape colonists. Dr. Smith (*Zool. Proc.*, April, 1833) had previously stated that *Aquila Verrauxii* of Lesson is synonymous with *Aquila vulturina*, which had recently been described by M. Lesson as a *Haliæetus*, but that it has however none of the habits of the *Fishing Eagles*, inhabiting the highest and most rocky mountains, preying principally upon the animal mentioned in the Catalogue. In the 'Proceedings' it is added that the error probably arose from the white back being concealed, in stuffed specimens, by the wings.

Leaving the *Fishing Eagles*, Mr. Vigors proceeds to

Circæetus. (Vieillot.)

Beak convex above. *Nostrils* lunulate, transverse *Cere* subhispid. *Tarsi* elongated, naked. *Acrotarsia* reticulated. *Toes* short, the external toe connected with the middle one at the base. *Claws* short, subequal. This genus is founded upon the well-known *Jean le Blanc* of the European continent, *Falco brachydactylus* of Wolff, *Falco Gallicus* of Gmelin, *Aquilotto* of the Italians. Here, Mr. Vigors observes, we find the exterior toe united to the middle by a short membrane, which is the case indeed in the greater portion of the family, while in the two latter genera the toes are all divided to the origin.

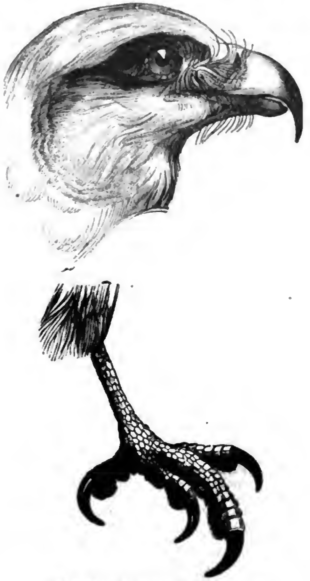
Description.—Circaetus brachydactylus is, according to Temminck, the *Falco brachydactylus* of Wolff; *Aquila brachydactyla* of Meyer; *Falco Gallicus* of Gmelin; *Falco leucopsis* of Bechstein; *Aquila leucamphoma, Borkh. Deut. Orn.*; *Le Jean le Blanc* of Buffon and the French generally; *Aigle Jean le Blanc* of Temminck; *Falco Terzo d' Aquila*, Stor. deg. Ucc.; and *Kurzzehiger-Adler* of Meyer.

Old Male.—Head very large; below the eyes a space clothed with white down; summit of the head, cheeks, throat, breast, and belly, white, but variegated with a few spots of bright brown; *back* and *coverts* of the wings brown, but the origin of all the feathers of a pure white; *tail* square, gray-brown, barred with deeper brown, white below; *tarsi* long and grayish-blue, as are the *toes; beak* black; *cere* bluish; *iris* yellow; length, two feet.

Female.—Less white than the male. The *head*, the *neck*, the *breast*, and the *belly*, are marked with numerous brown spots, which are very much approximated.

Young.—Upper parts darker, but the origin of the feathers pure white; *throat*, *breast*, and *belly*, of a red-brown, little or not at all spotted with white; bands on the *tail* nearly imperceptible; *beak* bluish; *feet* greyish-white.

Food and *Reproduction.*—Lizards and serpents, to which it gives the preference; rarely birds and domestic poultry. The *nest* is built on the highest trees, and the eggs are two or three in number, of a lustrous grey, and spotless.



Head and foot of Circaetus brachydactylus.

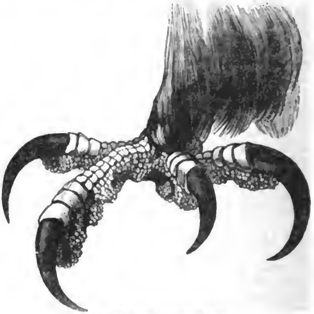
Locality.—The great fir forests of the eastern parts of the north of Europe; not common in Germany and Switzerland; rare in France;, never seen in Holland. (Temminck.) Prince Bonaparte notes it as rather rare near Rome. Colonel Sykes notes it among the birds of the Dukhun (Deccan)

Dr. Smith's *Circaëtus pectoralis*, which undergoes many changes of plumage before it arrives at maturity (see South African Museum and Catalogue), is stated (*Zool. Proc.*, April, 1833) to be synonymous with *Circ. thoracinus* of Cuvier.

Mr. Vigors next proceeds to the true

Aquila (of Authors).

Beak subangular above. *Nostrils* rounded. *Cere* subhispid. *Tarsi* plumed to the toes.



Leg and foot of Golden Eagle.

Mr. Vigors observes that the predominant mark of distinction in this genus is the *tarsi* being feathered to the toes. The *culmen* of the bill appears also to differ from that of the other *eagles* in being more angular. The species *Aquila heliaca* of Savigny, *Falco chrysaetos*, and *Falco nævius* of Linnæus, *Falco bellicosus* of Daudin, with some others lately made known to us, belong to the group which contains the most powerful birds of the family.

Example, *Aquila chrysaetos, the Golden Eagle. Adler* of the Germans, *Eryr Melyn* of the antient British.

Aquila chrysaetos

Description. Old birds.—Summit of the *head* and nape with acuminated feathers of a lively and golden-red; all the other parts of the *body* obscure brown, more or less blackish according to the age of the individual; inside of the *thighs* and feathers of the *tarsus* clear brown; *never any white feathers among the scapulars;* tail deep grey, barred with tolerable regularity with blackish-brown, and terminated at the end by a large band of that colour; *beak* horn-colour; *iris* always brown; *cere* and *feet* yellow. In this state Temminck considers it to be the *Aquila fulva* of Meyer; *Falco niger* of Gmelin; *Falco fulvus* and *Falco Canadensis* of Gmelin; *Falco chrysaetos* of Linnæus; *L'Aigle Royal* of Buffon; *Le Grand Aigle*, Gerard, *Tab. Elem.; L'Aigle Commun* and *L'Aigle Royal* of Cuvier; *Ringtail* and *Golden Eagle* of Latham; and *Aquila Reale di Color leonato* and *Aquila Rapace*, Stor. deg. Ucc.

Young birds of one and two years. (Ring tail Eagle.) All the plumage of a ferruginous or clear reddish-brown, uniform on all parts of the *body;* lower *tail-coverts* whitish; inside of the *thighs* and feathers of the *tarsus* of a pure white; *tail* quite white from the base to three-fourths of its length, but afterwards brown to the end; internal barbs of the *quills* and of the *caudal feathers* pure white: this same colour occupies also the greatest part of all the feathers of the body from their base. In proportion as the young bird advances in age the colours of the plumage become brown, the white of the tail occupies less space, and traces of the transverse bars appear. In the third year the young bird puts on his adult plumage.

Varieties.—Partially or totally white. (*Falco albus* of Gmelin; *Falco cygneus* of Latham; *L'Aigle Blanc* of Brisson.)

Food and *Reproduction.*—The Golden Eagle preys on lambs, fawns, &c., and often on large birds. Extreme hunger will drive it to prey on carcasses

Locality.—The great forests in plains, and in a less degree those in the mountains of the north of Europe; very common in Sweden, in Scotland, in the Tyrol, Franconia, and Suabia; more rare in Italy and Switzerland; rather common in France, in the forest of Fontainebleau, in the mountains of Auvergne, and on the Pyrenees; rare in Holland; less common in the Oriental countries than the preceding species, *i.e. Aquila heliaca* of Savigny, *Aquila imperialis* of Temminck. (Temminck.) According to Wilson, the Golden Eagle inhabits America, and occurs from the temperate to the arctic regions, particularly in the latter, where it *breeds* on precipitous rocks, always preferring a mountainous country. Dr. Richardson (*Fauna Boreali-Americana*) mentions it with a query as breeding in the recesses of the sub-alpine country which skirts the Rocky Mountains, and as seldom seen farther to the eastward. 'It is,' says Dr. Richardson, 'held by the aborigines of America, as it is by almost every other people, to be an emblem of might and courage, and the young Indian warrior glories in his eagle plume as the most honourable ornament with which he can adorn himself. Its feathers are attached to the calumets, or smoking pipes, used by the Indians in the celebration of their solemn festivals, which has obtained for it the name of the Calumet Eagle. Indeed, so highly are these ornaments prized, that a warrior will often exchange a valuable horse for the tail feathers of a single eagle.' It is the *Kæoo* of the Cree Indians. Dr. Richardson observes that the mature British Golden Eagle has a darkish-brown tail and wings, blackish-brown back, clouded with brownish-black, and a paler and brighter-brown head. He had not seen an American one in this state, but we do not think that any reason for a doubt. Many other authors mention the eagle and ring-tails in such terms as to leave the identity of the bird almost unquestionable; and though Dr. Richardson says that it is seldom seen farther to the eastward than the Rocky Mountains, M. Audubon relates that he saw a Golden Eagle on the coast of Labrador, besides others in various parts of the United States. It inhabits Russia, Iceland, and Germany, and is said to occur in Northern Africa and Asia Minor. Mr. Yarrell, in his interesting History of British Birds, now in the course of publication, thus sums up its localities in our islands. 'The Golden Eagle, though occasionally seen, and sometimes obtained, in the southern counties of England, is more exclusively confined to Scotland, and its western and northern islands. Some years ago a specimen was killed at Bexhill, in Sussex it has also occurred, but very rarely, in Suffolk, Norfolk, Derbyshire, Durham, and Northumberland. Mr. Mudie, in his 'Feathered Tribes of the British Islands,' has named 'the higher glens of the rivers that rise on the south-east of the Grampians, the high cliff called Wallace's Craig, on the northern side of Lochlee, and Craig Muskeldie on its south side,' as localities for the Golden Eagle. Mr. Selby and his party of naturalists observed this species in Sutherlandshire in the summer of 1834. Mr. Macgillivray, in his detailed descriptions of the rapacious birds of Great Britain, has recorded his own observations of this species in the Hebrides; and other observers have seen it in the Orkney and Shetland Islands, where it is said constantly to rear its young. In a direction west of London the Golden Eagle has been obtained or seen on the coasts of Devonshire and Cornwall. In Ireland, a Ring-tailed Eagle (the young of the Golden) was seen by a party of naturalists in Connamara in the autumn of 1835; and from William Thompson, Esq., vice-president of the Natural History Society of Belfast, to whom I am indebted for a catalogue and notes of the birds of Ireland, which will be constantly referred to throughout the work, I learn that specimens of the Golden Eagle are preserved in Belfast which were obtained in the counties of Donegal and Antrim.' The age of the eagle is almost proverbial. One that died at Vienna is said to have lived in confinement 104 years. Colonel Sykes notes the Golden Eagle among the birds of the Dukhun (Deccan). His specimen differed so slightly from the European bird as not to justify its separation. (*Zool. Proc.*, April, 1832.)

In the catalogue of birds collected on the Ganges between Calcutta and Benares, and in the Vindhyian hills between the latter place and Gurrah Mundela, on the Nerbudda, by Major James Franklin, F.R.S., &c., we find recorded an eagle, *Aquila Vindhiana*, with a query whether it is the *Cawnpoor Eagle* of Latham (*Zool. Proc.*, August, 1831), and among the Dukhun birds, *Aquila bifasciata* of Hardwicke and Gray. (*Ind. Zool.*) A whole rat was found in the stomach of one bird. A second was shot by Colonel Sykes at the dead carcass of a royal tiger, but it had not fed, for the stomach was empty. Dr. Smith stated (*Zool. Proc.*, 1833) that the eagle from the Cape presented to the Society by the Hon. J. T. Leslie Melville, and in the Society's menagerie, was not the young of *Aquila vulturina* (Daudin), but of *Aquila Choka* (Smith), *Falco rapax* (Temminck). Specimens of *Aquilæ bellicosa* and *rapax* are in the South African Museum, as well as of *A. vulturina*. The first is only found in wooded districts, preys upon small quadrupeds, and has been known to pounce upon small antelopes, and carry them off entire to its nest. *A. rapax*, though it principally preys on living creatures, does not wholly reject carrion, being frequently one of the first birds that approaches a dead animal. (See Catalogue of South African Museum.) Mr. Keith Abbott (*Zool. Proc.*, June, 1834) notes among the Trebizond birds *Aquila pennata*, inhabiting Eastern Europe and the adjacent parts of Asia and Africa.

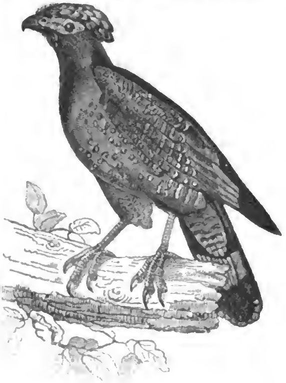
Hæmatornis. (Vigors.)

Mr. Vigors, at a meeting of the Zoological Society (December, 1831), characterized among the species comprising the 'Century of Birds from the Himalaya Mountains,' drawn and lithographed by Mr. and Mrs. Gould, the above-named genus, which Mr. Vigors considered as exhibiting a striking diversity of form among the *Eagles.*

Generic Character.—Beak rather strong, sufficiently elongated; upper *mandible* straight at the base, very much curved at the apex; *nostrils* oval, placed obliquely in the *cere. Wings* long, subrounded; the first *quill* rather short, the second and third longer, the fourth and fifth nearly equal and longest, the rest gradually decreasing. *Feet* rather weak, subelongated; *tarsi* rough, reticulated with scales; *toes* rather short, reticulated; *claws* strong. *Tail* sufficiently long, somewhat rounded. (Vigors.)

This group was observed to bear a near affinity to the genus *Pandion* in the shape of the bill, wings, and the rugose reticulated scales of the *tarsi*, but to differ from it in the comparative length and weakness of the legs and claws, as well as in having the nails grooved underneath, and not convex as in the latter group. To this genus belongs the *Falco Bacha* (Latham) of Africa, and the Manilla bird then lately described in the Proceedings (page 96), under the name of *Buteo holospilus*. These, from the apparent weakness of their limbs, had hitherto generally been ranked among the buzzards; although from the description of the courageous habits of the *Bacha Falcon*, the only one well known of the group, doubts had been expressed of the propriety of ranking them with that tribe. Mr. Vigors suggested the subfamily of *Eagles* as a more appropriate station for them; where, united by many important characters to *Pandion*, they apparently led off by the length of their *tarsi* to the genus *Limnaëtus* ('Memoirs of Sir S. Raffles,' Append., p. 648) and others of the long-legged *Eagles*. The three species of the group were exhibited, their general similarity in colour and markings pointed out, and their specific differences explained. These consist chiefly in size, *Hæmat. holospilus* being one-third smaller than *H. Bacha;* while *H. undulatus* (which is 2 feet 7 inches in length) considerably exceeds the latter. The first is spotted all over the body, the second only on the abdomen, while the third is marked by spots on the wing-coverts, and by *ocelli* bearing an undulated appearance upon the abdomen, the breast also being crossed by undulating *fasciæ*. A specimen of *H. undulatus* was afterwards (January, 1832) exhibited from Mr. Hodgson's Nepaul collection. It agreed accurately with that which had been previously exhibited, except in size; the present specimen being about one-third longer. From this difference in size it was conjectured to be a female. Colonel Sykes identified a specimen shot in the Dukhun (Deccan) with *Hæmatornis Bacha.* (Zool. Proc.)

Description of *H. undulatus* (male and female probably). *Back* and *wings* intense brown; *head* crested, the feathers white at the base, of a dark brown, nearly approaching to black at the end, the hind ones being margined with a light rufous band at the apex. The *wing-coverts* near the carpal joint deep brown, marked with small white spots; *quill-feathers* fuscous, darker at the apex, and marked with white towards the base of the interior web; the *cere*, base of the *beak*, and *legs*, yellow; *claws* black. (Vigors, in Gould's 'Century of Birds from the Himalaya Mountains.')



Hæmatornis undulatus, from the work above quoted, by permission.

* *

Short-winged Eagles.

Harpyia. (Cuvier.)

Beak, above, convex. Upper *mandible* slightly toothed. *Nostrils* semilunar, transverse. *Tarsi* elongated, very strong, feathered at the base. *Acrotarsia* scutellated. *Claws* long, very strong, acute.

Mr. Vigors, in placing *Harpyia* next to *Aquila*, observes that the former equals the latter in size and powers of body. Its *tarsi*, he remarks, are strong, thick, partly plumed, with scutellated *acrotarsia*. The *nares* are elongated, apparently semilunar, and placed transversely on the *cere*. The upper mandible, he adds, seems to have a notch somewhat analogous to that of the true *Falcons*. The type is *Falco imperialis* of Shaw.

This powerful bird is the *Grande Harpie d'Amerique* of the French, *Aquila coronada* of the Spanish, *Falco destructor* of Daudin, *Aigle destructeur* of Sonnini, *Grand Aigle de la Guiane* of Mauduyt, *Harpyia destructor* of Cuvier. Mr. Vigors states with truth that much confusion has arisen as to the synonyms of this bird, and even as to the characters of the genus. Mr. Bennett has, in our opinion, well cleared this confusion away, and we therefore select his synonymy.

'M. Temminck,' says the last-mentioned zoologist (*Gardens and Menagerie of the Zoological Society delineated*, vol. ii.), 'the latest writer on this magnificent bird, positively denies its identity with the *Vultur harpyia* of Linnæus, and the crowned eagle (*Vultur coronatus*) of Jacquin, on the singular ground that those names indicate a smaller bird with longer and more slender legs. Now Linnæus, who borrowed his original description of the harpy from Hernandez, asserts, on the authority of that writer, that it is equal in size to a common ram; and Jacquin states his bird to have measured full two feet and a half in height in its natural sitting posture, and almost two inches in the diameter of its legs. It is impossible to read the descriptions of Hernandez and Jacquin, making in the case of the former some little allowance for exaggeration, without feeling a conviction that they both refer to the bird now under consideration. That of the latter author in particular is admirably characteristic. Linnæus originally founded his species on the indication given by Hernandez in the tenth edition of his 'System' he suggested a comparison between it and a bird seen by a friend, probably a pupil, in the Royal Menagerie at Madrid, which there is every reason to believe, from the description given, to have been just. It was only in the twelfth edition of his immortal work that he introduced a slight confusion by adding to the citation from Hernandez, to the account furnished by his friend, and to some particulars extracted from Jacquin's then unpublished description of his supposed species, a synonym from Marcgrave, which can alone justify M. Temminck's criticism. We restore without hesitation both these synonyms of Linnæus and Jacquin, excluding only from the twelfth edition of the *Systema Naturæ* the references to Marcgrave and his copyists. With the *Vultur harpyia* of Linnæus and the *Vultur coronatus* of Jacquin are necessarily included among the synonyms of the Harpy eagle the *Falco harpyia* and the *Falco Jacquini* of Gmelin, by whom the trivial name assigned by Jacquin to his bird was changed on account of its introduction into a genus in which that appellation was pre-occupied. In the year 1778, Mr. Dillon observed, in the Menagerie of Buen Retiro at Madrid, a species of eagle, which he imagined to be 'an undescript kind not taken notice of by Linnæus.' This bird, which he figures in his Travels through Spain under the name of the *Crested Falcon*, is evidently of the same species with the harpy, although the representation is rudely executed, and in some respects, as for example the length of the beak, grossly caricatured. We might almost be tempted to suspect that the specimen seen by him was identical with that described by Linnæus from the same menagerie twenty years before, were it not that the latter bird is expressly called Mexican, while that of Mr. Dillon is stated to have come from the Caracas. For this reason Dr. Latham introduced it into his Synopsis under the name of the *Caracca Falcon*.

'Gmelin, quoting from Latham, soon after latinized its former name into *Falco cristatus*, and this may therefore be added to the synonyms of our bird, of which Mr. Dillon's was the first published figure. The next original describer of the Harpy Eagle was Mauduyt, who also regarded his specimens as nondescript, and gave them the name of *Grand Aigle de la Guiane*, from the country whence they were obtained. To these birds, which formed part of the collection of the Paris Museum, Daudin, in his Ornithology, published in 1800, applied the scientific appellation of *Falco destructor;* and the names given by these two writers have been generally adopted on the continent of Europe as the only ones certainly applicable to the species. M. Sonnini seems doubtful whether or not to regard the two specimens described by him as distinct species, and names the one *Aigle destructeur*, and the other *Grand Aigle de la Guiane*; but there seems no sufficient reason for their separation. Dr. Shaw's *Falco imperialis* is founded on this indication of Sonnini. In all probability the *Crested Eagle* of Stedman's 'Expedition to Surinam,' spoken of as a very strong and fierce bird, belongs to the same species. Figures of the harpy are likewise given by M. Cuvier in his 'Règne Animal,' by M. Vieillot, in the second edition of the 'Nouveau Dictionnaire des Sciences;' and by M. Temminck, in his 'Planches Coloriées.' Those of the two last-named works are strikingly characteristic. That of the 'Dictionnaire' exhibits the crest-feathers equally and stiffly elevated round the back part of the head, a state in which we have never seen them in our bird, and which, on account of their laxity, and the lower position of the middle ones, we doubt their power to assume. It is right however to remark, that the crest is stated by Linnæus and other authors to possess this power of elevation round the head in form of a crown, an ornament alluded to in the Spanish name of the bird, *Aquila coronada*, and in the trivial appellation, *coronatus*, affixed to the species by Jacquin. We believe that we have now restored to this bird all the original synonyms which unquestionably belong to it. The original descriptions of Hernandez, Linnæus, Jacquin, Mauduyt, Daudin, and Sonnini, and the figures of Dillon, Shaw, Cuvier, Vieillot, and Temminck, are such as leave no doubt upon our minds of the accuracy of the references to those authors. We have purposely abstained from mentioning others which have been occasionally quoted, but which either do not appear to us to be satisfactorily determined, or are evidently founded on mistake. Of the former class, the *Ouyra-Ouassou* of Lery, or Royal Bird of Prey of Brazil, may serve as an example; of the latter, the *Calquin* and *Tharu* of Molina.'

Description (adult).—*Head* with thick downy plumage, of a light slaty-gray. *Crest* arising from the back part, of numerous broad feathers increasing in length towards the middle line of the head, and thus assuming a rounded form, of a dull black, with the exception of a slight margin of gray on the tips of the longer feathers, and a more extensive tinge of the same colour on those of the sides. This crest is slightly raised above the level of the feathers of the back of the neck when the bird is quiet, but is capable of being elevated at right angles with them upon any sudden excitement. In this state, to an observer placed in front of the bird, the middle feathers of the crest are rarely visible, on account of their being inserted much lower down than the lateral ones; while the latter, converging on either side, form, as it were, two lax ear-like processes. Below the crest, the whole of the *back* and *wings*, together with a *broad collar* round the fore part of the *neck* black, each of the feathers of the back terminating in a narrow transverse somewhat lighter streak. *Under surface*, from the breast backwards, pure white; plumage of the *legs* white with blackish transverse bars. *Tail* with four transverse black bands, of about equal breadth with the four alternating whitish or ash-coloured spaces; the tip light ash. (Bennett.)

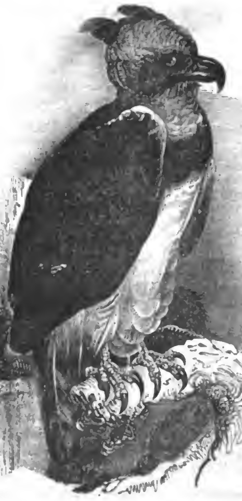
Immature bird.—Upper parts mottled with brown gray and whitish; *cheeks, occiput, throat,* and *under parts* light gray, with a few black feathers in front of the *neck*, and some large irregular black spots on each side of the lower surface of the *tail-feathers* on a light ash-coloured ground. (*Falco imperialis*, Shaw); (Vieillot, young female?). *Back* and *wings* grayish fawn-colour, irregularly marbled and spotted with black; *collar* ashy-fawn, more or less spotted with black; bars crossing the *legs* fewer and more irregular; all the *lower parts* whitish-fawn sprinkled with darker spots; upper surface of *tail* ash-coloured, with small blackish spots; patches of black mark the places of the future bands which gradually increase at each change; under surface whitish, dotted with fawn. (Temminck.)

(Bird further advanced.) *Collar, crest, back,* and wing-coverts almost uniformly gray; *quill-feathers* of the wings black; *under surface* of body dirty white; each of the *tail-feathers* marked beneath by four large black patches crossing its shaft and occupying about half its width. (Bennett.)

Upper mandible very thick at the base, straight for some distance, and suddenly curving downwards with a strong arch towards the sharp point; *lower mandible* straight, short and blunt; *nostrils* transverse and oval; *wings* when closed not reaching beyond the middle of the *tail*, which is rounded at the extremity; *legs* feathered on the upper part of their anterior surface only, the rest naked and reticulated; *talons* extremely strong, internal and posterior ones very long. Mr. Bennett observes that in some of these characters, as for instance the nakedness of the legs, the harpy approaches the sea-eagles; but it differs from them in many essential points, and in none more remarkably than in the shortness of its wings, and the robustness of its legs and talons; the former character rendering it, like the short-winged hawks, more adapted for preying near the surface of the ground on gallinaceous birds and quadrupeds, and the latter enabling it to carry off a prey of much greater magnitude.

Habits.—The harpy is stated to be a solitary bird, frequenting the thickest forests, where it feeds upon the *sloths* it also preys on fawns and other young quadrupeds. Sonnini observed it sitting motionless and uttering no cry, on a high tree on the banks of the Orapu. Hernandez does not seem inclined to detract from the powers of the bird, for he says that it will attack the most fierce beasts, and even man himself; and he further states that it may be trained like a hawk to pursue game. Linnæus gives the bird credit for strength sufficient to split a man's skull with a single blow (unico ictu) These accounts of its prowess must be taken with some grains of allowance, but that the bird is very powerful is without doubt. Jacquin's specimen was found dead in the ship that was conveying it to Europe, and its death was with some probability attributed to the sailors, whose monkeys the eagle had destroyed. When these animals gambolled too near its cage they were seized by its talons and devoured with almost all their bones, but not their skin, which the bird invariably stripped off. The harpy which was obtained by Mr. Hesketh, consul at Maranham, near the mouth of the river Amazon, and brought to England by Captain (now Major) Sabine, by whom it was presented to the Horticultural Society, which transferred it to the Zoological Society, in whose collection at the Regent's Park it now (1837) is, is said to have destroyed and eaten a king of the vultures (*Sarcoramphus Papa*) while on its passage to England. After its arrival a cat was put into its cage, and the eagle, with one blow of its immense foot, broke its back.

Localities.—Mexico (Hernandez, Linnæus, and others); neighbourhood of the river Magdalena, in New Granada (Jacquin); Caracas (Madrid specimen) · Guiana (Sonnini)



Harpyia Destructor.

Morphnus (Cuvier.)

Beak convex above; *nostrils* elliptical; *tarsi* elevated, rather slender; *acrotarsia* scutellated; *toes* rather short; *claws* acute.

Mr. Vigors observes, that this genus differs from *Harpyia* in its more slender, lengthened, and scutellated *tarsi*, and the comparative weakness of its toes. It is separated into two sections, as the *tarsi* are plumed or otherwise; among the former M. Cuvier arranges *Falcones occipitalis, ornatus*, and *albescens* of Daudin, and *F. maculosa* of Vieillot; among the latter, *F. Guianensis* of Daudin, and *F. Urubitinga* of Gmelin. *Spizaëtus* of Vieillot corresponds with this group.

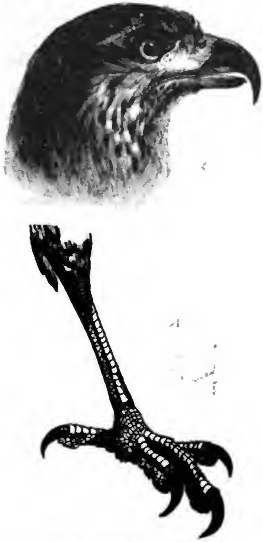
*

Tarsi naked.

Example, *Morphnus Urubitinga, Falco Urubitinga* of Gmelin, *Aquila Brasiliensis* of Brisson, *Brasilian Eagle* of Latham, *Urubitinga* of Marcgrave, Willughby, Ray, and others. The following is Willughby's

Description.—This bird is like an eagle of the bigness of a goose of six months old. It hath a thick hooked black beak; a yellowish skin (cere) about the nosthrils; great sparkling aquiline eyes; a great head; yellow legs and feet; four toes in each foot, disposed after the usual manner; crooked, long, black talons; large wings; a broad tail. It is all over covered with dusky and blackish feathers; yet the wings are waved with ash-colour. The tail is nine inches long, white for six, the end for three inches being black; howbeit in the very tip there is again a little white.

Young of the year.—Blackish yellow below; the centre of each feather marked with blackish brown tear-like spots; throat and cheeks with brown striæ on a whitish ground. Locality, Brazil and Guiana, where it is said to seek its prey on inundated places



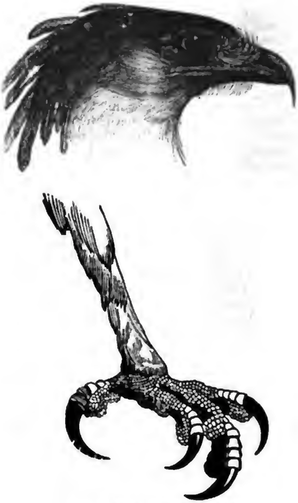
Head and foot of Morphnus Urubitinga.

* *

Tarsi feathered.

Example.—*Morphnus occipitalis, Falco occipitalis* of Daudin, *L'Aigle-autour noir huppé d'Afrique*, and *Huppart.*

Description.—Size of a crow; black, with a long crest or tuft dependant from the occiput; tarsi, edge of the wing, and bands on the tail, whitish. Locality, Africa.



Head and foot of Morphnus occipitalis.

Cymindis (Cuvier).

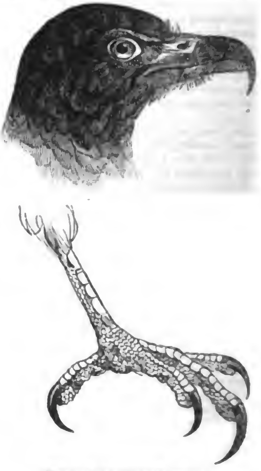
Beak convex above; *nostrils* nearly closed, rimiform, *tarsi* short, semipalmated.

Distinguished by their short, half-plumed, and reticulated *tarsi*, and more particularly by their nostrils being nearly closed, and bearing the appearance of a narrow slit or channel.

*

Acrotarsia scutellated.

Example.—*Cymindis hamatus Falco hamatus* of Illiger.



Head and foot of Cymindis hamatus.

Description.—(Adult) upper *mandible* extremely hooked; *cere* and *feet* yellow; all the plumage uniform lead colour. Length 15 inches 8 lines French.

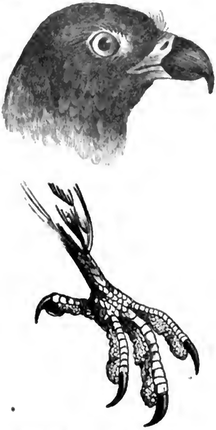
Young of the year.—Plumage sombre brown, each feather bordered and blotched with red; summit of the *head* and *cheeks* marked with yellowish elongated spots; a yellowish band below the eyes; front of the neck whitish. Locality, Brazil.

**

Acrotarsia reticulated.

Example, *Cymindis Cayennensis, Falco Cayennensis* of Gmelin, *Petit autour de Cayenne.*

Description.—Summit of the *head* ash-coloured; *back* (manteau) brown, barred with deeper brown; *belly* white; *tail* grey, barred with white beneath; *feet* ash-coloured. Locality, Cayenne.



Head and foot of Cymindis Cayennensis.

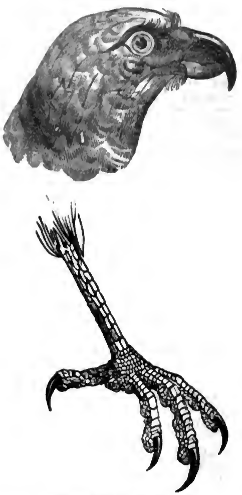
Asturina (Vieillot).

Beak convex above; *nostrils* lunulate; *tarsi* short, somewhat slender; *claws* long, very acute.

Example, *Asturina cinerea.*

Description.—Bluish ash-colour; whitish bands on the under part of the body; *tail* traversed by two black stripes, white at the point; *beak* blue below; *cere* blue; *feet* yellow. *Locality*, Guiana.

Mr. Vigors observes, that it is among these *short-winged Eagles* that the greatest difficulty prevails in deciding on their immediate affinities. Being for the most part extra-European, and not within the reach of general examination, their manners also being but little noted, and the characters on which we depend for forming our decision respecting their affinities being for the most part passed over in the descriptions given of them, it is only by conjecture that we can assign them a place in the general arrangement. Of this nature, he remarks, is the genus last described. The same difficulty, he adds, extends to several other described species of the *Falconidæ*, which appear to him to belong to the group of *short-winged Eagles*, although they have been assigned a different locality by the authors who have described them. Among these is the *Falco Bacha* of Daudin, which has been generall ranked with the *Buzzards.* Its short wings and lengthened bill, however, seem, according to Mr. Vigors, to bring it among the present group of the *Eagles;* and its habits, as described to him by Dr. Horsfield, who had an opportunity of closely observing them in the Island of Java, where the birds are by no means uncommon, do not in any respect correspond with the *Buzzard* tribe. Mr. Vigors would place it, together with *F. albidus* of Cuvier, near those species of the genus *Cymindis* which are distinguished by the reticulated *acrotarsia*, if not in that genus itself. He has, indeed, some doubts whether most of the short-winged *Falconidæ* at present placed among the *Buzzards*, such as *F. buson* and *F. tachiro* of Daudin, *F. pœcilonotus* of Cuvier, &c., may not be more properly removed to a situation between the *short-winged Eagles* and the *Hawks*, with both of which they seem to have a considerable affinity. There is, continues Mr. Vigors, another group which also appears allied to the present, distinguished by a rather feeble and elongated bill, short wings, and slender, lengthened *tarsi*, feathered to the toes. It includes *F. limnæetus* of Horsfield (*Zool. Res.*, No. 6, Pl. Col. 134), *F. niveus* of Temminck (Pl. Col. 127), and *F. atricapillus* of Cuvier (Pl. Col. 79.) These appear to be strongly allied, in the opinion of Mr. Vigors, if not to appertain, to the before-mentioned genus *Morphnus*. *F. tyrannus* of Prince Maximilian (Pl. Col. 73) bears also, Mr. Vigors thinks, a strong similitude to the same group, though partially differing in external characters.



Head and foot of Asturina cinerea.

2. Sub-family *Accipitrina* (Hawks).

Beak short, hooked from the base; *wings* short, fourth *quill* longest.

'The short wings of the last groups,' writes Mr. Vigors, 'lead us to the present division of *Hawks*, all of which, a considerably extensive tribe, are characterized by their wings extending no further than two-thirds of the extent of their tail. The fourth quill-feather is the longest, the first, second, and third, gradually exceeding each other in length. In this division we may observe that the upper mandible, though not furnished with distinct teeth like the true *Falcons*, has the festoon or prominence that generally supplies its place more strong and angular than is usual among these tribes. In some of the *Accipitres* this is particularly distinguishable. The sub-family we have just quitted includes all the birds of the present family in which the beak is straight at the base, and hooked only at the apex. We now enter upon the first of those groups where the bill is curved from the base, a character that extends through the remainder of the *Falconidæ*. It may be observed, that this character, which thus separates the family into two departments, was equally noticed as a mark of distinction between the species known to the antients. Pliny, apparently referring to it as a line of demarcation between them, divides the group into his two departments of *Aquilæ* and *Accipitres*. It is from adopting the same views respecting the family, that M. Brisson instituted his two leading divisions, to which he assigned corresponding denominations.'

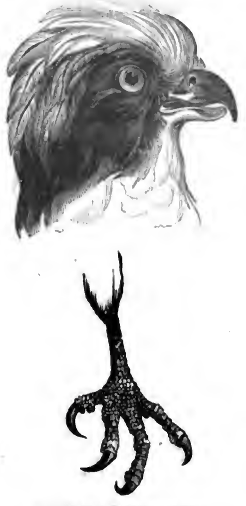
Dædalion (Savigny).

Beak short; *tarsi* moderate; *acrotarsia* reticulated; type *F. cachinnans* of Linnæus, and *F. melanops* of Latham.

Mr. Vigors adopts the name which was conferred by M. Savigny on the whole of the sub-family, for the present division of it.

Example, *Dædalion melanops.*

Description.—(Adult male) white, flamed with black on the *neck* and *breast; back, wings,* and *tail,* deep black, the last with a white stripe, and terminated with white; there are dots of the same colour on the coverts of the *wings; cere* and *tarsi* reddish. *Locality,* Guiana. The form may be illustrated by the



Head and foot of Dædalion cachinnans.

Astur (Bechstein).

Beak short; *nostrils* suboval; *tarsi* moderate; *acrotarsia* scutellated.

Mr. Vigors observes, that *Astur* is a title which has been applied to the whole group, but which may be confined to those whose tarsi, moderate in length, have their *acrotarsia* scutellated or covered with broad and even scales. He considers our European species, *Falco palumbarius* of Linnæus, as the type; to which may be added *F. Novæ Hollandiæ* of Latham, and a considerable number of corresponding species from every quarter of the globe.

Example, *Astur palumbarius.*

Description.—This is the *Autour* and *Atour* of the French; *Astore* (Zinan.) and *Girifalco* (Bonaparte), *Sparviere da columbe* and *Sparviere Terzuolo* of the Italians; *Grosser ge'feilter Falck* and *Hunerhabicht* of the Germans; *Goshawk* of the modern, and *Hebog Marthin* of the antient British.

A full-grown *female* measures from twenty-three to twenty-four inches in length; the males one-fourth, and sometimes one-third less; but when adult, the plumage is nearly similar. The beak is horn-colour or bluish-black; the cere and irides yellow; the top of the head, the whole of the back, upper surface of the wings, and tail-feathers, dark greyish-brown: in females the colour inclines to clove-brown; the upper surface of the tail feathers barred with darker brown; a band passing over the lore, eyes, cheeks and ear-coverts; the nape of the neck, throat, breast, belly, and thighs, nearly white, with spots, transverse bars, and undulating lines of dull black; under tail-coverts white; lore, cheeks, and ear-coverts greyish-brown, forming an elongated dark patch on the side of the head; the legs and toes yellow; the claws black.

Young birds have the beak, cere, and eyes, nearly similar to those of the old birds; the top of the head, nape, and ear-coverts, ferruginous white, each feather darker in the middle; back, wings, and upper tail-coverts, brown, margined with buff; upper surface of the tail-feathers with five bands of dark-brown and four bands of lighter brown, the ends of all the feathers white; wing-primaries dark-brown, barred with two shades of brown on the inner webs; the chin, throat, breast, and belly, greyish-white, each feather with a central elongated patch of dark-brown; thighs and under tail-coverts with a dark-brown longitudinal streak instead of a brown patch; under surface of the wings greyish-white, with transverse dusky bars; under surface of the tail-feathers greyish-white, with five darker greyish-brown transverse bars, the tips of all the feathers white; legs and toes yellow-brown; the claws black; those of the inner toe considerably larger than those of the outer. (Yarrell.)

Habits, Food, Reproduction.—Flies low and pursues its prey in a line after it, or in the manner called 'raking,' by falconers. If the game takes refuge it will sit patiently on a tree or stone till it moves, or till some other prey is accessible. *Food,* hares, rabbits, pigeons, pheasants, grouse, and partridges. The female was generally flown by falconers at fur, and the male at feather, but the female was also trained to take the larger winged game, the male being principally flown at partridges. Turbervile says, 'you shal not neede to shew any other game to a goshawke for her first entring than a partridge, because in learning to flee the partridge they prove most excellent; and the first yeare you shall doe best to flee them to the field, and not to the covert, for so will they learne to hold out (and not to turne tayle) in the middest of their flight; and when they be mewed hawkes, you may make them doe what you will; and understand you, that you shall not neede to take such pain, nor to use such art in making of a goshawke which is taken a brancher as with a *Nyasse,* for she will alwayes know of her selfe what to doe. (*The Book of Falconrie.*) *Nest,* on a high tree in the outskirts of the forest; rarely found in the interior, except in those parts which are open and free from timber. Eggs three or four, frequently hatched in the middle of May. (Hewitson, *ex relatione* Hoy.) Mr. Yarrell says that the eggs are rare, and that the few which he has seen were uniform in size and colour, $2\frac{3}{16}$ths inches in length by $1\frac{11}{16}$th inch in breadth, of a pale bluish-white, without any spots or streaks.

Locality.—Denmark, Norway, Sweden, Siberia, Russia, and Chinese Tartary. (Müller, Linnæus, Pennant.) Very common in France, Germany, Russia, and Switzerland; more rare in Holland. (Temminck.) Rare in the south of England. Mr. Yarrell says 'the few that are used for hawking are obtained from the continent. Colonel Thornton, who kept them constantly in Yorkshire, procured some of his specimens from Scotland. Dr. Moore, in his catalogue of the birds of Devonshire, says that it is found occasionally in Dartmoor, but I can find no record of its appearance farther west in England, nor any notice of it in Ireland. A fine adult male was trapped by a gamekeeper in Suffolk in March, 1833; and Mr. Doubleday, of Epping, has sent me word that he received a young bird from Norfolk in the spring of the same year. Mr. Selby mentions that he had never seen a recent specimen south of the Tweed, but states that it is known to breed in the forest of Rothiemurcus, and on the wooded banks of the Dee. Mr. Low says that this species is pretty frequent in Orkney; but as he speaks of it in connexion with sea-beaten rocks without shelter or woods, is there not reason to suspect that Mr. Low was mistaken, and that the birds he saw were Peregrine Falcons?—the more so, as several recent visitors to these northern islands have observed peregrines but no goshawks.' (*British Birds.*) Prince Bonaparte has noted the goshawk as not common in the neighbourhood of Rome, and as rare in that of Philadelphia. Dr. Richardson (*Fauna Boreali-Americana*) describes one shot in company with the female at the nest on the plains of the Saskatchewan, and states that another specimen was killed in the woody country three or four degrees of latitude farther north than the preceding. He records another killed near Jasper's House, on the Rocky Mountains, and a fourth killed at York Factory, supposed to be a young bird of the season (the specimen noticed by Mr. Sabine in 'Franklin's Journey').

The *Falcon-Gentil* is supposed to be the female and young of this species, which is the *Ash-coloured* or *Black-capped Hawk* of Wilson.

Colonel Sykes describes an *Astur* (*A. hyder*) among his birds of the Dukhun (Deccan), and there are specimens of *Astur musicus* and *A. melanoleucus* in the South African Museum.

Astur palumbarius.

Accipiter (of Ray, Brisson, and authors).

Beak short. *Nostrils* suboval. *Tarsi* elongated, smooth. *Acrotarsia* scutellated, the suture scarcely to be discerned. Type, the *Common Sparrow-hawk, Accipiter fringillarius* of Ray: to which, says Mr. Vigors, may be added many corresponding species which do not seem to have any limits to their geographical distribution.

Description.—The *Sparrow-hawk* is *L'Epervier* of the French; *Falco palombino* and *Sparviere da fringuelli* of the Italians; *Die sperber* of the Germans; *Sparfhoek* of the Fauna Suecica; *Falco Nisus* of Linnæus; and *Gwepia* of the antient British.

Adult Male.—About twelve inches in length; *beak* blue, lightest at the base: *cere* greenish-yellow, the *irides* yellow; top of the *head*, nape of the *neck*, *back*, *wings*, and *wing-coverts*, rich dark brown—in very old males with a tinge of bluish-grey; *tail-feathers* grayish-brown, with three conspicuous transverse bands of dark-brown; *chin, cheeks, throat, breast, belly, thighs*, and under *tail-coverts*, rufous, with numerous transverse bars of darker rufous brown; *legs* and *toes* long, slender, and yellow; the claws curved, sharp, and black.

Female.—Generally three inches longer than the male; *beak* bluish horn-colour; *cere* yellowish, the *irides* yellow; op of the *head*, upper part of the *neck*, *back*, *wings*, and *tail-coverts*, brown—the base of many of the feathers white, which, extending beyond the edge of the feather immediately above it, causes a white spot or mark; *primaries* and *tail-feathers* light-brown, barred transversely with darker brown; under surface of the *neck*, *body*, *wing-coverts*, and *thighs*, greyish white, barred transversely with brown; under surface of the *wing* and *tail-feathers* of the same olour, but the light and dark bars much broader: the first six *wing-primaries* emarginated; the fourth and fifth *quill-feathers* equal and the longest, the first *quill-feather* the shortest; *legs* and *toes* yellow; *claws* long, curved, sharp, and black.

Young Male.—Resembles the female; but the brown feathers of the *back* and the *wing-coverts* are edged with reddish-brown; feathers of the *tail* reddish-brown, particularly toward the base, with three conspicuous dark-brown transverse bands. In other particulars like the female: both have a collar formed by a mixture of white and brown, which extends from the sides of the neck to the nape. (Yarrell.)

Habits, Food, Reproduction.—Haunts, wooded districts. The great enemy of small quadrupeds and birds, and often very destructive to young chicks in poultry-yards in the breeding season. Used in falconry; the best of all hawks for landrails. (Sebright.) *Nest.* 'The *Sparrow-hawk* generally takes possession of some old or deserted nest in a tree, most frequently that of the crow, in which the female deposits four or five eggs, each about one inch seven lines long, by one inch four lines broad, of a pale bluish-white, blotched and spotted with dark-brown. The young are covered with a delicate and pure white down, and are abundantly supplied with food. Mr. Selby mentions having found a nest of five young sparrow-hawks, which contained besides, a lapwing, two blackbirds, one thrush, and two green linnets, recently killed, and partly divested of their feathers.' (Yarrell.)

Locality.—Spread throughout Europe, Japan (Temminck), Smyrna (Mr. Strickland), Denmark, Sweden, Norway, Russia, and from thence southward over the European continent to Spain and Italy. Common in most of the counties of England, and has been observed in the west and north of Ireland; occurs also in Scotland and its northern islands. (Yarrell.) Very common, migratory, near Rome. (Bonaparte.)

Head and foot of Accipiter fringillarius

The form is widely spread. Col. Sykes records *Accipitres Dukhunensis* (resembling *A. fringillarius*, but differing in certain points), and *Dussumieri* among the birds of the Dukhun (Deccan). In the South African Museum will be found *Accipitres polyzonus, polyzonoïdes, niger, Gabar, Tachiro, minulus*, and *rufiventris*.

Mr. Vigors remarks that there are some species which seem to be allied to this sub family and to be intermediate between it and the succeeding sub-family of *Falcons*, which, from some peculiarities of character, cannot well be appended to any established genus. They possess, he observes, a shortness of wing which would incline us to refer them to some of the present groups: but their upper mandible, strongly and doubly dentated, presents a character that will not admit of their being included in any of the foregoing genera, in which the mandibles are entire, or where the place of the tooth is supplied by a rounded prominence. These species Mr. Vigors would have wished to arrange in one genus: but they are found to differ in essential points which bring them respectively within the pale of the two conterminous sub-families now under consideration; and he feels obliged, for the sake of perspicuity, to adopt the following genus of which the type is *Falco bidentatus* of Latham.

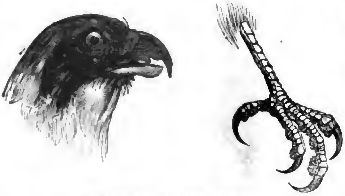
Harpagus. (Vigors. Bidens* of Spix.)

Beak short. Upper *mandible* strongly bidentated, lower with a double notch. *Tarsi* moderate. *Acrotarsia* scutellated. Third and fourth *quills* longest, equal.

Mr. Vigors observes that the essential characteristic of this group is the double tooth on both the upper and lower mandible. The wings, which correspond with those of the other *Hawks*, in being one-third shorter than the tail, have the third and fourth quill feathers, which are the longest, of equal length. The *tarsi* are of moderate length and strength, and have the *acrotarsia* scutellated as in the latter groups of the present sub-family. The *nostrils* are of a semicircular form and the *cere* is naked.

Example, *Harpagus bidentatus*. Locality, Brazil, and Guiana.

Description.—Length, a foot and some lines (French). Slate-colour above; *throat* white; *breast* and *belly* red, undulated with yellowish; lower coverts of the *tail* white; *tail* nearly equal, brownish, barred with whitish.



Head and foot of Harpagus bidentatus.

Mr. Vigors remarks that *Falco Diodon* of Temminck is to be referred to this genus.†

Gampsonyx. (Vigors.)

Beak short, *mandibles* entire. *Nostrils* rounded. *Wings* short, second *quill* longest, third generally equal to the second, and internal web of the first and second strongly notched near the apex. *Tail* moderate, equal. *Feet* moderate; *tarsi* reticulated, *acrotarsia* feathered below the knee to the middle. (Vigors.)

'The genus is founded on a small and beautiful *Hawk*,' writes Mr. Vigors in 'The Zoological Journal,' vol. ii., 'which has been kindly submitted to my inspection by Mr. Swainson, one of the fruits of that gentleman's extensive researches in Brazil. This bird decidedly belongs to the *Accipitrine* sub-family of the *Falconidæ;* but it is placed at that remote extremity of it, where the species, gradually approaching the *Falcons*, partially assume some of their leading characters. It possesses the bill of the *Hawks*, and also the shortness of wing which so strongly characterizes them: but the structure of the wing itself is the same as in *Falco*, the second quill-feather being the longest, and the first and second of these feathers being marked on the inner web by an abrupt emargination near the *apex;* while the *tarsi* also display the character of the same group in having the *acrotarsia* reticulated. The bird thus exhibits a striking modification of form, at once partaking of the chief of the respective characters of both the *Hawks* and *Falcons;* with the former of which it may in addition be observed that it agrees in its general form, and with some of the latter, particularly the beautiful group of *Ierax cærulescens*, in its colours, and in the general distribution of them. To the latter group indeed it has a striking resemblance, and might perhaps be referred unconditionally to it, could we pass over the important character of the untoothed bill.'

Description of *Gampsonyx Swainsonii*. Above cineraceous-black, white beneath; *front*, *cheeks*, *sides* of the *abdomen*, and femoral feathers orange; a black spot on each side of the *breast*.

Beak black. Feathers of the *back* and *scapulars* ashy-black, spotted with ferruginous. Lower *side* and *nuchal collar* white, sparingly variegated with orange. *Primaries* blackish, internally margined with white at the apex; *secondaries*, sparingly sprinkled with ferruginous, beneath white. *Tail-feathers* ashy-black, internally (the middle excepted) margined with white, beneath white. *Feet* yellow, *claws* black. Length of the body 9⅜ inches. (Vigors.)

Locality, Brazil. Mr. Vigors says that the following MS. note was appended to this bird in Mr. Swainson's handwriting:—'The only individual of this species I ever met with was shot on the Table Land, about 10 leagues in the interior of Bahia, in a direction west-south-west from the bay of St. Salvador. It was perched on the trunk of a withered tree, apparently watching some small birds. The *tarsi* are bright and the *irides* hazel.'

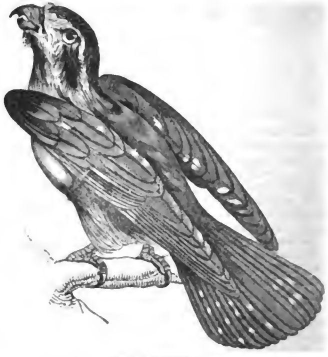
3rd. Sub-family, *Falconina* (Falcons).

Beak short, hooked from the base. *Wings* long. Second *quill* longest.

Mr. Vigors observes that this, closely allied to *Harpagus* by the double tooth on its upper mandible, is another group for which he proposes the name of

Ierax.* (Vigors.)

Beak short, upper *mandible* strongly bidentated, lower simply notched. *Tarsi* moderate. *Acrotarsia* scutellated. *Wings* short. Second *quill* longest, slightly notched near the apex.



Hierax cærulescens.

'Whoever,' writes Mr. Vigors, 'has seen that beautiful species, the smallest of its race, *Falco cærulescens* of Linnæus, now rendered familiar to us by the accurate and splendid illustrations of Dr. Horsfield, will at once acknowledge its separation from every other established genus of the family. Its upper mandible is strongly and sharply bidentated, as in *Harpagus*, but the under mandible is simply notched as in the true *Falcons*. Its wings, shorter than the tail, differ also from those of *Harpagus*, in having the second quill-feather the longest, thus again establishing the affinity of the genus to the *Falcons*. The *tarsi* are moderate, and the *acrotarsia* scutellated as in the latter group of *Hawks*. From its thus possessing characters in common with both sub-families, it is difficult to say to which we should refer it. But I prefer placing it in its present situation on account of the length of the second quill-feather, a peculiarity which distinguishes the true *Falcons*, and gives a striking character to their flight. Placed, however, at the extremity of the division, it preserves its affinity with those that went before.'

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* Mr. Vigors observes that the term *Bidens* is appropriated to Botany, and is indeed a Linnæan genus.

† For the description of Mr. Swainson's genus *Aviceda*, the reader is referred to the interesting work on the birds of Western Africa by that zoologist, 'Naturalist's Library,' vol vii. p. 104. *Aviceda cuculoides*, Cuckoo Falcon.

* Hierax, ἱέραξ.

Description.—Hierax cærulescens is, according to Dr. Horsfield, the *Allap*, or *Allap-allap* of the Javanese; *Falco cærulescens* of Linnæus; *F. Bengalensis* of Brisson; *Falco parvus Indicus* Ger. Orn.; *Little black* and *orange Indian Hawk* of Edwards; and the *Bengal Falcon* of Latham. Entire length six inches and a half. Upper parts bluish-black and glossy. Throat, breast, axillæ, sides of the neck, forehead, and a line continued from the environs of the bill over the eye and along the neck, white, with a ferruginous tail. Lower part of the breast, abdomen, vent and thighs, ferruginous. Hypochondria, thighs posteriorly, and a broad patch extending from the eye along the side of the head, black; the plumes which cover the thighs behind are terminated by long silky filaments, or radii which are straggling and pendulous, and by their laxity and irregularity afford a peculiar character to the bird. (Horsfield.) The natives told Dr. Horsfield that this small but robust bird was uncommonly bold in the pursuit of little birds. Several individuals were brought to him from the range of the southern hills, which are covered with forests, during his abode at Surakarta. He obtained one in the eastern districts. In the other parts of the Island of Java he did not observe it. Bengal is also given as its locality.

Head and foot of Hierax cærulescens.

Mr. Vigors (*Zool. Proc.* 1831) describes another species, *Hierax erythrogenys*, the size of *H. cærulescens*, from the neighbourhood of Manilla.

Falco.

Beak short. Upper *mandible* strongly toothed; lower notched. *Acrotarsia* reticulated. Second quill longest; first and second deeply notched internally near the apex.

This genus, which includes, as Mr. Vigors observes, the greater portion of the present sub-family, comprises the typical species. 'The upper mandible of this group,' writes that zoologist, 'is armed with a strong angular tooth; the lower is notched near the extremity. The *nares* are rounded. The wings are for the most part as long as the tail, the second quill-feathers being invariably the longest. The first and second quill-feathers are also distinguished by an abrupt emargination on the inner web near the extremity. In some species, as in *F. peregrinus*, the emargination of the second quill-feather is not so abrupt as in others. But in all the species of the true *Falcons* that have come under my examination, this emargination of the first quill-feather at least is strongly apparent. The *tarsi* are moderate in length and strength, and have the *acrotarsia* reticulated. Our European species, *F. peregrinus*, Linn., *F. subbuteo*, Linn., *F. Æsalon*, Linn., *F. rufipes*, Bechst., are readily distinguished as belonging to this typical genus. Some species belonging to the group have the wings somewhat shorter than the tail, which, in conjunction with *Ierax*, thus evince a gradual series of affinity between the short and long-winged tribes. Among these we may distinguish *F. tinnunculus*, Linn.: *F. rupicolus*, Daud.; with some corresponding species.' Example, *Falco peregrinus*.

Description.—The *Peregrine Falcon* is *Le Faucon pelerin* of the French; *Sparviere pellegrino* and *Falco reale* of the Italians; *Wander Falke* of the Germans; *Apestæ-kæoo* (Little Eagle) of the Cree Indians; *Hebog tramor* and *Commin* of the antient British.

Adult.—Length from 15 to 18 inches, depending on the sex and age of the bird. *Beak* blue, approaching to black at the point; *cere* and *eyelids* yellow, *irides* dark hazel-brown; top of the *head*, back of the *neck*, and a spot below the eye nearly black; *back* and upper surface bluish-slate or ash colour, becoming lighter at every succeeding moult; the males usually the most so; feathers of *back*, *wing-coverts*, and *tail* barred with a darker tint; *primaries* brownish black, inner webs barred and spotted with rufous white; front of *neck* white, with dark longitudinal lines; *breast* rufous white, with dark-brown transverse bars; *flanks*, under *tail-coverts*, and under surface of the *tail-feathers* barred transversely with dark-brown and greyish-white; *legs* and *toes* yellow, *claws* black.

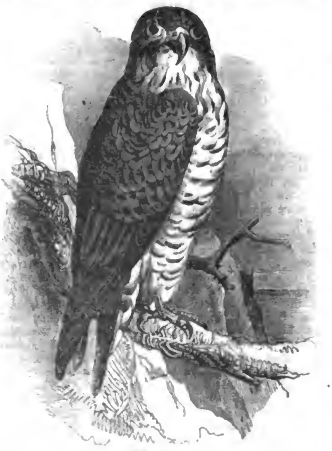
Young.—Head and upper surface of *body* and *wing-coverts* brownish ash, the edge of each feather rufous; the dark longitudinal streaks on the white under-side of the body more conspicuous, but, gradually shortening and spreading laterally, they ultimately change their direction, and become transverse. This change is first observed on the belly and flanks. (Yarrell.)

Temminck considers the *Lanier* (Lanner) of Buffon the perfect state of the male *Peregrine*. He also adds *Falco Barbarus* of Latham as one of its synonyms.

Habits, Food, Reproduction.—The food of the Peregrine consists of land and water-fowl, rabbits, young hares, &c. It was highly prized in falconry. Turbervile, in his chapter 'Of the Haggart Falcon, and why she is called the Peregrine or Haggart,' gives the following reasons for the name: 'First, because a man cannot find, nor ever yet did any man, Christian or Heathen, find their eyrie in any region; so as it may wel be thought, that for that occasion they have atchieved and gotten that name and terme of Peregrine or Haggart Falcons, as if a man would call them pilgrims or forainers. The second cause is, because these falcons do rangle and wander more then any other sort of falcons are wont to doe, seeking out more strange and uncouth countries, which indeed may give them that title of Haggart and Peregrine Hawks for theyr excellency, because they doe seeke so many strange and forraine coasts, and doe rangle so farre abroad. The third and last cause, I doe thinke, may be their beauty and excellency, because this word (*Peregrino*), or Peregrine, doth many times import an honourable and choice matter had in great regard. . . . Wherefore I conclude that these Haggart Falcons are not of Italie, but transported and brought thither from forraine places, as, namely, from Alexandrie, Ciprus, and Candie. And yet this is for certaine, that in Italie there are taken of these Haggart Falcons, as in the dominion of the renowned duke of Ferrara and in the countrie near Ravenna, being brought thither by force of weather and wind. And by that means there are none of those Haggarts found Eyesses, but they are al either soare Hawks or mewed Haggarts.'

'In the language of falconry,' writes Yarrell, 'the female Peregrine is exclusively called the Falcon, and on account of her greater size, power, and courage, is usually flown at herons and ducks; the male Peregrine, being smaller, sometimes one-third less than the female, is called the Tercel, Tiercel, and Tiercelet, and is more frequently flown at partridges, and sometimes at magpies. Young Peregrines of the year, on account of the red tinge of their plumage, are called, the female a red falcon, and the male a red tiercel, to distinguish them from older birds, which are called Haggards or intermewed Hawks. The Lanner of Pennant is a young female Peregrine, at which age it bears some resemblance to the true Lanner, *Falco lanarius* of authors—a true falcon also, but much more rare than the Peregrine, and which probably has never been killed in this country. Mr. Gould says he was unable to find a specimen in any collection here, either public or private, at the time he was desirous of figuring this species in his birds of Europe. The true Lanner is only found in the south and south-eastern parts of Europe. The king of France, Louis XVI., had Lanners sent annually from Malta; but they were brought from the eastern countries. It exceeds the Peregrine Falcon in size, being intermediate between that and the Gyr-falcon; was much esteemed for flying at the kite, with which the Peregrine is hardly able to contend.' The name of Lanner is confined to the female, the male is called a Lanneret, on account of his smaller size. (*British Birds.*) Our limits will not allow us to enter into any account of the mode of flying it at herons, &c., flying at the brook or at the river, as it was antiently called; and we must refer the reader to Turbervile, among the old writers, and to Sir John Sebright as the best of the modern authors on the subject. (See Sir John's *Observations on Hawking.*) *Nest.*- On high rocks. In Britain, Mr. Yarrell states that the Peregrine builds on various parts of the coast, more frequently in Scotland than in England. The eggs are from two to four in number, about two inches long by one inch and eight lines in breadth, mottled all over with pale reddish brown. Mr. Selby notices their eyrie at St. Abb's Head. It was from this locality that the late Mr. Baird of Newbyth usually obtained his cast of Hawks, for each of which he gave the persons who undertook the peril of climbing the rock one guinea. Other localities for the nest in Britain are the cliffs between Freshwater Gate and the lighthouse near the Needles. Devonshire and Cornwall, where it is called *Cliff Hawk.* Holyhead and the Great Orme's Head. (Yarrell.) Rocky coast of Caernarvonshire. (Pennant.) Rocky situations inland and marine in Ireland. (Thompson quoted by Yarrell.) Vale of Moffat in Dumfriesshire, the Bass Rock, and the isle of May, in the Forth. (Sir Wm. Jardine.)

Localities.—All the mountainous countries of Europe, particularly on rocks; very rare in champaign countries; never found in marshy districts; abundant in Germany and France; sufficiently common in England and Holland; rare in Switzerland. (Temminck.) Shetland Isles, where it breeds; Denmark, Sweden, Norway, Lapland, and Greenland. (Yarrell.) Uralian and Siberian mountains. (Pennant.) Dr. Richardson, who describes an old male from Melville Peninsula, lat. 68° N., says (*Fauna Boreali-Americana*), 'The Peregrine being a rare bird in the wooded districts of the fur countries where the trading posts are established, I did not procure a specimen on the late expeditions; but I have frequently seen it whilst on the march across the Barren Grounds. Of the two specimens figured by Edwards, one was from Hudson's Bay and the other was caught off the entrance of Hudson's Straits. Captain Parry likewise brought home several male and female specimens from Melville Peninsula, some of which are preserved in the British Museum. It is a summer visitor of the northern parts of America, and frequents the coasts of Hudson's Bay and the Arctic Sea, with the Barren Grounds, but is very seldom seen in the interior. It preys habitually on the long-tailed ducks (*Anas glacialis*), which breed in great numbers in the Arctic regions, arriving in June and departing in September. Captain Parry observed it, in his second voyage, following flocks of the snow-bunting on the coast of Greenland, near Cape Farewell. It frequents the shores of New Jersey and Pennsylvania in the winter, and is celebrated there for the havoc it makes among the water-fowl. Mr. Ord states that the ducks which are struck by it are lacerated from the neck to the rump; it gives the blow in passing, and returns to pick up its bird.' Port Famine, straits of Magalhaens. (Captain King.) New Holland. (Vigors and Horsfield.) Cape of Good Hope. (Dr. A. Smith.) Prince Bonaparte notes it as rare, and as seen only in winter near Rome, and as rare and casual near Philadelphia Dr. Smith (*South African Museum*, No. 94) says that the bird so numbered, though it does not exhibit exactly the plumage of the Peregrine Hawk of Europe, yet approaches it so closely, that it might be considered as attempting too great a refinement to class it as a different species.



Falco peregrinus

Mr. Vigors observes that Cuvier has separated the *Falco Islandicus* of Latham from the rest of the true *Falcons*, under the generic title of *Hierofalco*, which he characterizes as possessing no tooth on the upper mandible, but a rounded prominence in the centre, and in which he observes that the wings considerably fall short of the tail in length. In this opinion Mr. Vigors does not acquiesce. He cites examples of the Jerfalcon in its different stages of growth, and in none did he perceive any material difference between its bill and that of the true *Falcons*. He adds that he feels much hesitation in advancing the above opinion, not merely on account of the known accuracy of Cuvier, but on account of some facts that had then lately come to his knowledge. He mentions a specimen in the British Museum, in which the mandible accords exactly with Cuvier's description—'Il n'a qu'un feston comme celui des ignobles.' In several specimens from the arctic regions, however, in the same collection, he found the tooth. After referring to the figures quoted by Cuvier, and their discrepancies, he inquires whether it may not be possible that there are two species. He cannot think that the character itself is variable, or that Cuvier would have adopted one which must have been known to him as such, even from the plates. 'In no specimen of a true falcon,' says Mr. Vigors, 'have I seen the slightest alteration of the tooth, except by accident.

Our limits will not permit us to do more than hint at the other species of *Falco*. *F. chicquera*, Himalaya Mountains (Gould), Deccan (Sykes), South Africa (Smith), seems to be the nearest in typical points to the Peregrine Falcon. The following *Falcones*, besides *F. peregrinus* and *F. chicquera*, are in the catalogue of the South African Museum; *biarmicus*, *rupicolus*, *rupicoloïdes*, *subbuteo*, and *Swainsonii*: *F. tinnunculus*, *the Kestrel*, inhabits Asia and Africa, as well as Europe, and is very abundant in the Dukhun (Deccan). (Sykes, Abbott.)

4th. Sub-family, *Buteonina* (Buzzards).

Beak moderate, hooked from the base. *Tail* equal.

The sub-family of the *Buzzards* agrees, in the opinion of Mr. Vigors, with the last in the length of the wings, and the bill being bent from the base, and differs from it by a weaker and somewhat more elongated bill, by the third or fourth quill-feather being longest, and more particularly by the absence of a tooth on the upper mandible. A gradation seems, however, as Mr. Vigors observes, to soften down these differences, and there is an approximation to the teeth of the falcons in tho first genus of the sub-family.

Ictinia (Vieillot).

Beak short. Upper *mandible* subdentated, lower notched. *Tarsi* short and weak. *Acrotarsia* scutellated. *Wings* long. Third *quill* longest.

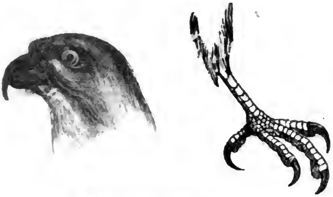
Mr. Vigors states that this genus is founded upon the *Milan Cresserele* of M. Vieillot, and has a strong and short bill, the upper mandible of which is somewhat angularly festooned, and the under distinctly notched. The *nares* are rounded as in the *Falcons*; the *tarsi* are rather short and feathered below the knees, and the *acrotarsia* scutellated. The wings are of considerable length, extending far beyond the tail; a character which induced M. Vieillot and others to place the bird near the *Kites*. Its strong affinity however to the last sub-family, of which it possesses so many of the characteristics, inclines Mr. Vigors to assign it its present situation. In manners, he adds, it seems also to approach the falcons; and he remarks that if we consider the *Missisippi Kite* of Wilson to belong to the present group of Vieillot, of which Mr. Vigors has little doubt, we must attribute to the bird before us, judging from the interesting description in the *American Ornithology*, much of those spirited and generous qualities which we admire in the typical groups of the family.

Example, *Ictinia plumbea.* (*Falco plumbeus* of Latham.)

Description.—*Back* and *wings* slate-blue; *head* and *belly* whitish, spotted with brown. *Iris* fine red.

Habits.—Said to fly to a great height, where it remains a long time poised or stationary, and cleaves the air with rapidity in order to seize the great insects which are its prey, independently of reptiles and birds.

Locality, America.



Head and foot of Ictinia plumbea.

Circus (of Authors).

Beak moderate. *Nostrils* sub-oval. *Tarsi* elongated. *Acrotarsia* scutellated. *Toes* generally short. Third *quill* longest. Sides of the *head* furnished with a circle of feathers, very like the capital disk of the *owls*.

This genus, says Mr. Vigors, exhibits still a slight approximation to the last groups in the structure of the upper mandible, which has a rounded protuberance towards the middle, similar to that of the *Hawks*. They are distinguished from the rest of the buzzards by their elevated and slender *tarsi*, which are covered with feathers for some space below the knee, and of which the *acrotarsia* are scutellated. The *nares* are sub-oval and transverse on the cere, and the third quill-feathers are the longest. It includes, according to Mr. Vigors, the European species *F. æruginosus* of Aldrovandus, and *F. pygargus* of Linnæus, to which, he says, may be added, *F. acoli* and *F. melanoleucos* of Daudin, together with some newly described species.

Example, *Circus æruginosus.*

Description.—This is the *Harpaye, Busard Harpaye*, and *Busard de Marais* of the French; *Falco castagnolo* and *Falco con la testa bianca* (young birds), *Falco albunella con il collare* (old), of the Italians; *Schwartz-brauner, Fisch Geyer mit dem gelben Kopf, Brauner rohr Geyer, Brandweihe, Wasserweihe*, and *Sumpfweihe*, of the Germans; *Moor-Buzzard, Marsh-Harrier, Duck-Hawk, Harpy*, and *White-headed Harpy* of the modern, and *Bod y gwerni*, of the antient British.

Adult Male (third moult).—*Beak* bluish black, with a slight festoon on the cutting edge; *cere* and *irides* yellow; top of the *head, cheeks*, and *nape* of the neck, yellowish white, tinged with rufous and streaked with dark brown; *back, wing-coverts*, and *tertials*, dark reddish brown with lighter margins; *primaries* brownish black; *secondaries* and *tail feathers* ash-grey.

After the third moult.—*Wing-coverts* and *tertials* become in addition, partially or entirely ash-grey; wing *primaries* slate grey; *chin* and *throat* nearly white; *breast* rufous, streaked longitudinally with dark brown; *belly, thighs*, and under *tail-coverts* reddish-brown, each feather streaked with dark brown; *legs* long, slender, and yellow; *toes* yellow; *claws* sharp and black.

Second year.—*Head, neck, chin*, and *throat* dull yellow, with an occasional patch of the same colour on the carpus, or anterior point of the wing. (Bewick's figure.)

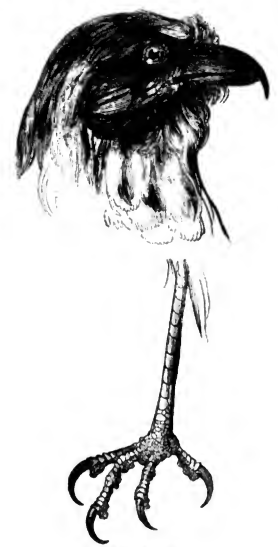
Young of the year.—All the plumage chocolate brown; feathers tipped with lighter reddish brown; irides darker than in the adult; legs and feet as in old birds. Length from twenty-one to twenty-three inches, depending on the sex. (Yarrell.)

Habits.—*Food.*—*Reproduction.*—The moor-buzzard, when in pursuit of game, flies low, and will, so to speak, beat a moor, or other piece of ground, with the regularity almost of a well-trained pointer. Young rabbits, small quadrupeds, birds, especially water-birds, reptiles, and even fish, are its prey. Sometimes it will sit on the look-out on a stone or low bush. *Nest.*—Generally on the ground, in a tuft of rushes, or coarse grass, or furze, and composed of rushes, or rank grass, and small sticks. Latham says that it will sometimes build its nest in the fork of a large tree, but that the instance is rare. Eggs, three or four, oval, rather pointed at one end, two inches and one line in length, one inch six lines in breadth (Yarrell).

Locality.—Denmark, Norway, Sweden, south of Russia, Germany, France, Holland, Spain, Italy, Turkey. In all countries where there are marshes, very abundant in Holland; rare in the south, migratory in the autumn (Temminck); common in the marshes near Rome, but only young birds, and migratory (Bonaparte); Trebizond (Abbott), Ganges, between Calcutta and Benares, &c. (James Franklin). Europe, India, Africa (Gould). Smyrna (Strickland).

The *Moor Buzzard* may be seen in most parts of England and Wales favourable to its habits. It occurs in Scotland and the Hebrides, and Mr. Thompson notes it as existing in several counties of Ireland from Cork to Antrim.

Mr. Vigors observes that the sub-family of *Buzzards* is that which of all the *Falconidæ* approaches nearest to the family of the owls (*Strigidæ*). In their dull and slothful habits, their heavy flight, and indeed their whole appearance, these contiguous groups evince, he remarks, a general resemblance indicating a corresponding inferiority in the qualities which distinguish the birds of prey. The soft and loose texture of the plumage of both presents a similar affinity, and he adds that *Circus*, in particular, furnishes us with a still further and more intimate point of resemblance. The feathers that cover the cheeks and ears form, as he says, a sort of rounded collar that rises on each side of the face; thus exhibiting a conformity to the disk, or circular erection of the face-feathers so conspicuous in the owls.



Circus Æruginosus.

Speaking of *Circus Cyaneus, Hen Harrier*, Mr. Gould, in noticing the Trebizond collection of birds presented to the Zoological Society by Mr. Keith Abbott, says that European, African, Indian, Chinese, and North American specimens present no specific difference. *Circus cineraceus* he notes as European, Indian, and African. (*Zool. Proc.*, 1834.) In the South African Museum will be found *Circi ranivorus* (with habits very much resembling those of our *Moor Buzzard*), *Maurus*, *Swainsonii*, and *Le Vaillantii*. In the British Museum there is a very good series of the *Moor Buzzard*, illustrating the different changes of plumage.

Pernis. (Cuvier.)

Beak moderate. *Lore* covered with serrated feathers. *Tarsi* moderate, semi-plumed. *Acrotarsia* reticulated. Third *quill* longest.

Mr. Vigors observes that *Pernis* is distinguished by the singular character of the *lorum*, that surrounds the eye, being covered with feathers, instead of being naked as in the other *Falconidæ*, or furnished only with hairs. In other respects also, he states, the genus differs from that of *Buteo* which follows. Its *acrotarsia* are reticulated, and, like *Circus*, it has the third quill the longest. The *nares* are similar to those of *Buteo*. *Falco apivorus* of Linnæus, the *Honey Buzzard*, and a corresponding species from Java, *F. ptilorhynchus* of Temminck, form, he adds, the typical species of the genus. Example, *Pernis apivorus*.

Description.—The *Honey Buzzard* is *La Bondrée* and *Buse Bondrée* of the French; *Wespen-Busard* of the Germans; *Frosch-geyerl* of Kramer; *Slag-hok* of the 'Fauna Suecica;' *Muse-Haeg* and *Muse-Baage* of Brunnich; and *Bod y mel* of the antient British.

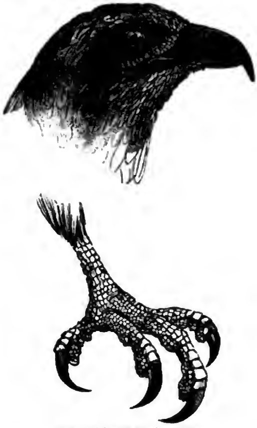
Old male.—Space between the eye and the beak covered with small serried feathers. Top of the *head* very pure ashy-blue; upper parts of the body brown, more or less ashy; *secondaries* barred alternately with blackish blue and grey blue; *tail* with three bands of blackish brown, at unequal distances; *throat* yellowish white with brown spots; *neck* and *belly* marked with triangular brown spots on a whitish ground; *cere* deep ash; interior of beak, *iris* and feet yellow. Length about two feet.

Female and *young.*—Ashy-blue on the forehead only; front of the *neck* marked with great spots of bright brown; breast and belly yellowish red with deeper spots; under surface of the body often whitish with reddish brown spots.

Young of the year.—*Cere* yellow; *iris* bright brown; *head* spotted with white and brown; under part of the body reddish white with great brown spots; feathers of the upper parts bordered with reddish. (Temminck.)

Habits—Food—Reproduction.—The *Honey Buzzard* feeds on field-mice, moles, mice, hamsters, birds, reptiles, wasps and other insects. (Temminck.) 'Examinations,' says Mr. Yarrel in his 'British Birds,' 'have usually proved the food to have been the larvæ of bees and wasps, to obtain which the receptacles containing them are scratched out and broken up in the manner described by Sir William Jardine.* In one instance, in the case of a Honey Buzzard kept in confinement, I was told that it killed and ate rats, as well as birds of considerable size, with great ease and good appetite.' The same author records that the stomach of a specimen killed in the north of Ireland and examined by Mr. Thompson of Belfast, contained a few of the larvæ and some fragments of perfect coleopterous insects; several whitish coloured hairy caterpillars; the pupæ of a species of butterfly, and also of the six-spot hornet moth. Willughby says, 'In the stomach and guts of that we dissected we found a huge number of green caterpillars of that sort called *Geometræ*, many also of the common green caterpillars and others.' White's specimen had in its stomach limbs of frogs, and many grey snails without shells. Willughby says that it runs very swiftly like a hen. Vieillot states that it seldom flies, except from one tree to another, or from bush to bush, and then always low, and that it runs on the ground with great rapidity like the common fowls. *Nest* on a lofty tree in a wood or forest. White mentions one on a tall slender beech near the middle of Selborne Hanger. Willughby says, 'It builds its nest of small twigs, laying upon them wool, and upon the wool its eggs. We saw one that made use of an old *Kite's* nest to breed in, and that fed its young with the *nymphæ* of wasps; for in the nest we found the combs of wasps' nests, and in the stomachs of the young the limbs and fragments of *Wasp-maggots*. There were in the nest only two young ones, covered with white down spotted with black. Their feet were of a pale yellow, their bills between the nostrils and the head white. Their craws large, in which were *Lizards*, *Frogs*, &c. In the crop of one of them we found two *Lizards* entire, with their heads lying towards the bird's mouth, as if they sought to creep out.' The same author says that the eggs are cinereous, marked with darker spots. The egg mentioned by White was smaller and not so round as those of the common *Buzzard*, dotted at each end with small red spots, and surrounded in the middle with a broad blood-red zone. Pennant mentions two blotched over with two shades of red, somewhat darker than those of the *Kestrel*. 'The eggs of the Honey Buzzard,' writes Mr. Yarrell, 'are rare: I have only seen three or four specimens, one of which answered to the description given by White, the colouring matter being confined to a broad band round the middle. One specimen in my collection resembles those mentioned by Pennant, being mottled nearly all over with two shades of orange brown: long diameter 2 inches 1 line; transverse diameter 1 inch 9 lines.'

Locality. Oriental countries; very rare and accidental in Holland; more abundant in France in the Vosges and in the south, a bird of passage (Temminck). Denmark, Norway, Sweden, Russia, Germany, France, Italy and the south of Europe generally (Yarrell and authors by him quoted). Skins received from India (Gould). In Britain the bird has been obtained in Suffolk, Norfolk, and along the eastern coast as far north as Northumberland, and in several western counties, including Dorsetshire, Devonshire, and Worcestershire. Rare in Cumberland, according to Dr. Heysham, who had only met with one specimen, and was told that it bred in the woods at Lowther. Mr. Thompson mentions one killed in the North of Ireland, and Mr. Macgillivray two as having occurred in Scotland. Buffon and others, Belon among the rest, say that it gets very fat in winter and is then good eating.



Head and foot of Pernis aviporus.

Buteo (of Authors).

Beak moderate, rather weak. *Nostrils* somewhat rounded. *Tarsi* short. *Acrotarsia* scutellated. Fourth *quill* longest.

Mr. Vigors remarks that the true *Buzzards* are known by their comparatively feeble bill, their short *tarsi* and scutellated *acrotarsia*. Their *nares* are round and their fourth quill-feather the longest. Their tarsi are either plumed to the toes or half-way covered with feathers. Of those whose *tarsi* are completely feathered, *F. lagopus* of Linnæus is the type, according to Mr. Vigors, and *F. desertorum* of Daudin appears to appertain to it; of those birds whose *tarsi* are but half plumed he gives *Buteo vulgaris*, the *Common Buzzard*, as an example, and remarks that the genus is very numerous in species, and that the form is very generally to be observed over the globe

Description.—*Buteo vulgaris* is the *Falco Buteo* of Linnæus; *Buteo* of Gesner; *Falco variegatus* of Gmelin; *F. glaucopis* of Merrem; *La Buse* of the French; *Falco but-*

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* Address to the members of the Berwickshire Naturalists' Club; September, 1836.

tuone and *Pojana* of the Italians; *Mause Falk* and *Wald Geyer* of the Germans; *Quidfogel* of the 'Fauna Suecica;' *Oerne Falk* of Brunnich; and *Bod teircaill* of the antient British. 'The whole length of the Common Buzzard is from 20 to 22 inches, depending on the sex,—the females, as in the *Falconidæ* generally, being the largest. From the habit of seeking food late in the evening, observed in this species, and also in the Rough-legged Buzzard, and in the softer and more downy texture of the feathers, as compared with the plumage of the true Falcons, the Buzzards are considered as indicating an approach to the Owls. The *beak* is bluish black, darkest in colour towards the point; the *cere* yellow, the *irides* generally yellow; but, as the Common Buzzard and indeed all the Buzzards are subject to considerable variation in the colour of their plumage, the irides are observed to vary also, presenting some reference to the prevailing tone of the colour of the feathers. The upper part of the *head, occiput,* and *cheeks*, pale brown, streaked longitudinally with darker brown; the whole of the *back, wing-coverts,* upper *tail-coverts* and upper surface of the *tail-feathers* dark clove-brown, the latter barred with lighter brown, the feathers of the former-named parts having lighter-coloured edges; the wing *primaries* brownish black; the *chin* and *throat* almost white; front of the *neck, breast,* under *wing-coverts, belly,* and *thighs* grayish white, barred transversely with dark wood-brown; *legs* and *toes* yellow; the *claws* black.' (Yarrell.)

Varieties.—Falco albidus, Gmel. *Falco versicolor,* Gmel. *Weisslicher Busard,* Borkh. Deut. Orn. (Temminck.)

Habits—Food—Reproduction.—The flight of the Buzzard is slow, and it generally remains perched on some tree in the wooded districts patiently waiting for its prey, viz. small quadrupeds, birds, and reptiles, and even earth-worms and insects. It may be seen sometimes soaring in circles, but not often, and does not pursue its game but pounces at it when on the ground. Its nature is slothful and cowardly, but its philoprogenitiveness appears to be great. The cock buzzard will hatch and bring up the young if the hen is killed (Ray), and, among other instances, Mr. Yarrell records one of a female buzzard kept in the garden of the Chequers Inn, at Uxbridge, which showing an inclination a few years back to make a nest and sit, was supplied with materials and two hen's eggs, which she hatched and afterwards reared the chicks. Since that time she has hatched and brought up a brood of chickens every year. Once they put down chicks just hatched to her to save her the labour of sitting, but she killed them all. Her family, says Mr. Yarrell, in June, 1831, consisted of nine; the original number were ten, but one had been lost. When flesh was given her she was very assiduous in tearing and offering it as food for her nurslings, and appeared uneasy if, after taking small portions from her, they turned away to pick up grain. ('British Birds,' where there is an elegant vignette of the bird and her foster family.) Indeed the young remain with the old birds some little time after they quit the nest, contrary to the usage of other birds of prey, which generally drive away their young as soon as they can fly. *Nest.*—In Scotland, where the bird is said to be bolder, on rocks or on the edges of steep scars or beds of torrents. (Macgillivray.) In England, the buzzard builds (or sometimes takes to a nest) in the fork of a tree in a wood. The eggs are generally three, sometimes four, short oval, two inches three lines in length by one inch ten lines in breadth, of a soiled white, slightly spotted with pale brown. (Yarrell.)

Locality.—Common in all the wooded countries of Europe; very abundant in Holland. (Temminck.) It is well-known, says Mr. Yarrell, over the wooded parts of the Continent of Europe, south of Russia, and inhabits Spain and Italy, passing over the Mediterranean to North Africa: but Trebizond, Smyrna, and Madeira appear to be its limits to the southward. Prince Bonaparte notes it as very common near Rome. In several parts of Ireland it is common (Thompson); not very plentiful in Scotland, nor does it appear in the lists of the birds of Orkney and Shetland, by the Rev. Mr. Low and Mr. Dunn, though it occurs in Denmark, Norway, Sweden, and Russia. Mr. Gould, in noticing the Trebizond birds presented to the Zool. Soc. by Mr. Keith Abbott, among which it was, observes that it was not previously observed in Asia, although there is a nearly allied species in the Himalaya mountains, and that it had not then been noticed in Africa. (*Zool. Proc.* 1834.) In England, though lately more rare, it is still far from uncommon.

Dr. Richardson ('Fauna Boreali-Americana') states that the Common Buzzard arrives in the fur countries in the middle of April, very soon afterwards begins to build its nest, and, having reared its young, departs about the end of September. It haunts the low alluvial points of land which stretch out under the high banks of a river, and may be observed for a long time motionless on the bough of a tree watching for some small quadruped, bird, or reptile to pass within its reach. As soon as it espies its prey, it glides silently into the air, and, sweeping easily but rapidly down, seizes it in its claws. When disturbed, it makes a short circuit, and soon settles on another perch. One of Dr Richardson's specimens had two middle-sized toads in its crop. It builds its nest, according to the Doctor, on a tree, of short sticks, lining it with deer's hair. The eggs are, he says, from three to five in number, and he remarks that it was seen by the expedition as far north as the 57th parallel, and that it most probably has a still higher range. He gives a description of two; one a male, shot on the 17th June, at the nest, which contained three eggs, on the plains of the Saskatchewan; and another, a female, killed at the nest also, near Carlton, May 22.

Buteo vulgaris.

Buteo Bacha is recorded by Major James Franklin among the collection formed by him on the banks of the Ganges and in the mountain-chain of Upper Hindostan. In the South African Museum the *Buteones Jackul* and *Tachardus* are preserved. The former obtains its name from uttering a cry somewhat similar to that of the small quadrupeds called *Jackalls* at the Cape. It abounds throughout South Africa. (See the Catalogue.) In the same collection will be found *Butaëtes Lessonii.*

5th Sub-family. *Milvina.* (Kites.)

Beak moderate, rather hooked from the base. *Tail* forked. The length of the wings and the forked tail, instruments of action to which the birds are indebted for their peculiar power and gracefulness of flight, are the characters which more particularly separate the *Kites* from the rest of the *Raptores.*

Elanus. (Savigny.)

Beak moderate, weak, compressed. *Tarsi* short, semi-plumed. *Acrotarsia* reticulated. *Claws,* with the exception of the middle one, rounded internally. Second *quill* longest. First and second *quills* strongly notched internally.

Example, *Elanus melanopterus. Black-winged Swallow-Hawk.*

Description.—This is the *Falco melanopterus* of Daudin; *E. cæsius* of Savigny; and *Le Blac* of Le Vaillant. *Size* of a *Sparrow-Hawk. Plumage* soft and silky, *tail* a little forked. *Above* ash-coloured, *quills* blackish, *beak* and *shoulders* black. *Below* white. *Tail* principally white. *Feet* yellow.

Habits.—The bird is said to live principally upon insects which it captures on the wing.

Locality.—Common in Africa from Egypt to the Cape. There is a specimen in the South African Museum. Savigny speaks of it as being in great abundance in Syria, Egypt, and Barbary. Cranch (Tuckey's expedition) saw great numbers at the mouth of the Congo, and some were sent home from thence. Lesson says that it occurs in New Holland. It is noticed among the birds collected by Major James Franklin on the banks of the Ganges, and in the mountain-chain of Upper Hindostan.

Elanus melanopterus.

Nauclerus. (Vigors.)

Beak rather short, weak, compressed. *Nostrils* sub-oval, placed in the *cere*, which is furnished with bristles in an oblique direction. *Wings* long; second or third *quill* longest. *Tail* long, very much forked. *Feet* short, weak. *Tarsi* reticulated. *Acrotarsia* feathered below the knee to the middle. *Claws* not cylindrical. *Body* slender, elegant.

Mr. Vigors observes that *Nauclerus* is distinguished from the true *Milvus* by the greater development of the character of the forked tail; by the relative proportion of the wing-feathers, the fourth being the longest in *Milvus;* and by the reticulation of the *acrotarsia*, those of *Milvus* being covered with even scales or scutellated. He divides the genus into two sections.

1st.

With the second quill longest.

Example, *Nauclerus Riocourii.*

2nd.

With the third quill longest.

Example, *Nauclerus Furcatus.* *Falco furcatus*, Linn. *Swallow-tailed Hawk.*

Description.—Whole *length* 20 inches. *Beak* bluish-black, *cere* lighter blue, *irides* dark; *head, neck, breast, belly*, under surface of the *wings, sides* of the body, *thighs*, and under *tail-coverts* pure white; *back, wing primaries, secondaries*, upper *tail-coverts* and *tail-feathers* black, with a purplish metallic lustre; *tertials* black on the outer webs but patched with pure white on the inner; *tail* very deeply forked; *legs* and *toes* greenish blue; *claws* faded orange. (Yarrell.)

Habits—Food—Reproduction—Locality.—We select Mr. Audubon's account of the habits and locality of this graceful bird:—'A solitary individual of this species has once or twice been seen in Pennsylvania. Farther to the eastward the Swallow-tailed Hawk has never, I believe, been observed. Travelling southward along the Atlantic coast, we find it in Virginia, although in very small numbers. Beyond that state it becomes more abundant. Near the falls of the Ohio a pair had a nest, and reared four young ones in 1820. In the lower parts of Kentucky it begins to become more numerous; but in the states farther to the south, and particularly in parts near the sea, it is abundant. In the large prairies of the Attacapas and Oppellousas it is extremely common. In the states of Louisiana and Mississippi, where these birds are abundant, they arrive in large companies in the beginning of April, and are heard uttering a sharp plaintive note. At this period I generally remarked that they came from the westward, and have counted upwards of a hundred in the space of an hour, passing over me in a direct easterly course. At that season and in the beginning of September, when they all retire from the United States, they are easily approached when they have alighted, being then apparently fatigued, and busily engaged in preparing themselves for continuing their journey, by dressing and oiling their feathers. At all other times, however, it is extremely difficult to get near them, as they are generally on wing through the day, and at night rest on the higher pines and cypresses, bordering the river bluffs, the lakes, or the swamps of that district of country. They always feed on the wing. In calm and warm weather they soar to an immense height, pursuing the large insects called *Musquito Hawks*, and performing the most singular evolutions that can be conceived, using their tail with an elegance of motion peculiar to themselves. Their principal food however is large grasshoppers, grass-caterpillars, small snakes, lizards, and frogs. They sweep close over the fields, sometimes seeming to alight for a moment to secure a snake, and holding it fast by the neck, carry it off and devour it in the air. When searching for grasshoppers and caterpillars, it is not difficult to approach them under cover of a fence or tree. When one is then killed and falls to the ground, the whole flock come over the dead bird, as if intent upon carrying it off. An excellent opportunity is thus afforded of shooting as many as may be wanted, and I have killed several of these hawks in this manner, firing as fast as I could load my gun. The Swallow-tailed Hawk pairs immediately after its arrival in the southern states; and as its courtships take place on the wing, its motions are then more beautiful than ever. The nest is usually placed on the top branches of the tallest oak or pine tree, situated on the margin of a stream or pond. It resembles that of a carrion crow externally, being formed of dry sticks, intermixed with Spanish moss, and is lined with coarse grasses and a few feathers. The eggs are from four to six, of a greenish white colour, with a few irregular blotches of dark brown at the larger end. The male and female sit alternately, the one feeding the other. The young are at first covered with buff-coloured down. Their next covering exhibits the pure white and black of the old birds, but without any of the glossy purplish tints of the latter. The tail, which at first is but slightly forked, becomes more so in a few weeks, and at the approach of autumn exhibits little differ-

Nauclerus furcatus.

ence from that of the adult birds. The plumage is completed the first spring. Only one brood is raised in the season. The species leaves the United States in the beginning of September, moving off in flocks, which are formed immediately after the breeding season is over.'

This species, according to Mr. Nuttall, will, like the *Honey Buzzard*, prey upon locusts and wasps, and their larvæ, and make a regular attack on their nests. M. Vieillot states that it visits Peru and Buenos Ayres. Mr. Yarrell gives it a place among the British birds on the authority of two specimens, one killed at Balachoalist in Argyleshire in 1772, and another taken alive in Shaw-gill, near Hawes in Wensleydale, Yorkshire, in 1805. Apparently to avoid the violence of a tremendous thunder-storm, and the clamorous persecution of a flock of rooks which attacked it at the same instant, it took shelter in a thicket, where it was seized before it could extricate itself, on the 6th September. The person who caught it kept it a month; but a door being accidentally left open, it made its escape. It first alighted on a tree at no great distance, from which it soon ascended in a spiral flight to a great elevation, and then went steadily off in a southerly direction as far as the eye could trace it. (*Linn. Trans.*, vol. xiv.)

Milvus (of Authors).

Beak moderate, weak, subangular above; *nostrils* oblique, elliptical; *tarsi* short; *acrotarsia* scutellated; *wings* very long, fourth quill longest; *tail* forked.

Example, *Milvus ictinus*, *Falco milvus* of Linnæus; *Milvus vulgaris* of Fleming and Gould.

Description.—This is the *Milan Royal* of the French from Belon to Buffon; *Pojana*, *Milvio*, *Nicchio*, and *Nibbio* of the Italians; *Rother Milan* of the Germans; *Glenta* of Brunnich; *Glada* of the Fauna Suecica; *Kite*, *Fork-tailed Kite*, *Glead* or *Glede* (Pennant says from the Saxon 'Glida') of the modern, and *Barcud* of the antient British. In some of the counties of England it is called the *Puttock*, a name also sometimes bestowed provincially upon the common *Buzzard*. In Essex it is called the *Crotched-tailed Puddock*.

Milvus ictinus.

Length about twenty-six inches; *beak* horn-colour; *cere* and *irides* yellow; feathers of the *head* and *neck* grayish-white, streaked along the shaft with ash-brown; feathers of the *back* and *wing-coverts* dark brown in the centre, broadly edged with rufous; inner web of some of the *tertials* edged with white; *primaries* nearly black; upper *tail-coverts* rufous; *tail-feathers* reddish brown, the outer webs of one uniform colour, the inner webs barred with dark brown; the outer *tail-feather* on each side the darkest in colour; *tail* deeply forked; *chin* and *throat* grayish white, streaked with dusky; *breast*, *belly*, and *thighs*, rufous brown, each feather with a central longitudinal streak of dark brown; under surface of the *wings*, near the body, rufous, with dark-brown feathers edged with red-brown towards the outer part of the wing; under *tail-coverts* plain rufous-white; under surface of the *tail-feathers* grayish-white, with the dark bars of the upper surface showing through; *tarsi* and *toes* yellow; *claws* black (Yarrell) The females are larger than the males.

Habits—Food—Reproduction.—The *Kite* sails gracefully in the air, now describing circles and anon with outspread tail remaining stationary. It pounces on its prey, consisting of moles, mice, leverets, rabbits, unfledged birds, and the young of the Gallinaceous tribe especially. It was, when more plentiful than it is at present, a great scourge to the poultry-yard. It will eat frogs and snakes, and, in the 'Magazine of Natural History,' an observer bears witness to its taking fish from a broad river near which he resided. The *nest*, made of sticks, and lined with soft materials, is usually built on the fork of a tree in a thick wood. The eggs are two, sometimes three, short oval, 2 inches 2 lines in length by 1 inch 9 lines in breadth. They are of a dirty white, with a few reddish-brown spots at the large end. The female lays early in the season, and she often makes a vigorous defence when her nest is attacked.

Locality.—France, Italy, Switzerland, and Germany; less abundant in Russia; more rare in Holland; migratory in autumn. (Temminck.) Very common near Rome, especially near the herds of cattle. (Bonaparte.) It also occurs in Siberia, and the country about Lake Baikal; and has been observed in Egypt, and several parts of Africa north of the equator In Ireland it does not seem to be known. In Britain, especially in the southern counties, it is become rare, though at one time it was evidently abundant. Clusius states, that when he was in London an amazing number of kites flocked there for the offals which were thrown into the streets. They were so tame, that they took their prey in the midst of crowds, and it was forbidden to kill them. In falconry it was used both as pursuer and pursued, and is very docile. A good instance of this docility is given by Mr. Thompson in the 'Magazine of Zoology and Botany,' vol. ii., p. 172. Louis XVI. fled at the kite with powerful falcons; and Sir John Sebright tells us, that 'Fork-tailed kites were much flown some years ago by the earl of Orford, in the neighbourhood of Alconbury Hill. A great owl, to the leg of which the falconers usually tie a fox's brush, not only to impede its flight, but to make it, as they fancy, more attractive, is thrown up to draw down the kite.'

Colonel Sykes notes *Milvus Govinda* as occurring both in South Africa and India. In the catalogue of the South African Museum is the following account of *Milvus parasiticus*, the *Cape Kite*, there preserved. 'This bird is the *Kuicken Deif* or Chicken-stealer of the Dutch colonists, and only appears in South Africa during the summer season. It resorts to inhabited places, and, as its name implies, is very destructive to young chickens. Everywhere it is bold; but it is especially so in districts into which fire-arms have not as yet been introduced, where it will pounce down and seize pieces of flesh from the hands of children, or even grown persons. It feeds in part upon carrion, and many individuals are often seen congregated together upon dead carcasses.'

General Geographical Distribution of the Falconidæ.—Wherever birds and small quadrupeds are to be found there is the bird of prey, whose office it is to keep their number within their proper bounds. Thus, as Mr. Vigors writes (*Zool. Journ.*, vol. i., p. 329—*On the Groups of the Falconidæ*), there seem to be no limits affixed to the geographical distribution of the true *Falcons*. This indeed appears generally the case in the larger groups of this family. The naked-cheeked *Falconidæ* alone seem to be confined to the southern parts of the New World, and to Australia, if we are to refer *F. Novæ Zælandiæ* of Dr. Latham to the genus *Polyborus*, according to M. Temminck's opinion. But the remaining groups appear to be dispersed in every division of the globe.

The *Falconidæ* described and figured in Mr. Swainson's 'Birds of Western Africa,' before alluded to, belong to the two most typical or perfect divisions of the family, viz. the noble falcons (*Falconidæ*), and the hawks (*Accipitrinæ*).

Some of the best illustrations of the *Falconidæ* will be found in Audubon, Bewick, Gould, Le Vaillant, Temminck, Savigny, Swainson, Vieillot, and Yarrell. Some of Frisch's figures are good. There are many fine and expensive works (the 'Planches Enluminées, for example) which contain figures of these noble birds, but they are sadly deficient in character, and look like what they were mostly taken from, ill stuffed specimens. There is more to be learnt from the wood-cuts of the heads by Swainson in 'Fauna Boreali-Americana' and the 'Classification of Birds,' than from the most gorgeously coloured ill-shaped engraving. The magnificent works of Audubon and Gould are full of the character of the respective species: Swainson particularly excels in this, whether he pourtrays the bird in his beautiful drawings, or gives an epitome of its leading points in the small compass of a wood-cut. The figures in Yarrell's 'British Birds' are excellent, and charming examples of the perfection to which wood engraving can be carried.

Fossil Falconidæ.

Dr. Buckland notices the remains of *Falconidæ* in the 1st period of the Tertiary series (Eocene period of Lyell), and figures a *Buzzard* (*Buteo*), as recent and fossil, in the first plate of his Bridgewater Treatise.

FALCONRY, or HAWKING, the art of training and flying hawks to take other birds. Julius Firmicus, who lived in the middle of the fourth century, is the first Latin writer who speaks of falconers and the art of teaching one species of bird to fly at and catch another. The art, however, had been, in all probability, practised in the East from remote ages; whence it certainly came to Europe.

From the Heptarchy to the time of Charles II. falconry was the principal amusement of our ancestors in England: a person of rank scarcely stirred out without a hawk upon his hand, which, in old illuminations and upon antient seals, is the criterion of nobility. Harold, afterwards king of England, is thus represented in the Bayeux tapestry, when visiting the court of William duke of Normandy.

Florence of Worcester (4to. edit. 1592, p. 310) states that King Alfred had his falconers among the persons whom he encouraged for their skill in different professions; and a metrical treatise on the art of falconry, still extant, is ascribed to King Edward the Confessor.

In 'Domesday Book' the practice of falconry is illustrated by numerous entries. In several places we find a sum, no less than ten pounds, made the optional payment instead of finding a hawk (*Domesd.* tom. i. fol. 134, b. 172, 230); and once, at Worcester (tom. i. 172) a Norway hawk is specified. Aeries, or places destined for the breeding or training of hawks, are entered in the Survey in Buckinghamshire, Gloucestershire, Worcestershire, Herefordshire, Shropshire, and, more frequently than in other counties, in Cheshire; as well as among the lands between the Ribble and the Mersey. (*Ibid.* tom. i. fol. 144, 152, 163 b, 172, 180, 252 b, 256 b, 257, 264, 265, 265 b, 266 b, 267, 267 b, 268 b, 269, 270.)

Nor were hawks less prized at subsequent periods. According to Madox (*Hist. Excheq.* i. 273), in the 14th Hen. II., Walter Cnot, one of the king's tenants, rendered his rent at the exchequer in three hawks and three girfalcons. King John had also his hawks (*Pat.* 4, *Joh.* m. 2); and upon the Patent Roll of the 34th Hen. III. a copy occurs of the letter which the king sent in that year to the king of Norway for hawks. Bray, in the 'History of Surrey,' (vol. iii., p. 82,) relates a curious anecdote of Henry III.'s anger with one Roger Belet, who by reason of something he had done or omitted about a spar-hawk, was disseised of all his lands and 40*s.* rent in Bagshot. In the 34th Edw. III. it was made felony to steal a hawk; to take its eggs, even in a person's own ground, was punishable with imprisonment for a year and a day, besides a fine at the king's pleasure. In Queen Elizabeth's reign the imprisonment was reduced to three months; but the offender was to find security for his good behaviour for seven years, or lie in prison till he did. (Pennant, *Brit. Zool.*, 8vo. Lond. 1812, vol. i., p. 212.)

Edward III., according to Froissart (*Chron.* i., c. 210), had with him in his army, when he invaded France, thirty falconers on horseback, who had charge of his hawks; and every day he either hunted or went to the river for the purpose of hawking, as his fancy inclined him. Queen Elizabeth is represented enjoying this sport in a wood-cut in Turbervile's 'Falconry,' published in 1575; and it was the favourite amusement with King James I.

By an entry upon the Originalia Rolls of the 35th Edw III. (*Origin.*, vol. ii., p. 267) it appears that a falcon gentil cost 20*s.*, a tersil gentil 10*s.*, a tersil lestour 6*s.* 8*d.*, and a lanner 6*s.* 8*d.*: these were the prices which the sheriff was to give for hawks for the king's use. In an account-book of the 20th Hen. VIII. a goshawk and two falcons are prized at 3*l.*, and five falcons and a tersil at 8*l.* Bert in his Address to the Reader, prefixed to his 'Treatise of Hawkes and Hawking,' published in 1619, says he 'had for a Goshawke and a Tarsell a hundred marks.'

Falconry was attempted to be revived by George Earl of Orford, who died in 1791; and in Yorkshire Col. Thornton had a hawking establishment at a rather later period: Sir John Sebright and a few other gentlemen also practised it in Norfolk at the beginning of the present century. As a rural diversion however, principally in consequence of the enclosures, it has gone into disuse.

A list of the hawks which were most used by sportsmen in the time of Charles I. is given in Walton's 'Complete Angler;' and an explanation of the words of art in hawking will be found in Latham's 'Falconry,' 4to., Lond. 1633.

The earliest printed treatise on hawking in English is the 'Book of St. Alban's,' fol., 1481, ascribed to Juliana Barnes or Berners, abbess of Sopwell. [Berners.] There are numerous other and curious treatises upon falconry both in French and English, some of them of very rare occurrence. 'Le Miroir de Phebus, avec l'Art de Fauconerie,' published at Paris in 8vo. without date, was the first work upon the subject printed in the French language.

For further information upon Falconry and its practice, the reader may refer to Spelman's *Glossary*, v. 'Acceptor,' edit. fol., Lond., 1626, p. 7; Warton's *Observ. on Spenser's Fairy Queen*, vol. ii., p. 171—173; Strutt's *Sports and Pastimes of the People of England*, 4to., Lond., 1810, pp. 21—33; and Haslewood's *Literary Researches into the History of the Book of St. Alban's*, 4to., Lond., 1810, pp. 21—48 [Falconidæ.]

FALCU'NCULUS. [Laniadæ.]

FALKIRK, a considerable market, post-town and parish, in Stirlingshire, 24 miles west by north of Edinburgh, and 12 miles south by east of Stirling. The parish is nearly seven miles in length by about four in breadth, and the whole is perfectly level, except that part on which the town stands. It is bounded on the north by the river Carron, which gives name to the celebrated iron works, situated near the fertile tract called the 'Carse of Falkirk.' The town is thriving and increasing in trade and population. It consists of one long street, called High-street, extending about half a mile, and is lighted with gas. It is situated in a wealthy and densely peopled district, in the midst of collieries and manufactories, and is the chief town in the eastern part of Stirlingshire. The extensive suburbs comprise the villages of Lauriston, Grahamstown, Bainsford, and Camelon, together with the seaport town of Grangemouth. These suburbs owe their rise to the great canal passing through them, and to their being in the vicinity of the Carron works, which are only a mile distant from the canal, and which have a railway communication with the basin in Bainsford. The town-house is situated in the middle of High-street, and in this quarter both the houses and shops are large. The new church has a fine steeple 130 feet in height. The old church was a very ancient structure, and built in the form of a cross. According to an inscription that was discovered when taking it down in 1810, it appears to have been founded by Malcolm III. in 1057. In the church-yard were interred Sir John Graham and Sir John Stewart, who were killed at the battle of Falkirk, 22nd July, 1298, while defending the independence of their country under Wallace against Edward I. On each side of the High-street narrow and confined streets branch off, one of which extends upwards of a mile towards Carron, passing through Bainsford and Grahamstown. On the banks of the canal are large corn-mills, a foundry, and a distillery. There are also some extensive tar works in the neighbourhood. The market-day is Thursday, and the trysts or cattle fairs are held three times a year, when black cattle, principally for the English markets, and likewise sheep and horses, are exposed for sale to a very great amount. Indeed this is the largest cattle market in Scotland. The town of Falkirk was formerly a burgh of regality; it afterwards became a burgh of barony, and was held of the family of Livingstone till the attainder, in 1715, of the earl of Linlithgow and Callander, by whose forfeiture his estates and superiorities became vested in the crown. In 1720 the estate of Callander was purchased by the York Buildings Company, from whom, in 1783, it was acquired by the late William Forbes of Callander, the father of the present occupier. During the time the estate was held by the York Buildings Company there was always a resident baron-bailie: and Mr. Forbes continued to name a person to that office till about the end of the last century. Since then the office has been vacant.

The management of the affairs of the town and community is at present vested in two separate bodies, the stent-masters and committee of feuars. The stent-masters are elected annually, and are twenty-four in number; four being chosen by the merchants, two by each of the trades or guilds of hammermen, wrights, weavers, shoemakers, masons, tailors, bakers and brewers, and four from the suburbs of the town. Any person belonging to any of these trades is qualified to vote for and to be elected a stent-master of his craft. By the act 3 and 4 William IV., c. 77, the town of Falkirk obtained a municipal constitution. The council consists of a provost, three bailies, a treasurer, and seven councillors. According to the population returns for 1831 the burgh and parish of Falkirk contained 12,743 persons. It returns a member to parliament in union with the burghs of Lanark, Linlithgow, Hamilton, and Airdrie. The debt of the town is 1700*l.*, its revenue about 200*l.*, and annual expenditure 174*l.* The patronage is in the crown. Near Falkirk the Pretender gained a victory over the royal army on the 17th of January, 1746. Here also is a part of the Roman wall, known by the name of 'Graham's Dyke,' built in the time of the Emperor Antoninus Pius. The grammar and English schools of Falkirk are in high repute: they are all private except the parish one, the master of which is appointed by the heritors. (Playfair's *Description of Scotland;* Sinclair's *Statistical Account of Scotland; Boundary Reports; Municipal Corporation Reports*, 1835; *Population Returns.*)

FALKLAND, HENRY CARY, VISCOUNT, descended from the Carys of Cockington, was the son of Sir Edward Cary of Berkhamsted and Aldenham in Hertfordshire, at which latter place he was born late in the reign of Queen Elizabeth. When about sixteen years of age, he was sent to Exeter College, Oxford; but he left that university without taking a degree. In 1608 he was made one of the Knights of the Bath, at the creation of Henry, Prince of Wales; and in 1617 was sworn in Comptroller of his Majesty's household, and made one of his privy council. On the 10th November, 1620, he was created Viscount of Falkland, in the county of Fife, in Scotland. King James I., knowing his abilities and experience, constituted him Lord Deputy of Ireland, into which office he was sworn September 18th, 1622, and continued in it till 1629. During his administration he is said to have kept a strict hand over the Roman Catholics in that kingdom, which gave them occasion to send complaints to the court of England against him, till, by their clamour and prevailing power, he was removed in disgrace. Leland in his 'History of Ireland,' has given the character of his government. 'Lord Falkland,' he says, 'seems to have been more distinguished by his rectitude than abilities. In a government which required vigour and austerity, he was indolent and gentle; courting rather than terrifying the factious. He was harassed by the intrigues and clamours of the king's ministers, whom he could not always gratify to the full extent of their desires; his actions were severely maligned at the court of England; his administration in consequence was cautious and embarrassed. Such a governor was little qualified to awe the numerous and powerful body of recusants, relying on their merits, and stimulated by their ecclesiastics to the most imprudent excesses.' Lord Falkland returned and lived in honour and esteem till 1633, in which year, in the month of September, he died, in consequence of having broken one of his legs by an accident in Theobald's Park. Wood includes Lord Falkland among the Oxford writers. The only work of his which was published was a *History of the most unfortunate Prince Edward II.*, edited by Sir James Harrington, in folio and octavo, in 1680. One of his letters is printed in the 'Cabala,' and three or four others remain unpublished in the Harleian Collection of Manuscripts in the British Museum. Lord Orford says he was remarkable for an invention to prevent his name being counterfeited, by artfully concealing in it the successive years of his age, and by that means, detecting a man who had not observed so nice a particularity. (*Biogr. Brit.*, Kippis's edit., vol. iii., p. 290; Leland's *Hist. of Irel.*, vol. ii., p. 474; Park's edit. of Lord Orford's *Royal and Noble Authors*, vol. v., p. 65.)

FALKLAND ISLANDS, The, are a group of islands situated in the southern Atlantic Ocean, between 51° 40′ and 52° 10′ S. lat., and 57° 30′ and 60° W. long. There are two larger islands, called East and West Falkland, and a number of smaller ones, which it is said amount to more than 90. The strait which separates the larger islands is called Falkland or Carlisle Strait, and is from six to ten miles wide. The surface of both islands is calculated to be about 3400 square miles, or about 1000 miles more than that of Devonshire. The northern districts in both islands are rather mountainous, but the highest ground does not much exceed 2000 feet above the sea-level. At the foot of the mountains the plains stretch from five to fifteen miles along the margin of the sea; the southern districts are more level, and hardly contain a hill. The whole coast, especially in the northern districts, is much indented, and contains numerous excellent harbours; among which the most frequented are Berkeley Sound on West Falkland and Port Egmont on East Falkland: both these bays are spacious, of sufficient depth for men-of-war, and have excellent anchoring ground. The climate of these islands does not differ much from that of the British islands. The range of the thermometer is between 26° and 75°; in winter between 26° and 50°, and in summer between 50° and 75°. The weather is rather unsettled. The snow disappears in a few hours, except on the tops of the mountains, and the ice is seldom above an inch thick. Fogs are frequent, especially in autumn and spring, but they usually disappear towards noon. The vegetation is very rapid.

No trees grow on the islands, but wood for building may easily be obtained from the Strait of Magalhaens. Peat and some bushes, which are abundant, supply fuel. Several antiscorbutic plants grow in abundance. The islands contain foxes, but they differ from those of Europe, having a thick head and a coarse fur. Seals are found on the rocks close to the islands. Many black whales are caught in the neighbouring seas. A kind of fish, between the mullet and the salmon, is very abundant, especially in spring. Game is extremely common, especially wild geese and ducks, which are easily tamed. The flocks of gulls and penguins which visit these shores are valuable on account of their eggs.

The Europeans who settled in these islands about the middle of the last century brought with them domestic animals: on their settlements being broken up, the animals remained, and some of them thrive well. There are herds of wild horned cattle and of wild hogs; the horses are of small size, but very hardy, and may be broken in, though with some difficulty. Rabbits are very numerous, of a large size, and have a fine fur.

The soil, especially along the base of the mountains and hills, is well adapted to cultivation, consisting generally of from six to eight inches of black vegetable mould. Wheat and flax have been raised, and potatoes, cabbages, turnips, and other kinds of vegetables, largely and of excellent quality. As to other kinds of produce, the capabilities of the soil have not yet been ascertained. It is probable that even fruit-trees will succeed in sheltered places.

These islands were discovered in 1594 by Hawkins, who called them Hawkins' Maiden Islands, and afterwards again in 1689 by Strong, who gave them the name which they now bear. A French vessel from St. Malo landed here in 1710, and named them Isles Malouines. The French formed a settlement in 1764 on Berkeley Sound which they called St. Louis, but it was given up to the Spaniards in 1767, and some time after abandoned. The English settled in Port Egmont in 1765, but after a few years they were expelled by the Spaniards. A negotiation followed, by which the English recovered possession of the settlement. On this occasion Dr. Johnson wrote a pamphlet about the islands in answer to one of the letters of Junius, in which he depreciated their value as much as Junius had exaggerated it. The English kept possession of this place up to 1774, when it was also abandoned. But when, about the beginning of the present century, the whale-fishery in the seas surrounding the antarctic pole began to become important, these islands again attracted attention, and this interest was still further increased when the commerce with the western coast of

South America was opened to all nations by the navigation round Cape Horn. The English again formed a small settlement in Port Egmont in 1817, principally as a place of refreshment for the whalers. Berkeley Sound, which is better situated for vessels bound round Cape Horn, was settled by a small colony sent there from Buenos Ayres in 1832, but the English government took possession of it soon afterwards. [*London Geog. Journ.*, III. and VI.]

FALL OF BODIES. Under this head we propose simply to explain the laws which regulate the fall of a material substance, supposed either to be allowed to drop or to be projected directly upwards or downwards. The motion of a body projected in an oblique or horizontal direction comes under PROJECTILES, THEORY OF; the nature of the forces which cause the descent or retard the ascent, under ACCELERATION, GRAVITY, &c.; and the circumstances which influence more or less the results about to be specified, under PROJECTILES, RESISTANCES, MOTION OF THE EARTH; MOTION, LAWS OF.

The resistance of the air does not greatly affect the motion of bodies, unless either—1, the bodies themselves be very light, as in the case of feathers, or—2, the velocities be very great, as in that of a cannon-ball. The law according to which this resistance acts is not well ascertained for great velocities; but for moderate velocities it is not far from the truth to say that it is as the square of the velocity: that is to say, whatever resistance there may be to a velocity of 10 feet per second, there is *four* times as much to 20 feet per second, *nine* times as much to 30 feet per second, and so on.

Neglecting the resistance of the air, let us first suppose a body (say a bullet) to be allowed to drop from a height above the earth. The law of its motion is as follows. It acquires velocity uniformly at the rate of $32\frac{1}{6}$ feet per second: that is, at the end of a quarter of a second it is in such motion as would, were the action of the earth to cease, cause it to describe $8\frac{1}{24}$ feet in a second. At the end of one second the rate of motion is $32\frac{1}{6}$ feet per second; at the end of two seconds, $64\frac{1}{3}$ per second, and so on: that is, the fall of a body is a uniformly ACCELERATED MOTION. In the article just cited the law of this motion is further explained. We shall here collect the principal formulæ connected with the subject, referring to PENDULUM and ATWOOD'S MACHINE, for the manner in which the main fact of the acceleration being $32\frac{1}{6}$ per second is proved and verified.

Let $g=32\frac{1}{6}$

$t=$ the number of seconds during which the motion has lasted when the body has attained a velocity of v feet per second, and described a length of s feet.

Firstly, suppose the bullet simply to drop without any initial impulse being communicated. Then

$$v=gt, \qquad s=\tfrac{1}{2}gt^2=\tfrac{1}{2}vt, \qquad v^2=2gs.$$

Thus, either of the three, v, t, s, being given, the others may be found.

Secondly, suppose the bullet to be projected downwards with a velocity of a feet per second; the consequence is still a uniform addition of g feet per second to the velocity, and we have

$$v=a+gt, \qquad s=at+\tfrac{1}{2}gt^2, \qquad v^2-a^2=2gs.$$

Thirdly, suppose the bullet to be projected upwards with a velocity of a feet per second. The action of the earth begins by producing a loss of velocity at the rate of $32\frac{1}{6}$ feet lost per second. This lasts until the velocity of the bullet is entirely destroyed, after which it begins to descend without any initial impulse, and we have the first case repeated.

During the ascent,

$$v=a-gt, \qquad s=at-\tfrac{1}{2}gt^2, \qquad a^2-v^2=2gs,$$

and the height through which the bullet will ascend is $a^2\div 2g$ feet, the time of doing which is $a\div g$ seconds. After this the first case may be repeated: but this is not necessary; for the preceding equations will continue to represent the relations which actually exist, provided that v, becoming negative, be interpreted as indicating that the turn has taken place and the bullet has begun its descent, and also that s becoming negative be interpreted to mean that the descent has continued until the bullet has passed through the point from which it was first thrown, and fallen below it. For instance (supposing $g=32$ for simplicity), let a bullet be projected *upwards* with a velocity of 100 feet per second, where will it be, and at what rate will it be moving, at the end of ten seconds?

$v=100-32\times 10=-220$, or the bullet is moving *downwards* at the rate of 220 feet per second.

$s=100\times 10-\frac{1}{2}\times 32\times 10^2=-600$, or the bullet is 600 feet below the point from which it was thrown upwards.

FALLACY, as defined by Archbishop Whately, is any unsound mode of arguing which appears to carry conviction and to be decisive of the question in hand, when in fairness it is not. Bentham's definition in his 'Book of Fallacies' is this: 'By the name of fallacy it is common to designate any argument employed, or topic suggested, for the purpose, or with a probability, of producing the effect of deception,—of causing some erroneous opinion to be entertained by any person to whose mind such argument may have been presented.' Accordingly if an argument be undesignedly vicious, and without any attempt at deception, it is more correctly termed a paralogism, and it is the intention of fraud that constitutes the fallacy or sophism. There is, however, a legitimate use of fallacy which is too often unnoticed by writers on logic. Thus in modern times Kant has employed the dilemma for a purely scientific purpose; and from the impossibility of two opposite and conflicting cases, has inferred, not as is the usual deduction, that the hypothesis upon which they both rest is false and untenable, but that the truth is intermediate. In like manner did Zeno of Elea infer the inadequacy of sense to represent the truth, from his conclusion that either a bushel of corn must make no noise in falling or else the fall of the smallest portion of a single grain must be perceptible to the ear. Again, the famous 'Megarian fallacies of the Heap and the Bald-head' (acervus calvus), in which it is proved that these notions are incapable of any precise determination, may have been designed to show that the distinctions of degree (here represented by Heap and Bald-head) are unavailable for philosophical purposes, and thereby to call attention to the difficulty of admitting into science the vague representations of sense.

Aristotle in his treatise 'De Sophisticis Elenchis' has laboured to expose and classify the different fallacies which he terms *sophismata* (σοφίσματα). He divides them into those *extra dictionem* (ἔξω τῆς λέξεως) where the fallacy is in the process of reasoning, and those *in dictione* (παρὰ τὴν λέξιν) where it lies in the subject-matter. The former have by the schoolmen been called formal, the latter material. Dr. Whately proposes the terms logical and non-logical; which terminology has at least the advantage in a scientific point of view that it excludes from the domain of logic much that is extraneous to it: for the fallacies of form may be reduced to the syllogism with four terms which the analytical process of demonstration can alone discover, whereas those of the matter must be corrected by the formation of valid principles and a correct generalization of terms, which belong to the synthesis of induction, which is totally alien from logic as the science of demonstrative reasoning.

For an enumeration and exposition of the several sophisms see the sections on fallacy in Whately's *Logic;* and for the exposure of that class of fallacies which he has called political fallacies, the work of Bentham already cited, 8vo., London, 1824.

FALLING STARS. [AEROLITES.]

FALLOPIAN TUBES. The Fallopian tubes, so called from the anatomist who first accurately described them, are tortuous and slender membranous canals about three inches in length, which proceed on each side from the two upper corners of the flattened triangular or pear-shaped body of the uterus. They communicate with its cavity by minute openings capable of admitting a large bristle. As they diverge outwards from their origin, they enlarge, and, curving backwards, terminate obliquely in open fringed extremities directed towards the ovaries, which lie below and somewhat behind them. They are included, as are likewise the ovaries, in the duplicature of the peritoneal lining of the abdomen, called the broad ligaments of the uterus, by which that body is itself invested and attached laterally to the cavity of the pelvis. A production of this membrane sheathes them to their loose trumpet-shaped extremities, and turning over the edge is continued for some distance up the interior surface, finally blending with the mucous lining which accompanies them in their exit from the uterus. This is the only instance in the body of the continuity of a serous and mucous membrane, and probably has some concern in the spreading of inflammation from the interior of the uterus to the peritoneum, which constitutes one of the forms of puerperal fever

Before the period of conception these tubes are observed in the lower animals to become more full of blood, and to have a writhing peristaltic motion like that which impels the aliment along the intestinal canal. Certain prominences are also observed at this time on the surface of the ovaries, produced by the maturation and swelling of the *Graafian vesicles*, which are the ova or germs of the future progeny. The Fallopian tubes then become attached by their open fimbriated mouths over these prominences; and receiving the vesicles as they burst through the peritoneal covering of the ovaries, convey them by the peristaltic motion we have mentioned into the uterus.

Whether these germs are always fecundated before they reach their destination is disputed. Such is unquestionably the fact in what is called extra-uterine conception. In these cases the germ never reaches the uterus at all, but remains in the intermediate canal and becomes attached to its surface; in this position it may attain its full size, expanding the tube as it grows, till at length it gives way, and the fœtus escapes into the general cavity of the abdomen. Such cases are not necessarily fatal; the fœtus, dead of course, sometimes becomes enclosed after a certain period in a membranous cyst, gradually extended around it from the parietes of the abdomen; and may remain for many years without exciting much irritation. In other instances abscesses form and break in succession, discharging the bones and other unabsorbed parts of the fœtus, and the case eventually does well. But such results are rare; and nothing but the cæsarean operation affords much prospect of saving life.

FALLOPPIO, GABRIELLO, or FALLO'PIUS, was born at Modena about the year 1523. He was one of the three distinguished anatomists of the sixteenth century, to whom Cuvier, an unquestionable authority on such subjects, has assigned the merit of restoring, or rather creating their science in its modern and exact form. His associates in this award of praise are Vesalius and Eustachius, the former of whom he succeeded in the united professorships of anatomy and surgery at Padua in 1551. The latter taught at Rome during the same period with less success and perhaps more ability, and their writings indicate some mutual jealousy. [EUSTACHIUS.]

Fallopius appears at one time to have held an ecclesiastical appointment in the cathedral at Modena, which he resigned to devote himself to more congenial pursuits. Having gratified his curiosity by travelling through the most interesting parts of Europe, he settled for a time as a public teacher of anatomy at Ferrara, where he had received a medical education. But he soon quitted that university, which was, in fact, a sphere too narrow for his talents; and had lectured at Pisa for some years with increasing reputation under the patronage of the first Grand Duke of Tuscany [COSMO I.], when he was induced by the liberal proffers of the Venetian senate to repair to Padua to take the place of Vesalius, who had been obliged to resign his academic offices by one of the disastrous incidents which have thrown a romantic interest over the latter part of his remarkable life. [VESALIUS.]

The studies of Fallopius were by no means confined to one department of natural history. He appears to have occupied himself among the rest with the subject of systematic botany, which had very recently begun to attract attention. In this, as in all other steps in the revival of learning, Italy took the lead. The first botanic garden had been established at Pisa by Cosmo de' Medici in 1543, and was at this time under the management of Cæsalpinus. [BOTANY.] The second was established two years later at Padua; and the charge of this garden, with the professorial duties annexed to it, was committed to Fallopius soon after his arrival in that university. The botanical researches and collections he had made during his travels, and his subsequent opportunities at Pisa of access to the best sources of contemporary information, had probably fitted him in no common degree to undertake this additional charge, which he is said to have sustained with great ability and applause. He did not write, and we are not aware that he lectured expressly on the subject of botany as a system; but there are many allusions to it in his works, and among them are several treatises on the preparation and use of various medicinal herbs, as well as of the mineral substances employed in pharmacy.

In addition to his merit as a naturalist and a teacher, Fallopius was an excellent and expeditious operator, and otherwise, for his time, a good practical surgeon. His character with posterity in this respect is somewhat tainted by the appearance of a degree of quackery in the concealment of his remedies, and a trumpeting forth of their virtues which his experience of them could not have justified. But our own age is not so free from the like professional sins, or from the credulity which tempts to their commission, as to make it a matter of surprise that such things were consistent three centuries ago with the high reputation of Fallopius.

After a short but brilliant career of eleven years both in practice and as a teacher, he died at Padua in 1562, and was succeeded by his favourite pupil Fabricius ab Aqua pendente.

The only work certainly known to have been revised by himself was a volume entitled 'Anatomical Observations.' It was first printed in 8vo. at Venice, in the year before his death, and has been frequently reprinted. The publication of this work forms an epoch in the science of human anatomy. There is no part of the frame with which the author does not display a masterly acquaintance. Many important parts of it he was the first to describe, if not to observe, and several of them still bear his name. His lectures on pharmacy, surgery, and anatomy were published after his death in various forms and with very different degrees of fidelity by his pupils. The best of them were collected and published with his 'Observations' in three volumes folio, Venice, 1584, and have passed through several editions. They are now superseded by more complete and systematic treatises, and are seldom consulted but by antiquarians in medical literature, or to support novel opinions; for in these sciences, as in others, much that is *new* is likewise old.

FALLOW is a portion of land in which no seed is sown for a whole year, in order that the soil may be left exposed to the influence of the atmosphere, the weeds destroyed by repeated ploughings and harrowings, and the fertility improved at a less expense of manure than it would be if a crop had been raised upon it.

The practice of fallowing land is as old as the Roman Empire. It appears that wherever the Romans extended their conquests and planted colonies, they introduced this mode of restoring land to a certain degree of fertility when exhausted by bearing grain. The principle on which it was recommended was however erroneous. It was thought that the land grew tired of raising vegetable produce and required rest, and hence this rest was often all that constituted the fallow, the tillage, which alone is the improving part of the process, being almost entirely neglected. Where land was abundant and the population thin, it was no great loss to allow a considerable portion of the soil to remain unproductive; and it was cheaper to let land lie fallow during the course of a whole year, which gave ample leisure for every operation, than to accelerate the tillage and increase the manure put upon it. But when land becomes of greater value with the increase of population, it is a serious loss if a great portion of the soil be thus left in an unproductive state. Accordingly the attention of agriculturists has been turned to lessen the necessity of fallows, and to substitute some other means of restoring fertility. It is acknowledged by all experienced farmers that manure alone is not sufficient for this purpose. The ground must be tilled and noxious weeds destroyed; and the only efficacious mode of doing so is to stir the ground at the time when their seeds have vegetated, their roots have made shoots, and before any new seed can ripen. But this is exactly the time when corn is usually growing, and when the land cannot be stirred to expose it to the heat of the sun and to dry the roots which are turned up. The only apparent remedy is therefore not to sow it during one summer, and on this principle lands are usually fallowed. The manner in which this is done has been noticed before [ARABLE LAND]; and the common process is so simple, that provided the purpose of fallowing be kept in view, the operations require only a little attention to time and weather to be performed aright.

There is no difference of opinion respecting the manner of extirpating weeds by repeated ploughing and harrowing, but there is with respect to the influence of the heat of the sun upon the land. Some men are of opinion that light is the great purifier of the soil; that it decomposes certain noxious particles, which are the result of the formation of the seed, and which have been termed the excrements of plants. Physiologists agree that the roots draw the nutritive juices out of the soil, that they undergo a chemical change in the plant, and that there is an exudation also from the roots, which may be looked upon as the residuum of the natural process. De Candolle, Raspail, and other eminent physiologists have placed this point beyond controversy; but no one has yet been able to collect these matters so as to analyze and compare them; and the reasonings on the subject have been merely conjectural. In particular soils and situations a scorching sun has a pernicious effect on the soil which is exposed to his rays; and where it is shaded by a crop which covers it completely, it seems to have acquired fertility, which the exposed surface has not. But this is not sufficient to establish a general rule. Some soils which are of a wet nature are greatly improved by being as it were baked in a hot sun. Not only are the weeds destroyed by the abstraction of moisture, but the soil thus becomes lighter and more friable. On sandy soils the reverse is the case, and on intermediate loams the effect will be more or less advantageous as they approach nearer to the clay or to the sand. In light sandy soils, then, it is probable that the only advantage of a naked fallow is to kill weeds, especially the couch-grass (*triticum ripens*), which is apt to infest light soils; and that the exposure to the sun in hot weather is not only no advantage, but probably detrimental. If, then, any means can be devised of clearing light lands from weeds without leaving them fallow for a whole summer, a great advantage will be obtained. This has been effected completely by the cultivation of turnips and clover, which was first practised in the light soils of Flanders, and afterwards introduced into the similar soils of Norfolk, from whence it has spread all over Great Britain, and is beginning to be adopted more generally in Ireland. The advantage of the turnip culture is so great in light lands, that it has gradually been extended through the different gradations of loams, till it has reached even the colder and stiffer clays, on which it would at one time have been thought absurd to attempt to raise this root. But this has been attended with an important benefit. It has made the cultivators of heavy soils turn their attention to the drying of their lands, by draining and deep tillage, in order to make them capable of bearing turnips; and although the extended culture of this useful root is not what we should recommend for cold wet clays, we highly approve of all improvements which will make such lands capable of bearing good crops of turnips. Unless the turnips can be consumed by sheep on the spot, or by cattle near at hand, without injuring the land in taking off the turnips and carting on the manure, there will be no great advantage in a crop of turnips; and some other substitute must be found for the occasional fallow before it can be altogether abandoned. On light lands the preparation for the turnips, the abundant manuring, and subsequent hoeing are as effectual in cleaning the land and bringing it into a fertile state as any complete fallow could ever be; and the clover smothers and destroys the seed weeds which may have come up amongst the barley or oats sown after the turnips. There are several ways in which the cultivation of light soils may be varied without adhering strictly to the Norfolk rotation, so as to introduce a greater variety of produce. Tares may be sown on the better sorts of light lands after a good tillage given immediately after harvest. If they are fed off or cut green in May and June, early turnips may be sown after them, which will be fit to feed off or draw for the cows in September; in good time for ploughing up the land for wheat-sowing. In this case the land gets all the ploughing necessary to clean it completely, and exactly at the best time. Three ploughings may be given after the tares if the land is not clean, and the turnips being well hand-hoed and horse-hoed, the land will be perfectly clean to receive the wheat-seed. Manure may be put on for the tares or the turnips; and if these are fed off with sheep, they will so enrich the soil, that the next crop cannot fail to be abundant. By varying the management of light land according to circumstances, and with some judgment, many more profitable crops can be raised than by the common simple rotation, in which a fourth of the land is sown with turnips. If this crop fails, which is often the case where it recurs so often, the whole system is deranged, and the loss is very great. The introduction of a greater variety of produce in the cultivation of light lands, in imitation of the Flemish practice, and the increase of stock kept in consequence, would be an important step in the improvement of British husbandry.

On heavy soils it is often impossible to keep the land clear of weeds, in wet climates and unfavourable seasons, without a complete fallow, and when this is the case it is best to do the thing effectually. Upon cold wet soils, which should always first of all be well under-drained, no pains should be spared to get the land perfectly clean: it should be exposed to the frosts of two winters and the heat of one summer and part of another, as already mentioned. [ARABLE LAND.] Only one crop is lost by this method, and if the land is properly worked, cleaned, and manured in autumn, it may be sown with barley or oats in the spring of the second year. The crop will be ample, and the subsequent produce of clover equally so, and the land so clean, that, with proper manuring, several crops may succeed, such as wheat, beans, oats, tares, wheat, without the necessity of another intervening fallow. The advice we would impress on the minds of the cultivators is—Avoid fallows if you can keep your land clean; but when you fallow, do it effectually, and improve the soil at the same time by chalk, lime or marl, according to circumstances. Do not spare either ploughs or harrows in dry weather. Lay the stitches high and dry before winter, and deepen the water-furrows well with the spade. By following these rules the stiffest land may be brought into a good state of cultivation; and the farmer will not find by the growth of weeds, docks, and thistles, that his labour and manure are thrown away, as is too often the case. Experience has fully proved that the air and the dews impart fertility to the soil, and that land which has been well fallowed and stirred requires less manure than it would otherwise do. Fallowing alone will not make up for want of manure, nor will manuring be sufficient without ploughing and cleaning the land properly, and exposing it to the influence of the atmosphere, especially in autumn and in spring: but a great saving of the one and the other may be effected, by judiciously varying the crops so as to admit of ploughing the land at different seasons of the year.

It is asserted by some old-fashioned farmers that the plough alone is sufficient for all the purposes of fallowing. This is a great error, which leads to useless and unnecessary labour. We would almost say that ploughing the fallows is never necessary, except to enable the drags and harrows to stir the land. The first ploughing of the stubble cannot be too shallow, and the harrows should be set to work before the wet weather sets in. When the surface is become mellow and clean, the land may be ploughed deep, and the soil below should be brought up and exposed to the air and frost all the winter. In spring the drag should begin the work again before the soil is hard. It may then be ploughed in narrow ridges right across the old stitches, or obliquely, and left for the influence of summer. The drags will level all these ridges when the manure is to be put on; and this being ploughed the land is fit to receive the seed, if wheat is the crop intended. If it is left for barley, it must have another ploughing in spring, and be well harrowed before the seed is sown, especially if this is done by the drilling machine. The clover or grass-seeds may be sown immediately after, and the land lightly rolled. There is no danger of making it too fine in spring. Without a fine tilth no good barley can be expected.

FALMOUTH, a parish, borough, market, and seaport town in the county of Cornwall, in the hundred of Kerrier, 54 miles south-west from Launceston and 267 miles west-south-west from London, in 50° 8′ N. lat. 5° 3′ W long. The town is situated at the mouth of the river Fal, whence it derives its name, and consists principally of one street, which extends along the south-western shore of the harbour for about a mile. There is a convenient quay, a town-house, and gaol erected in 1831. The water near the quay is of sufficient depth to allow vessels of considerable burthen to discharge their cargoes on the wharf. Adjoining the principal street and near the centre of it stand the market-house and town-hall. The Public Rooms, a handsome building, is situate in the heart of the town: and not far from it is the polytechnic hall, a spacious and commodious structure, in which are held the annual exhibitions of the Royal Cornwall Polytechnic Society, an institution which, though only established in the year 1833, has always contributed much to promote emulation in the fine and useful arts among all classes throughout the county. The church, which has a handsome altar, was built soon after the Restoration, and dedicated to Charles the Martyr. The average net income of the living is about 300*l*. It is in the diocese of Exeter, and the patron is Lord Wodehouse. There are also places of worship for Baptists, Bryanites, the Society of Friends, Wesleyan Methodists, and Unitarians, a Roman Catholic chapel, and Jews' synagogue, and likewise several schools and numerous charitable institutions. On the whole Falmouth is a neat and tolerably well-built town. It is lighted with gas, and contains two good hotels. The suburbs are adorned with several villas, which, together with the harbour, when seen from the surrounding hills, have a very beautiful appearance.

The charter of incorporation bears date 13 Charles II. The governing body, under the Act 5 and 6 William IV., c. 76, consists of a mayor, four aldermen, and twelve councillors. The corporation has no revenue whatever; the tolls of the market and the quay are the property of Lord Wodehouse. The only police are the constables appointed by the town councils, these and other expenses being paid by a rate. According to the returns made in 1831 the population of the town and parish of Falmouth was 7284, of which the town alone contained 4761. Falmouth is a parliamentary borough, and in union with Penryn returns two members. The market-days are Tuesday, Thursday, and Saturday, and the fairs are held the 7th August and 10th October.

The harbour, which is extensive and well protected by the surrounding high lands, is so conveniently situated that vessels have frequently been able to proceed on their voyage from this port, while those from Plymouth and Portsmouth have been forced back by contrary winds before they could reach the mouth of the Channel. It is defended by two castles; one, towards the west, called Pendennis, and the other, towards the east, called St. Mawes. Carew, in his 'Survey of Cornwall' (London, 1602) states that both these castles were built by Henry VIII., and subsequently improved and strengthened by Queen Elizabeth. Pendennis long resisted the attacks of Oliver Cromwell, whose lines of encampment may yet be seen. It now contains commodious barracks, storehouses, and magazines, with apartments for the lieutenant-governor. A light-house has recently been erected at St. Anthony's Point, at the east side of the harbour. The Trinity Board have recently directed the building of an obelisk on the height of the Black Rock, between Pendennis and St. Mawes, for the assistance of mariners in making Falmouth harbour. Formerly there was an extensive fishery in pilchards, and large quantities were annually exported. It has been stated that of late years this fish has become particularly scarce, though from the account given by Mr. M'Culloch of the present state of the fishery on the coast of Cornwall, there appears to be little or rather no foundation for such an assertion. The exports consist principally of the produce of the tin and copper mines: the trade with Jersey in fruit and cyder is considerable. The port is first spoken of in the reign of Henry IV., when the duchess dowager of Bretagne landed here, in progress to celebrate her nuptials with that king. Until 1613 the site of the present town was occupied merely by the huts of fishermen. There was however one house of entertainment, at which Sir Walter Raleigh and his crew put up on their return from Guiana. Shortly after this period Sir John Killegrew, bart., an enterprising individual, having obtained permission from James I., constructed a new quay, laid the foundation of the present town, and procured an act of parliament, by which the payment of certain duties was secured to himself and heirs. The subsequent establishment, about 1688, of the post-office packets to the West Indies, Lisbon, &c., contributed much to the rising prosperity of the place. In 1700 there were 350 houses, in 1750 upwards of 500, and in 1811 there were 647 inhabited houses in the town and suburbs. Large amounts of specie and bullion are landed from the packets arriving from Spain, Portugal, and America. The steamers which run between London and the Mediterranean invariably call here on their outward and homeward passage to take in passengers and coals; and the Peninsula Steam Navigation Company, having recently contracted with government to carry the mail, one of their powerful vessels now leaves the port every Monday. This alteration in the conveyance of the mail had long been felt necessary by merchants connected with the Peninsula. About the middle of the entrance to the harbour is a large rock called the Black Rock, which is traditionally said to have been the island where the Phœnicians trafficked with the natives for tin. Borlase, in his 'Antiquities of the County of Cornwall,' mentions the finding of a large quantity of Roman coins on a branch of Falmouth harbour, nearly the whole of which were of the coinage of the Emperors Gallienus, Carinus, and Numerian, who reigned A.D. 259—284. At the western extremity of the town stands Arwinnick-House, the antient seat of the Killegrew family

(Borlase's *Antiquities of Cornwall*; Carew's *Survey of Cornwall*; M'Culloch's *Commercial Dict.*; *Boundary Reports*; *Municipal Corporation Reports*; *Population Returns*; *Ecclesiastical Revenue Reports*.)

FALSE POSITION, a rule of arithmetic, which, though originally applied to such questions as are soluble by equations of the first degree, has been in modern writings, and upon principles explained in APPROXIMATION and INTERPOLATION applied to equations of all degrees. It is however of very little use, though of some notoriety, and a general explanation will be sufficient.

Let there be a function of x, ϕx, which it is desired to make equal to a, and firstly, let this function be such that successive *equal* increments added to the value of x produce successive *equal* increments (or decrements) in the value of ϕx (which is, in fact, supposing that ϕx is of the form $mx + n$): assume two values for x, p, and q, and let the corresponding values of ϕx be P and Q. If then (to use the easiest form of speech) a uniform increase of x is accompanied by a uniform increase of ϕx, and if x represent the value which makes ϕx equal to a, it follows that the interval between P and Q bears to that between p and q the same proportion as the interval between P and a bears to that between p and x. Or x can be obtained from the proportion

$$\mathrm{P}-\mathrm{Q} : p-q :: \mathrm{P}-a : p-x$$

If the preceding be not easily understood, the same proportion may be immediately deduced from

$$mp + n = \mathrm{P},\ mq + n = \mathrm{Q},\ mx + n = a$$

which follow from the several hypotheses made.

When ϕx and x do not increase uniformly together, it is nevertheless true that they do so *nearly* when the successive increments added to x are very small. If then p and q can be found so that P and Q are near to a, the use of the preceding proportion will produce a value of x which is nearer the truth than either p or q, and may be substituted for either in a repetition of the process, which will then produce a still nearer value.

The rule of False Position, as thus extended, is simply Newton's well-known method of approximating to the roots of equations, with this difference, that instead of the differential co-efficient of ϕx, the approximation $(\mathrm{P}-\mathrm{Q}) \div (p-q)$ is used. The equation of the first degree is one in which either method will bring an accurate result in one process; but the notoriety of the rule of False Position arose out of its appearing that a couple of errors, or wrong solutions, were made infallibly to give the right result and thus it is that Recorde says he can solve mathematical questions by taking the answers of any children or idiots who may be in the room To persons ignorant of algebra there seems to be a mystery in the being able to make any two guesses, however remote, to discover the truth. Thus, what is that number whose half, third, and fourth, together with 10, make 62? Make any guess, say 12: the half, third, and fourth of 12, together with 10, make 23, which is wrong. Make another guess, say 60, which produces 75, also wrong. The difference of the wrong results, 75—23 or 52, bears to the difference of the wrong assumptions, 60—12, or 48, the same proportion as the excess of the result 75 over 62 (the required result) bears to the excess of 60 over the truth. But 52 : : 48 13 : 12, or 12 is the excess of 60 over the truth, that is, the true answer is 48, as may easily be verified.

Where the equation is of the form $mx = a$, one guess only will suffice. If the assumption of p give P, or if $mp = \mathrm{P}$, then $\mathrm{P} : p :: a : x$

FALSETTO, in Music, an Italian term, signifying a false or artificial voice, produced by tightening the ligaments of the glottis, and thus the vocal compass is extended about an octavo higher. The Italians call the falsetto *voce di testa*, or voice from the head; the natural voice *voce di petto*, or voice from the chest.

FALSTER, a Danish island in the Baltic, due south of Seeland, and east of Laaland or Lolland; between 54° 30′ and 54° 58′ N. lat., and 11° 45′ and 12° 11′ E. long. The strait called the Gaabensesund separates it from Seeland, and the Goldburgsund from Laaland; on the north-east, the Groensund divides it from the island of Moen. Its greatest length from north to south is about 25 miles, and its greatest breadth from east to west is about 16 miles. The area is about 177 square miles, and the population about 17,500; in 1801 it was 15,548. It forms the eastern part of the circle or 'stift' of Laaland or Falster. It lies higher than Laaland, has better water, and a healthier atmosphere, and is accounted one of the best cultivated and most productive parts of the Danish dominions. The surface is level, and in the south the island terminates in two long tongues of land, formed by an arm of the sea called the Noret. The western tongue of land has a lighthouse upon it, beyond which a reef of rocks extends far into the sea. The soil is equally fertile with but less swampy than that of the other Danish islands near it: the produce of grain is more than adequate to the consumption, so that between 30,000 to 35,000 quarters are annually exported. Flax and hemp, hops, potatoes, and other vegetables, are grown. Large quantities of fruit are raised, and apples in particular are a considerable article of exportation. The woodlands occupy about one-sixth of the whole surface. Horned cattle and a native race of sheep are bred, and the forests afford food for a great number of swine. Much wax and honey are obtained; and poultry, geese especially, are abundant. There are no rivers but the Aar, an inconsiderable stream, and the short river through which the Mariboersee, a large lake, has an outlet into the sea. There are no manufactories in the island; and the people make their own clothing, stockings, and brandy. The principal imports are colonial produce, salt, and tobacco; and the exports are grain, salt meat, butter, fruit, live cattle, potatoes, &c. There is some ship-building.

Falster is divided into two districts, the North and South Hardes, and contains 28 parishes, 2 towns, and 107 villages and hamlets. Nykioebing, the chief town, is situated on the western side of the island upon the Goldborgsund; it is a pleasant well-built place, has some traces of its former fortifications, contains a cathedral and church, several schools, a town-hall, a hospital, about 250 houses, and a population of about 1600. There is an antient castle, in which several dowager queens of Denmark have resided, called Norre Ladegaard. The situation of this town is so picturesque, that it has been termed the northern Naples. It has a good corn trade. Stubbekiobing, the other town, is an inconsiderable place on the Groensund in the north-east, opposite the island of Baagoe; it is surrounded by walls, and has eight streets, a church, a school, and poor-house, about 130 houses, and about 700 inhabitants.

FALUN, a town in Sweden, the capital of the province of Dalecarlia, and of the Lān of Kopparbergs, lies in 60° 35′ N. lat. and 15° 35′ E. long. The population is about 4000 or 4500. The town is built in a wide valley between two lakes, which are not far from it. It is celebrated for the great mine of copper which is in the middle of the town. Unlike all other mines, this is an immense abyss, about 1200 feet long and as many wide, into which people descend by a staircase to a depth of 1200 feet; the ore is detached by the miners from the bottom of this hole, so that they are not obliged to use candle-light. The vapours which continually rise from the mine have destroyed every trace of vegetation in the neighbourhood, and even wild animals and birds are rarely seen. The annual produce of this mine is from 4000 to 4500 skippounds of copper. It also produces gold to the annual value of from 200 to 300 ducats, silver from 400 to 500 marks, lead from 100 to 150 skippounds, vitriol from 600 to 800 tons, ochre about 1000 tons, and brimstone from 20 to 30 skippounds. The copper is sent to Avestad to be refined and worked up. There are a few manufactures of linen, cotton and wool, but all on a small scale.

FAMAGOSTA. [Cyprus.]

FAN PALM. [Chamærops.]

FANARIOTES, a name applied to the inhabitants of the Fanar, or Greek quarter of Constantinople. After the capture of Constantinople by the Turks, the Greeks of the Fanar, taking advantage of the ignorance of the Turks, succeeded in rendering themselves necessary to the ministers of the Porte as translators, and to other Turkish grandees as secretaries, agents, and men of business in general. They were all comprised under the general denomination of Grammatikoi, clerks or scribes. At first they were not distinguished from common servants; and the office of the translator to the Sublime Porte conferred no consideration on the individual who held it. The Greek translator explained to the Turkish ministers the contents of a foreign dispatch, after which he retired into the great hall of the palace, where he waited with other menials till his masters might want him.

In the year 1669, under the reign of Mahomet the Fourth, a Greek called Panayotaki persuaded the Turkish divan that the interests of the Sublime Porte would be much better served by an official interpreter, honoured with the full confidence of the government, than by the ordinary translators who had hitherto been employed. The government acted on this suggestion, and Panayotaki was nominated dragoman of the divan, or translator to the council of the state. The successors of Panayotaki continued to enjoy the advantages conferred on their predecessor, which were gradually enlarged. From that time the ambition of the Fanariote families became entirely turned in that direction, and they instructed their children in the Turkish, the Italian, and French languages, in order to enable them to discharge the duties attached to the office of the dragoman.

In the progress of time the divan created another dragoman, who was called the dragoman of the fleet, whose duty was to accompany the capitan pasha, or grand admiral, on his annual tours in the Archipelago for the collection of taxes. Although the office of the dragoman of the fleet was much less important than that of the dragoman of the divan, it was more lucrative, being estimated at about 300 purses, while the fixed salary of the dragoman of the Porte did not exceed 94 purses. The dragoman of the fleet exercised an almost unlimited power over the islands of the Archipelago, which, with the exception of Cyprus and Candia, were governed by officers called mooselims, chosen by the capitan pasha, and renewed every year. The dragoman of the fleet always purchased the appointments to those offices, which he resold with considerable profit. The capitan pasha never acted without the advice of the dragoman, who even frequently acted as his master's deputy in the collection of taxes from the above-mentioned islands. The Fanariotes, thus invested with the office of dragoman of the divan, being the only agents of communication betwixt the Porte and the European governments, necessarily acquired a great influence over the Turkish government, and they took good care to turn it to their own advantage. In the beginning of the eighteenth century the Fanariotes succeeded by their intrigues in prevailing on the Turkish government to choose from among them the Hospodars or princes of Moldavia and Wallachia, which dignities had been hitherto bestowed on natives of the above-mentioned provinces.

Maurocordato was the first Greek who was nominated Hospodar of Wallachia in 1711. A crowd of Fanariotes always followed the new Hospodars, who employed them in different offices in their respective provinces, where they became notorious for their unprincipled exactions, employing every means, however odious, to acquire as much wealth as possible during their short and precarious tenure of office. The Hospodars, who partook of this ill-gotten wealth, countenanced and protected them in all their proceedings. The mode of government has been since changed in the above-mentioned provinces of Moldavia and Wallachia.

The offices of the dragomans and the principalities of Moldavia and Wallachia were not the only sources of wealth to the Fanariote families: the bankers of the Fanar disposed of the greater part of the military and civil appointments in the Ottoman empire. Although precluded by their religion from holding any of those offices, they purchased the appointments to them from the grand vizier at a high price; and the Turks who wished to be invested with the command of a fortress, the government of a province, on any other similar charge, could find at the confidential banker of the vizier the firmans or nominations for the desired places, with the name left in blank. The purchaser entered into an arrangement with the banker, who filled up the blank with his name, and commissioned one of his Greek agents to accompany the new governor to his province, which he administered in his name, and collected from the revenue the sums advanced by the banker to the grand vizier with the most usurious interest. Many judicial appointments of the Turkish empire were also purchased by the bankers of the Fanar, and resold at a considerable profit. It is superfluous to add, that this system led to general oppression, and the most venal administration of justice. Besides this infamous traffic in public offices, the Fanariotes conducted almost all the private affairs of the Turkish grandees. They purchased, sold, and managed their estates, which the supineness and ignorance of the proprietors entirely abandoned to their care. The profits which they realized from such transactions generally amounted to from forty to fifty per cent. An interesting picture of the Fanariotes is given in Mr. Hope's celebrated novel 'Anastasius; or, the Memoirs of a Greek;' as well as in the 'Essai sur les Fanariotes,' by Marco Zallony, and in a work published by Von Hammer, called 'Constantinople and the Bosporus.'

The events which have followed the last Greek revolution have considerably diminished the importance and altered the position of the Fanariotes.

FANCY, a corruption of phantasy (*φαντασία*), which term in antient philosophy indicated the sensuous appearance of an object, and in a general sense was used as co-extensive with conception, or the faculty by which man reproduces images of objects either absent or present, without an immediate impression on the organs of sensation. In later times its signification has been greatly narrowed, and it is now limited to a particular province of the imagination, with which, however, it is often frequently confounded in loose and inaccurate language, and to which it is employed as equivalent. Imagination differs from conception either by the greater distinctness and vividness of its images, or else by combining the manifold materials of experience into a new and true unity. In the former case it is merely reproductive; in the latter creative, and becomes fancy:—

> 'Of all external things
> Which the five watchful senses represent
> She forms imaginations, aerie shapes.
> MILTON, Par. Lost, v.

Fancy is a higher energy of the mental activity than imagination simply, but is nevertheless dependent upon it, since it is the latter that furnishes the materials out of which it creates its phantasies either by modifying or exaggerating them, or by forming new combinations, and by a prosopopœia investing its personification with the properties of real beings. Imagination is necessary to authors generally, but both imagination and fancy to the poet; the latter presenting him with those lofty speculations which comprise what has been termed the ideal of art, and furnishing the link for that enchainment of his ideas which, rejecting the restraint of all general laws, is wholly dependent upon the peculiarities of the poet's mental temperament.

FANDANGO, a quick dance in $\frac{3}{8}$ or $\frac{6}{8}$ time, universally admired and practised in Spain, and supposed to be of Moorish origin; though Volney ascribes much higher antiquity to it, believing it to have come originally from Carthage, thence to Rome, and so into Spain. The probability however is that it was brought into Europe by the Arabians, to whom certainly it may have been transmitted from very remote ages. Like many other dances, this is performed with more or less propriety according to the degree of delicacy possessed by those who practise it.

FANO. [URBINO E PESARO.]

FANOE. [DENMARK, vol. viii., p. 398.]

FANSHAWE, The Right Honourable Sir **RICHARD**, was the youngest son of Sir H. Fanshawe, and was born in 1608, at Ware Park, in the county of Hertford. He became a fellow-commoner of Jesus College, Cambridge, in 1623, and removed to the Inner Temple in 1626. On the death of his mother, who had long survived his father, he betook himself to travel, and visited France and Spain. He was subsequently appointed secretary to the embassy at Madrid, and was left resident there till 1638. After his return, and on the breaking out of the civil war, he declared himself a royalist, and attended the court at Oxford, where he received the degree of Doctor of Civil Law. He followed the prince of Wales to the islands of Scilly and Jersey in the capacity of secretary, and in 1648 became treasurer to the navy under Prince Rupert. At the battle of Worcester he was taken prisoner, but contrived to be released, and repaired to Charles II. at Breda, who appointed him master of requests and his Latin secretary. He returned to England with Charles, represented Cambridge in 1661, and was employed in negotiating Charles's marriage with Catherine. He was sent as ambassador to Philip IV. of Spain in 1664, and died at Madrid in 1666, leaving a widow and five children. His body was sent home embalmed.

Notwithstanding the active life of Fanshawe, he found leisure to attend to literature, and produced several works, the most celebrated of which is a translation of Guarini's 'Pastor Fido.' The parts of this work written in heroic measure are harsh and ill-managed, but the lighter lyric passages are playful and often melodious, and some of the more sublime choruses are sonorous and majestic. This book is not very easily procured. It was published in 1664, and is adorned with a curious portrait of Guarini.

FANTEES, or **FANTINS**, a nation inhabiting a part of the Gold Coast in Western Africa. The country of the Fantees is bounded by Acron on the east, and by Sabo, from which it is divided by the Iron Mountain, about three miles east from Cape Coast Castle, on the west. Its entire length, according to Bosman, is nine or ten miles. The capital, called Fantin, is placed about fifteen miles inland, but all the other towns of note lie along the sea-coast. Taking them in their order from east to west, the principal are:—Manfro, Laguyo, Aqua, Cormantin, Ameisa, the Lesser Cormantin, Aga or Adja, Annamaboe or Jamissia, and Anikan or Ingenisian. At many of these places the Dutch, Danes, Portuguese, and English, used to have forts or factories. The natives are described as principally employed in fishing. The government antiently seems to have been less of a despotism than that of most of the surrounding nations. 'Here,' says Bosman, 'is no king, the government being in the hands of a chief commander, whom they call their Braffo, a word importing leader. He is a sort of chief governor, and has the greatest power of any in the whole land, but is somewhat closely restrained by the old men, who are a sort of national counsellors, not unlike some European parliament, acting perfectly according to their inclinations, without consulting the Braffo. Besides these, every part of Fantyn hath also its particular chief, who will sometimes scarce own himself subject to the Braffo, who hath the ineffectual name only of supreme power.' Since the commencement of the present century the country of the Fantees has been overrun by the Ashantees, and its recent history will be found in the article on that people. [ASHANTEE.]

FARCE. [ENGLISH DRAMA, vol. ix., p. 417.]

FARIA E SOUSA, a Portuguese escudero, and a writer on various subjects, chiefly in the Spanish language, was born in 1590, in a country residence called Caravella, in the province of Entre Minho e Douro. His talents were so precocious, that in 1600 he attended the lectures of his father and others at the university of Braga, and soon after, being desirous to become familiar with the Greek and Roman classics, he repaired, in 1604, to the learned Gonçalo de Moraes, bishop of Oporto. This new tutor soon appointed him his secretary, notwithstanding Faria's constant rejection of all offers of preferment on condition of entering the church, and notwithstanding his consecrating the first essays of his muse to his mistress Amelia. This lady was probably the same Donna Catalina Machado whom Faria married in 1614, whose stoical calmness in a tremendous storm at sea he celebrated in his 'Fuente de Aganippe' (Od. ii. part 3). In 1619 Faria quitted Portugal to try his fortune at the Spanish court; but his independent character prevented his success, and he returned to Portugal. Being unable to improve his prospects in Portugal, he once more resorted to Madrid, and at last in 1631 obtained the secretaryship to the Spanish embassy at Rome under the marquis of Castel Rodrigo. Although he attracted the notice of the Italian literati, and even numbered Pope Urban VIII. among his patrons, Faria could not agree with the marquis, and returned to Spain in 1634. After many sufferings, proceeding from the resentment of this personage, he was allowed at last to settle as a prisoner at Madrid, where, abandoning all thoughts of advancement, he devoted the remainder of his life solely to letters with such ardour as to hasten his death, which took place on the 3rd of June, 1649.

Faria adhered closely to that extravagant school which in Spain was fostered so much by that of the Martinists in Italy. He revelled in bold flights of fancy, but all his beauties are like flowers buried in parasitical weeds. He wrote daily, as he says himself, twelve sheets; and moreover had such facility in rhetorical turns and flourishes, that in a single day he could compose a hundred different addresses of congratulation and condolence. On the other hand, his historical works, which are written in Spanish, are still valuable for their subject-matter. The rest of his works are not all in that language, as we find it stated in the 'Biographie Universelle.' Out of his select 600, or, as he terms them, 'six centuries,' of sonnets, exactly 200 are in Portuguese, and twelve of his eclogues are also in that language.

His works are:—1st. Noches claras, o Discursos morales y politicos. 2nd. Comentarios sobre la Lusiada, on which he laboured twenty-five years, and yet the commentary, except on historical points, rather obscures than illustrates the original. It was prohibited first by the Inquisition of Spain and more strictly afterwards by that of Portugal. This occasioned the following work:—3rd. Defensa por los Comentarios sobre la Lusiada. 4th. Epítome de las Historias Portuguesas, or a History of Portugal. 5th. Imperio de la China, y Cultura Evangélica por los Religiosos de la Compania de Jesus, written by Samedo, but published by Faria. The following are his posthumous works:—El Asia Portuguesa desde 1497 hasta 1640; La Europa Portuguesa hasta 1557; El Africa Portuguesa, translated by John Stevens, 3 vols. 8vo., London, 1796; El America Portuguesa, inedited; Fuente de Aganippe, o Rimas varias; Divinas y humanas Flores; Gran Justicia de Aragon; at the end of which is the 'Retrato de Manuel Faria,' that is to say, his Life, by his friend Porcel. Besides this work the reader may consult Bouterweck, *Spanish and Portuguese Literature;* Nicholas Antonius, *Biblio. Hisp.;* Niceron, *Mémoires*, &c., vol. xxxvi.

FARI'NA. [STARCH.]

FARM. A farm is a portion of land which is set apart for cultivation either by the proprietor or by a tenant who pays a certain stipulated rent for it. We shall consider it in this latter sense; and, without entering into the mode of cultivation, we shall notice the circumstances which determine the profit that a tenant may reasonably expect to make in return for his trouble and outlay.

The first thing to be considered in taking a farm is the capital which the tenant is possessed of, or of which he can procure the use at a reasonable rate. If a man takes a farm without the means of stocking it properly, and is restrained in his first outlay, he will never be able to cultivate it with benefit to himself or to his landlord: he will be obliged to sell his produce at a loss, to over-work his cattle, and to keep a smaller quantity of stock, and consequently make less manure than is required to keep the farm in a productive state. It is not sufficient that he has the means of stocking the farm; he must have wherewith to pay the greater part of the whole expenses and the rent for the first year. In the present state of agriculture, a man who takes a farm of 200 acres of arable land, or land partly arable and partly good pasture, will require from 1600*l.* to 2000*l.*; and it is not the interest, either of the landlord or the tenant, that he should take the farm unless he can command that sum. The amount of capital required depends in a great degree also on the quality of the land; very rich land requires less capital in proportion to the rent than poor land, especially if the poor land requires draining, chalking, or marling, before it will produce any tolerable crops. All these circumstances must be taken into consideration before a farm is hired.

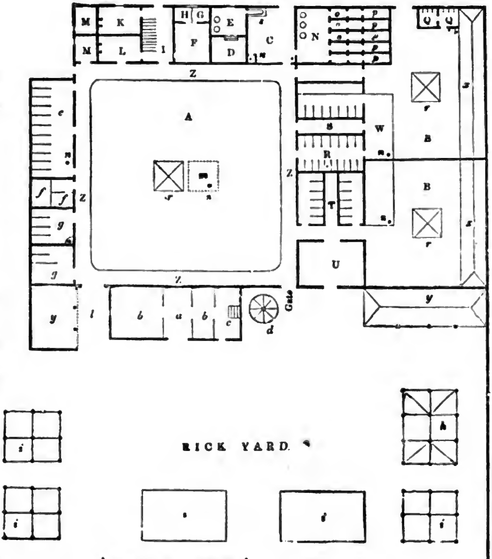
When it is ascertained what extent of farm may be safely undertaken with a given capital, the most important object to be attended to is the condition and fertility of the soil, not only with respect to the natural quality of the land, but the actual state it is left in by the preceding system of cultivation. A moderately fertile soil, in good condition, will give a greater profit for several years than a better soil which is partially exhausted and rendered foul by injudicious management and over-cropping. For this purpose it is necessary to ascertain what has been the state of the crops for several years before, how the land has been ploughed, and whether the crops have been heavy with or without manure. There is no method yet found out of ascertaining the comparative state of land which has been exhausted. It would be a discovery well worth the attention of modern chemists, who have made such progress lately in the analysis of vegetable substances, and would be invaluable to farmers and proprietors of land. In the mean time the nature of the weeds which abound on the land will give some clue to its state; and an experienced person will collect from various minute appearances in the soil whether it has been fairly managed or exhausted. It is in general more advantageous to take a farm in a district with which you are well acquainted. It will be a great advantage if you have had an opportunity of seeing the land at all times, observing it in different seasons and states of the weather, and especially of seeing the crops threshed out, and ascertaining the quantity of corn which is usually yielded from a certain quantity of straw, for lands very similar in outward appearance will produce a very different return when the crops are threshed out. A want of attention to these circumstances is the cause that a man who comes from a distant part of the country and hires a farm on his own judgment seldom succeeds so well as might be expected, even with a superior knowledge of agriculture. He naturally compares the soil with some similar soil which he has been acquainted with. If he comes from a district where the soil is sandy, and where clay is in request, he will give the preference to very stiff loams; if he comes from a cold wet clay, he will prefer the sandy; and the chances are, that he is mistaken in his judgment, and finds it out when he has already embarked his capital in a losing concern. Next to the nature of the soil is to be considered the convenient situation of the farm, the disposition of the fields, and the adaptation of the farm buildings to the most profitable occupation of the land. The roads, especially those which lead to neighbouring towns, whence manure may be obtained, are a most important object; and if there is water carriage, it greatly enhances the value of the farm. The roads to the fields, and the distance of these from the farm-yard; the convenience of having good pasture, or land easily laid down to grass, near the homestead, and especially the situation of the farm-buildings with respect to the land, and the abundance of good water, are all circumstances which must be well considered, and which will greatly influence the probable profits, and consequently the rent which may be fairly offered. A central situation is no doubt the most advantageous for the farm-buildings, as greatly diminishing the labour in harvest and in carrying out manure. But there may be circumstances which render some spot nearer the extremity of the land more eligible, and it is only when entirely new buildings are to be erected that there is a choice. The old farm-buildings are generally in low and sheltered situations, but it is a great inconvenience to have to carry the manure, which is the heaviest thing carted on a farm, up a steep hill. The best situation is on a moderate slope, neither in the lowest nor highest ground.

The disposition of the buildings is of great importance both to the landlord and tenant. Large straggling buildings are inconvenient, and cost much in repairs. The house should be neat and comfortable, fit for the residence of a farmer who has a capital such as the farm requires. The rooms should be airy and healthy, facing the south, with a neat garden in front of the house. The farm-yard should be to the north, behind it. Near the house and the farm-yard there should be a small paved court separated from the yard by a low wall. In this court, which should communicate with the dairy, the utensils may be placed on proper benches to air and dry in the sun. The architecture of the buildings may be left to the taste of the proprietor or his architect. The simpler it is, the more appropriate. The yard or yards in a large farm should be sheltered on the north side by the barns, which need not be so extensive as used formerly to be thought necessary. If there is a threshing machine, a single floor to thresh the seeds upon, and to employ the men occasionally in winter, is quite sufficient. Every farm which is so extensive as to require more than one floor to thresh the corn on ought always to have a threshing-mill attached to it. [BARN.]

A small yard, distinct from the other, with sheds for the cattle to shelter themselves under in wet and stormy weather, is a great advantage, and may be added at a trifling expense to any set of farm-buildings. The cart-sheds should be in the stack-yard, which properly occupies a space north of the barn. There should be a sufficient number of stands with proper pillars and frames to build stacks on. Each stack should be of such a size as to be conveniently taken into the barn to be threshed out. The round form, and the square which becomes nearly round when built up, are the most convenient. Nine stone or cast-iron pillars with caps over them are placed on brick foundations, and support a strong frame on which the stack is built. In the centre of the stack there is usually a pyramidical open frame, to allow the air to circulate through the stack, and prevent the heating of the grain. On each side of the yard should be placed the stables, cow-houses, and feeding-stalls, with a pump of good water near the last, and convenient places to put hay, straw, and turnips in, with a machine to cut them. A great deal of time and labour is saved by a proper arrangement of the different parts of the farm-buildings. An underground cistern near the cow-house and stables, into which the urine and washings of the cow-house may run by means of a sink or drain, is a most useful appendage, which is too little thought of in England, whereas it is one of the most indispensable parts of a Flemish farm. It supplies a kind of manure, which can be applied to the land at all times, which invigorates sickly crops, and may often produce an abundant return, where otherwise there would be a complete failure. There are many plans of farm-buildings given in works on agriculture, which combine all that is useful on a large scale. Most of these plans have been executed at a great expense for the farming establishments of noblemen and men of large fortunes. They may be considered as the palaces of husbandry, where much is expended for the sake of grandeur. But the proprietor who desires to erect buildings most proper for the occupation of his land must study economy, and lay out no more in buildings than is necessary. They should be so substantial as not to require frequent repairs; without unnecessarily increasing the original expense of materials and labour. Light thatched roofs are sufficient for the sheds and smaller buildings, and even for the cow-houses and stables; but the waste of straw and the danger from fire should be set against the cost of tiles or slate as a covering. The barn should not be thatched, unless it can be done with reeds, which form a durable and impervious covering, not subject to be infested with rats. The house should always be detached from the farm-buildings, and should have a tiled or slated roof.

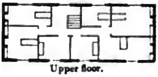
We here give a plan of plain farm-buildings for the occupation of 200 or 300 acres of land, of which two-thirds are arable, fit for turnips, barley, clover, and wheat. The farm house should have a large kitchen, two good parlours, and five or six bed-rooms; a wash-house, with coppers to brew; a scullery, and larder. The dairy should communicate with the house, and with a small paved court, near which are the pig-sties and the cow-house. There should be two distinct farm-yards with proper sheds, and in each there should be a cistern for the urine from the stables and the drainings from the dung.

Buildings for a Farm of 300 acres

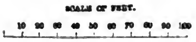


A. principal yard.
B. second feeding yard, divided.
C. small paved yard adjoining the dairy and piggery.
D. dairy two feet under the level of the yard.
E. wash-house and brew-house.
F. kitchen.
G. skullery.
H. larder.
I. entrance and stairs.
K. best parlour.
L. second ditto; cellars under them.
M M. coal and wood-house.
N. steaming-house for pigs.
Q Q. Hen-houses.
R. calf-pens.
S. cow-house for sixteen cows, with a passage through it.
T. bullock-house.
U. root and straw-house to cut turnips, chaff, &c.
W. cistern divided into two by a partition, sunk seven feet and vaulted over.
Z. paved road round the yard.
a. barn floor.
b b. bays.
c. raised floor and thrashing-mill.
d. horse race.
e. horse stable.
f f. loose boxes.
g g. spare stables and chaise-house.
h. granary on stone piles.
i i i. corn-stacks.
l. entrance to the yard
m. tank covered over
n n. pumps.
o o o. pig-styes.
p p p. small open court to each stye
r r. feeding cribs.
s. oven.
x x. open sheds for cattle.
y. cart-sheds.

Elevation towards the Garden.



Upper floor.



For a small occupation, where the tenant is but a little above the rank of a day labourer, a set of buildings all under one roof, and forming the longer side of the yard, which may have open sheds round it, such as is represented in the annexed figure and plan, is at once convenient and economical. If this building is thought too long, it can very easily be divided into two, which may be placed at right angles to each other and form two sides of a square. The farm-house and cow-house might form one side, and the stables and barns the other. This is the more common distribution in Flanders.

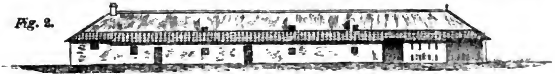
Flemish Farm Buildings.

Fig. 1

Elevation towards the yard.

Fig. 1.
P, privy.
R R, pumps for urine.

Fig. 2.



Elevation towards the orchard and garden.

Fig. 3.

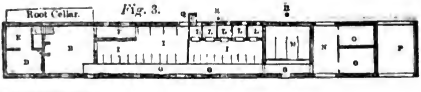


Fig. 8.
B kitchen.
D and E are sleeping rooms raised a few feet above the kitchen and over the dairy and cellar.
F, a work-shop for weaving and other work.
G, passage to feed the cattle.
I I, cow-house.
L L, pig-styes.
M, stable.
N, barn floor.
O O, bays.
P, cart shed.
Q, privy.
R R, pumps for urine.

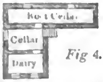
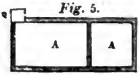


Fig 4.

Sunk floor arched over.

SCALE OF FEET.

Fig. 5.



A A, Urine tank, under the stable and cow-house, 50 feet by 20, and 6 deep, with a partition in it.
Q, privy.

These two examples of farm-buildings will be sufficient to give some idea of what may be proper for farms of an intermediate size. A principal thing to be attended to is to have plenty of room for cattle; and where old barns remain much larger than is required according to the present mode of stacking corn in the yard, they can be very advantageously converted into cow-stalls or ox-stables. Where many sheep are kept, it is of great advantage to have a sheep-yard, with low sheds all round, at the time when the ewes lamb, especially when the season is wet and chilly, which hurts them more than a dry frost. The second yard B (see plan, p. 197) is well adapted for that purpose; and an additional temporary shed against the partition which divides it in two will convert either division into an excellent sheep-yard.

In valuing the rent of a farm the habitation of the farmer is seldom taken into the account, and it ought not to be above the station of the tenant; but the buildings immediately connected with the cultivation necessarily add to the rent or diminish it, as they add to or diminish the profit.

The next important question is what may be a fair rent both to the landlord and the tenant. This depends as much on the mode of cultivation adopted as on the fertility of the soil. The tenant must have a fair interest for his capital, and a fair remuneration for his trouble. In the old system a third of the gross average produce was considered as a fair rent, including all the direct payments for the occupation of the land, such as tithes, rates, and taxes; another third was supposed to cover the labour and expenses of the farm and interest of capital; and the remaining third was appropriated to the maintenance of the farmer and his family, out of which he had to save whatever he laid by as a clear profit. But this calculation is no longer applicable to the present state of agriculture. The expenses are greatly increased, and the produce is also greater. It requires a greater capital, and more skill to manage a large farm. The tenant is a man of a more liberal education, and his habits are more expensive. The occupier of 500 acres of land in England expects to live as well as a land-owner of 500*l.* a year income. He cultivates better by applying more labour, and much of the produce is owing to his skill and his capital. He therefore expects a greater share of the produce than the landlord, not only to repay his outlay, which is greater, but to live upon. Supposing the tenant to have a capital employed equal to ten times the rent, which is often the case, the gross annual produce ought to be equal to five times the rent. This we shall distribute as follows: two-fifths for expenses, including rates, tithes, labour, and interest of capital at 5 per cent.; one-fifth for rent; one-tenth for improvements and purchased manure; and three-tenths for the net profit of the farmer, out of which he is to live. This appears a less proportion than the old third; but it must be remembered that the produce is greatly increased. It will be found, wherever accurate accounts are kept and a farm is skilfully managed, that the proportions above stated are not far from the truth. It requires much judgment and experience to calculate what average crops may be expected by an improved mode of cultivation, and especially by increasing the number of cattle and sheep maintained on the farm.

In Scotland it is notorious that rents are much higher than in England, not only for small occupations, but for extensive farms; and that the tenants have complained less of the times than their neighbours in the south. It may be worth while to inquire into the cause of this, for the low price of corn must affect the Scotch farmer equally with the English. One great difference between the Scotch and the English farmer is, that the former gets work done at a cheaper rate than the latter. The Scotch labourer is fully as well fed, and clothed, and lodged, as the English; but he has less money to spend at the alehouse. He is paid, not in a certain sum every Saturday, but in comforts, in the keep of a cow, in a certain number of rows of potatoes, a certain quantity of malt to make his beer, a cottage to live in, and a meal to feed his family. His immediate wants are supplied, and he is comfortable; the consequence is, that he works willingly. He has no remnant of the last night's debauch at the beer-shop. He is early at work, and he does his work cheerfully. The horses of a Scotch farmer are well fed; they are always in good condition. They work ten and even twelve hours in a day at two yokings. The ploughman only thinks how he shall finish his work in proper time, and unless he makes the horses work as much as they can without distressing them, he knows he shall not get through his work. All this is worth 25 per cent. on the whole labour of the farm, as Arthur Young has very judiciously calculated, when he gives the expense of labour on the farm of a gentleman, compared with that on the land of a farmer who works with his men. (See *Farmer's Guide.*) The moral effect of an interest in the work to be done, when opposed to that of a perfectly distinct and often hostile interest, will readily account for so great a difference.

But besides this the Scotch farmer has generally the advantage of a scientific education, and of a thorough knowledge of the principles of his profession; and with the shrewdness peculiar to his country, he knows how to take advantage of every favourable circumstance. He has also been taught to calculate, and will soon discover where there is a profit or a loss. This has made him turn his attention to cattle and sheep of late years, more than to the production of corn; and the Scotch have found, that while a very decent profit was made on the cattle, their land produced more corn, although it sold at a lower price; for the green crops raised for the cattle, and the manure made by them, enriched the land so much, that the average produce on some light lands was nearly doubled. All this kept up rents to a much higher level than in England, where prices were low, and there were no means of diminishing expenses or increasing produce. Hence rents in Scotland have kept up wonderfully, when we consider the great fall of rents in England since the peace.

The price of agricultural produce throughout Great Britain and even Ireland is brought very nearly to an equality, the only difference being occasioned by the means of transport. But the price of labour still varies much, and this is owing to local circumstances, which it is hoped will gradually cease. While the very unequal distribution of the expense of the maintenance of the poor was not remedied, adjoining parishes might differ in any proportion with respect to the actual price of labour; and before a fair rent could be calculated, it was necessary to consider how much of the value of the labour was paid directly, and how much in the shape of rates. Our northern neighbours were free from this uncertainty.

Farm Accounts.—In proportion as the management of a farm requires more skill, and the various operations become more complicated, so the necessity of great accuracy in the accounts becomes more evident. The manner in which farm accounts should be kept deserves therefore particular attention.

Many farmers, who are not devoid of intelligence, and who are anxious to ascertain their gain or their loss in cultivating the land which they have hired, have no other means of ascertaining this than the balance of their account of receipts and expenditure. If they have separated the accounts of their private establishment from that of their farm, they think that they have done all that is required, and at the end of the year they can tell accurately how much they have gained or lost by their farm. But ask them to account for this gain or loss, and they can give no answer. If a tradesman, who has a capital in business equal to that of a farmer of a considerable number of acres, were to keep accounts in this manner, and become a bankrupt, no one would hesitate in saying that he failed because he kept no regular accounts. He had no greater stake than the farmer, and his transactions were perhaps less varied: if he kept no clerk, he should have attended better to the accounts himself. The same may be said of the farmer; and if a man who has a floating capital of 2000*l.* does not think it worth his while to employ a clerk to keep his accounts, not having time to do so himself, it is no great wonder if he is involved in difficulties. But it may be said that agricultural accounts are very simple, and that any one can keep them. So are merchants' accounts at first sight. Nothing is simpler than to put down what is bought and sold, what is the profit on each transaction, and the sum is the profit on the whole. But merchants know that to keep this very simple account many books, many entries, many checks, and consequently many clerks are required. In a lesser degree this is true in a farm. It is easy to know what is bought and sold; what is expended or produced; but it requires very minute accounts to ascertain what part of the farm gives a profitable return, and what is the cause of loss. There may be a profit on the crops and a loss on the stock, or *vice versâ*. The money expended on improvements or adventitious manure may have produced an increase which is proportionate to the outlay, and which affords a good interest; but it may also be a decided loss. How is this to be ascertained, except it be by accurate accounts? The expense of keeping accounts is much overrated. A clerk who has his board and 30*l.* a year is generally a young man who has some education. He is useful in seeing that the operations ordered by the farmer are duly executed. He is a trusty overseer, and, as he has his accounts in his thoughts, he is most likely to detect the cause of any loss, from a want of attention in subordinate agents;—his salary is therefore well earned, and the farmer will not think it thrown away. In whatever manner the accounts are kept, whether by the farmer himself or by a clerk, method is of great importance: and whatever may be said against it by those who do not know its value, there is no system of accounts which can be compared with the well-known method of double entry, as it is called, which is of Italian invention. The principle of this method is so simple that the slowest arithmetician cannot be confused by it, and it is so perfect that no error can escape its scrutiny. As applied to agricultural accounts, which are simple in their nature, it becomes so clear, that if once adopted, it is impossible that it should ever be abandoned. The satisfaction of a perfect proof of the correctness of the accounts is so great, that no one who has ever experienced it will be satisfied with any other method.

To give a general and comprehensive notion of the system of double entry, to those who are unacquainted with it, would lead us from our present purpose, suffice it to say, that every account is checked by another, in which the same entry is made in a different manner. The sum of all the entries must be equal on each account; and consequently any inequality indicates an error somewhere, which may be detected.

In the accounts of a farm there are many separate items to be taken into consideration. There may be a separate account kept for every field. There should always be one for every crop of which the rotation consists. There is an account of the labour of men and horses; of the produce of the dairy; of the stock purchased to be fatted, or sold again in an improved state. In short the divisions of the general account may be increased without limit. The more subjects there are to furnish items for an account, the more difficult it is to strike a balance, but, with a little attention and perseverance, it may be done; and he who keeps very correct accounts will always be the first to discover any impending evil, and to take measures to provide against it.

The basis of all the accounts is a daily journal of every transaction, which must be collected from all the labourers and agents employed. M. De Dombasle, at his celebrated farm of Roville, in France, has all his principal servants and his apprentices assembled every evening after the day's work is over. Each man gives an account of the work done by him or under his superintendence, which is written down by the clerk. The orders for the next day are then given, and every one returns to his lodging or his home. In the course of the next day the clerk enters all that is in the journal into a book, where every person employed has an account; every field has one; every servant and domestic animal has one; and every item which can be separated from the rest is entered, both as adding to the account or taking from it. For example, the milk of the cows is entered daily. The quantity of butter, butter-milk and skimmed-milk, which it produces is also entered; and these two accounts check one another. Any error is immediately detected, and the knowledge of this prevents mistakes. An entry should be made of every particular operation in each field, that the farmer may know which is his most profitable land. The number of ploughings, the quantity of manure, the state of the weather, and all other circumstances which may influence the return should be carefully noted, in order that it may be clearly seen whether any experiment or deviation from the usual routine is advantageous or otherwise. Thus all real improvements may be encouraged, and uncertain theories detected by the result.

The most important circumstance which influences the profits of a farmer is the cost of his team and the wages of his labourers. These vary in different situations so much, that they greatly influence the rent which he can afford to give for the land. In some parts of the country the horses are pampered and kept so fat that they can scarcely do a day's work as they ought. In others they are over-worked and badly fed. Either extreme must be a loss to the farmer. In the first case, the horses cannot do their work, and they consume an unnecessary quantity of provender; in the other, they are soon worn out, and the loss in horses that become useless or die is greater than the saving in their food, or the extra work done by them. A horse properly fed will work eight or ten hours every day in the week, resting only on Sundays; by a judicious division of the labour of the horses, they are never over-worked, and an average value of a day's work is easily ascertained. This, in a well regulated farm, will be found much less than the common valuations give it. It is here that most of the errors are to be detected in the accounts of the expense of cultivation given in evidence before parliament, without any intention to deceive in those who gave the accounts. There have been printed forms invented in order to render the accounts more simple as well as more comprehensive. Forms may be of use to enter minute details; and each superintendent labourer may have a form of entry for the work which he performs or superintends; but the ledger should be kept exactly as that of a mercantile man, and be frequently balanced to ensure correctness. This is a thing which cannot be too strongly recommended to young farmers.

When a farm has been agreed for as far as rent is concerned, there are always conditions in a lease, which it is of great importance to the farmer to understand fully. It is necessary that the landlord should have some security against the wilful deterioration of his land by a dishonest tenant, but agents are too apt to cramp the tenants by prescribing the exact mode of cultivation without giving the tenant sufficient scope to try improved methods, which may ultimately be highly beneficial to all parties. If the landlord can ensure that the proper quantity of manure is put on the land every year, and that it shall be well tilled and kept free from weeds, he need not have any other protection, unless it be for the last two or three years of the lease, when the tenant might be induced to over-crop the land, and thus exhaust it.

In entering on a farm there is often a heavy demand on the in-coming tenant for work done by the predecessor, for a supposed remainder of manure, and various other items, which are usually settled by reference to the custom of the country. Some general rule is required to regulate all these demands, which are often exorbitant, and cripple the in-coming tenant in his capital. It is just that an outgoing tenant should be repaid for any permanent improvement which he has made, and of which he has not reaped the whole advantage, and that he should be encouraged to keep up the proper cultivation of the land, so that the incoming tenant may be able to continue the regular course. But this he will not do, unless he expect to be remunerated. On the other hand, it is also just that the in-coming tenant should not pay for work slovenly done or for supposed remnants of manure which do not exist in the land. We have known instances where the valuation of all the items to be paid for by the in-coming tenant greatly diminished his capital and crippled his operations for several years. There should therefore be a separate stipulation on this head before a farm is finally hired.

FARMER, Dr. RICHARD, descended from a respectable family in Leicestershire, was born at Leicester, August 28, 1735. He received the early part of his education in the Free Grammar School of his native town, and in 1753 was entered a pensioner of Emmanuel College, Cambridge. He appears to have been little influenced by the overbearing tendency to mathematical study which existed and still exists in that University, and, after his degree, took no interest in pursuits of that nature, farther than was necessary for the purposes of college tuition. In 1760 he became Classical Tutor of Emmanuel College, which office he held until his election to the mastership in 1775. He served the office of Vice-Chancellor in the same year, and in 1778 was elected Chief Librarian to the University. In 1780 he was collated to a prebendal stall at Lichfield, and some time afterwards became Prebendary of Canterbury, which he resigned (1788) for the office of a Canon Residentiary at St. Paul's. He died after a long and painful illness, at Emmanuel Lodge, Sept. 8, 1797, and was buried in the chapel. An epitaph to his memory was written by Dr. Parr, and is inscribed on the college cloisters. Dr. Farmer collected a valuable library of tracts and early English literature, which was sold after his death and produced, as it is said, a great deal more than it originally cost.

Dr. Farmer's constant residence at Cambridge is said to have been owing to an early disappointment in love; a cause perhaps more productive of resident fellows than any other. His political principles were inclined to toryism, and he appears to have been attached to that party in the church which goes by the name of 'orthodox.' His manners were frank and unreserved, and his habits rather those of a boon companion than of a clergyman. It is reported of him that he declined a bishopric rather than forego his favourite amusement of seeing Shakspeare performed on the stage, a reason which, if founded on truth, had at all events more cogency in the time of Garrick than at present.

Dr. Farmer is celebrated, and justly so, for one single work, his 'Essay on the Learning of Shakspeare,' which, in our opinion, surpasses anything of the kind written in England, and is perhaps the best commentary which we possess. The mixture of gold and rubbish which is generally appended as notes to every edition of Shakspeare contains so little of the former element and so much of the latter, that it is not easy to estimate such commentaries as Dr. Farmer's above their true value; indeed, if we had to choose from all Shakspeare's voluminous annotators what appears to us most deserving of study, we should have no hesitation, as far as English literature goes, in fixing on Coleridge's 'Lectures' and Dr. Farmer's 'Essay,' works which are, and are intended to be, entirely dissimilar, but which, more than any others, come up to our notion of a commentary on Shakspeare.

FARMERS GENERAL, Fermiers Généraux, was the name given in France under the old monarchy to a company which farmed certain branches of the public revenue, that is to say, contracted with the government to pay into the treasury a fixed yearly sum, taking upon itself the collection of certain taxes as an equivalent. The system of farming the taxes was an old custom of the French monarchy. Under Francis I., the revenue arising from the sale of salt was farmed by private individuals in each town. This was and is still in France and other countries of Europe a monopoly of the government. The government has alone the right of providing the people with salt, which it collects in its stores, and sells to the retailers at its own price. This monopoly was first assumed by Philippe de Valois in 1350. Other sources of revenue were likewise farmed by several individuals, most of whom were favourites of the court or of the minister of the day. Sully, the able minister of Henry IV., seeing the dilapidation of the public revenue occasioned by this system, by which, out of 150 millions paid by the people, only 30 millions reached the treasury, opened the contracts for farming the taxes to public auction, giving them to the highest bidder, according to the antient Roman practice. By this means he greatly increased the revenue of the state. But the practice of private contracts through favour or bribing was renewed under the following reigns: Colbert, the minister of Louis XIV., called the farmers of the revenue to a severe account, and by an act of power deprived them of their enormous gains. In 1728, under the regency, the various individual leases were united into a Ferme Générale, which was let to a company, the members of which were henceforth called Fermiers Généraux. In 1759, Silhouette, minister of Louis XV., quashed the contracts of the farmers general, and levied the taxes by his own agents. But the system of contracts revived: for the court, the ministers, and favourites were all well disposed to them, as private bargains were made with the farmers general, by which they paid large sums as douceurs. In the time of Necker, the company consisted of 44 members, who paid a rent of 186 millions of livres, and Necker calculated their profit at about two millions yearly, no very extraordinary sum, if correct. But independent of this profit there were the expenses of collection, and a host of subalterns to support: the company had its officers and accountants, receivers, collectors, &c., who having the public force at their disposal, committed numerous acts of injustice towards the people, especially the poorer class, by distraining their goods, selling their chattels, &c. The 'gabelle' or sale of salt, among others, was a fruitful source of oppression. Not satisfied with obliging the people to pay for the salt at the price fixed upon it in the name of the king, they actually obliged every individual above eight years of age to buy a certain quantity of salt whether wanted or not. But the rule was not alike all over France; in some provinces, which enjoyed certain privileges, salt was nine livres the 100 weight, whilst in others it cost 16, and in some 62 livres. In some provinces the quantity required to be purchased per head was 25 pounds weight; in others it was nine pounds. And yet the provinces, nay the individual families of each province, were prohibited under the severest penalties from accommodating each other's wants, and buying the superfluous salt of their neighbours, but whoever wanted more salt than his obligatory allowance was obliged to resort to the government stores. Besides, every article of provisions that was exported from one province to another was subject to duties called Traites. Every apprentice on being bound to a master was bound to pay to the king a certain sum according to the nature of the trade, and afterwards a much larger sum on his admission to practise his trade as a master. These few instances may serve to convey an idea of the spirit of taxation in France previous to the revolution. A lively but faithful picture of the whole system is given in Breton's *Histoire Financière de la France*, 2 vols. 8vo., Paris, 1829. The farmers general, as the agents of that system, coming into immediate contact with the people, drew upon themselves a proportionate share of popular hatred. But the revolution swept away the farmers general, and put an end to the system of farming the revenues: it equalized the duties and taxes all over France; but the monopoly of the salt and tobacco has remained, as well as the duties on provisions, cattle, and wine brought into Paris and other large towns, and the right of searching by the octroi officers, if they think fit, all carriages and individuals entering the barriers or gates of the same.

The system of farming the taxes, although generally disapproved of, is still continued in some European states. Not many years ago the custom-house duties at Naples were farmed by private speculators. For the character and effects of the system see Necker, *De l'Administration des Finances*.

FARNABY, or FARNABIE, THOMAS, a learned critic and grammarian, was born in London in 1575. His grandfather was of Truro in Cornwall; but his great-grandfather, an Italian musician, was the first of his family who settled in England. He was admitted of Merton College, Oxford, in 1590, in the station of a servitor; but being of an unsettled disposition, he quitted the university abruptly, changed his religion, passed over to Spain, and was received into one of the colleges of that country belonging to the Jesuits. Growing weary of the discipline of the Jesuits' institution, he did not stop very long with them, but in 1595 joined Sir Francis Drake and Sir John Hawkins in their last expedition. He is reported also to have served subsequently as a soldier in the Low Countries. Gaining no profit in these expeditions, he returned to England, landed in Cornwall, and in the urgency of his necessities descended to the humble employment of teaching children their horn-book. In this situation he assumed the name of Thomas Bainrafe, the anagram of Farnabie. After some time he changed his residence to Martock in Somersetshire, where he established a grammar-school for youth with great success, under his own name. From Martock he removed to London, and opened a school in Goldsmiths' Rents behind Red-cross-street, near Cripplegate, where his reputation became so established, that the number of his scholars, chiefly the sons of noblemen and gentlemen, amounted at one time to more than 300. Antony à Wood says, his school was so frequented that more churchmen and statesmen issued from it than from any school taught by one man in England. Whilst here he was created M.A. in the University of Cambridge, and on the 24th April, 1616, was incorporated in the same degree at Oxford. In 1636 he quitted London to reside at Sevenoaks in Kent, but here he resumed his former occupation, and, with the wealth which he had accumulated, purchased landed property both in Kent and Sussex. In 1641 he became mixed up in the commotions of the times as a favourer of the royal cause, and was fortunate in receiving no other punishment than residences in prison, first in Newgate, and afterwards in Ely House. It was at one time debated in the House of Commons whether he should not be transported to America. Wood insinuates that some of the members of both Houses who had been his scholars were among those who urged his being treated with severity. He died on the 12th of June, 1647, and was interred in the chancel of the church at Sevenoaks.

His own works were—1. 'Index Rhetoricus Scholis accommodatus,' 12mo. Lond. 1625: to which in 1646 were added 'Formulæ Oratoriæ et Index Poeticus:' the fifth edition was printed in 1654. 2. 'Florilegium Epigrammatum Græcorum, eorumque Latino versu à variis redditorum,' 8vo. Lond. 1629, 1650. 3. 'Systema Grammaticum,' 8vo. Lond. 1641. 4. 'Phrasæologia Anglo-Latina,' 8vo. Lond. 5. 'Tabulæ Linguæ Græcæ,' 4to. Lond. 6. 'Syntaxis,' 8vo. Lond. His editions of the classics, with annotations, were Juvenal and Persius, 12mo. Lond. 1612; Amst. 1662; Hag. 1663. Seneca, 12mo. Lond. 1613; Amst. 1632, 1634; 8vo. Pat. 1659; 12mo. Amst. 1665. Martial, 12mo. Lond. 1615; Gen. 1623; Lond. 1633. Lucan, 12mo. Lond. 1618; 8vo. Francof. 1624. Virgil, 8vo. Lond. 1634. Ovid, fol. Par. 1637; 12mo. Lond. 1677, &c. His Notes upon Terence were finished only as far as the fourth comedy when he died; but Dr. Meric Casaubon completed the two last comedies, and published the whole at London, 12mo. 1651. Other editions were 8vo. 1669; and Salm. 1671. Dr. Bliss, in his additions to Wood's Athenæ, says, 'Farnaby intended an edition of Petronius Arbiter's Satyricon.' (*Biogr. Brit.* Kippis's edit. vol. v p. 682; Wood's *Ath. Oxon.* last edit. vol. iii. col. 213-216 *Biogr. Universelle*, tom. xiv. p. 168.)

FARNE'SE, the name of a noble family of modern Rome, who were originally feudatories of the territory of Farnese and Montalto, in the Papal States, south-west of the lake of Bolsena, and near the borders of Tuscany. The splendour of this family was greatly increased by the exaltation of Cardinal Alessandro Farnese to the Papal See after the demise of Clement VII. in October, 1534. [PAUL III.] This pope had a natural son, Pier Luigi Farnese, whom he determined to make a sovereign prince. For this purpose he first of all alienated part of the territory of the church in the neighbourhood of the feudal domain of his family, and formed a duchy called that of Castro, from the name of its chief town, adding to it the towns of Ronciglione and Nepi, with their territories. This district, which comprised nearly one-half of the province called Patrimonio di S. Pietro, he bestowed on Pier Luigi and his descendants, with the title of Duke of Castro, as a great fief of the Holy See. He also obtained for him from Charles V. the investiture of the Marquisate of Novara as an imperial fief, and from the Venetian Senate permission to be inscribed on the golden book of the patricians of Venice, an honour considered as equal, if not superior, to that of a feudal title. The pope also made his son Gonfaloniere, or Captain General, of the Holy See, an office which Pier Luigi dishonoured by the most depraved conduct. Lastly, Paul III. in 1545 gave his son the investiture of Parma and Piacenza, which Pope Julius II. had conquered, with the title of sovereign duke of those states, on condition that the duke and his successors should pay an annual sum of 8,000 ducats to the Roman See. The emperor Charles V., however, who, as Duke of Milan, had claims on Parma and Piacenza, would not bestow the investiture upon Pier Luigi. The new Duke of Parma and Piacenza soon became hateful to his subjects for his vices and oppression, and a conspiracy was formed by Count Anguissola and other noblemen, secretly countenanced by Don Ferrante Gonzaga, imperial governor of Milan, who hated Pier Luigi. On the morning of the 10th September, 1547, Anguissola stabbed the duke while at dinner in the ducal palace of Piacenza, and threw his body out of the window, when it was mutilated and dragged about by the mob. Piacenza was taken possession of by the imperial troops, but Parma remained in possession of Ottavio Farnese, son of the murdered duke. In 1556, Philip II., as sovereign of the Milanese, restored Piacenza to the Duke Ottavio, but the citadel continued to be garrisoned by Spanish soldiers. Ottavio dying in 1587, was succeeded as Duke of Parma and Piacenza by his son Alessandro Farnese, who distinguished himself as general of the Spanish armies in the wars against France. He was made governor of the Spanish Netherlands by Philip II., and carried on the war against the Prince of Orange. He is known in history by the name of the Duke of Parma. Alessandro died in 1592, and was succeeded by Ranuccio Farnese, a suspicious and cruel prince. A conspiracy was hatched against him at Rome, but it being discovered, a number of people were put to death in 1612. His successor, Odoardo Farnese, quarrelled with Pope Urban VIII. about the Duchy of Castro, which that pope wished to take away from him to give it to his own nephews, the Barberini. This gave rise to an absurd and tedious warfare between the papal troops and those of Parma. Ultimately, through the mediation of other princes, the Farnese were left in possession of Castro, but under the following pontificate of Innocent X. they were finally deprived of that territory in 1650, and the pope razed the town of Castro to the ground, under the pretence of its bishop having been murdered by some assassins. This occurred under Ranuccio II., Farnese, Duke of Parma, who had succeeded Odoardo. The Farnese continued to rule over Parma and Piacenza till 1731, when the last duke, Antonio Farnese, having died without issue, the male line of the Farnese became extinct. But Elizabeth Farnese, wife of Philip V. of Spain, claiming the duchy for her children, it was ultimately given, by the peace of Aix la Chapelle, to her younger son Don Filippo. [PARMA.] The other fiefs, however, and the personal property of the Farnese, including the rich museum and the splendid palaces at Rome, were given to his brother, Don Carlos, king of the two Sicilies, and some of the finest statues and paintings in the museum of Naples are derived from that inheritance. The Farnese palace at Rome, which belongs to the king of Naples, is considered the finest among the numerous palaces of that city. The Farnesina or smaller mansion on the opposite or right bank of the Tiber is known for the beautiful frescoes of Raphael. The Orti Farnesiani occupy a great part of the Palatine, and include some remains of the palace of the Cæsars.

Among the various families which have owed their aggrandizement entirely to a papal ancestor, the Farnese attained the highest rank among Italian princes, and retained it the longest. It has also produced several cardinals, distinguished for their learning. (See Ciacconius, *Vitæ et Gesta summorum Pontificum et Cardinalium*; Moreri's *Dictionary*, art. 'Farnese;' and Affo's *Vita di Pier Luigi Farnese*, and the Italian historians of the 16th century.)

FARNHAM, a town in the parish and hundred of Farnham and county of Surrey, 9½ miles west by south from Guildford, and 38 miles south-west by west from London. The town, which is situated near the north bank of the Wey, consists of one principal street running east and west, and contains many excellent houses. Though not a corporation, it is governed by twelve masters or burgesses, from whom two bailiffs are annually chosen. These magistrates act under the bishop of Winchester, to whom they pay an acknowledgment of 12*d.* per annum, receive the profits of the fairs and markets, and hold every three weeks a court, which has power to determine all actions under forty shillings. Farnham once returned members to parliament. The church, which is dedicated to St. Andrew, was formerly a chapel of ease to Waverley Abbey, and appears to have been erected about the beginning of the sixteenth century. The tower is substantially built, and has a small turret at each corner. In the interior there are some handsome monuments, and a fine painting of the twelve apostles forms the altar-piece. The vicarage is in the diocese of Winchester; patron the archdeacon of Surrey, and average net income 430*l.* The other public buildings are a market-house, a free-school, and a good day-school supported by charitable contributions. The manor of Farnham was given by Ethelbald, king of the West Saxons, to the see of Winchester, to which it has ever since belonged. On the north side of the principal street, and on the summit of a hill, formerly stood a castle, built by Henry de Blois, brother of King Stephen, and bishop of Winchester. This fortress was destroyed by Henry III. It was re-built, and again destroyed during the civil war. After the Restoration Dr. Morley, bishop of Winchester, expended a considerable sum in erecting the present structure, which is of brick, covered with stucco, embattled, and of a quadrangular form. It contains a fine library, and some good paintings. Adjoining the castle is an extensive park, through which the little river Loddon flows. About two miles south-east of the town is Moor Park, once the seat of Sir William Temple. On the borders of the park is Waverley Abbey, a neat modern mansion, which derives its name from a monastery of Cistertian monks, the ruins of which are in the vicinity. Farnham is noted for its hop plantations. It had formerly some cloth manufactures. The great mart for the Farnham hops is Weyhill fair. The largest plantations are less than 60 acres. The average produce is about 6¼ cwt. per acre. According to the census of 1831, the population of the parish of Farnham was 5858. The market-day is Thursday. The fairs for horses, cattle, sheep, and hogs are held on Holy-Thursday, 4th June, and 13th November.

(Carlisle's *Topog. Dict.*; Stevenson's *Survey of Surrey*; M'Culloch's *Commercial Dict.*; *Beauties of England and Wales*; *Municipal Corporation Reports*; *Ecclesiastical Revenues Reports*; *Population Returns*.)

FARO in Italian and Spanish, *pharus* in Latin, *phare* in French, was the name given to light-houses in the Mediterranean. The first light-house, called Pharus, is said to have been that raised by Sostratus of Cnidus B.C. 283, on the island at the entrance of the new harbour of Alexandria, the island itself being called Pharos. [ALEXANDRIA, ANTIENT.] The name became afterwards an appellative for light-houses, and in some instances it has been given to the towns near which a light-house was built. Such, for instance, is the town of Faro, in Algarve. Torre di Faro, a light-house on Cape Pelorus, in Sicily, has given its name to the straits at the entrance of which it is placed, between Calabria and Sicily, and which the Italians call Faro di Messina. The united kingdom of the Two Sicilies is divided, with regard to its administration, into 'dominj di quà del Faro,' meaning the continental part, and 'dominj di là del Faro,' that is to say, the island of Sicily.

FAROE, FEROE, or FAROERNE ISLANDS, a group twenty-two in number, seventeen of which are inhabited; they are about 300 miles west of the coast of Norway, and about 200 north-west of the Shetland Isles, between 61° and 63° N. lat., and 8° and 6° W. long. They were discovered between the years 858 and 868 by some Norwegians, in the time of Harold Harfager, king of Norway, and at present belong to Denmark. Their whole area is estimated at about 494 square miles, and the population at about 5800.

These islands mostly consist of steep rocks, some of them rising gradually from the sea, by two or more sloping terraces, covered with a thin stratum of earth, which produces grass. Close to the sea the land consists in general of perpendicular rocks, from twelve to eighteen hundred feet in height. The most westerly island is Myggenaes, the most southerly is Suderoe, the most easterly are Svinoe and Fugloe, and the most northerly are Kalsoe and Videroe. The interior is composed of hills, usually separated only by narrow ravines, in which there are brooks or rivulets which are in general so swollen in the rainy season as to become impassable: there are no valleys of any extent. Some authors report that the greatest elevation in these islands is the basalt mountain Skaellingfield, in the south part of the largest of them, Stromoe, which is nearly the central island of the group, and divided by narrow straits from Vaagoe and Osteroe; this mountain is about 2240 feet high. Another writer mentions the Skattaretinel as being the highest, and states its elevation at 2816 feet. There are several lakes, among which the largest are the Soorvagsvatn in Vaagoe, which is three miles long, and the Sandsvatn in Sandoe: and there are some falls of water, the most considerable of which is the Fosaa in Stromoe, which has a double fall, nearly 200 feet in height. Among the mineral springs the most esteemed is that of Varmakielde in Osteroe. The climate is very bleak, and the summer lasts only through the months of July and August: yet it seldom freezes more than one month in the year, nor are the harbours ice-locked except in very severe winters. Violent storms prevail at all seasons, which prevent the growth of any large trees, and compel the inhabitants to fix their dwellings between the hills. The soil is stony, and in many parts covered with earth only four inches deep. In some islands there are majestic groups of basalt formation, similar to the caves of Staffa. Neither the soil nor climate admit of any extended tillage; and the sudden variations in the temperature induce the cultivator frequently to gather in his crops in a half-ripe state, and dry them by artificial heat. They consist principally of barley and rye, the growth of which is scarcely adequate to the consumption; potatoes, parsnips, turnips, and carrots are partially raised, but it is extremely difficult to raise any other vegetable. Landt states the proportion of the cultivated to the uncultivated land to be about 1 to 60, and that the corn-fields are not more than from 8 to 12 feet in breadth. The pasture-lands are luxuriant, and the chief wealth of the islanders consists in their flocks, often containing from 300 to 500 sheep, which graze in the open air the whole year round, and yield wool of good quality. Horses of small stature, but strong, swift, and sure-footed, are bred in considerable numbers: the horned cattle are also diminutive, yet become exceedingly fat. Few swine are fed. The dog is in so much request, that his value is equivalent to that of a cow. Seal-catching, and the whale, cod, herring, and other fisheries are another main resource of the people. Independently of domestic animals, the islands contain only rats and mice. There is an immense number of wild-fowl, such as eider-ducks, swans, geese, pigeons, solan-geese, puffins, cormorants, plovers, &c.

Turf is used for fuel. Beds of coal were discovered in the island of Suderoe in 1709, and some mines have been opened from time to time; but the coals are of inferior quality, and the cost of working and transporting them has caused them to be abandoned. Copper is found in the island of Nolsoe. Jasper and opal are met with here and there.

The inhabitants are of Norman (or Norwegian) descent, and speak the Norwegian language with a Danish accent. They have in general handsome features, and are well made: those of the northern are taller, and have more elongated countenances than those of the southern islands. They are ingenious, peaceable, honest, hospitable, and simple in their manners. Their number in 1769 was 4775;

in 1782, 4409; and in 1801, 5265. Their food consists of milk, fish, mutton, poultry, wild-fowl, and barley groats; bread and salt are considered luxuries. Their clothing is of coarse woollen, woven by their own hands. They are either hereditary proprietors of the soil which they cultivate, or farm lands under grant from the crown, from which circumstances they have the respective appellations of Odelsbonde or Kongsbonde. Christianity was introduced among them about the year 1000; they now profess the Lutheran faith, and are divided into thirty-nine flocks, under the care of seven incumbents, who minister among them week by week in rotation, the service in their absence being performed by one of the elder parishioners. The amtmann, or bailiff, is at the head of civil affairs: in judicial matters the landvoigt, or judge, is assisted by sidesmen from each parish.

Ship-building and commerce have greatly improved since a free trade with Denmark was granted at the beginning of the present century. There are some mechanics and good shipwrights; woollen-yarns, cloths, and stockings are manufactured; and there are a few tanneries. The exports consist of hose and trowserings, fish, feathers, skins and hides, butter, tallow, train-oil, &c.: the imports, of grain, bread, malt, brandy, salt, hemp, iron, timber and deals, linen, &c. The whole revenues of the islands are said to be about 4000 dollars, or 900*l*.

The larger islands are Stromoe, 27 miles long and about 7 in breadth: its capital Thorshavn, on the south-east side of the island, is the seat of government, and has a neat wooden church, a Latin school, and a fort. The streets are exceedingly narrow. There are about 100 houses with as many families. Population about 1600. Osteroe, to the east of Stromoe, is in length about 20 miles, and in its greatest breadth about 10. It has two fresh-water lakes and several deep fiords, or inlets of the sea, on the eastern side. There is a curious basaltic hill about 420 feet high, consisting of pentagonal and octagonal columns, on a foundation of trap 300 feet in height; and at the N.N.W. point of the island there are two rocks, with the appearance of colossal statues, which are called Risin and Kiedlingen, and are 240 feet high. On the south-west side is a safe harbour, the Kongshavn. The population of Osteroe is about 1300. Sandoe, to the south of Stromoe, is about 13 miles long and 1½ broad: it has a large lake called Sandsvath, which abounds in trout, five villages, three churches, and is the residence of the Amtspropst, who is the head ecclesiastical authority. Suderoe, lying south of the preceding, is about 17 miles in length and 5¼ in its greatest breadth, and contains 10 villages and 6 churches. It is full of rocks and precipices. Population about 700. Punthavn, its port, is almost the only spot where there is a safe landing. Vaagoe, to the west of Stromoe, is nearly 13 miles long and about 5 broad. Its principal lake, Soorvaag, is the largest in the Faroe islands, and is full of trout. It has four churches, the parochial one being at Midvaag, a village and seaport. Myggenaes, to the west of Vagoe, is an inconsiderable island about three miles broad. The remainder of the 17 inhabited islands are Fugloe, Svinoe, Videroe, Bordoe, Konoe, Kalsoe, Kolter, Hestoe, Nolsoe, Skuoe, and the greater Dimon. (Landt's *Faroerne;* Thaarup's *Danske Stat;* Hassel's *Denmark.*)

FARQUHAR, GEORGE, was born at Londonderry in 1678, and received his education at the university of Dublin. Though he displayed talents at an early age he did not take any degree, but forsook his severer studies for the stage, and appeared at the Dublin theatre. He never however made any great figure as an actor, and having had the misfortune to wound a brother comedian with a real sword, which he mistook for a foil, he forsook the stage, being at that time only seventeen years of age. He accompanied the actor Wilks to London, and attracted the notice of the Earl of Orrery, who gave him a commission in his own regiment, which was then in Ireland.

Wilks exhorted him to try his powers as a dramatist. Accordingly in 1698 he produced his comedy of 'Love and a Bottle,' which was so successful as to encourage him to another effort. His 'Constant Couple,' which appeared two years afterwards, was played 53 nights in the first season, and was the cause of the favourable reception of a very indifferent sequel which he wrote under the title of 'Sir Harry Wildair.' In 1703 he produced a version of Beaumont and Fletcher's 'Wild-goose Chase,' under the name of the 'Inconstant,' which, though it had small success at the time, was occasionally played at the London theatres a very few years back. He was married in the same year, and getting into great difficulties was forced to sell his commission. Being deceived by a nobleman, who had promised to assist him, he was so deeply affected that he fell into a decline, and died in 1707. During his last illness he wrote his celebrated 'Beaux Stratagem.'

The appearance of Farquhar's comedies may be regarded as an important epoch in the history of the English drama. None of his celebrated predecessors bear any resemblance to him: he was the first of his period to write in an easy flowing style, equally removed from the pedantic stiffness of Congreve and the formal courtly viciousness of the Etherege school. Immoral and licentious as his plays may appear to readers of the present day, those who are conversant with writings of that time must acknowledge them to be considerably more pure than those of his contemporaries, if we except his first piece 'Love and a Bottle.' Let any one who is disposed to be severe upon Farquhar cast his eye for a moment over the gross works of Wycherly, or the obscene and filthy trash of Mrs. Behn; let him compare Farquhar's volatile and airy Sir Harry Wildair with the cold-blooded and brutal Dorimant, held forth by Etherege in the 'Man of Mode' as a model of what a gentleman should be, and then he will measure the former by a right standard. Farquhar attended more to character than most writers of the day: he introduced a variety of classes talking in appropriate language, while the persons of Congreve's drama were but an assembly of professed wits, and those of Etherege and others were only rakes, city dupes, unfaithful wives, and women of the town, most of them speaking pretty much alike. At all events their pieces were marked by only one distinction of character, that between the injurer and the injured, the former of whom was held up as a clever personage, and the latter made to talk like a fool.

It is singular enough that the critics regarded as Farquhar's chef d'œuvre a serious comedy called the 'Twin Rivals,' which has now sunk entirely into oblivion, or at best is only remembered by readers of the old English drama as containing a masterly though disgusting portrait of a procuress, under the name of 'Mother Midnight.' A neat edition of his works was published in 1736.

FARRANT, RICHARD, one of the highly-venerated fathers of English church music, was born in the early part of the sixteenth century. He was a gentleman of the chapel-royal in 1564, and subsequently organist and master of the choristers of St. George's chapel, Windsor. His death is supposed to have taken place about the year 1585. So long as solemn harmony of the purest and finest kind shall find admirers, so long will his service in G minor, and more especially his two anthems, 'Hide not thou thy face,' and 'Call to remembrance,' be productive of the most delightful emotions that can arise out of a love of art combined with religious feeling.

FARRINGDON, a town in Berkshire, in the hundred of Farringdon, and in the parish of Great Farringdon. It is pleasantly situated on an eminence, 36 miles north-west by west from Reading, and 69¼ miles west by north from London. It is governed by a bailiff and inferior officers. The market-day is Thursday. There are three annual fairs, viz. on Old Candlemas-Day, Whitsun-Tuesday, and 29th October, besides a statute fair on the 18th October for hiring servants. The Saxon kings had a palace at Farringdon, wherein Edward the Elder died in 925; and a castle was built here during the wars in the reign of Stephen, by the earl of Gloucester, or his son, but was totally destroyed a few years after by Stephen. In 1202 this king founded at Farringdon a priory of Cistertian monks, subject to the abbey of Beaulieu in Hampshire, and here, according to a manuscript in the Bodleian Library, King Henry III., his queen, and Prince Edward passed a night, being entertained at the cost of the abbot of Beaulieu. The expense of the king's entertainment amounted to 100*s.* 6*d.*, the queen's to 75*s.*, and Prince Edward's to 50*s.* 6*d.* This priory, like the castle above mentioned, has long since been entirely ruined, and no vestige is left of either of them. During the civil war Cromwell made an attack upon the town, which was successfully resisted by the garrison under Sir Marmaduke Rawdon, whose memory is commemorated by an inscription in the parish church. King Charles was at Farringdon after the second battle of Newbury. Near Radcot Bridge, about three miles to the north of Farringdon, was fought the battle between Robert Vere, duke of Ireland, and the earl of Derby, afterwards King Henry IV. The parish church, which is dedicated to All Saints, is a large and handsome structure in the Gothic style, and contains many old monuments, described in Ashmole's 'Antiquities of Berkshire' (Lond. 1719). It has a low square tower, formerly surmounted by a spire, which was destroyed during the civil war. The vicarage is in the diocese of Salisbury, and its average net income is 265*l*. The parish of Great Farringdon is partly in the hundred of Farringdon and partly in that of Schrivenham. According to the population returns for 1831, the entire parish contained 3033 inhabitants, and 6910 statute acres. (Lysons' *Magna Britannia;* Carlisle's *Topographical Dictionary;* Ashmole's *Antiquities; Ecclesiastical Revenues Report*, &c.)

FARS, or **FARSISTAN**. [Persia.]

FARTHING. [Money.]

FARTHINGALE, or **VARDINGALE**, a hoop, a circle of whalebone formerly worn by ladies to spread the petticoat to a wide circumference. Strutt, in his 'Manners and Customs,' vol. iii. pp. 84, 86, tells us that among the men, early in the reign of Queen Elizabeth, the wearing of great breeches was carried to very absurd and ridiculous lengths; and the ladies, that they might not be behind-hand with the gentlemen in fantastical taste, invented the large hoop farthingales as a companion to the trunk-hose or breeches. The farthingale afforded the ladies a great opportunity of displaying their jewels, and the other ornamental parts of their dress, to the utmost advantage, and for that reason obtained the superiority over the closer habits and the more simple imitations of nature.

Bulwer, in his 'Artificial Changeling,' says, when Sir Peter Wych was ambassador to the Grand Signior from King James I., his lady was with him at Constantinople; and the sultaness, having heard much of her, desired to see her; whereupon Lady Wych, accompanied with her waiting-women, all of them neatly dressed in their great farthingales, which was the court-dress of the English ladies of that time, waited upon her highness. The sultaness received her with great respect; but wondering much at the extension of her hips, inquired if that shape was peculiar to the women of England; to which the lady replied, that the English women did not differ in shape from those of other countries; and, by explaining to her the nature of the dress, convinced the sultaness that she and her companions really were not so deformed as they appeared to be. (Strutt's *Habits of the People of England*, vol. ii. pp. 259, 260.)

The farthingale however, if not then, was at least subsequently worn through Europe. The French farthingale had the name of *Hausse-cul;* see Cotgrave. Lascells, in his 'Voyage of Italy,' 12mo., 1655, p. 96, says, 'I found all the great ladies here to go like the donnas of Spain in guardinfantas, that is, in horrible overgrown vertigals of whalebone;' and Pepys, in his 'Diary,' 4to. edit., vol. i. p. 144, notices the strangeness of those worn by the ladies who came over from Portugal with Charles the Second's queen. The hoop, the last remain of the farthingale in England, went out at the beginning of the reign of George IV.

FASCES. [Consul; Dictator.]

FASCICLE, in botany, is, strictly speaking, that kind of inflorescence in which the flowers are arranged in a flat-headed raceme or corymb, and begin to expand in the centre sooner than at the circumference. The term is however constantly applied to any collection of flowers or leaves in clusters at the end or on the sides of a branch; thus the leaves of the larch are called fasciculate.

FASCICULA'RIA. [Madrephylliœa.]

FASCINES are bundles of strong brush-wood, employed chiefly for the purposes of reveting the epaulements of batteries and covering the roofs of field-magazines or other blindages, but occasionally to increase the heights of trench parapets, and to make temporary roads over marshy ground.

They are formed by placing the rods side by side in a cradle made of trestles, and compressing them by means of two levers connected by a chain, which is passed round the bundle: the whole is secured by withs or binders, which are placed 18 inches asunder. Fascines are commonly about 8 or 9 inches in diameter, and, when made, are 18 feet long; but they are then, if necessary, cut by the saw into parts of any required lengths, which are generally 6 feet or 12 feet. A fascine of the longest kind is sometimes called a saucisson.

When fascines serve for the revetment of a battery, they are usually laid horizontally, one line above another, against the interior slope of the epaulement, to which they are attached by pickets driven through them into the earth.

FASCIOLA'RIA. [Siphonostomata.]

FAST, abstinence from food, more particularly used for such abstinence as a religious observance; from the Anglo-Saxon *fæstan*.

Religious fasting has been practised in almost all ages and all countries. Moses appointed that of the Day of Expiation for the Israelites. Herodotus (ii. 40) and Porphry, give us details of the Egyptian fasts. Among the fasts of the primitive Christians, the greatest was that of Quadragesima, or Lent: but they likewise observed the *Jejunia quatuor temporum*, or fasts of the four seasons.

The fixed days appointed by the church of England for fasting are, first, the Forty days in Lent; second, the Ember days at the four seasons, being the Wednesday, Friday, and Saturday after the first Sunday in Lent, the Feast of Pentecost, September 14th, and December 13th; third, the three Rogation days, being the Monday, Tuesday, and Wednesday before Holy Thursday; fourth, all the Fridays in the year except Christmas-day. The 30th of January is observed as a fast, in repentance for the execution of Charles I.: and other days of fasting are occasionally appointed by royal proclamation. The Long Parliament appointed a fast on the last Wednesday of every month.

Lewis, in his *Antiquities of the Hebrew Republic*, has given from Maimonides many particulars of the Jewish fasts, for which the reader may also consult Ockley's translation of Leo Modena's *History of the Jews*, 12mo., Lond., 1707, p. 150, and D. Levi's *Rites and Ceremonies of the Jews*, 8vo., Lond., pp. 70, 71, 85, 120, 125. For those of the Greek church he may consult Leo Allatius, *De Ecclesiæ Occidentalis atque Orientalis, consensione*, and Ricaut's *Present State of the Greek and Armenian Churches, Anno Christi*, 1678, 8vo. Lond. 1679. For the Mohammedan fasts, Reland *De Religione Mohammedica*, 8vo., Tr. ad Rhen. 1717, ca. x. and D'Herbelot's *Bibliothèque Orientale*, p. 708. The distribution of the fasting days in the present church of Rome will be found in Bishop Challoner's *Garden of the Soul*.

FASTI were marble tables at Rome, on which were inscribed the names of the consuls, dictators, censors, and other principal magistrates of the republic. Fragments of these tables have been collected, and are ranged along the walls of one of the halls in the palace of the Conservatori on the Capitol. The deficiencies in the series of the consuls have been supplied by means of the historians, and by consulting monumental inscriptions. Several learned men in modern times have compiled Fasti, or chronological tables of the Roman consuls. Among the most learned and accurate of these compilers is Sigonio of Modena, who published his 'Fasti Consulares ac triumphi acti a Romulo rege ad Titum Cæsarem,' fol., 1559; with a dissertation 'de nominibus Romanorum,' a work of great erudition and exact criticism. Pighius published 'Annales Magistratuum et Provinciarum S. P. Q. R. ab Urbe condita,' fol., 1599. Labbe, in his 'Bibliotheca Nova,' published Fasti 'Consulares' out of a MS. of the college of Clermont. Other editions of the Fasti have been made from various sources. Between these lists occasional discrepancies occur as to the names of some of the consuls, and the particular years of their consulships; for, notwithstanding the labours of critics and antiquarians, there is still some uncertainty about Roman chronology. The word Fasti is often used as synonymous with the annals, or chronicles of a nation.

The Romans had another kind of Fasti, which they called 'Fasti minores,' a kind of almanacs, in which were registered the periodical festivals, games, official days for business, &c. Ovid wrote a poem explanatory of these Fasti, which he dedicated to Germanicus, and in which he described the origin of the festivals, and the recollections, either happy or calamitous, connected with the various days of each month. The poem, as we have it, is in six books, one for each of the first six months of the year; the rest is unfortunately lost.

FASTING. [Abstinence.]

FAT. This substance varies in properties according to the animals producing it; in all cases however it is composed of two different kinds which differ as to their melting point, these are termed *olein* or *elain* and *stearin*. It is not however to be considered that the substances to which these names are given are in all cases absolutely identical; they vary as to smell, taste, solubility in alcohol, &c., but all fats agree in being insoluble in water, and in not containing any azote, which is a common constituent of most other animal matter. It has not been decided whether the differences which exist in the properties of the various kinds of olein and stearin are derived from a real difference in their elementary composition, or are owing to an admixture of substances which have not as yet been separated from them. Chevreul has however found, that the olein of the fat of man, the sheep, and the hog, are so similar as to their composition, as to induce the belief that the difference depends upon some accidental admixture. There is nevertheless this difference between human fat and that of the sheep, that the stearin of the latter yields a certain quantity of stearic acid by saponification, whilst the former does not give a trace of it. This peculiarity may be explained by supposing the presence of another kind of stearin, which has not hitherto been separated. Olein and stearin may be separated by dissolving the fat in hot alcohol, from which the stearin separates on cooling: seven-eighths of the fluid are then to be distilled, and, on adding water to the residue, a mixture of a large quantity of olein and a small portion of stearin is precipitated; when this is treated with cold alcohol of sp. gr. 0·85, the olein is dissolved by it, and the stearin left; by distillation the alcohol is separated and the olein remains. We shall now notice the difference existing in the properties of some of the more remarkable kinds of fat.

Human fat varies a little according to the part of the body producing it; that from the region of the kidneys, after it has been melted, is yellowish and inodorous; it begins to concrete at 76° Fahr., and is solid at 64°: it dissolves in forty times its weight of alcohol of 0·821 when boiling, and on cooling stearin is deposited, which, after pressure in bibulous paper at 78°, is colourless, fusible at 122°, and may be cooled to 106° before it begins to congeal; its temperature, on account of the evolution of latent heat, then rises to 120°: 21·5 parts of this stearin are soluble in 100 parts of boiling anhydrous alcohol, the greater part of which separates in acicular crystals on cooling.

The *olein* of human fat is a colourless oily sweetish fluid, and remains so at 40°; at 60° its specific gravity is 0·913: 123 parts of this olein are soluble in 100 parts of boiling alcohol; on cooling to 170° the solution becomes turbid.

Ox fat.—When this has been fused it begins to solidify at 98°, and the temperature then rises, for a reason already mentioned, to 102°. Forty parts of boiling alcohol, of sp. gr. 0·821, dissolve one part of it; and it contains about three-fourths of its weight of stearin, which is solid, hard, colourless, not greasy, and of a granular crystalline texture; it fuses at about 112°, and may then be cooled to 102°, when, on congealing, it rises to 112°. It burns like white wax. Of this stearin about 15·5 parts are dissolved by 100 parts of anhydrous alcohol.

The olein of ox fat is colourless, nearly inodorous, and its specific gravity is 0·913; boiling alcohol dissolves nearly one-fourth more than its weight.

Sheep's fat (or *Mutton suet*) greatly resembles that of the ox; it is however whiter, and by exposure to the air acquires a peculiar odour. After fusion it congeals at a temperature varying between 98° and 102°; it dissolves in 44 parts of alcohol of sp. gr. 0·821. The stearin is white, translucent, and after fusion but imperfectly crystalline; about 16 parts are dissolved by 100 parts of boiling anhydrous alcohol; the olein of mutton suet, is colourless; its specific gravity is 0·913; and 80 parts of it are dissolved by 100 parts of anhydrous alcohol at 168°.

Hog's fat, or *hog's lard*, is a soft colourless solid, which fuses between 78° and 86°; its specific gravity at 60° is 0·938. By powerful and long continued pressure at 42°, between folds of blotting-paper, it is stated to yield $\frac{62}{100}$ its weight of colourless olein, of specific gravity 0·915; of this, 100 of boiling alcohol dissolve 123 parts the stearin of hog's lard is inodorous, solid, and granular, which, after fusion, remains liquid down to 100°, and then on congealing the temperature rises to 109°. It becomes acid by exposure to the air.

Goat's fat contains a peculiar fat, termed by Chevreul *hircin*, and to the presence of this its peculiar odour is owing, and which remains to a great degree with the olein when this is separated from the stearin; by particular management this fat yields hircic acid. [HIRCIC ACID.]

The *fat of birds.*—Goose fat is colourless, and of a peculiar taste and smell; after fusion it congeals at 80° into a soft solid of the consistence of butter. When subjected to bibulous paper to pressure at 30°, 100 parts are separable into 68 of olein, and 32 of stearin, fusible at 112°; the fat of ducks fuses at 76°, and yields 72 olein, and 28 stearin, fusible at 120°; turkey's fat is separable into 74 olein and 26 stearin, fusible at 112°.

The fat of insects has been but slightly examined, and does not offer any very remarkable properties: the fluid fats, whether of animal or vegetable origin, and which are usually termed OILS, will be considered under that head.

The olein and stearin of animal fats are highly useful and important substances in the manufacture of soap and candles; for the latter purpose stearin has been of late very advantageously employed and to a considerable extent as a substitute for wax.

The subjoined analyses of the stearin and olein of mutton suet may be taken as examples of the general constitution of these substances, and will show that their composition is less different than might be expected from their different properties:—

	Stearin.	Olein.
Hydrogen . .	11·770	11·090
Carbon . . .	78·776	79·354
Oxygen . . .	9.454	9·556
	100·	100·

FA'TA MORGA'NA, a name of uncertain derivation given to a very striking optical delusion which has been principally remarked in the Strait of Messina, between the coasts of Sicily and Calabria. It has been differently described by different observers, which we may attribute to the different states of the atmosphere at the periods of the respective observations. The indications both of the hygrometer and thermometer should have been carefully noted, in order to obtain a precise explanation according to the known laws of optics.

The images of men, of houses, &c. are occasionally seen from the coast, sometimes in the water, and sometimes in the air, or at the surface of the water. The same object has frequently two images, one in the natural and the other in an inverted position: the images of a single object are said also to be sometimes considerably multiplied.

In accounting for this phenomenon, it should be remembered that the mountains on both coasts of the strait nearly inclose a portion of quiescent or stagnant air, the temperature of which near the surface of the water is therefore easily raised above that of the surrounding objects. The rarer medium thus generated causes a depression in the places of the images, in the same manner that a denser medium would elevate them; and the secondary images formed between the air and water are necessarily inverse. The colours which are seen in hazy weather arise from the refraction of light through the small globules of vapour floating above the surface of the water, and would equally accompany any real object, as a ship, under the same circumstances. [MIRAGE.]

The remarks of Minasi, which have been so often copied, in explanation of this phenomenon, are unworthy of attention.

FATALISM. This term is used to express an article of philosophical religion, and usually signifies that the successive actions of mankind, and even the successive operations of the powers of nature, are under the guidance of some superior almighty power, so that these *successions* and the actions themselves are entirely independent of each other.[*] This doctrine has been embodied in all religious systems, though very different names have been given to the governing power. The Greeks called it *moira* or *ananke*, and the Romans called it *fate;* their mythology also mentions a Demiurgus, who had formed the gods. All the antient religions of Asia recognise a similar fate, something mightier than the gods, to whom it dictates laws; such, for example, as the alternating governments of Ormuzd and Ahrimanes in the Persian mythology, &c. Among the Hebrews the Pharisees were fatalists, the Sadducees materialists, and the Essenes deists. The old Germanic religion of Odin modified this Fate, and brought it nearer to the idea of the government of the world by a deity, identifying it with their highest god, Allfadur (Father of all). From this point fate changes to what is called predestination (in opposition to chance), which idea is only a mitigated fate, distinguished however from genuine fatalism in proceeding directly from God, and not from fate. This belief in predestination was taught by Mohammed, and his followers have retained it. Catholicism has no trace of this doctrine, but it is held by the Calvinists, and to a certain extent at least by the church of England.

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[*] Many Psychian physicians (*i. e.* of mental maladies) of modern times maintain the exact contrary, that all the actions of mankind are the effects of circumstances, and that all successive consequences depend on these actions.

The doctrine of fatalism, as is well known, has been frequently and effectively used both by antient and modern poets.

Intimately related to fatalism is the doctrine of the immediate and direct intervention of Providence in the government of the world. According to this doctrine the *consequences* of the actions of mankind depend wholly upon the actions themselves; God, however, is able so to conduct these consequences, that collectively they shall result in good, and conformably to his purpose. To comprehend this working precisely is impossible for man, since his mental powers are not sufficiently extensive, and this dogma must therefore be a matter of faith. This doctrine is held by many Christian sects, and in the Bible there are passages strongly in favour of such special intervention; for example, Matthew x. 29, 'Are not two sparrows sold for a farthing? and one of them shall not fall on the ground without your Father.'

The third or deistical interpretation of this doctrine teaches the complete non-intervention of the Deity in the affairs of the world or of mankind: we may also call this doctrine the doctrine of theological chance, which may still be consistent with that of physical necessity, according to Kant. The doctrine of physical necessity was advocated by Hobbes, and served for the foundation of the charges against him of deism and atheism.

If we consider these doctrines in a philosophical point of view we may come to the following results:—The theological theories of fatalism, predestination, the immediate government of God, and his non-intervention, evidently bear an analogical relation to the political systems of despotism, constitutional monarchy, and republicanism. Accordingly as every one may have grounds for being an adherent of one of these political systems, so may he also have grounds for being a follower of one of these theological views. According to the ideas and investigations of the author of this article, God may have positively fixed, before any creation of the world, the eternal ideas, or the relations of things to each other within the circle of which nature and human intelligence have to move. These ideas are (1) for nature, self-preservation, or continuance, of which the product is attraction, &c.; regularity, producing crystallization, &c.; and adaptation to purposes, producing organization, &c.; (2) for human intelligence, self-love, beauty and virtue. In so far as nature and humanity with all their efforts cannot move out of this sphere of ideas, so far fatalism and predestination exist. The efforts of nature to adapt means to ends, and the endeavours of the wise after virtue (or human happiness) appear to produce an ever-increasing progression, and in this sense they constitute an intervention of Providence—since nature being wholly bound, and God absolutely uncontrolled, man stands between both; so that though he is not absolutely free, yet he is free to work his ultimate ends out of himself; he is free whenever he acts morally, and he is not free whenever he acts immorally (or rather physically), and he may thus arrive at the consciousness that his state in another world entirely depends on himself. With this conviction every species of intervention would appear less harsh towards him, and without these grounds he may be doubtful whether any direct intervention exists with respect to worldly affairs.

An intervention of any other kind than that of God would lead to the doctrine of dæmons and spirits.

FATHER. [PARENT AND CHILD.]

FATHERS OF THE CHURCH is the name given to the early teachers and expounders of Christianity, who lived between the second and the sixth centuries of our æra, and whose writings are looked upon as possessing considerable authority in matters of faith. The earlier, or 'primitive fathers,' as they are sometimes styled, to distinguish them from the fathers of the fourth and fifth centuries, and who followed close upon the apostolical age, namely the age in which the Apostles lived and died, are generally reckoned as follows 1st. Clemens Romanus, bishop of Rome, who died about A.D. 100, and of whom we have an interesting epistle to the church of Corinth. [CLEMENT I.] 2nd, Ignatius, bishop of Antioch, a disciple of the Apostles in his youth, was sentenced to death under Trajan, A.D. 107, and was taken to Rome to be executed, as he informs us in his epistles. He was exposed to the wild beasts in the amphitheatre. There are extant several of his epistles to various churches of the East, and one to that of Rome. His epistle to Polycarp is doubtful. 3rd, Polycarp, bishop of Smyrna, who is said to have conversed with St. John and other Apostles in his youth, and who suffered martyrdom A.D. 167, when he was nearly 100 years old. He is the author of an epistle to the Philippians, which has been printed repeatedly, and is given in Cave's 'Antiquitates Ecclesiasticæ,' vol. i. 4th, Justinus, a native of Neapolis, in Palestine, a man of considerable learning, and a follower of various sects of philosophers. Having embraced Christianity he came to Rome in the time of Antoninus, had a controversy with Marcion, an early heretic, and wrote an eloquent apology for the Christians, which he addressed to Antoninus, and which drew from that emperor a rescript favourable to the Christians. Justinus afterwards returned to the East, where he held a disputation with Tryphon, or Tarphon, a learned Jew: on his return to Rome he had a controversy with Crescens, the philosopher, of which Jerome (*De Scriptis*), and Tatianus, a disciple of Justinus, give particulars. His second apology for the Christians was addressed, as it is believed, to Marcus Aurelius: soon after which he suffered martyrdom at Rome. We have of him, besides his two apologies, a 'Parænesis ad Græcos,' 'Dialogus cum Tryphone Judæo,' 'Epistola ad Diognetum,' and a 'Liber de Monarchia Dei.' 5th, Theophilus, made bishop of Antioch about 169, died about the beginning of the reign of Commodus. There is extant by him a work in three books, addressed to Autolycus, a heathen friend of Theophilus, whom he endeavoured to convert to the Christian faith 6th, Irenæus, a Greek by birth, and a disciple of Polycarp of Smyrna, came with Polycarp to Rome, and was thence sent to Lyon to assist the aged Photinus, bishop of that city, whom he succeeded A.D. 179. He wrote against the Gnostics and other heretics, and suffered martyrdom under Severus. He is called by Tertullianus 'a very inquisitive explorer of every kind of knowledge.' His principal work, written originally in Greek, but which has come down to us in a Latin translation, is styled 'Adversus Hæreses, seu de Refutatione et Eversione Falsæ Scientiæ, libri v.,' and is directed against the Gnostics. 7th, Clement of Alexandria, who was born about the middle of the second century, died about 220: left numerous works. [CLEMENS, TITUS FLAVIUS ALEXANDRINUS.] 8th, Cyprian, bishop of Carthage, born about the end of the second century, suffered martyrdom about 258. His works are numerous. [CYPRIAN, ST.] He has been confounded by some with Cyprian of Antioch, who suffered martyrdom under Diocletian. 9th, Origen of Alexandria, born A.D. 186, died about 254: wrote numerous works, some of which however contain notions which have been reprobated as heretical. [ORIGEN.] 10th, Gregory, called Thaumaturgus, a native and afterwards bishop of Neo Cæsarea, in Cappadocia, and a disciple of Origen, died soon after the Council of Antioch, which he attended A.D. 264: we have of him a 'Metaphrasis in Ecclesiastem,' a 'Brevis Expositio Fidei,' an 'Epistola Canonica,' and a panegyrical oration to his master Origen, on leaving his school; to which the latter replied by an interesting letter, which is printed in his works. 11th, Dionysius, bishop of Alexandria, also a disciple of Origen, was banished under Valerian to the deserts of Libya, but was restored to his see under Gallienus, was engaged in controversy with Sabellius, Nepos, and Paul of Samosata, and died A.D. 265. Of his numerous writings only fragments remain. 12th, Tertullianus of Carthage, lived under S. Severus, and died at a very advanced age, under Alexander Severus. He is one of the most copious of the Fathers of the Latin church. In the latter part of his life he fell into the errors of the Montanists. [TERTULLIANUS.]

We now come to those Fathers of the Church who flourished in the fourth century, after Christianity had become the religion of the Empire, an age which may be styled the Augustan age of ecclesiastical literature, for the number and the merits of the writers whom it produced. Some account of most of these fathers and their works is given under their respective heads. They are generally ranged in two classes—fathers of the Greek or Eastern

Church, and fathers of the Latin Church. The former are: 1st, **Eusebius** of Cæsarea, who died A.D. 340; his works give him a place among the fathers, notwithstanding the obloquy which his dubious conduct in the Arian controversy drew upon him. 2nd, **Athanasius**, bishop of Alexandria, who died in 371. 3rd, Basilius, called the Great, bishop of Cæsarea, in Cappadocia, in the reign of Valens, one of the most eloquent of the Greek fathers, and whose works have been published repeatedly both in Greek and in a Latin translation. 4th, Gregorius Nazianzenus, the friend of Basilius, and for a time patriarch of Constantinople, who afterwards abdicated and ended his days in voluntary banishment A.D. 389. His style is remarkable for a certain poetical imagery which distinguishes him from his brethren. 5th, Gregory, bishop of Nyssa, in Cappadocia, the brother of Basilius, died about 396; he distinguished himself in the Arian controversy. 6th, **Cyril**, bishop of Jerusalem, who died A.D. 386, wrote 18 books of sermons and other works. 7th, **Chrysostom, St. John**, patriarch of Constantinople, died in banishment A.D. 407. 8th, **Ephiphanius**, bishop of Salamis, in Cyprus, died in 403. 9th, **Cyril**, bishop of Alexandria, who died A.D. 444, was the great opposer of Nestorius concerning the Incarnation. To the above must be added Ephraim the Syrian, deacon of Edessa, who died about 378, and whose works have been published in the original text by Assemani.

The Fathers of the Latin Church are—1st, **Lactantius**, who died A.D. 316. 2nd, Hilarius, bishop of Poictiers, who died about 368. He was much concerned in the controversy against the Arians, and wrote several books against Constantius, who patronized them. 3rd, **Ambrose**, archbishop of Milan, died in 397. 4th, **Jerome**, the translator of the Bible, died A.D. 420. 5th, **Augustin**, bishop of Hippo, died A.D. 430. With Augustin the list of the great fathers of the church is generally considered as terminating, although this title has been also bestowed on some subsequent prelates and theologians; but these, such as Bernard, Thomas Aquinas, &c., are more properly distinguished by the name of doctors of the church.

The study of the Fathers is interesting not only to theologians, but to those who would examine carefully the philosophy and the state of society in their time. They are now much studied in the Protestant universities of Germany.

FATHOM. [Measures.]

FATIMIDES, the name of a race of kings, who assumed the title of caliphs, and reigned for many years over the north of Africa and Egypt. They obtained the name from the pretensions of the founder of the dynasty, Abu Mohammed Obeidallah, who asserted that he was descended from Fatima, the daughter of Mohammed and wife of Ali. The Arabic historians however generally deny the truth of this assertion; and many of them say that his grandfather was a Jew or of the Magian religion. The princes of this family were also called the Aliades, in consequence of their descent, real or pretended, from Ali.

1. Obeidallah, the first Fatimide caliph, was born A.D. 882. Having incurred the displeasure of Moktafi, the reigning Abasside caliph, he was obliged to wander through various parts of Africa, till, through fortunate circumstances, he was raised from a dungeon in Segelmessa (A.D. 910) to sovereign power. He assumed the title of Mahadi, or 'director of the faithful,' according to a prophecy of Mohammed's that in the space of 300 years such an individual would arise in the west. He subdued the princes in the north of Africa, who had become independent of the Abassides, and established his authority from the Atlantic to the borders of Egypt. He founded Mahadi on the site of the antient Aphrodisium, a town on the coast of Africa, about a hundred miles south of Tunis, and made it his capital. He became the author of a great schism among the Mohammedans by disowning the authority of the Abassides [Abassides], and assuming the title of Emîr al Mûmenîn, 'prince of the faithful,' which belonged exclusively to the caliphs. His fleets ravaged the coasts of Italy and Sicily, and his armies frequently invaded Egypt, but without any permanent success.

2. Caiem succeeded his father A.D. 933. During his reign an impostor, Abu Yezid, originally an Ethiopian slave, advanced certain peculiar doctrines in religion, which he was enabled to propagate over the whole of the north of Africa, and was so successful in his military expeditions as to deprive Caiem of all his dominions, and confine him to his capital, Mahadi, which he was besieging when Caiem died.

3. Mansour succeeded his father (A.D. 946) when the kingdom was in a state of the greatest confusion. By his valour and prudence he regained the greater part of the dominions of his grandfather Obeidallah, defeated the usurper Yezid, and laid the foundations of that power which enabled his son Moez to conquer Egypt.

4. Moez (A.D. 955) was the most powerful of the Fatimide caliphs. He was successful in a naval war with Spain, and took the island of Sicily; but his most celebrated conquest was that of Egypt, which was subdued by his lieutenant A.D. 972. Two years afterwards he removed his court to Egypt, and founded Cairo. (See D'Anville's *Mémoires sur l'Egypte*, p. 132.) The name of the Abasside caliph was omitted in the public prayers, and his own substituted in its place; from which time the great schism of the Fatimide and Abasside caliphs is more frequently dated than from the assumption of the title by Obeidallah. The armies of Moez conquered the whole of Palestine and Syria as far as Damascus. The Arabic historians greatly extol the virtues of this caliph.

5. Aziz (A.D. 978). The dominions recently acquired by Moez were secured to the Fatimide caliphs by the wise government of his son Aziz, who took several towns in Syria. He married a Christian woman, whose brothers he made patriarchs of Alexandria and Jerusalem.

6. Hakem was only 11 when he succeeded his father, A.D. 996. He is distinguished even among oriental despots by his cruelty and folly. His tyranny caused frequent insurrections in Cairo. He cruelly persecuted the Jews and Christians, and burnt their places of worship. By his order the church of the resurrection at Jerusalem was destroyed (A.D. 1009). His persecution of the Christians led them to appeal to their brethren in the West, and was one of the causes that led to the crusades. His folly induced him to become the founder of a new religion, and to assert that he was the express image of God. He was assassinated in consequence of the intrigues of his sister, and was succeeded by his son

7. Dhaher (A.D. 1021). He was not so cruel as his father, but was addicted to pleasure, and resigned all the cares of government to his vizirs. In his reign the power of the Fatimide caliphs began to decline. They possessed nothing but the external show of royalty: secluded in the harem, they were the slaves of their vizirs, whom they could not appoint and dared not disobey. In addition to the evils of misgovernment, Egypt was afflicted in the reign of Dhaher with one of the most dreadful famines that ever visited the country.

8. Mostanser (A.D. 1037) was only nine when he succeeded his father. The Turks invaded Syria and Palestine in his reign, took Damascus and Jerusalem (A.D. 1076), where the princes of the house of Ortok, a Turkish family, established an independent kingdom. They advanced to the Nile with the intention of conquering Egypt, but were repulsed.

9. Mostali (A.D. 1094), the second son of Mostanser, was seated on the throne by the all-powerful vizir Afdhal. The government was entirely in the hands of Afdhal during the whole of his reign. The invasion of Asia Minor by the crusaders (A.D. 1097) appeared to Afdhal a favourable opportunity for the recovery of Jerusalem. Refusing to assist the Turks against the crusaders, he marched against Jerusalem, took it (A.D. 1098), and deprived the Ortok princes of the sovereignty which they had exercised for twenty years. His possession of Jerusalem was however of very short duration, for it was taken in the following year (A.D. 1099) by the crusaders. Anxious to recover his loss, he led an immense army in the same year against Jerusalem, but was entirely defeated by the crusaders near Ascalon.

10-13. The reigns of Amer (1101-1129), Hafedh (1129-1149), Dhafer (1149-1154), Faiez (1154-1160), contain nothing worthy of notice. During their reigns the power of the Fatimides rapidly decayed.

14. Adhed (1160) was the last caliph of the Fatimide dynasty. At the commencement of his reign Egypt was divided into two factions, the respective chiefs of which, Dargham and Shawer, disputed for the dignity of vizir. Shawer implored the assistance of Noureddin [Noureddin], who sent an army into Egypt under the command of Shiracouh, by means of which his rival was crushed. But becoming jealous of Noureddin's power in Egypt, he solicited the aid of Amauri, king of Jerusalem, who marched into Egypt and expelled Shiracouh from the country. Noureddin soon

sent another army into Egypt under the same commander, who was accompanied by his nephew, the celebrated Saladin. [SALADIN.] Shiracouh was again unsuccessful, and was obliged to retreat. The ambition of Amauri afforded shortly afterwards a more favourable opportunity for the reduction of Egypt. Amauri, after driving Shiracouh out of the country, meditated the design of reducing it to his own authority. Shawer, alarmed at the success of Amauri, entreated the assistance of Noureddin, who sent Shiracouh for the third time at the head of a numerous army. He repulsed the Christians, and afterwards put the treacherous vizir to death. Shiracouh succeeded to his dignity, but dying shortly after, Saladin obtained the post of vizir. As Noureddin was attached to the interests of the Abassines, he gave orders for the proclamation of Mosthadi, the Abasside caliph (A.D. 1171), and for depriving the Fatimides of the caliphate. Adhed, who was then on a sick bed, died a few days after, ignorant, as it is said, of his loss.

(Mill's *History of Muhammedanism*, pp. 134-143; Mill's *History of the Crusaders*, vol. i.; D'Herbelot's *Bibliothèque Orientale*, articles 'Fathemiah,' 'Obeidallah,' 'Hakem,' 'Adhed,' 'Saladin,' &c.; Gibbon's *Decline and Fall*, cc. 57, 58, 59.)

FAULT. [MINING.]

FAUN, FAUNUS, was the name given in the Roman mythology to the gods or genii of the woods, corresponding with the Panes of the Greek mythology. The Fauni were supposed to be the descendants of Faunus an old mythical king of Latium, who resided in the forest Albunea with his wife Fauna or Fatua, near the pond of sulphureous water, which is between Rome and Tivoli; both were gifted with the faculty of prophesying. In subsequent ages the forest of Albunea continued to be the Delphi of Latium; the oracles were delivered by a voice issuing from its recesses. (Virgil, *Æneid*, vii. 82, &c.) Several statues in the Italian and other museums are believed to represent Fauni; among the most remarkable are those in the gallery of Florence, and a very handsome one in the museum of the Capitol. The sleeping Faun of the Barberino is now in the gallery at Münich.

FAUSSE-BRAYE, a name given to the rampart which is sometimes formed on the exterior of and parallel to that which constitutes the principal enceinte of a fortress.

In the antient fortifications a bank of earth was frequently raised in the ditch, nearly or quite contiguous to the wall of stone or brick surrounding the place, in order to protect the latter against the battering-engines of the besiegers; and the Italian engineers of the sixteenth century make mention of a detached wall of masonry similarly situated, which seems to have been intended for a like purpose. This was then called a *fossa-brea*, and, subsequently, by the French engineers, a *fausse-braye;* the first term indicating a covering work in the ditch, and the other simply a secondary or advanced rampart.

In and immediately before the time of Vauban the fausse-braye constituted the exterior part of the general rampart of a fortress; its terreplein, or upper surface, was situated a little above the level of the natural ground, and it carried a parapet for the protection of the defenders. The terreplein and parapet of the interior part of the rampart were several feet higher than those of the fausse-braye, and the interval between the two parapets was sometimes broad enough to allow room for artillery.

A good indication of the nature of this work may be obtained from the lower flanks of the bastions at Portsmouth, and, in order to render the example complete, it is merely necessary to suppose their parapets continued along the curtains and before the faces of the bastions.

The fausse-braye, thus formed, was intended for the defence of the ditch and covered way by a closer and more grazing fire than that of the principal rampart; but the enfilading fire to which the parts in front of the bastion were liable, and the destructive effects of the shells and grenades thrown into the work by the enemy, rendered it impossible for the defenders to remain in it at the time when their services were most required; it also afforded to the enemy some facilities in escalading the rampart. On account of these defects, this kind of fausse-braye has been long since suppressed, and the use of it in defending the ditch is supplied by the tenaille. [BASTION, *Fig.* 1, p. 17.] It should be observed however that Carnot and other French engineers have recently proposed constructions which may be considered as partial revivals of the fausse-braye, but with circumstances which appear to render the work free from the defects above mentioned.

FAUST, DR., a German scholar in the beginning of the fifteenth century, who is not, as is frequently supposed, the same person as Fust, the assistant of Guttenberg. The popular traditions of Northern Germany give very strange accounts of this man, which are somewhat confirmed by contemporary chroniclers, and represent him as having been in the possession of supernatural secrets, of a magic cloak, and other conjuring apparatus: he was said to have commanded the elements, and to have performed the greatest wonders, with the aid of his associate the devil, who at last carried him off. The simple fact is, that Dr. Faust being far in advance of his contemporaries in the physical sciences, made experiments, the results of which must have appeared superhuman to the narrow understandings of the people. But the poetical personification of the character which has gradually developed itself is much more interesting than the historical personage. Some of the greatest poets of Germany have represented Faust as a man inflamed by the most ardent desire for knowledge, who, after having devoted himself for many years to intense study, arrives at the conviction that the depths of truth are inaccessible to the human understanding. The despair of a mind thus disappointed, and the fiction of the use of magic to get admission to the forbidden regions of knowledge, impart to this character a particularly romantic charm. The idea itself is very old, and may be clearly traced to a primitive age. The circumstance that the wandering Punch and Judy showmen, those rude fathers of the drama in Germany, and even in France, have for centuries made, and are still making, the subject of Dr. Faust's deeds and descent to hell the favourite entertainment of their auditors, proves how well adapted this character is to dramatic action. In modern times, Lessing, the originator of German dramatic art, undertook to dramatise the subject; it was an undertaking grand in conception and plan, but unfortunately it has remained a fragment. The same idea however was taken up by Göthe, the greatest poet that Germany has yet produced. The following are the leading features of Göthe's work:—Faust, doctor and professor in all the faculties, highly admired for his wisdom, carries in his breast the conviction of the insufficiency of his knowledge to reach the fountain of truth. Accordingly he has recourse to magic. At his command appears the Erdgeist, the symbol of the original power which vivifies all matter, directs its motions, and its organic conformation and action. The spirit proceeds to explain to Faust its mode of creation and of action; but the limited human understanding is incapable of conceiving the immensity of the spirit, who disappears and leaves Faust in despair. Faust now resolves to release himself by death from all material forms, and to enter the secret regions of knowledge. But the moment he puts the deadly cup to his lips, the tolling of bells, the sound of the organ, and sweet chanting fall on his ears, and bring back to his mind such charming recollections of infancy and of earthly delights, that he cannot summon resolution to shake off the chains of existence. While he is still irresolute and doubtful, in the comfortless weariness of all human knowledge, the devil appears (the negative and destructive principle in opposition to the vivifying and creating), and Faust, recollecting his impotence when in presence of the Erdgeist, resolves to enter into a compact with the reprobate spirit; not with the expectation of satisfying his longing after knowledge, for he knows that the human mind, notwithstanding its narrow limits, rises higher and is more closely allied to truth than the evil spirit; neither is it his intention to obtain enjoyment by his agency, as the pleasures of the world have no charm for the man who is eager after truth; but the object which Faust contemplates in this union is constant uninterrupted activity. To be continually agitated by the conflict of the ever-changing elements of life is the only thing which can offer any compensation to man for knowledge which is denied. But whoever deserts the province of inquiry and plunges into the stream of life is unavoidably drawn into the vortex of sensuality, and as soon as the intellect of man loses its empire, he is carried into the abyss of material existence. This is the fate of Faust. The first volume of the work, published about twenty years previous to the second, leaves Faust degraded and sunk in sensuality, and struggling in vain to emerge from it. Instead of following up the conflict of the two opposing principles (the one spiritual and vivifying, the other materia and destroying), and of exemplifying the triumph of the former clearly and impressively, Göthe, who was then far advanced in years, gave shortly before his death, in the second volume (in which his glowing genius manifests itself most conspicuously), only mystical and fragmentary hints, instead of the forcible exposition of which the character is capable. The same subject has been dramatically treated by Klingemann and Röder, but their productions are far beneath Göthe's.

FAUSTI'NA, ANNIA, was the daughter of Annius Verus præfect of Rome; she married Antoninus before his adoption by Hadrian, and died in the third year of her husband's reign, 36 years of age. She left only one surviving child, named Faustina. The historians have represented her conduct as very licentious. [ANTONINUS PIUS.]

Coin of Faustina the Elder.
British Museum. Actual Size. Copper. Weight, 346¼ grains.

FAUSTI'NA the Younger, daughter of the preceding, married her cousin Marcus Aurelius, and died, A.D. 176, in a village of Cappadocia at the foot of Mount Taurus, on her husband's return from Syria. She is represented by Dion and Capitolinus as even more profligate in her conduct than her mother, and yet Marcus in his *Meditations* (i. 17) extols her obedience, simplicity, and affection. Her daughter Lucilla married Lucius Verus, whom Marcus Aurelius associated with him in the empire, and her son Commodus succeeded his father as Emperor. [AURELIUS, MARCUS.] J. Marchand (*Mercure de France*, 1745) and Wieland have attempted to clear this princess of the imputations against her character.

Coin of Faustina the Younger.
British Museum. Actual Size. Copper. Weight, 395¼ grains.

FAUVETTE. [SYLVIADÆ.]

FAVASTRÆA. [MADASTRÆA.]

FAVERSHAM. [KENT.]

FAVO'NIA. [MENSA.]

FAVORI'NUS. [PHAVORINUS.]

FAVOSITES. [MILLEPORIDÆ.]

FAWKES, GUY. During the latter years of the reign of Queen Elizabeth the Protestants, who, since the death of Mary, had so increased in numbers and in power as to govern the kingdom as they would, endeavoured, by the severity of laws enacted against Roman Catholics, and by continual oppression, to extirpate that religion from England. 'Not only were the Catholics forbidden to use the rites and ceremonies of their own faith, but were required to attend upon the service of a church which, if conscientious and consistent, they were bound to abhor. If they refused or forbore to come to a Protestant church on the Sabbath, they were liable to a penalty of 20*l.* for every lunar month during which they absented themselves.' Every priest who said mass and every person who heard it, was liable to a fine of 100 marks, and imprisonment for a year. 'The ministers of their religion, without whose presence they were precluded from the exercise of the sacraments and other rites, were in effect proscribed and banished; for by a statute passed in 1585 it was enacted "that all Jesuits, seminary and other priests, ordained since the beginning of the queen's reign, should depart out of the realm within forty days after the end of that session of parliament, and that all such priests or other religious persons ordained since the same time should not come into England, or remain there under the pain of suffering death as in case of treason." It was also enacted by the same statute that all persons receiving or assisting such priests should be guilty of a capital felony.' It may be truly said that these and other rigorous statutes were not at *all times* enforced; but they placed the whole body of the Catholics at the mercy of the Protestant government: for them therefore there was no liberty, personal or religious, but such as the privy council thought proper to allow; and with reference to their religion, the law gave them no rights, and afforded them no protection.

The facts that James I., although himself a Protestant, was born of Catholic parents, had been baptized by a Catholic archbishop, and approved several of the ordinances of the Roman church, gave to the Catholics at his accession hopes of a revival of their liberties. At first, indeed, it appeared that their wishes would be realised, and the severity used toward them relaxed, for the fines paid by the recusants, which in the last year of Elizabeth had amounted to 10,333*l.*, in the first year of James's reign scarcely exceeded 300*l.*, and in the second they were little more than 200*l.* James however was no sooner firmly seated upon the throne than he overthrew all their expectations. In February, 1604, he assured his council that 'he had never any intention of granting toleration to the Catholics,' that he would fortify the laws against them, and cause them to be put into execution to the utmost.

We must refer to the 2nd vol. of 'Criminal Trials,' from which this article is extracted, for a fuller account of the enactments made at this time against the Catholics: sufficient has been said to show the cause of their discontent with the government, the king, and the Protestants in general. The design of blowing up the House of Lords with gunpowder at the opening of parliament, and thus destroying at a single blow the King, the Lords, and the Commons, was formed about the summer of 1604. The conceiver of this desperate and bloody vengeance was Robert Catesby, a Catholic, the son of Sir William Catesby, who had been several times imprisoned for recusancy. Catesby disclosed his scheme to John Wright and Thomas Winter, the former descended from a respectable family in Yorkshire, the Wrights of Plowland in Holderness: the latter from the Winters of Huddington in Worcestershire, where they had been in possession of estates since the time of Henry VI. At a conversation held between these conspirators, it was agreed that Winter should go over to the Netherlands to meet Velasco, constable of Castile, who had arrived at Flanders on his way to England, to conclude a peace between James and the king of Spain, and request him to solicit his majesty to recal the penal laws against the Catholics, and to admit them into the rank of his other subjects. Winter received no encouragement from Velasco that he would stipulate in the treaty of peace for the liberties of the English Catholics, and so returned to England, having in company Guido or Guy Fawkes, who, it was thought, would be of assistance in the business. Fawkes was a gentleman of good parentage and respectable family in Yorkshire; his father, Edward Fawkes, was a notary at York, and held the office of registrar and advocate of the Consistory Court of the Cathedral. Of his education and early history nothing is known; but having spent the little property that he derived from his father, he enlisted in the Spanish army in Flanders, and was present at the taking of Calais by the Archduke Albert in 1598. Soon after Winter's return to London, Thomas Percy, the relation and confidential steward of the Earl of Northumberland, joined the four conspirators already mentioned, and the following oath of secrecy, was administered to each, kneeling with his hands placed upon the Primer:—'You swear by the blessed Trinity, and by the sacrament you now propose to receive, never to disclose directly or indirectly, by word or circumstance, the matter that shall be proposed to you to keep secret, nor desist from the execution thereof until the rest shall give you leave.' They then heard mass, and received the sacrament from Father Gerard in confirmation of their vow. Percy took the next step. He was a gentleman pensioner, and upon pretence that it would be convenient to him when in attendance in that capacity, he purchased of one Ferris the remainder of a short term which he had in the lease of a house adjoining the parliament house.

Fawkes, who was unknown in London, and had assumed the name of Johnson, acted as Percy's servant, and took possession of the house. Parliament was soon afterwards adjourned till the 7th of February, and the conspirators having first hired a house in Lambeth for the preparation of timber for the mine and a place of deposit for combustibles, agreed to meet in London about the beginning of November. The custody of the house in Lambeth was committed to Robert Keyes, the son of a Protestant clergyman in Derbyshire, but himself a Catholic; the oath of secrecy was administered to him also. The proceedings of the star chamber during the interval of their meetings so exasperated the conspirators that they became more eager than ever about the plot. Catesby and his confederates, according to a previous agreement, assembled in the house about the 11th of December, and a mine was immediately commenced. The stone wall, however, which separated them from the Parliament House being found three yards in thickness, Keyes and the younger brother of John Wright (who was enlisted as the others had been) were called in to assist, and the seven men were thus occupied until Christmas-eve without their ever appearing in the upper part of the house. During their laborious employment they had much consultation respecting the scheme to be adopted. It was supposed that Prince Henry would accompany the king to the Parliament House and perish there with his father. The Duke of York, afterwards Charles I., would then be the next heir, and Percy undertook to secure his person, and carry him off in safety as soon as the fatal blow was struck. If this scheme should fail, the princess Elizabeth was to be surprised and secured by a party provided in the country. It was the intention to proclaim one of the royal family as king. It was also arranged that Warwickshire should be the general rendezvous, and that supplies of horses and armour should be sent to the houses of several of the conspirators in that county, to be used as occasion might require.

In the midst of these deliberations Fawkes brought intelligence that the parliament had again been prorogued from the 7th of February to the 3rd of October following. The conspirators therefore separated for a time; and in the mean while John Grant of Norbrook in Warwickshire, and Robert Winter of Huddington, were sworn in among their number. In February (1604-5) their labours were resumed, and the stone wall nearly half broken through. One morning while working upon the wall, they suddenly heard a rushing noise in a cellar nearly above their heads. At first they feared they had been discovered; but Fawkes being despatched to reconnoitre, found that one Bright to whom the cellar belonged was selling off his coals in order to remove. Fawkes carefully surveyed this large vault situated immediately below the House of Lords, and perceived its fitness for their purpose. The difficulties connected with breaking through the wall, its thickness, the damp of the situation, for water was continually oozing through the stone work, and the danger of discovery from noise, disposed the confederates to abandon their operations, and to possess themselves of the cellar of Bright. The vault was immediately hired, and about twenty barrels of powder were carried by night from Lambeth: iron bars and other tools that had been used in mining were also thrown among the powder that the breach might be the greater, and the whole was covered over with faggots. Lumber of various kinds was placed in the cellar to prevent any suspicion of the curious or the watchful. In May, 1605, the preparations were complete: the conspirators having marked the door, in order that it might be seen if any one entered the vault, consented to separate; before their separation, however, it was proposed that an attempt should be made to obtain foreign co-operation by informing Sir William Stanley and Owen of the project. This was agreed to on condition of their being sworn to secrecy, and Fawkes was despatched to Flanders for the purpose of conferring with them. Sir Edmund Baynham was also sent on a mission to the pope, that when the news of the explosion arrived at Rome he might be prepared to negotiate on behalf of the conspirators, and to explain that the design of the plot was the re-establishment of Catholicism. Soon after Fawkes's return from Flanders the parliament was further prorogued from October to the 5th of November. These repeated prorogations alarmed the conspirators, and led them to fear that their project was suspected. Their alarms however having been discovered to be groundless, Catesby purchased horses, arms, and powder, and under the pretence of making levies for the archduke in Flanders, assembled friends who might be armed in the country when the first blow was struck. As considerable sums of money were necessary for these purposes, it was proposed to admit into the confederacy three wealthy men, Sir Everard Digby [[illegible]], Ambrose Rookwood of Coldham Hall in Suffolk, and Francis Tresham, the son of Sir Thomas Tresham of Rushton in Northamptonshire. These gentlemen were afterwards sworn in.

As the day of meeting of parliament approached, it was finally determined that Fawkes should fire the mine with a slow match, which would allow him a quarter of an hour to escape. Sir Everard Digby was to assemble a number of Catholic gentlemen in Warwickshire on the 5th of November under pretence of a hunting party, and Percy was to seize the prince of Wales, or the duke of York if the prince should go to the parliament house with the king. One subject of discussion only arose, whether and how the Catholic peers should be warned of their danger: each conspirator had friends, if not relations among them; but the danger of communicating the project to so large a number of persons was considered so imminent, that they despaired of saving all of them, and it was concluded that no express notice should be given them, but only such persuasion, upon general grounds, as might deter them from attending. Many of the conspirators were averse to this advice and angry at its adoption; and Tresham in particular, for his sisters had married Lords Stourton and Mounteagle. Indeed Tresham so passionately required that Lord Mounteagle should have warning of his danger, that very high words ensued; and when he was thwarted in his wishes, he hinted that the money which he had promised would not be forthcoming; and from this time he ceased to attend their councils.

On Saturday, the 26th of October, ten days before the meeting of parliament, Lord Mounteagle unexpectedly gave a supper in a house which he had not lately occupied. Circumstances have given rise to a belief that he was privy to the plot at the time that he invited his friends, and that the supper was only given as a convenient opportunity of discovering the conspiracy to them. Be this as it may whilst he was at table a letter was brought to him by one of his pages, who stated that he had received it in the street from a stranger, who pressed its instant delivery into his master's hands. The letter ran thus:—'My lord out of the love i beare to some of youer frends i have a caer of youer preservacion therefor i would advyse yowe as yowe tender youer lyf to devyse some exscuse to shift of youer attendance at this parleament for God and man bathe concurred to punishe the wickednes of this time, and thinke not slightlye of this advertisment but retyere youre self into youre contri wheare yowe may expect the event in safti for thowghe theare be no apparance of anni stir yet i saye they shall receyve a terrible blowe this parliament and yet they shall not seie who hurts them, this councel is not to be contemned because it may do yowe good and can do yowe no harme for the dangre is passed as soon as yowe have burnt the letter, and i hope God will give yowe the grace to mak good use of it to whose holy protection i commend yowe.' 'To the right honorable the Lord Mounteagle.' This letter has been ascribed to Anne, the daughter of Lord Vaux, to Mrs. Abington, Lord Mounteagle's sister, to Percy, and to others; but there seem greater reasons for believing that no one of these was the writer of it, but rather that Tresham was its author. It is a point, however, we have not room to discuss, and therefore must refer the inquiring reader to *Criminal Trials* (vol. ii. p. 66) for further remarks upon it.

On the same evening Lord Manteagle showed the letter to several lords of the council, who with him agreed that no steps should be taken until the king returned from hunting at Royston. The contents of the letter and its communication to many of the council, as well as to the secretary of state, soon reached the ears of the conspirators; but though their danger was evident, and the vessel which was to convey Fawkes to Flanders was lying in the river, they made no attempt to escape. All suspected Tresham to be their betrayer, and he was accused by them, but he vehemently denied the accusation. Since they did not know accurately to what extent their proceedings had been divulged, they had still hope of effecting their design, especially as, upon examination, Fawkes found that the cellar was not watched, and had not been disturbed. When, however, they heard that on the 31st of October the letter had been shown to the king, their hope diminished and their fears increased. Some of the conspirators left London; others concealed themselves in an obscure lodging; all held themselves ready to start at a moment's warning. Fawkes alone, with the extraordinary courage which he had displayed throughout the transaction, took up his station in the cellar. Thus they passed three days of anxiety and suspense. On Monday the chamberlain, with Lord Mounteagle, commenced the search, which appears to have been somewhat strangely delayed. Their suspicions were excited both at finding that Percy was the occupier of a house of which he was known to make no use, and at the unaccountably large store of fuel which filled the cellars, and by the side of which a tall dark suspicious-looking man (Fawkes) was standing. They therefore gave orders to Sir Thomas Knevet, a magistrate in Westminster, to search the houses, the cellars, and the whole neighbourhood. The search was commenced, and about twelve o'clock on the night of the 4th Fawkes was seized as he came out of the cellar: matches and touchwood were found upon his person, a dark lantern with a lighted candle stood behind the cellar door, and under the faggots 36 casks of gunpowder. Fawkes at once avowed his purpose to the magistrate, and declared that 'if he had happened to be within the house when he took him, he would not have failed to have blown him up, house and all.' His courage and composure were not disturbed when he was examined before the king and council. He gave his name as John Johnson, the servant of Thomas Percy, declared his intention to blow up the king, lords, and bishops, and others who should have assembled at the opening of the parliament, refused to accuse any one as his accomplice, and upon being asked by the king how he could enter upon so bloody a conspiracy against so many innocent persons, declared that 'Dangerous diseases require a desperate remedy.'

After having received the news of the apprehension of Fawkes, it was agreed by the conspirators, who had assembled at Ashby Ledgers, to take up arms with the few followers they could collect, and to endeavour to excite to rebellion the Roman Catholics in the counties of Warwick, Worcester, and Stafford, together with those of Wales. This scheme was immediately adopted; arms and horses were seized upon, and different parties despatched over the country. But all their efforts were in vain [DIGBY], and the failure of the project so complete, that their proceedings served no other purpose than to point them out as members of the confederacy. A party of the king's troops pursued some of the conspirators to Holbeach, and here an obstinate defence was made, in which the two Wrights, Percy, and Catesby were killed, and Rookwood and Thomas Winter wounded. The others were eventually taken. Tresham died a natural death in prison, and on the 27th January, 1606, eight persons, namely, Robert Winter, Thomas Winter, Guy Fawkes, John Grant, Ambrose Rookwood, Robert Keyes, and Thomas Bates, were tried at Westminster by a special commission, for being concerned in the powder-plot. Sir Everard Digby was arraigned and tried separately for the same crime. Upon the trials no witness was orally examined: the evidence consisted of the written declarations of Digby's servant and of the prisoners themselves. There is reason to believe that Fawkes was tortured in order to make him confess more fully. All the prisoners were found guilty, and upon all the sentence of death was passed. Care was taken to render their execution, which took place on the following Thursday and Friday, as solemn and impressive as possible.

Of the implication of the Jesuits in this conspiracy we shall speak in the article GARNET.

The atrocity of the design and the extent of the mischief contemplated form the principal features of the gunpowder-plot. It is also remarkable for having been imagined and contrived, not by needy and low-born adventurers, but by gentlemen of good family and for the most part ample fortune. Its effect continued long to be felt; for it not only determined the feeble and wavering mind of the king against the Roman Catholics, but prejudiced the whole nation against them to such an extent, that not only were the severe acts then in force against them left unrepealed, but others equally harsh were enacted. (Abridged and extracted from *Library of Entertaining Knowledge, Criminal Trials*, vol. ii.)

FAWN. [DEER, Vol. viii. p. 358.]

FAYAL is one of the Azores or Western Islands. It is situated in 38° 30′ N. lat. and near 29° W. long., and is more than 24 miles long from east to west. Like the other Azores, it has an uneven surface, and in some places the hills rise into mountains. Though the soil is rocky, it is very fertile, and vegetation is favoured by the mildness of the climate. The island grows firs and palms, pine-apples, oranges, cabbages, and potatoes: but the principal object of agriculture is the vine. In good seasons, from 8000 to 10,000 pipes of wine are exported, chiefly for America; oranges are sent to England and corn to Brazil. Its harbour, Horta, is the best in the whole group. Boats alone can land on the adjacent islands of Pico, Flores, and Corvo; and the produce of these islands is accordingly brought to Fayal for exportation. Fayal has also the advantage of lying directly in the track of European ships homeward bound from South America and India, and is visited by many vessels for provisions or refitting. Its capital, Horta, sometimes but improperly called Fayal, is a pretty little town with 5000 or 6000 inhabitants; it is the place of export for the product of this and the neighbouring islands.

FAYETTE, MARIE MAGDELAINE DE LA VERGNE, Countess de la, was the daughter of an officer and a nobleman of Provence. She took lessons in Latin of Ménage and Father Rapin, and soon made great progress in that language. In 1655 she married Francis Count de la Fayette, and her house became the rendezvous of the literary men and the wits of the age. Lafontaine, Ménage, Huet, and Segrais were her most frequent visitors. The Duke de la Rochefoucault, celebrated for his wit and his licentiousness, became acquainted with her, and she boasted afterwards of having contributed to his reformation. Madame de Sevigné, in her letters, speaks highly of the moral character of Madame de la Fayette as well as of her talents. She wrote several novels which obtained a high reputation at the time, being the first of the kind in France written in a natural style, and free from the exaggerations and affectation of former novelists. She also wrote:—1. 'Mémoires de la Cour de France, pour les années 1688-89,' which contain some curious particulars. 2. 'Divers Portraits de quelques Personnes de la Cour,' being true sketches of living characters. 3. 'Mémoires de Henriette d'Angleterre,' not so interesting as the other two. Madame de la Fayette left also other memoirs of contemporary history which have not been published. Her printed works were collected and published together in 8 vols. 12mo., Paris, 1786, with a notice of her life, and again in 1804, together with the works of Madame de Tencin. Her correspondence was published in 1805. Madame de la Fayette died in 1693.

FAYETTE, GILBERT MOTTIER, Marquis de la, was born on the 1st of September, 1757, at Chevagnac, near Brioude, in the present department of the Haute Loire. He married at the age of sixteen Mademoiselle de Noailles d'Ayen, and his wife's relations offered him a place at court, which he refused. When the American revolution broke out, La Fayette, who was deeply interested in the cause, made an offer of his services to Benjamin Franklin, which being accepted, he armed a vessel at his own expense and landed at Charlestown in April, 1777. He fought as a volunteer at the battle of the Brandywine on the 11th of September, 1777, in which he was wounded. Congress having given him a brevet of major-general, he served in the north under Washington's orders, and was at the battle of Monmouth in June, 1778, and afterwards received the thanks of Congress for his gallant conduct, and the present of a valuable sword. In 1779 he returned to France, the government of that country having acknowledged the independence of the American States, and he obtained assistance in men and money, with which he returned to America. In 1780 he commanded the advanced guard of Washington's army; and in the following year he was intrusted with the defence of Virginia against Lord Cornwallis. Being joined by Washington and Rochambeau, he contributed to the operations in consequence of which Lord Cornwallis was obliged to capitulate at York Town. After the surrender of Cornwallis he returned to France for fresh reinforcements, but the peace of 1783 prevented his sailing back to America. He however revisited that country some years after, and was received in triumph by its grateful citizens, whose independence he had powerfully contributed to establish. After his return to France he travelled through Germany, and was received with marked distinction by Frederick the Great and Joseph II. of Austria. In 1787, being returned a member of the Assembly of Notables, he advocated the abolition of the lettres de cachet and of state-prisons, and he supported the claims of the Protestants of France, who were still labouring under civil disabilities. He also supported the convocation of the States-General of which assembly he was returned a member. In this capacity he supported Mirabeau's motion for the removal of the military from the neighbourhood of the capital; and in July, 1789, he proposed the first declaration of rights, which formed the basis of the following constitution. In the same month, being appointed commandant-general of Paris, he organized the national guard, and distributed among the soldiers a tricoloured cockade, namely, blue and red, the colours of the commune of Paris, and white, the colour of the lilies of France, and these became thenceforth the national colours. On the 15th of October of that year he marched at the head of the national guard to Versailles, where a tumultuous multitude had preceded him: he was probably the means of saving the lives of the king and the royal family on that occasion, by escorting them back to Paris, whither the Assembly also removed their sittings. He voted in the Assembly for the institution of the jury for the suppression of hereditary nobility, for the political equality of all citizens, &c. Mistrusting the effects of individual ambition in revolutionary times, he moved and carried a resolution to the effect that the same person should not have the command of the national guards of more than one department at once. He himself refused the appointment of lieutenant-general of the kingdom. In conjunction with Bailly he instituted the club of the Feuillans, which supported the constitutional monarchy on a popular basis. After the king's forced return from the flight of Varennes, La Fayette supported the decree by which the king was restored to the exercise of his regal office on swearing to the new constitution. Upon this the republican party broke out into an insurrection, which La Fayette and the national guards put down on the Champ de Mars. Soon afterwards La Fayette gave in his resignation and retired into the country; but the war of the first coalition having begun, he was appointed to the command of the army of Flanders, and he defeated the allies at Philippeville and Maubeuge. He was however hated by the Jacobins at Paris, and mistrusted by the court. On the 16th of June, 1792, he wrote a strong letter to the Legislative Assembly, denouncing the plots of those men 'who, under the mask of democratic zeal, smothered liberty under the excess of their license.' He soon after repaired to Paris, and demanded of the Legislative Assembly the punishment of the outrages committed against the king at the Tuileries on the 20th of June. But the republican party was already preponderating in that Assembly, and La Fayette found that he was not safe in Paris. It is said that he then proposed to the king and the royal family to take shelter in his camp at Compiègne, but the advice was rejected by Louis, or rather by those around him, who placed all their confidence in the duke of Brunswick and the Prussians.

On the 30th of June the Jacobins of Paris burnt La Fayette in effigy in the Palais Royal. La Fayette having returned to his camp, publicly expressed to his officers his disapprobation of the attack on the Tuileries of the 10th of August, and on the 15th of that month he arrested the commissioners sent by the Legislative Assembly to watch him. Upon this he was outlawed, and was obliged to cross the frontiers with a few friends. His intention was to repair to some neutral country, but he was arrested by the Austrians, and carried to the fortress of Olmutz, in Moravia, where his wife and daughter soon after joined him, to console him in his confinement. He remained in prison for five years, and was released at last by the treaty of Campo-Formio; but not approving of the arbitrary conduct of the Directory he repaired to Hamburg, and did not return to France till after the 19th Brumaire, 1799. Here he found himself again in opposition to Bonaparte's ambition, and he voted against the consulship for life, refused all employment under that chief, and retired to the country, where he applied himself to agricultural pursuits.

In 1815 he was returned to the house of representatives convoked by Napoleon on his return from Elba. After the defeat at Waterloo he spoke strongly against any attempt to establish a dictatorship, and moved that the house should declare its sittings permanent, and that any attempt to dissolve it should be considered as treason. When Lucien appealed to the Assembly not to forsake his brother in his adversity, La Fayette replied with great animation:—'We have followed your brother through the burning sands of Syria, as well as to the frozen deserts of Russia; the bleached bones of two millions of Frenchmen scattered all over the globe attest our devotion to him; but that devotion,' he added, 'is now exhausted, as his cause is no longer the cause of the nation.

After the forced dissolution of the Legislative Assembly by the allied troops, La Fayette protested against that violence, and retired to his country residence at Lagrange. In 1818 he was returned after a great struggle to the Chamber of Deputies for the department of La Sarthe. During that and the following session he spoke in favour of constitutional liberty and against exceptional laws, but to no effect.

In 1824 he went on a visit to the United States, where he was received with the greatest enthusiasm in every state of the Union. In 1830, being in the house of deputies, he was foremost among the members who resisted the arbitrary ordonnances of Charles X. He then called out again the national guards and placed himself at their head. Faithful to his old constitutional principles, he proposed Louis Philippe as king of the French, stating his conviction that a monarchy based on popular institutions was the government best suited to France. During the trials of the ex-ministers he exerted himself zealously to save them from popular fury. Of the subsequent differences between him and Louis Philippe concerning views of foreign and domestic policy several versions have been given. La Fayette died at Paris on the 20th of May, 1834, and his funeral took place on the 28th of the same month, being attended by numerous friends, foreigners as well as French, peers and deputies, who showed the high sense which they entertained of the personal character of the deceased. He was interred, according to his own directions, in the same grave with his wife. He was one of the few public men whose character passed unscathed through the ordeal of half a century of revolutions. (Cloquet, *Souvenirs de la Vie Privée du Général La Fayette*, 8vo., 1836; Sarrans le Jeune, *La Fayette et la Révolution de* 1830, and a *critical notice* of the latter work in the *Foreign Quarterly Review*, No. XX., October, 1832; and the historians and biographers of the French Revolution.)

FAYETTEVILLE. [CAROLINA, NORTH.]

FAYOUM. [FAIOUM.]

FEALTY. [DISTRESS, p. 29; FEUDAL SYSTEM.]

FEAR is the dread or apprehension of any object or event, which object or event however is sometimes purely imaginary. Absence of fear is resolution or courage. Absence of all *dread* would be a repose of the soul, for which, as it cannot exist, the language affords no term. Dread is a minor species of affright or terror, but of a more enduring nature. The highest and most excessive state of terror amounts to a total deprivation of consciousness, and produces death. If these definitions are correct, a smaller degree of terror would consist in a quickly-passing unconsciousness. Dread would consequently consist of a succession of recurring periods of unconsciousness, alternating with excessive rapidity with intervals of consciousness, of which only the total impression is perceived (as in the vibratory strokes of vibrating bodies in acoustics): this total impression constitutes dread. Fear is only distinguished from dread through the imminence of danger, and thence a fearful or a dreadful or frightful object are nearly synonymous. The longer these periods of unconsciousness endure in a state of fear or dread, the more powerful are the feelings, till at length (as in drowning persons, or in children who are much alarmed) total unconsciousness ensues, and, according to circumstances, death.

If these definitions of fear and dread are psychologically correct, they serve to explain all the consequent physiological phenomena. A violent blow upon the head deprives us of consciousness, by occasioning an interruption in the regular functions of the brain, through which recollection ceases, and unconsciousness ensues. Any horrible appearance to or impression upon the organs of sight may produce a similar effect; for if the nerves of vision are so powerfully affected as to re-act upon the brain, the regularity of its action is similarly destroyed and the same effects are produced as by a blow. It is the same with all the other senses; and it is worthy of remark, that these feelings (of fear or dread) evidently heighten the powers of the imagination. If therefore a powerful affection of the visual nerve will produce absolute terror, so may a smaller degree of terror produce the more lasting sensations of dread or fear, *i. e.*, interchanging pauses of consciousness and unconsciousness. With the brain and spinal marrow the nerves are connected which lead to the lungs, to the stomach, to the muscles, and other parts of the body. It is therefore not surprising that dread or fear should display itself in shortness of breath, irregularity of pulsation, an increased action of the heart, a disordered stomach, sickness, and powerlessness of the limbs.

Fear may be also produced through a disordered action occasioned by some local affection of the heart or the lungs, or through plethora or disorders of the blood, or through a general sickness, as in the cholera.

FEAR, CAPE. [Carolina, North.]

FEAR, CAPE, RIVER. [Carolina, North.]

FEAST or **FESTIVAL**, an anniversary day of civil or religious joy: from the Latin *festum*.

Among the Jews, the feast of Trumpets, that of Expiation, the feast of Tabernacles, the feast of Dedication, the Passover, Pentecost, and the feast of Purification, were the principal. The modern Jews have a few more, but they are of later institution.

The Greeks, and more especially the Athenians, had an abundance of festivals. Such were the Aglauria, in honor of Aglauros, the daughter of Cecrops; the Artemisia in honor of Diana; the Dionysia in honor of Bacchus; the Eleusinia in honor of Ceres; and the Panathenæa in honor of Minerva.

The Roman festivals were of two kinds; first, those which were fixed or stated; secondly, those which were appointed annually on a certain day by the magistrates or priests. Of the former kind were the Agonalia, the Faunalia, Matronalia, Cerealia, Saturnalia, &c., through the several months; the latter were the Feriæ Latinæ or Latin holidays, the Paganalia in honour of the tutelary gods of the rustics, the Sementivæ in seed-time, and the Compitalia. Dion (ix. 17) observes that so large a portion of the year was taken up with sacrifices and holidays, to the great loss of the public, that Claudius abridged the number.

The Mohammedans, in addition to their weekly feast, or sabbath, which is observed on Friday, have two festivals of a more solemn kind; the feast of Victims, celebrated on the 10th day of the last month of their year, and the feast of Bairam.

With us, some of our festivals are immoveable, and others moveable. The immoveable festivals are Christmas Day, the Circumcision, the Epiphany, Candlemas or the Purification, the Annunciation of the Virgin Mary or Lady Day, All Saints, and All Souls. The greater part of what are called Saints' Days have long ceased to be celebrated, except in the Calendar. The principal of the moveable feasts, and that by which the rest are guided, and from which they keep their proper distance, is Easter; the others are Palm Sunday, Good Friday, Ash Wednesday, Sexagesima, Ascension Day, Pentecost, and Trinity Sunday. The four feasts from which leases are usually dated, and quarterly payments made, are Lady Day, 25th March; the Nativity of St. John Baptist, June 24th; Michaelmas Day, September 29th; and Christmas Day, December 25th.

The reader who would know more of the English festivals at an earlier period, may consult the *Liber Festivalis* printed at Westminster by W. Caxton, sm. fol., 1483, which consists chiefly of a collection of Sermons, preached to the common people upon them. See also *Festa Anglo-Romana*, 12mo., London, 1678; and *Historia Sacra, or the Holy History, giving an exact and comprehensive account of all the Feasts and Fasts of the Church of England*, 2nd edit., 8vo., Lond.

FEBRUARY, the second month of the year. Its name is derived from *februo*, to purify or cleanse. The Lupercalia were celebrated in this month. (Ovid, *Fasti*, ii. l. 19, 31.) The Saxons called it *Sol-Monath*, because the sun's meridian altitude visibly increases in it.

February was not in the Calendar of Romulus. It was added to the year by Numa, who gave it the twelfth place in the Calendar. The Decemviri transferred it to the place in which it now stands. (Ovid, *Fasti*, ii. l. 47.) Numa assigned twenty-eight days to it in order that the sum of the year might be an uneven number, according to a Pythagorean fancy. (Macrob. *Saturnal.* li. i. c. 13.) In an ordinary year February has twenty-eight days; in bissextile, or leap-year, it has a twenty-ninth, or intercalary day. [Bissextile.]

FE'CAMP, a town in France, in the arrondissement of Hâvre, at the outfal of a small river on the coast of the department of Seine Inférieure, 116 miles north-west of Paris, and 40 from Rouen, the capital of the department. Fécamp is said to have existed in the Roman times as a place for collecting tribute, and to have been thence termed Fisci Campus, whence its modern name. But it owes its historical celebrity to an abbey for nuns founded A.D. 664, or thereabout, by Waning, count or governor of the Pays de Caux. The Normans under Hastings, A.D. 841, dispersed the nuns and levelled the abbey with the ground. The abbey church was rebuilt A.D. 988, by Richard I., duke of Normandie. The abbot of Fécamp subsequently became one of the most powerful ecclesiastics of Normandie, three suffragan abbots owned his superiority; he presented to one hundred and thirty benefices, and his abbey had the enormous yearly income for that period, of 40,000 crowns. There was a noble conventual library well stored with MSS., and containing among its archives many deeds and charters of William the Conqueror and his successors. Casimir, king of Poland, upon the voluntary abdication of his throne, retired to this abbey. Fécamp was also the occasional residence of the dukes of Normandie.

Mr. Dawson Turner, who visited Fécamp in the year 1818, thus describes it:—'Fécamp, like other towns in the neighbourhood, is imbedded in a deep valley, and the road on approaching it, threads through an opening between hills "stern and wild," a tract of "brown heath and shaggy wood," resembling many parts of Scotland. The town is long and straggling, the streets steep and crooked; its inhabitants, according to the official account of the population of France, amount to 7000, and the number of its houses is estimated at 1300, besides above a third of that quantity which are deserted, and more or less in ruins.' The population in 1832 was 8869 for the town, or 9123 for the whole commune. The church of the abbey mentioned above is yet standing; it is 370 feet long, and 70 feet high; the transept, including 'the Chapel of the Precious Blood,' is 120 feet long, and the tower 200 feet high. Some circular chapels round the choir are probably parts of the church as rebuilt by duke Richard near the close of the tenth century, but the rest of the building is all in the pointed style, and scarcely any part is earlier than the end of the twelfth century; the cloister is modern. The church of St. Etienne, one of the ten parochial churches which Fécamp had before the Revolution, has a very imposing exterior.

The inhabitants are engaged in fishing, manufactures, and commerce; a few years since (Dupin, *Forces Productives de la France*, 1827) they had eighteen vessels engaged in the cod and whale fishery, and one hundred and forty-eight in the mackerel, herring, and other smaller fisheries. The decline of this branch of industry has led many of the fishermen to engage in manufactures. The manufactures are of cotton goods, in spinning, weaving, and dyeing, in which near 1400 workmen are occupied; also linens leather, articles of clothing for the colonies, iron wares kelp, rape-oil, and refined sugar. The trade is chiefly coasting-trade, or the supply of the English smugglers with tea, brandy, hollands geneva, and other contraband articles. The port, which is formed by the mouth of the small river which falls into the sea at Fécamp, has been much improved. Courses of instruction are given on navigation, geometry, and mechanics applied to the arts; there are a tribunal de commerce, or commercial court, an exchange, and an hospital. Limestone is quarried, and chalk refined in the neighbourhood.

FECIA'LES, in antient Rome, were the messengers or heralds of war and peace; they belonged to the order of the priesthood, and their persons were held sacred even by enemies. When the Romans had or pretended to have grievances against another state, they sent one of the feciales, who, clad in his solemn robes, entered the obnoxious territory or town, and in the presence of the assembled people, or of the magistrates and rulers of the country, stated the complaints of the Romans, and asked for reparation. A certain time, generally thirty days, was allowed for deliberation and for returning an answer, at the end of which the fecial herald came again, and if the answer was not satisfactory, he took to witness Jupiter and the other gods that he had religiously performed his duty, and that it was now the business of the Roman senate and people to decide upon the question. On his return to Rome he declared to the senate the result of his mission, and told them that they might now declare war if they thought proper. If war was decided upon, the fecial herald went again to the limits of the hostile state, and there, in presence of witnesses appealing to Jupiter and the other gods celestial and terrestrial, he protested against the injustice of that people and their obstinacy in refusing reparation, and declared that nothing now remained for Rome but to seek satisfaction by its own arms: he then threw a spear within the hostile boundaries, upon which war was considered as begun. When a treaty of peace or alliance was to be concluded, the presence of the feciales was likewise required, as with the Romans all political conventions partook of a religious character. The Etruscans and other antient Italian nations had also their feciales. This institution had a beneficial effect, insomuch as it tended to humanize the system of warfare, and to prevent sudden and unexpected aggressions. (Pitiscus, Hildebrandus, and the other writers on Roman antiquities.)

FE'CULA, or FÆCULA. [STARCH.]

FECUNDATION OF PLANTS. [IMPREGNATION OF PLANTS.]

FEDERATION. A federal union of sovereign states may be most easily conceived in the following manner:—

We will suppose that the sovereign power in any number of independent states is vested in some individual in those several states. These sovereign persons may agree respectively with each other and with all not to exercise certain functions of sovereignty in their several states, and to transfer these functions to be jointly exercised by the contracting sovereign persons. The consequence of such a compact will be that the contracting sovereign persons in their joint capacity will become sovereign in each state and in all the states. The several sovereign persons having for the time surrendered to the joint body certain powers incident to their several sovereignties are no longer severally sovereign in their several states. The powers surrendered to the joint body may be determined by written contract, the interpretation of which belongs to the joint body, yet in such a manner that there can be no valid interpretation unless the sovereign persons are unanimous; for if any number or majority could bind the rest, they might, by interpretation, deprive the several contracting persons of all the powers reserved to them by the contract. It follows also from the terms of the union, that any one party can withdraw from it at pleasure, and, as far as he is concerned, dissolve the union; for the essence of this union is the continuing consent of all.

This is the simplest possible form of a supreme federal government; one in which the contracting sovereign powers are individuals, and in which the sovereign persons in their aggregate capacity exercise the functions of sovereignty. Such a federation may never have existed, but any federation that does exist or can exist, however complicated it may seem, is reducible to these simple elements.

If the sovereign powers, instead of being in individuals, are in all the people of the respective states, the only difference will be that the functions of sovereignty, which in the first case we supposed to be exercised by the individual sovereigns in their joint capacity, must, in this case, be delegated to individual members of the sovereign body. The citizens of the several sovereign states must in the first instance of necessity delegate to some of their own body the proper authority for making the federal contract or constitution; and they must afterwards appoint persons out of their own body, in the mode prescribed by the federal contract, for executing the powers intrusted by the federal contract to persons so appointed. Thus the individuals who form the federal contract act therein severally as the agents of the sovereign states from which they receive their commission; and the individuals appointed to carry into effect the terms of the federal contract are the ministers and agents of that sovereign power which is composed of the several sovereign states, which again are composed of all the citizens. By whatever name of President, Senate, House of Representatives, or other name, the agents of the sovereign power are denominated, they are only the agents of those in whom the sovereign power resides.

When the sovereign power is so distributed, the question as to the interpretation of the federal contract may in practice be more difficult, but in principle it is the same. No one state can be bound by the interpretation of the rest, for if this were once allowed there would be no assignable limit to the encroachments of the states exercising sovereign power in their aggregate capacity. It is a clear consequence of the nature of the compact, whether the several sovereign powers are nations or individuals, that each contracting power must exercise its judgment on the interpretation of the instrument to which it is a party, and that no interpretation from which any power dissents can, consistently with the nature of the compact, bind that power.

In the case of complete dissent or disagreement by any one power, the contract is, by the very nature of its terms, at an end; for the contract being among sovereign powers, they cannot severally as such yield *obedience* to another sovereignty, which results from the aggregation of their several sovereign powers: their acts in their joint capacity must be acts of complete consent.

If the sovereign power in such a federal union has delegated the power of interpreting the written instrument of union to certain judiciary authorities, appointed under the federal compact for the purpose of carrying its provisions into effect, the several sovereign powers must still exercise, either by their legislatures or their judiciary authorities, their right to judge of the correctness of the interpretation, just as much as if the several sovereign persons, in the case first supposed, themselves exercised the functions of sovereignty in the supreme federal government.

What is commonly called the general government of the United States of North America is an example of a federation or federal government, or a supreme federal government. The contracting parties were sovereign states (the sovereignty in each state being in the citizens), which in their aggregate capacity formed a supreme federal government. The ministers for carrying into effect the federal government are the president and congress, and the judiciary of the United States. By the preamble to the constitution it is in fact declared that the 'people of the United States' are the contracting parties.

The fifth article of the constitution provides that 'The congress, whenever two-thirds of both houses shall deem it necessary, shall propose amendments to this constitution, or, on the application of the legislatures of two-thirds of the several states, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this constitution, when ratified by the legislatures of three-fourths of the several states, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the congress: provided, &c., and that no state, without its consent, shall be deprived of its equal suffrage in the senate.' From this article it is clear that the framers of the constitution did not fully comprehend the nature of the supreme federal government; for it is assumed by this article that the several states may be bound without their unanimous consent, which is contrary to conditions essentially implied by the nature of the union. This article involves also the inconsistency that the sovereign in any state may bind his successors: if the case of a federation of individual sovereign persons had been that to be provided for, the impossibility of the provision would have been apparent; but the impossibility equally exists when the contracting sovereign powers are respectively composed of many individuals, for the abiding consent is still the essence of the union that has been formed.

This is not the proper place to discuss the advantages and disadvantages of a supreme federal government, nor to examine into its stability. That it is necessarily deficient in one element of stability, namely in there being a necessity for all the consenting parties to continue their consent, is evident: in this respect it is like a partnership for an indefinite period, which may at any time be dissolved by any one of the partners. Such a power, which is incident to the nature of the partnership, so far from being an objection to it, is a great advantage. So long as all the parties agree, they have the benefit of the union: when they cannot agree, they take instead of it the benefit of the separation.

It is also foreign from our purpose to consider what is the tendency, in a union like that of the United States, resulting from the powers placed in the hands of the President and Congress by the States acting in their aggregate capacity. If such power were placed in such hands by sovereign persons originally severally sovereign in their respective states, as in the case first supposed, the vigance of these persons in their aggregate capacity, though somewhat less than the vigilance of a single sovereign person, would probably prevent any undue assumptions of power on the part of those to whom they had delegated certain fixed powers. But the farther the several sovereigns, who in their aggregate capacity form this federation, are removed from those to whom they delegate certain powers, and the more numerous are the individuals in whom this aggregate sovereignty resides, the greater are the facilities and means offered to, and consequently the greater is the tendency in, their ministers and agents practically to increase those powers with which they may have been intrusted. In their capacity of ministers and agents, having patronage at their command and the administration of the revenue, such agents may gradually acquire the power of influencing the election of their successors, when their own term of office is expired, and may thus imperceptibly, while in name servants, become in fact masters. That there is such a tendency to degenerate from its primitive form in all social organization, as there is in all organized bodies to be resolved into their elements, seems no sufficient reason for not forming such union and deriving from it all the advantages which under given conditions it may for an indefinite time bestow on all the members of such federation.

Those who wish to examine into the nature of the North American Union and the party questions which have arisen out of the interpretation of the federal constitution may consult the essays of Jay, Hamilton, and Madison in the *Federalist*, the *Journal of the Philadelphia Convention*, published in 1819, and Tucker's *Life of Jefferson* (London, 1836), where they will find ample reference to other authorities.

A supreme federal government, or a composite state, is distinguished by Austin (*Province of Jurisprudence determined*) from a system of confederated states: in the latter 'each of the several societies is an independent political society, and each of their several governments is properly sovereign or supreme.' It is easy to conceive a number of sovereign powers, such as the German States, assembling and passing resolutions which concern all the members of the confederacy, and yet leaving these resolutions to be enforced in each state by its own sovereign power. Such a union therefore differs essentially from a supreme federal government, which enforces its commands in each and all the states. As to the existence of a written constitution, as it is called, in the one case and a mere compact in the other, that makes no essential difference, for the federal constitution, as we have shown, is merely articles of agreement, which only derive their efficacy from the continued assent of all the members that contribute in their aggregate capacity to form the sovereign power in such federation.

As to a system of confederated states, Austin adds: 'I believe that the German Confederation, which has succeeded to the antient empire, is merely a system of confederated states. I believe that the present diet is merely an assembly of ambassadours from several confederated but severally independent governments; that the resolutions of the diet are merely articles of agreement which each of the confederated governments spontaneously adopts; and that they owe their legal effect, in each of the compacted communities, to laws and commands which are fashioned upon them by its own immediate chief. I also believe that the Swiss Confederation was and is of the same nature. If, in the case of the German or of the Swiss Confederation, the body of confederated governments enforces its own resolutions, those confederated governments are one composite state, rather than a system of confederated states. The body of confederated governments is properly sovereign: and to that aggregate and sovereign body each of its constituent members is properly in a state of subjection.'

FEDOR IVANOVICH, the last tzar of Moscow, of the dynasty of Ruric, ascended the throne in 1584, after the death of his father, the celebrated tyrant Ivan Vasilevich. He was weak in body and in mind, but the affairs of the government were conducted by the talented Godoonoff during his reign, which was marked by some events that produced a decisive influence on the destinies of the Russian empire. It was during Fedor's reign that the peasants of Muscovy, who had hitherto enjoyed personal liberty, and could pass from the estate of one landowner to that of any other who would grant them better conditions, were converted into serfs attached to the ground (servi glebæ adscripti). This change was introduced in 1592 by the instrumentality of Godoonoff, who adopted that measure in order to gain a party among the landowners. There had been previously to that epoch domestic slaves in Russia, but the predial serfs date only from that time. The Greek church of Moscow originally depended on the patriarch of Constantinople, who consecrated the Metropolitan of Moscow; but after the capture of Constantinople by the Turks, the supremacy of the Greek patriarch over the Muscovite church was almost destroyed. Jeremy, patriarch of Constantinople, arriving in 1588 at Moscow in order to collect alms for the erection of churches, was received with great honours by Fedor, who, being exceedingly devout, presented the head of the Greek church with rich donations. Jeremy acknowledged the kindness of Fedor by consecrating a patriarch of Moscow, which dignity lasted till the time of Peter the Great, who abolished it, and declared himself the head of the Russian church. The conquest of Siberia, which had been commenced under Ivan Vasilevich, was completed under Fedor, during whose reign Russia made the first attempt to extend its influence over the Caucasian regions. The khan of Crimea invaded Russia, and penetrated to the capital, but he was repulsed from the walls of Moscow in 1591. The reign of Fedor is also remarkable for many diplomatical relations with foreign courts, and particularly with that of England. The most important event of Fedor's reign was his attempt to get himself elected king of Poland in 1587. Fedor, or rather his prime minister Godoonoff, promised to the states of Poland and Lithuania, that if they elected him king, he would unite all the forces of Moscow with those of Poland, and conquer the Crimea for Moscow, and Wallachia, Moldavia, and Hungary for Poland. The proposed union would have easily created a power capable of accomplishing not only the projected but even much more extensive conquests. Fedor's proposals were readily accepted by the majority of the Lithuanians, and they found many partisans even amongst the Poles. He was on the point of being elected, when, fortunately for the repose of Europe, the overbearing conduct of the Muscovite ambassadors destroyed the hopes of Fedor, and Sigismund Vasa, prince of Sweden, was elected king of Poland. Fedor died in 1591, and with him ended the dynasty of Ruric on the throne of Moscow, his younger brother Demetrius having been murdered through the instrumentality of Godoonoff.

FEDOR ALEXEYEWICH, tzar of Moscow, the eldest brother of Peter the Great, ascended the throne after the death of his father Alexius Michaylowich, 1676, being only 19 years of age. His youth and delicate constitution did not prevent him from displaying remarkable talents and energy, and the strong will which he constantly evinced to improve the barbarous institutions of his country, and to introduce civilization into the Muscovite empire, may justify us in supposing that but for his death he might have accomplished what was afterwards performed by his brother Peter the Great. Fedor distinguished his reign particularly by putting an end to a most absurd custom which had acquired the force of law in Muscovy. According to this custom, called Mestnichestvo (literally *placeship*, from Mesto, place), no member of a great family could be put under the command of or give precedence to a person whose birth was considered inferior to his. All the noble families of the country were registered in a roll called *Razriad*, or *Arrangement*, and all the disputes which frequently arose about precedence, not only at the court, but even in active service, were settled by referring to this kind of herald's office. A natural consequence of such a preposterous system was confusion, and it frequently proved very detrimental to the public service; but it was so deeply rooted, that even the celebrated tyrant Ivan Vasilevich, who deluged Muscovy with blood and decimated its nobility, was unable to destroy the Mestnichestvo. Fedor abolished the absurd practice by very simple means: he assembled his boyards, or principal nobles, and having expostulated with them on the bad consequences of the abovementioned custom, threw, in the presence of the assembly, all the rolls of the Razriad into the fire. This auto-da-fé, which took place in 1681, extinguished for ever the system of the Mestnichestvo, and since that time the nobles of Russia have equal privileges. The nobility in Russia enjoy as a class many rights from which the other classes of the community are excluded, but neither antient family nor title legally gives in Russia any privilege to an individual belonging to the class of the nobles which any other mem ber of the same body does not possess. The genealogical records of the Muscovite nobles, which did not relate to their claims of precedence, were spared by Fedor, and even arranged in order by his command. Death prevented Fedor from attempting other reforms in his country; he died in 1682, at the age of 25.

FEE SIMPLE. [Estate.]

FEE TAIL. [Estate.]

FEELING. [Touch.]

FEES, certain sums of money claimed as their perquisite by official persons under the authority of various acts of parliament, and by prescription. The right to fees, as well as the amount payable in most cases connected with the administration of justice, has been regulated by several recent statutes.

Officers demanding improper fees are guilty of extortion. [Extortion.]

The rewards paid to barristers and physicians, attorneys and surgeons, for their several services, are called fees, which may be recovered by the two last-named by action; but barristers and physicians cannot recover their fees by any legal proceeding, on the ground that they are not capable of being fairly estimated in amount, and also because they are or ought to be paid in advance. [See Counsel; Physician.]

FEHME, or FEHMGERICHT. After the crusades, when the spirit of chivalry had degenerated from its antient splendour, the German nobles retired to their gloomy castles, whence they darted, like birds of prey, upon the travelling merchants, or waylaid each other for the perpetration of every description of outrage. Murder, robbery, rape, abduction, went unpunished. Nor were these excesses confined to the laymen; the clergy, secular and monastic, casting off the rigid morals of their predecessors, plunged into license and debauchery. In the midst of general depravity and anarchy, the authority of the laws, both civil and ecclesiastical, gave way to force, which, in the hands of ignorance and rapacity, threatened society with dissolution. In order to check the audacity of those who, relying upon their power, thought themselves above the reach of the law, and for the protection of the defenceless and innocent, a secret tribunal was formed, called the sacred Fehme, or Fehmgericht. According to the best critical inquiries, there can be little doubt that the formation of this tribunal was due to Charlemagne after his conquest of Saxony. A division into counties, 'grafschaften,' formed part of the general organization which he then gave to Germany; each county had a 'freygraf,' free-count, and a 'schœffe,' sheriff, who, on certain days of the month, generally on Tuesdays, held a court for the administration of justice in the open air. According to the antient German custom, the spirit of which still breathes in the laws of England, no criminal proceedings could be had by a judge unless an information was previously lodged by the prosecutor. 'Wo kein klager ist, da ist kein richter;' 'where there is no accuser, there is no judge,' was a maxim of the old Saxon law. Charlemagne, having conquered the Saxons, endeavoured to establish Christianity by force, and punished all who would not profess the new religion; but being aware that no Saxon would betray his fellow-citizen for such an act of disobedience, he imposed on the sheriffs the duty of accusing and denouncing all those who would not profess Christianity. This obligation was afterwards extended to other crimes, as adultery, rape, administering of poison, conspiracy, and rebellion.

At the period of anarchy above alluded to, the schœffen, who were the traditional possessors of the secret orders of Charlemagne, being prevented by continual acts of violence from discharging their duties, resolved on forming a secret association for the vigorous enforcement of the laws.

The members of this tribunal, who called themselves Wissende, 'the Knowing Ones,' were chosen from the most moral, well-educated, and boldest members of the community. After the necessary inquiries into his previous course of life, the neophyte was summoned to attend a meeting of the schœffen, which was held at midnight in some secluded part of a forest, and opened with all the formalities of a court of law. He was required to kneel before the freygraf, his head uncovered, with his fore-finger on the sword, and to take the following oath:—'I swear to keep the secret from man and woman, from village and farm, from stick and stone, even from toad and frogs, or any other of God's creations, unless I have the permission of him who heads the holy Fehm. And I will not break my oaths for pleasure or pain, for pledge or dress, for silver or gold, or any other reason. I further swear to disclose to this holy chair, which presides at our sittings, every thing that concerns this secret tribunal, which I know to be true, or hear for truth from trustworthy persons.' As soon as the neophyte had pronounced this oath, he was informed that the object of the association was to uphold peace, virtue, and honour against the open or concealed enemies of the law; and as the interest of the order required that the schœffen of the different counties and principalities should be known to each other, they had adopted a sign consisting of four letters, S. S. G. G., the signification of which is still involved in mystery. The neophyte was further presented with a rope, which he was obliged to carry in his left sleeve, and also a dagger, on which the four above-mentioned letters were engraved, together with other symbols. Moreover he was charged with the duty of accusing before the secret tribunal all those who could not be successfully prosecuted before the ordinary courts, and of executing capital punishment whenever required by the society to perform this duty.

The mode of proceeding against the accused was as follows: If the author of a crime absconded, or his residence was unknown, the schœffe was required to write four summons, and post them on a cross road; but if the residence was known, the schœffe came at night, and nailed the summons with four nails, folded as a letter, containing an imperial farthing, on the man's door. He then rang the bell, and told the porter that he had brought a letter from the sacred tribunal for his master. The summons required the accused to appear at a certain hour at the appointed spot, within a fortnight after its delivery, to answer for his base and criminal conduct before the sacred tribunal, or otherwise clear himself of the accusation; at the same time threatening to proceed against him for contempt in case of non-appearance. If the accused attended the summons, the schœffe who brought the accusation was called upon by the freygraf to state all that he and his witnesses knew relating to the charge, after which the accused and his witnesses were heard. The judges were all armed and dressed in black gowns, with a cowl that covered their faces like a mask. When the sentence was pronounced, the execution of which, in case of capital punishment, was intrusted to all the members of the order, the condemned (who came under a kind of safe conduct) was dismissed, with the warning that his life was forfeited, and that no power on earth could withdraw him from the deserved punishment. Whenever three sheriffs (for that was the number necessary for an ordinary execution) afterwards met the person condemned, they seized him, and with one of the ropes which they carried in their sleeves, hung him on the next tree, fixing a dagger in the trunk to denote that the deceased was killed by the holy tribunal. When such an event occurred, no court of law dared to take notice of the affair; every man's tongue was struck silent, for fear of incurring the vengeance of this terrible body. This punishment however was seldom inflicted upon those who readily appeared; in such cases the judges were satisfied with causing the defender to redress the wrong that he had inflicted. But if the accused failed to attend the summons, which was repeated three times, judgment passed by default, and the accused was declared an outlaw. Every sheriff, though he were the father or son of the criminal, was duty-bound to put him to death by the rope, the dagger, the sword, or even poison, and to revenge any insult offered to the tribunal upon man, woman, or child, noble or plebeian, freeborn or slave, house or farm, monastery or nunnery, that dared to shelter him.

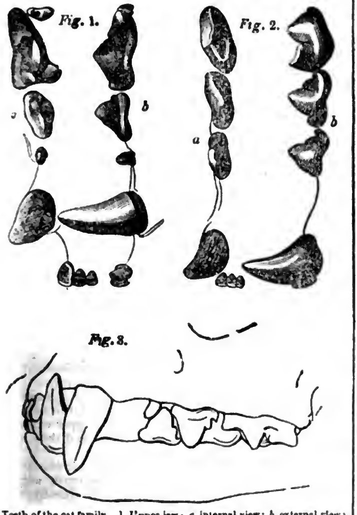
The power of this tribunal was greater than that of the Holy Inquisition; it struck terror into all Germany, and especially in Westphalia, where it originated. Princes and nobles were anxious to enter into this order either for protection against their enemies, or to avoid the jurisdiction of a tribunal the power of which they were unable to withstand. Towards the end of the fifteenth century, the German empire having acquired more political consistency, and the objects for which this tribunal was instituted having ceased to exist, it gradually lost its power, without being abolished by any legislative enactment. Some traces of the revival of this tribunal appear in the seventeenth century, but its efforts to regain its former importance were checked by the public authorities. It sunk at length into utter insignificance; and a remnant of it which continued to act as a kind of society for the suppression of vice was abolished in Westphalia by order of Jerome Buonaparte in the year 1811. The members of the order maintained that they were the true and genuine possessors of the secrets intrusted to the Fehm by Charlemagne, but no one would or could explain the signification of the mystical S. S. G. G. Goethe has given the most graphic picture of the working of this tribunal in his historical drama 'Goetz von Berlichingen.' The best historical account of its organization is by Paul Wigaud, 'Die Fehmgerichte Westphalens,' Hamm., 1827.

FELEGYHA'ZA, a market town, and the capital of the Hungarian district of Little Cumania, situated on the high road between Pesth and Temeswar, in the middle of a country of corn-fields, vineyards, and orchards; in 46° 43′ N. lat., and 19° 52′ E. long. It contains about 1370 houses, and a population of about 15,030. There is a Roman Catholic church, a gymnasium, and a very handsome building in which the Cumanian courts of justice are held and the public archives kept. Roman urns have been found in the vicinity of the town. The cattle-markets held here are considerable.

FELIPE, SAN, a town in South America, in the republic of Venezuela, and the department of Sulia, in 10° 30′ N. lat., and 68° 30′ W. long., in a pleasant valley on the small river Aroa. In the surrounding country, which is diversified by high hills and wide fertile valleys, great quantities of cocoa, coffee, maize, and rice are grown, also a little cotton. These commodities are sent to Puerto Cabello to be exported. The town, which has a population of about 7000 souls, has several handsome houses, and its streets are regularly laid out. Some copper-mines are worked in the neighbourhood.

FELIS, FE'LIDÆ, animals of the cat kind, a family of *Carnivora*, in which the organs of destruction reach their highest development. They are, among the quadrupeds, what the *Falconidæ* are among the *Birds*.

The principal instruments of the destructive energy of these animals are the teeth and claws.



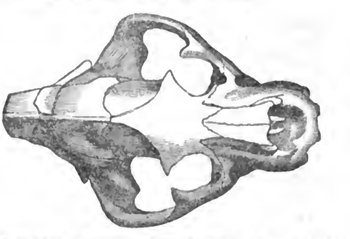
Teeth of the cat family. 1, Upper jaw; *a*, internal view; *b*, external view; 2, lower jaw; *a*, internal view; *b*, external view; 3, teeth when the jaws are shut seen in profile: from F. Cuvier.

The dental formula then in these animals is the following:—Incisors, $\frac{6}{6}$, canines, $\frac{1-1}{1-1}$, molars $\frac{4-4}{3-3} = 30$.

The formation of these teeth is beautifully shown in four preparations in the museum of the Royal College of Surgeons in London. No. 329 is the anterior part of the right *ramus* of the lower jaw of a young lion, exhibiting the teeth, together with the gums in which they are imbedded, and the border of soft parts, or lip, with which they are surrounded. No. 330 is the anterior part of the upper jaw of a young lion injected, in which the body of the second or permanent laniary (canine tooth, or *cuspidatus*) is pretty completely formed, and the fang forming. The laniary is cut down in the direction of its axis to expose the cavity containing the pulp on which it was forming. There is one of the molars in the act of being shed, and the adult or permanent tooth is pushing into the gum. No. 331 is the counterpart, or opposite section of the same laniary; and No. 332 is the laniary of the jaw of the opposite side of the same lion, showing the whole of the pulp on which it was forming. (*Catalogue, Physiological Series, Gallery*, vol. i. p. 95.)

The articulation of the condyles of the lower jaw in which this formidable apparatus is set is so contrived as to cause its operation in the most efficient manner. These processes are situated in the same straight horizontal line; they are cylindrical and firmly locked in the transversely elongated glenoïd cavities, the margins of which are so extended both before and behind the condyle that rotatory motion is impossible. The crowns of the molar or rather lacerating teeth are compressed and covered with enamel, as indeed are those of all the others: the molars terminate in pointed processes, and the lower teeth shut within the upper. Thus, when called into action, the teeth and jaws operate like the antagonist blades of a pair of scissors upon the substance submitted to their cutting edges. The canine teeth, the principal prehensile weapons of the head, are very long and large, especially in the larger cats. If we examine the cranium of a lion or tiger we shall be at no loss to discover the machinery by which this dental apparatus is worked.

The *crista occipitalis*, which is most strongly marked in the cats, is a sharp and prominent bony ridge rising from the upper and hind portion of the skull. Its chief use is for the attachment of the temporal muscle, and the size of the temporal fossa, and the strength and extent of the zygomatic arch depend upon the magnitude of that muscle. In no animals is this fossa larger than in the carnivora. It not only occupies the whole of the sides and upper part of the skull, but is still further increased by the prominent bony crests proceeding from the frontal, parietal, and occipital bones. The temporal muscles would indeed almost completely cover the cranium in many of these animals, were it not for their separation by the parietal ridge.

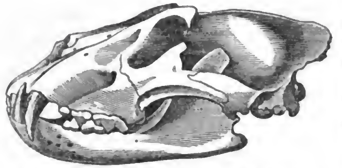


Skull of lion seen from above, showing the extent of the zygomatic arches and temporal fossæ.

The zygomatic suture is so oblique that the temporal bone forms the whole superior margin, and the *os malæ* the inferior edge of the zygoma.

In consequence of the construction which we have endeavoured to explain, the lower jaw is capable of motion only upwards and downwards, and entirely incapable of that motion in a horizontal direction which is necessary to mastication, properly so called. Accordingly the cats cut and lacerate their food coarsely, and transmit it in large portions to the stomach, there to be acted on by the gastric juice.

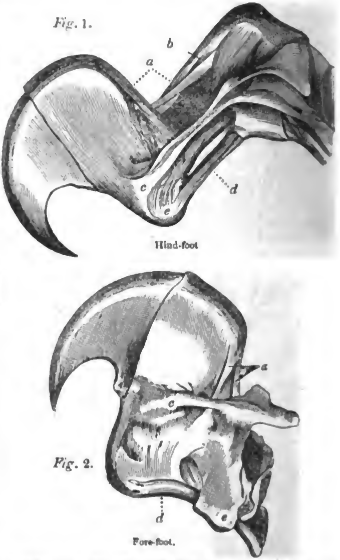
The muscles of the neck and fore-quarter of the cats are especially powerful to give full effect to this part of the organization, and to enable the animal to drag or carry away its prey.



Skull of lion seen in profile, showing the prominent bony crests.

We must next turn our attention to the other organs of prehension, the claws.

The five toes of the anterior, and four toes of the posterior extremities of the cats are armed with very strong, hooked, sub-compressed sharp claws. These extremities, the anterior ones especially, thus become powerful instruments for seizing and rending the prey. The muscles that are to wield these weapons are of great strength: those of the fore arm especially, which in the lion and tiger offer the same arrangement for flexion, extension, pronation, and supination, as is observed in man, are highly developed, and the blow alone which the animal can deal with this limb is frequently fatal. It is asserted that the Bengal tiger has been known to fracture the skull of a man with one stroke of its heavy paw. The claws, by a beautiful conformation, are always preserved without effort from coming in contact with external bodies, so as to keep them sharp and ready for action. There are some interesting specimens in the Museum of the Royal College of Surgeons in London, which will illustrate this provision. No. 287 of the 'Physiological Series' is a toe from the right fore foot of a lion, with the last phalanx retracted on the ulnar (which from the prone state of the foot is the outer) side of the second phalanx. This state of retraction is constantly maintained, except when overcome by an extending force, by means of elastic ligaments, two of which have bristles placed beneath them in the preparation. The principal one arises from the outer side and distal extremity of the second phalanx, and is inserted into the superior angle of the last phalanx; a second arises from the outer side and proximal end of the second phalanx, and passes obliquely to be inserted at the inner side of the base of the last phalanx; a third, which arises from the inner side and proximal extremity of the second phalanx, is inserted at the same point as the preceding. The tendon of the flexor profundus perforans, which is the antagonist of the ligaments, has been divided. No. 287 A is a toe from the left fore foot of a young lioness, with the last phalanx drawn out, as in the action of the flexor profundus. The same ligaments are shown as in the preceding preparation, together with the insertion of the flexor and extensor tendons. In order to produce the full effect of drawing out the claw, a corresponding action of the extensor muscle is necessary to support and fix the second phalanx; by its ultimate insertion in the terminal phalanx, it serves also to restrain and regulate the actions of the flexor muscle. A bristle is placed beneath that part of the extensor tendon which passes under one of the elastic ligaments to be inserted into the base of the last phalanx immediately above the articulation. In both preparations lateral processes of tendon may be observed going to the under part of the base of the phalanx, which are partly inserted there, and partly lost in the integument: they are given off from the extensor tendon as it passes over the proximate phalanx, and are joined by ligamentous fibres from the sides of the same phalanx. No. 288 is a toe from the right hind foot of a lion, with the last phalanx drawn out, and the elastic ligaments put on the stretch. As the phalanges of the hind foot are retracted in a different direction to those of the fore foot, *i. e.* directly upon and not by the side of the second phalanx, the elastic ligaments are differently disposed, as may be seen by comparing this with the preceding preparation. The outer ligament is of a flattened triangular form; it arises from the whole outer side of the middle phalanx, is strongest at the anterior margin, and is inserted at the superior angle of the last phalanx: the inner ligament is of a rounded form, arises from the inner side and distal end of the second phalanx, and is also inserted at the superior angle of the last phalanx, which is necessarily drawn back in the diagonal of the elastic forces. No. 288 A is the innermost toe or pollex of the right fore foot of a young lioness, exhibiting a disposition of the elastic ligaments and mode of retraction similar to the toes of the hind foot; but here the inner ligament is of the flattened triangular form, and the outer one rounded. The latter passes between a division in the extensor tendon one part of which is inserted in the base of the last phalanx just above the articulation; the other part into the outer side of the base of the phalanx, and into the integument. (*Catalogue, Physiological Series, Gallery*, vol. i., p. 75.) 'It seems scarcely necessary,' adds the able author of the foregoing description, 'to allude to the final intention of these beautiful structures, which are, with some slight modifications, common to the genus *Felis*. The claws being thus retracted within folds of the integument, are preserved constantly sharp, and ready for their destined functions, not being blunted and worn away in the ordinary progressive motions of the animal; while at the same time, as soft parts only are brought in contact with the ground, this circumstance contributes to the noiseless tread of the feline tribe.' (*Ibid.*)



Structure of the apparatus for retracting and extending the claws of the cats, as exemplified in the fore foot and hind foot of the lion.

The elastic ligaments which retain the last phalanx and claw in a state of retraction are not the same in the fore and hind foot.

In figure 1, which is a toe from the left fore foot of a young lion, represented in a state of extension, *a* points to the two elastic ligaments; *b*, the tendon of the extensor muscle; *c*, a process of inelastic tendon; *d*, the tendon of the flexor muscle, which passes over the upper extremity of the last phalanx at *e*, as over a pulley, and thus assists the powerful action of that muscle.

In figure 2, a toe from the hind foot, the two elastic ligaments (*a*) converge to be inserted into the upper angle of the last phalanx, and draw it backwards directly upon, instead of by the side, of the penultimate phalanx: *c* is a process of lateral inelastic tendon; and *d* the tendon of the flexor profundus, which is strongly strapped down by an annular ligament, *e*.

The claw is supported on the last phalanx, which is of a very peculiar form. Its two portions are united to each other at nearly right angles. The base of the claw is received into a groove in the body of the bone, to prevent its being pushed backwards in the violent action of the paws. The two parts of the bone form a species of hook or crotchet. The superior end of the phalanx in this state of repose is placed almost vertically; while the other extremity lies nearly parallel to the second. The articulation is at the upper end of the vertical portion, and the flexor tendons, passing over the upper part of the bone, are strongly fixed to the other portion. The action of the flexor profundus causes the whole bone to move through 90° round the end of the second phalanx. (Dr. Traill.)

Having laid before the reader the mechanism of the parts more immediately concerned in the capture of the prey and the separation of its flesh, we must notice another organ which in the cats is used for other purposes than those of mere taste and deglutition. The roughness of a domestic cat's tongue is familiar to every one, as well as the action of lions and tigers in licking the bones of their prey in order to detach any remnants of flesh that may be adhering thereto. This is effected by numerous horny papillæ, which are differently arranged in different species, some having them in straight rows, others in alternate lines; but in all the points are directed backwards. In the Museum of the Royal College of Surgeons are preparations well illustrating the structure of the tongue in these animals. No. 1509 exhibits the tongue and larynx of a young lion injected. The tongue is of considerable length, in consequence of the distance at which the larynx and os hyoïdes are placed behind the bony palate. The soft palate is of a proportional extent. All that part of the tongue which corresponds to the soft palate is smooth; as it advances forwards it is covered with large soft papillæ directed backwards; then there are four large fossulate papillæ, anterior to which the simple conical papillæ continue increasing in size to near the tip of the tongue: the strong cuticular spines with which they are armed have been removed, showing the vascular secreting surface beneath. With the larynx there are preserved the thyroïd glands and part of the wide trachea. No. 1510 is a portion of the cuticular covering of the smaller posterior conical papillæ, from the preceding tongue. No. 1511 shows a portion of the cuticular covering of the anterior papillæ of the same tongue. At the fore part of the base of each of the larger spines may be observed a group of small gustatory papillæ. No. 1512 is the extremity of the tongue of a lion, with the cuticular covering of the papillæ removed from one side; and No. 1513 is the anterior part of the tongue of a lion, with the cuticular and spiny covering of the papillæ preserved. (*Catalogue*, *Physiological Series*, *Gallery*, vol. iii. part i. p. 12.)

Portion of Lion's Tongue, showing the horny papillæ.
From the specimen in the College of Surgeons.

Mr. Owen remarks, that in the cats generally the connexion of the *os hyoïdes* to the cranium is not by a long elastic ligament, as in the lion, but by an uninterrupted series of bones, and that this latter structure exists in the *Cheetah* (*Felis jubata*). (*Zool. Proc.* 1833.)

This leads us to the other

Digestive organs.—In the cats the salivary glands are small, as might be expected where it can hardly be said that mastication is exercised. The stomach of the lion is divided, by a slight contraction in its middle, into two portions. Its coats, particularly the muscular coat, are very strong, as in most of the *Carnivora*. Blumenbach observes, that in most carnivorous quadrupeds, particularly those of a rapacious nature, the stomach bears a considerable resemblance on the whole to that of the human subject. Mr. Lawrence, in his notes, remarks, that the food of carnivorous animals, approaching in its constituent elements more nearly to those of the animal than that of the herbivorous tribes, is more easily reduced into the state which is required for the nourishment of the body in the former than in the latter case. In the Carnivora, the stomach, which is of a cylindrical form, has no cul-de-sacs; the œsophagus opens at its anterior extremity, and the intestine commences from the posterior, so that every thing favours a quick passage of the food, which receives no mastication, and is retained a very short time in the stomach. The intestine has no valves, is small in diameter, but muscular, and the whole canal, when compared with the body, is extremely short, being as 3 or 5 to 1. It is worth noticing, that in the domestic cat they are as 5 to 1, but in the wild cat they are only as 3 to 1. Some of the Carnivora have no cæcum, and in those that have this appendage it is constantly small and uniform in its cavity. In the Museum of the College of Surgeons are four preparations, Numbers 693 to 696 (*Gallery*), both inclusive, showing the structure of the intestines of a lion. No. 724 shows the termination of the ileum of a lion, with the cæcum or caput coli injected. The cæcum is simple, resembling that of the Suricate (*Ryzæna tetradactyla* of Illiger), with its apex similarly occupied by a cluster of glands; the terminal orifice of the ileum is also of a circular form, but it is situated on a valvular prominence in the large intestine. No. 730 is the injected colon of a lion. The longitudinal muscular fibres are very strong, and are disposed around the whole circumference of the intestine, which consequently is not drawn up into sacculi. The lining membrane is smooth, and is thrown into zig-zag rugæ. No. 736 is a portion of the rectum of a lioness, showing the strong round fasciculi of longitudinal fibres forming the outer stratum of the muscular coat, part of which has been turned down to show the inner circular fibres. The intestinal glands of the ileum in the lion are shown by No. 757. No. 806 shows the liver of the domestic cat, and its subdivision, as in all carnivorous quadrupeds, into a great number of lobes. The second lobe from the left side, or cystic lobe, is deeply cleft for the insertion of the suspensory ligament; to the right of this cleft it is perforated for the lodgement of the gall-bladder. No. 807 is the cystic lobe of the same species, showing that the gall-bladder is situated in the middle of the substance of the large lobe. (*Catalogue, Gallery, Phys. Series*, vol. i.) Blumenbach remarks that the ductus choledochus forms a pouch between the coats of the intestine for receiving the pancreatic duct in the cat. No. 821 in the Museum of the College of Surgeons displays a portion of the duodenum, with the termination of the hepatic and pancreatic ducts of a lion. A black bristle is passed into the ductus communis choledochus, and a white one into the pancreatic duct; the mucus coat of the intestine is laid open to show their junction. The orifice of a distinct pancreatic duct is preserved. No. 837 is the spleen, with a portion of the duodenum and pancreas of a domestic cat. The spleen is of an elongated trihedral form, attached to the stomach by a duplicature of peritoneum inclosing its vessels: this duplicature passes off from the angle formed by the two lesser sides. The splenic vein is seen passing from the spleen along the pancreas, which extends from it to the duodenum. No. 840 exhibits the stomach and duodenum, spleen, pancreas, and great omentum of a small carnivorous animal, apparently of a cat. The parts have been injected, and show remarkably well the principal peculiarities in the form and disposition of these parts as they exist in the feline tribe. A part of the œsophagus has been inverted, to show the transverse rugæ of its lining membrane, near its termination. The stomach exhibits the broad dilated cardiac and the narrow tubular pyloric divisions, which are acutely bent upon each other; in the duodenum may be observed its regular extended curve, and its broad mesentery, by which much greater freedom of motion is allowed to this portion of the intestinal canal than in the human subject. The small omentum is seen attached, not in a regular line along the lesser arch of the stomach, but advancing in an irregular scolloped manner upon its anterior surface: an analogous process of peritoneum is attached posterior to the lesser curvature. The great omentum anteriorly is continued from the greater arch of the stomach, from the left end of which it is continued down the spleen, and posteriorly along the pancreas, which is thus seen to have an entire investment of peritoneum: from the pancreas it extends to the pylorus, where it becomes continuous with the anterior layer, completing the circle, and leaving a large aperture behind the lesser arch of the stomach, which leads into the omental cavity analogous to the foramen Winslowi. The form of the pancreas and its division into the transverse or greater lobe and the circular or duodenal lobe are well shown, and also the form and situation of the spleen. (*Catalogue, Gall., Phys. Series*, vol. i.)

Organ of the Voice.—The terrific roar with which the larger animals of this family rush on their prey is well known, and well calculated to paralyze the nervous system of the victim with fear. Stealing on the victim with noiseless tread till couched within the proper distance for their spring, these destroyers leap on it with a horrid sound which salutes its ear in the same moment almost that it feels the blow of the deadly talons and the murderous gripe of the teeth. The cartilages of the larynx of a lion, the large size of the vocal organ, and the rounded contour of the epiglottis, may be seen in preparation No. 1172 (*Gallery*) of the Museum of the Royal College of Surgeons. From the narrowness of the thyroïd cartilage anteriorly, there is a considerable interval at that part between the thyroïd and cricoïd cartilages, a structure which, as the Catalogue tells us, obtains in all the feline animals. No. 1129 consists of the heart and lungs of a kitten, and shows principally the subdivision of the lungs into many lobes, and more especially the small azygos lobe of the right lung, filling up the space which intervenes between the heart and diaphragm in this and most other quadrupeds. Vicq-D'Azyr and Blumenbach notice the two delicate membranes lying under the ligamenta glottidis of the cat, which probably cause the purring noise peculiar to it.

Urinary and Genital Organs.—'The structure of the kidney in *Mammalia*,' observes Mr. Lawrence, in his notes to Blumenbach's 'Comparative Anatomy,' 'displays two very opposite varieties, which may be called the *simple* and the *conglomerated* kidneys. In the former there is a single papilla, which is surrounded by an exterior crust of the cortical substance. This is the case in all the *feræ*, and in some other animals, as many *rodentia*.' 'In some animals,' says John Hunter, 'the kidney is a very oblong body, extending in length for a considerable way, and very narrow, as in some fish, while in other animals it is almost globular, as in the leopard. * * * In the lion kind, cat kind, as also in the hyæna, we find that perhaps one-half of the veins get on the external surface, and are either strongly attached to or pass in a doubling of the capsule of the kidney, and then pass along like the veins of the pia mater, afterwards joining the trunks from the inside just as they pass out. * * * The veins of the kidneys have in general nothing particular respecting them. They in common attend the arteries, or at least ramify similarly to the arteries, excepting in the lion and cat kind, as also in the hyæna, where some of the veins ramify on the surface, while the others are attending the arteries.' The reader will find in the Museum of the College of Surgeons some beautiful preparations illustrative of the kidneys, &c., of the *Felidæ:* they are numbered 1200 to 1205 both inclusive, 1218 to 1221 both inclusive, and 1284 (*Gallery*).

Blumenbach observes that in some species of the cat kind the glans is covered with retroverted papillæ, which, as these animals have no vesiculæ seminales, may enable the male to hold the female longer in his embraces. Most of the cats are retromingent, but not, as has been so often and erroneously repeated from the time of Aristotle, retrocopulant.

Brain, Nervous System, and Senses.—Blumenbach observes that the bony tentorium cerebelli constitutes in most species of the cat kind an uniform bony partition which leaves a quadrangular opening in the lower part of the cranium. In the cat the brain forms $\frac{1}{94}$ of the body, the proportion of the weight of the cerebellum to the cerebrum is as 1 to 6, and the breadth of the medulla oblongata after the pons varolii is to that of the brain as 8 to 22. In the Museum of the Royal College of Surgeons, No. 1324, (*Gallery*) is the brain of a tiger. The pia mater has been removed from the medulla oblongata, showing the transverse tract of medullary matter posterior to the tuber annulare, called *corpus trapezoïdeum;* this is traversed by the corpora pyramidalia. The development of the cerebrum is such as not only to cover the optic lobes or bigeminal bodies, but also the anterior half of the cerebellum itself; and the surface of the cerebrum is augmented by convolutions, of which one is analogous to the single convolution in the agouti, and extends parallel with the fissure dividing the hemispheres; a second runs parallel with and external to the preceding; a transverse one proceeding from the mesial fissure marks off what may be regarded as the anterior lobes, which, together with the lateral regions of the hemispheres, are traversed by other anfractuosities. No. 1325 is the brain of a lion, closely resembling the preceding in general form and disposition of the convolutions. No. 1326 is the brain and part of the spinal chord of a young lion, with the vessels of the pia mater minutely injected. The left lateral ventricle is exposed, showing the pes hippocampi and the choroid plexus. The fourth ventricle is also laid open, and contains a similar plexus of minute arteries. Bristles are inserted into the hollow olfactory and the optic nerves, and black threads are tied round the origins of the remaining cerebral nerves of the right side. A small quill is placed in the infundibulum; but the pituitary gland, which may be seen in both the preceding specimens is here removed. The union of the vertebral arteries to form the basilar artery, the great length of that vessel, and its division to join with the internal carotids in the formation of the circle of Willis, are well displayed. No. 1326 is a portion of the basis of the brain of a lion, prepared to show the form and relative proportions of the bigeminal bodies or optic tubercles; of these, the posterior, though smaller in longitudinal diameter, are broader, and rise above the level of the anterior pair. No. 1372 and No. 1373 are two highly interesting preparations of the spinal chord and cauda equina of the lion. (*Catalogue*, vol. iii.)

Taste and *Touch.*—For illustrations of the former sense we refer the reader to the descriptions of the preparations, Nos. 1509 to 1513, both inclusive, above given. The latter sense presents nothing particularly worthy of notice in the cats; the whiskers indeed are provided with very large nerves, and may be serviceable in warning the animal in certain situations where they come in contact with any object.

Smell.—Blumenbach enumerates the cat kind among the animals remarkable for their acuteness in the sense of smelling, and as affording examples of a very complicated formation of the ethmoïd bone, both in regard to the elegant structure of its cribriform lamella, and to the wonderful convolutions of its turbinated portions, which procure as large a surface as possible within the confined space of the nasal cavity, for the application of the Schneiderian membrane. The *conchæ narium inferiores* are also much convoluted. There is in the Museum of the College of Surgeons (*Gallery*) a preparation (No. 1552) of a longitudinal vertical section of the head of a leopard, showing the turbinated bones of the left side *in situ;* and another, No. 1553, of a longitudinal section of the side of the head of a young lion, showing the ossa turbinata *in situ* also. The following luminous description of the latter is given in the Catalogue. (*Physiological Series*, vol. iii.) The superior bone is of a conical form, extending along the whole of the roof of the nasal cavity, with its base opposite to the frontal sinus (which is here exposed), and its apex terminating above the anterior extremity of the inferior turbinated bone. It presents a smooth or uniform surface towards the nasal cavity, as may be seen in the preceding specimen; but the lamella forming this surface has been partially removed, showing the subjacent lamella, which is folded longitudinally: the more complicated disposition of the exterior lamella of the same bone is exhibited on the opposite side of the preparation, where the surface for the extension of the olfactory membrane is augmented by a series of deep arched folds, having their convexity upwards. The middle turbinated bone is also of a pyramidal form, its broad basis being applied to the cribriform plate of the ethmoïd bone, and its apex extending between those of the other two turbinated bones, but not reaching so far forwards. The nasal or mesial surface of this bone is complicated by numerous deep furrows, two of which extend longitudinally, parallel with the superior margin of the bone, while the others radiate in an irregular manner from the lower point of attachment. The lateral surface of the bone is less complicated and extensive. The inferior and anterior turbinated bone is of an elongated form, and contracted at both extremities. Its posterior and inferior extremity is attached to the outer parietes of the nasal passage, below the middle of the turbinated bone: from this point it extends obliquely upwards, enlarging as it crosses the anterior extremity of the middle bone, and then diminishing in size to its anterior and superior attachment behind the external nostril: from its position therefore the odorous particles in inspiration must first impinge upon this bone. Its nasal surface is pretty uniform, presenting only one curved groove, parallel with and near to the lower margin of the bone, in this respect differing widely from the lower turbinated bone in the hare: its exterior surface is similarly characterized. In the preparation the outer lamella has been cut away to show the subjacent fold. The whole being minutely injected, the vascularity of the pituitary membrane extended over this vast and complicated surface is well displayed. The pituitary membrane is evidently thickest and most vascular at the anterior part of the cavity, where it must receive the first impression of the external air. A portion of the pituitary membrane is reflected from the base of the middle turbinated bone, showing the fibres of the olfactory nerves spreading over it. In No. 1554 (the opposite section of the same head) and No. 1555 (the intermediate section) this part of the organization is still further illustrated.

Hearing.—This sense is acute in most of the cats. There is, in the greater number of mammiferous quadrupeds, connected with the tympanum another cavity which Blumenbach compares, with regard to the situation of the bony organ that contains it, to the mastoïd cells in the temporal bone of man. In several animals (and the cat is one of them) this organ is a mere bony cavity. The *ossicula auditûs*, considering the *lenticulus* as only a process of the *incus*, are three, as in the human subject. In the Museum of the College of Surgeons there is a preparation (No. 1600, *Gallery*) of a section of the cranium of a young lion, including the organ of hearing of the left side. A part of the meatus is preserved with the membrana tympani, and the cavity of the tympanum is laid open, showing the convexity of the membrane turned towards it, as in most mammalia. (*Catalogue*, vol. iii.)

Sight.—This sense is acute in the *Felidæ*, and they have the nictitating membrane very large and moveable. The pigment, as far as is known, is, generally speaking, of two colours, and the anterior perforation of the iris is formed of two segments of large circles joined, giving it a long and a short axis, the long axis being vertical. In the Museum of the College of Surgeons (No. 1710, *Gallery*) is the eye of a lion minutely injected by the ciliary arteries, and the sclerotic coat transversely divided, and reflected from the choroid, to show the vascularity of that tunic. No. 1730 is a preparation of the eye of a lion, showing the broad patch of tapetum lucidum below and also a little above the insertion of the optic nerve. The succeeding numbers to No. 1733 inclusive are also illustrative of this part of the organization in the lion and the leopard. John Hunter, *Observations on certain parts of the Animal Œconomy*, 2nd. edit., p. 243) remarks, that when the pigmentum is of more than one colour in the same eye, the lighter portion is always placed at the bottom of the eye, in the shape of a half-moon with the circular arch upwards; the straight line or diameter passing almost horizontally across the lower edge of the optic nerve, so that the end of the nerve is within this lighter-coloured part, which makes a kind of semicircular sweep above it: and he observes that the shape is peculiar to the cat, lion, dog, and most of the carnivorous tribe. Mr. Owen observes that the *Cheetah* has the circular pupil of the *Lion, Tiger, Leopard*, and *Jaguar*. (*Zool. Proc.*, 1833.)

Natural History.

The osteology of the FELIDÆ presents little for the distinction of species, except size, and in no animals does specific character depend upon size and colour more entirely than it does in this family. There are indeed differences: such, for instance, as that pointed out by Mr. Owen between the skull of the lion and that of the tiger; but, taken as a whole, the skeleton of a cat is very nearly the miniature representation of that of a lion or a tiger. We accordingly find that the disposition of many leading zoologists has been to bring all the numerous species under one genus. Linnæus arranges them under *Felis*, the third genus of his order *Feræ*, placing them between the dogs *Canis*, and *Viverra*. Illiger assigns to them a position in his order *Falculata*, with the title *Sanguinaria*. Cuvier places them under the name of *Les Chats* (*Felis*, Linn.) among his *Carnivores*, the third family of his *Carnassiers*, between the *Hyænas* and the *Seals*. Temminck regards the genus *Felis* as an indivisible group zoologically, but separates them into two sections, the first comprising those which are found in the Old Continent and its Archipelagos, eighteen species in number; the second those which occur in the New World, of which he enumerates nine species. C. L. Bonaparte, prince of Musignano, admits into his family *Felina* the genera *Proteles*, *Hyæna*, and *Prionodon*, a very questionable admission. Dr. Leach gives the *Lions* a generic distinction with the name of *Leo*. The *Lynxes* are separated as a genus by Mr. Gray, under the title of *Lynchus*; and the *Hunting Leopard, Felis jubata*, is characterized, generically by Wagler as *Cynailurus*. The whole family may be popularly divided into LIONS, TIGERS, LEOPARDS, LYNXES, and *Wild Cats*, or *Cats* properly so called, the two latter terms being more particularly applicable to the smaller forms. Under the first four titles will be found in this work the notices of those subdivisions, and we shall in the present article treat specially of the latter subdivision only.

Geographical Distribution of the Felidæ.—The form is widely spread over the face of the earth; but reaches its most powerful development in the warmer climates. With the exception, however, of New Holland and the islands of the Southern Pacific, species are found in every part of the world, excepting the arctic regions; and some extend far beyond the limits of moderate temperature and even into districts where the severity of the cold is almost arctic. No species has yet been discovered common to the Old and New World.

Cats.

Among the smaller species of the great feline family our attention is naturally first directed towards that domestic animal which is found in almost every house. 'In this case,' says the author of that interesting little book *The Menageries* (Lond. 12mo. 1830), 'unlike that of the dog, there is no doubt which is the original head of the domesticated stock. The wild cat of the European forests is the tame cat of the European houses; the tame cat would become wild if turned into the woods; the wild cat at some period has been domesticated, and its species has been established in almost every family of the Old and New Continent.' There is good authority for this assertion; but the origin of the domestic cat has been attributed to a very different source, and there are not wanting zoologists who even now hold that the parent stock of that useful animal is still undiscovered.

Rüppell during his first travels in Nubia discovered a cat (*Kleinpfötige Katze, Felis maniculata*) of the size of a middle-sized domestic cat, and one-third smaller than the European wild cat (*Felis Catus ferus*, Linn.). All the proportions of the limbs were on a smaller scale, with the exception of the tail, which is longer in *Felis maniculata*. The woolly or ground hair is in general of a dirty ochreous, darker on the back and posterior parts, and becoming gradually lighter on the anterior and lateral parts: longer hair of a swarthy dirty white, so that the appearance of the animal is greyish-yellow. Skin of the edges of the lips and of the nose bare and black. Beard and bristles of the eyebrows shining white, brown at the roots; edges of eyelids black; iris glaring yellow. From the inner corner near the eye there is a dark-brown streak running in the direction of the nose, and there is a white streak as far up as the arch of the eyebrows; between these two streaks is another greyish one extending on the forehead by the side of the ears and under the eyes. Outside of the ears grey, inside white and without tufts of hair. Eight slender black undulating lines arise on the forehead, run along the occiput, and are lost in the upper part of the neck. Cheeks, throat, and anterior part of the neck shining white. Two ochreous-yellow lines spring, the one from the outer corner of the eye, the other from the middle of the cheek, and meet both together under the ear; and two rings of the same colour encircle the white neck: below the rings there are spots of ochreous yellow. Chest and belly dirty white with similar spots or semicircular lines. A dark streak along the back becomes lighter as it rises over the shoulders, and darker on the cross. This streak is gradually lost on the upper part of the tail, the lower surface of which is white-yellow. The tail is almost of an equal thickness, rather slender, and with two dark rings at its point. The extremities, which have less hair in proportion on the outer side, are of the general colour, with besides five or six blackish semicircular bands on the fore-legs, and six distinct dark cross streaks on the hind-legs. The inner sides are lighter in colour, with two black spots or streaks on the upper parts of the fore-legs, and the hind extremities show the cross streaks winding around the thighs towards the inside. Foot, soles, hind parts of ankles, and wrists shining black. Length two feet five inches, the tail being about nine: height at the shoulder about 9½ inches. The description was taken from an aged female. M. Rüppell, who found this cat west of the Nile, near Ambukol, in rocky and bushy regions, is of opinion that there can be no doubt that it is descended from the domestic cat of the antient Egyptians, now to be traced in the cat-mummies and their representations on the monuments of Thebes. In the 'Description de l'Egypte, Hypogées de Thebes,' vol. ii. pl. 45, No. 14, is the representation of a cat. Pl. 51, No. 3, shows a cat's mummy, and pl. 54, No. 7, the skeleton of a cat's mummy which in size of body, form of head, and length of tail accords perfectly with *Felis maniculata*. The question then arises whether this domestic cat might not have been transferred or bequeathed to the contemporary civilized Europeans by the Egyptians; and the superintendents of the Frankfort collection agree that the general facts strongly favour the opinion that *Felis maniculata* is the type of our domestic cat. M. Temminck concurs in opinion with M. Rüppell that this Nubian species is the stock from which it sprang. Sir William Jardine, in his able *Natural History of the Felinæ* (*Naturalist's Library, Mammalia*, vol. ii., small 8vo., Edinburgh and London, 1834), states that the opinion generally accepted before this by most naturalists was, that the wild cat of Europe was the original stock; but, he adds, that although, since the introduction of our house cat to this country, there may have been an accidental cross with the wild native species, an attentive examination of the greater numbers will at once show a very different form from that exhibited by the wild cat; the most prominent distinctions being the shortness of the legs and shortness and thickness of the tail in the latter. 'The domestic cat,' continues this author, 'is the only one of this race which has been generally used in the economy of man. Some of the other small species have shown that they might be applied to similar purposes; and we have seen that the general disposition of this family will not prevent their training. Much pains would have been necessary to effect this, and none of the European nations were likely to have attempted it. The scarcity of cats in Europe, in its earlier ages, is also well known, and in the tenth and eleventh centuries a good mouser brought a high price. Although, however, our opinion coincides with that of the above-mentioned authorities, and we think that we are indebted to the superstition of the antient Egyptians for having domesticated the species described by Rüppell, we have no doubt that since its introduction to this country, and more particularly to the north of Scotland, there has been occasional crossing with our own native species, and that the results of these crosses have been kept in our houses. We have seen many cats very closely resembling the wild cat, and one or two that were very tame, which could scarcely be distinguished from it. There is perhaps no animal that so soon loses its cultivation, and returns apparently to a state completely wild. A trifling neglect of proper feeding or attention will often cause them to depend upon their own resources; and the tasting of some wild and living food, will tempt them to seek it again, and to leave their civilized home. They then prowl about in the same manner as their congeners, crouching among cover, and carefully concealing themselves from all publicity. They breed in the woods or thickets, and support themselves upon birds or young animals. Few extensive rabbit warrens want two or three depredators of this kind, where they commit great havoc, particularly among the young in summer. They sleep and repose in the holes, and are often taken in the snares set for their prey. I once came upon a cat which had thus left her home: she had newly kittened in the ridge of an uncut corn-field. Upon approaching she showed every disposition to defend her progeny, and beside her lay dead two half-grown leverets.'

Before we quit this part of the subject we must not forget that among the animals seen by Rüppell in Kordofan he discovered a new small species of cat.

Mr. Bell (*History of British Quadrupeds*, Lond. 8vo. 1837) first addresses himself to the question whether the common wild cat is the original from which all our domestic cats have sprung, according to the general opinion of the older naturalists. He states that there are many reasons for believing that this opinion is entirely erroneous. In the first place, he observes, the general conformation of the two animals is considerably different, especially in the length and form of the tail, which in the wild cat is strong, robust, and at least as large towards the extremity, as at the base and middle, whilst that of the domestic cat tapers towards the apex. The fur too of the former, he remarks, is thicker and longer; and although the colours are somewhat like those which occur in some individuals of the ordinary species, there are, even in this respect, distinctions which can scarcely be considered otherwise than as essentially specific; as, for instance, the termination of the tail in a black tuft, which invariably marks the wild cat. To these distinctions may be added the difference of length of the intestinal canal; though domestication might account for much of that.

But to return to Mr. Bell. With regard to the alleged crossing between the wild and the domestic breeds, 'it is not without much reflection on the matter that he has come to the conclusion that this opinion of their intermixture, repeated and transmitted from one to another till it has become an uncontested dogma, is erroneous, and has its foundation in mistaken facts.' Mr. Bell then notices Rüppell's *Felis maniculata* above described, and comes to the conclusion that 'this species, to which the high authority of Rüppell has assigned the origin of our house cat, is still farther removed from it in essential zoological characters than even the British wild cat, to which it had been previously so generally referred; and that, as in the case of so many of our domesticated animals, we have yet to seek for the true original of this useful, gentle, and elegant animal.'

We must confess that we do not see much difficulty in coinciding with the opinion of Rüppell, Temminck, and Sir William Jardine upon the evidence at present known. It is not attempted to be denied that the Egyptians had a domestic cat, and we think there can be little doubt that the domestic cat of the Egyptians was identical with *Felis maniculata*. This extraordinary people, whose existence is now only to be traced in their wonderful and enduring monuments, were, when in their high and palmy state, the centre of civilization, and we can see no reason why other nations, who borrowed so largely from them, should not have also received their domestic cat among other benefits of civilization. This animal, when introduced, would be liable to all the usual consequences of domestication and of intermixture, according to the localities of the various nations who obtained it. We can see no reason why the domestic cat, from whatever source derived, should not breed with the wild cat in Great Britain, and we believe that it has so bred

Egyptian Cat. Felis maniculata.

The arguments derived from the difference between the tails of the wild cat, of the domestic cat, and of *Felis maniculata*, do not seem to us to carry much weight. We cannot shut our eyes to the effect of domestication on this organ among the dogs, which gives us every variety, from the well-clothed tail of the Newfoundland dog, setter, and spaniel, to that of the greyhound, which is so scantily furnished as to owe one of its excellencies to being 'tailed like a rat;' nay, in some varieties, that long tail is reduced to almost no tail at all. There are also tail-less cats, as Mr. Bell himself notices.

Still the doubt thrown on the question by a zoologist of so much experience and skill as Mr. Bell is deserving of the most serious consideration, and should stimulate those who have the opportunity to investigate the subject upon every occasion offered to them.

The domestic cat is *Le Chat* of the French, *Gatto* of the Italians, *Gato* of the Spanish and Portuguese, *Katze* of the Germans, *Cyperse Kat* and *Huyskat* of the Dutch, *Katta* of the Swedes, *Kat* of the Danes, *Cath* and *Gwr Cath*[*] of the antient British, and *Felis domestica, seu Catus*, of Ray. The varieties, as in all cases of domestication, are endless: among the most noted are the Tabby, the Tortoiseshell, the Chartreux, which is bluish, and the Angora cat with its long silky hair. The domestic cat is but too famous for its attainments in the art of ingeniously tormenting, and it is difficult to say what end is answered by the prolonged agonies of fear and torture which the poor mouse is made to undergo before it receives the *coup de grace*. This refined cruelty appears to be confined to mice, young rats, and small quadrupeds: if a cat strikes down a bird, she does not trifle with it, but, conscious of its chances of escape, bites off its head or wounds it mortally at once.

We insert the following from Pennant, though it has been often quoted, not only as illustrating the manners of a period so distant as that of *Howel*, who died in the year 948, after a reign of 33 years over South Wales and of eight years over all Wales, but also on account of the reflection at the end, which we think worthy the consideration of those who are interested in inquiring whence the stock of the domestic cat was derived. 'Our ancestors,' says Pennant, 'seem to have had a high sense of the utility of this animal. That excellent prince, *Howel Dda* or *Howel the Good*, did not think it beneath him, among his laws relating to the prices, &c. of animals (*Leges Walliæ*, p. 247, 248), to include that of the cat, and to describe the qualities it ought to have. The price of a kitling before it could see was to be a penny; till it caught a mouse, twopence. It was required besides that it should be perfect in its senses of hearing and seeing, be a good mouser, have the claws whole, and be a good nurse; but if it failed in any of these qualities, the seller was to forfeit to the buyer the third part of its value. If any one stole or killed the cat that guarded the prince's granary, he was to forfeit a milch ewe, its fleece, and lamb; or as much wheat as when poured on the cat suspended by its tail (the head touching the floor) would form a heap high enough to cover the tip of the former. This last quotation is not only curious, as being an evidence of the simplicity of antient manners, but it almost proves to a demonstration that cats are not *aborigines* of these islands, or known to the earliest inhabitants. The large prices set on them (if we consider the high value of specie at that time) and the great care taken of the improvement and breed of an animal that multiplies so fast, are almost certain proofs of their being little known at that period.' (*British Zoology*.)

The *Wild Cat* is *Le Chat sauvage* of the French, *Gato montis* of the Spaniards, *Wilde Katze* and *Baumritter* of the Germans, *Vild Kat* of the Danes, *Cath goed* of the antient British, *Catus sylvestris* of Klein, *Felis Catus* of Linnæus, and *Felis sylvatica* of Merrett.

Description.—Head triangular, strongly marked; ears rather large, long, triangular, and pointed. Body strong, rather more robust than that of the domestic cat. Tail of equal size throughout its length, or rather larger towards the extremity. Fur soft, long, and thick; colour of the face yellowish gray, with a band of black spots towards the muzzle; whiskers yellowish white; forehead brown; head gray, marked with two black stripes passing from the eyes over and behind the ears; back, sides, and limbs grey, darker on the back, paler on the sides; with a blackish longitudinal stripe along the middle of the back, and numerous paler curved ones on the sides, which are darker towards the back, and become obsolete towards the belly, which is nearly white. Tail annulated with light grey and black; tip of the latter colour. Feet and insides of the leg yellowish grey; soles black, at least in the male, of which sex Temminck declares it to be a peculiarity. Colours of the female paler, and markings less distinct. Dimensions differing greatly according to the statement of various naturalists. Medium size of full-grown male:—

Wild Cat. Felis Catus.

	Foot.	In.	Lines.
Length of head and body . .	1	10	0
„ of head	0	3	8
„ of ears	0	2	3
„ of tail	0	11	2

Female rather smaller. (Bell.)

Temminck gives the average length as three feet.

Locality.—All the wooded countries of Europe, Germany especially; Russia, Hungary, the north of Asia, and Nepâl. The animal is larger in cold climates, and its fur is there held in higher estimation.

In Britain it was formerly plentiful, and was a beast of chace, as we learn from Richard the Second's charter to the abbot of Peterborough, giving him permission to hunt the hare, fox, and wild cat. The fur in those days does not seem to have been thought of much value, for it is ordained in Archbishop Corboyl's canons, A.D. 1127, that no abbess or nun should use more costly apparel than such as is made of lambs' or cats' skins.

The wild cat is now rarely found in the south of England, and even in Cumberland and Westmoreland its numbers are very much reduced. In the north of Scotland and in Ireland it is still abundant.

Among the foreign wild cats may be enumerated *Felis Chaus*, Guld.; the *Mota Rahn Manjur* or *Larger Wild Cat* of the Mahrattas (a lynx); and *Felis torquatus*, F. Cuv.; the *Lhan Rahn Manjur* or *Lesser Wild Cat* of the Mahrattas; *Felis Moormensis*, the *Moormi Cat*, Hodgson, from the Moormi Hills in Nepâl (*Zool. Proc.*, January, 1824). *Felis planiceps*, Vigors and Horsfield, departs in many points from the true cats, and approaches *Prionodon* in others. *Felis Temminckii* of the same zoologists, which is near the domestic cat in size, comes nearer in form—it is uniform in colour—to the true *Tiger Cats*, which will be noticed under the article on TIGERS. We must not omit to notice the *Felis Caffra*, a specimen of which is to be seen in the South African Museum (No. 28) specimens of which have been met with, as the Catalogue informs us, in whatever direction South Africa has yet been explored. 'It exhibits certain fixed peculiarities which unequivocally constitute it a distinct species from the domestic cat, which is occasionally found wild in the colony, and with which the former has sometimes been erroneously confounded. It possesses a full share of the ferocity of the feline tribe; and dogs which have once had a specimen of its pugnacious will and power show a considerable degree of caution in encountering it a second time. It is frequently found in such flats as chance to be covered with long grass or with a moderate growth of brushwood; and when disturbed by the approach of men or dogs, usually seeks shelter in thickets, or the burrows of other animals. It preys upon small quadrupeds and birds, and is an especial enemy to those of the latter which have their nests upon the ground.' (*Catalogue of South African Museum.*)

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[*] It is worthy of remark that all these names are the same as the Latin *catus*, whence the diminutives *catulus* and *catellus*; and this is somewhat in favor of all northern and western Europe having received the cat through Roman civilization. We are thus brought nearer to Egypt, its probable origin. The Greek word *ailuros* (αἴλουρος) is an odd one, and helps us nothing, being apparently a descriptive term.

Fossil Felidæ.

In the second or Miocene period of the tertiary formations we have hitherto found the first traces of large fossil cats. There are no less than four species of these great cats, some as large as a lion, enumerated by Professor Kaup from the Epplesheim sand near Altzey, about twelve leagues south of Mayence. These remains are preserved in the museum at Darmstadt. The professor names these *Felis aphanista, F. prisca, F. ogygia*, and *F. antediluviana*. In the third and fourth (or Pliocene), divisions of the tertiary periods, we find that the number of terrestrial herbivorous quadrupeds become more abundant; and, with their numerical importance, the *Carnivora*, whose agency was required for keeping them down, increase also. The remains of *Felidæ* occur in the ossiferous caverns, such as those of Kirkdale, Gailenreuth, &c.; and also in the osseous breccias (Nice, &c.). In the cave at Kirkdale the only remains that had been found of the tiger species, according to Dr. Buckland, were two large canine teeth, each 4 inches in length, and a few molar teeth: these exceeded in size those of the largest lion or Bengal tiger. Mr. Cottle of Bristol procured from Oreston Cave, Plymouth, among many other remains, two tusks of a tiger, one 3¾ inches long, the other 3½, one from the upper, and one from the lower jaw. Dr. Buckland in the same work (*Reliquiæ Diluvianæ*) mentions that Cuvier had then lately found the tusks of an extinct lion or tiger in the breccia of Nice, and that Mr. Pentland had discovered the tooth of the same extinct tiger in the breccia of Antibes. Bavard, the Abbé Croizet, and Jobert, in the work on Fossil Cats, found, among the remains contained in the ossiferous rocks of Auvergne (Puy de Dome) the following species: *Felis Issidoriensis, F. brevirostris, F. pardinensis, F. Avernensis*, and *F. megantereon*.

FELIX I., a native of Rome, succeeded Dionysius the Calabrian as bishop of that city A.D. 271, and suffered martyrdom in 275. He was succeeded by Eutychianus, bishop of Luna. There is extant an epistle of Felix to Maximus, bishop of Alexandria, against Paul of Samosata.

FELIX II., by some styled III., on account of an antipope who assumed the title of Felix II. in the schism against Liberius (A.D. 355-66), was a native of Rome, and succeeded Simplicius in the year 483. He had a dispute upon questions of ecclesiastical supremacy with Acacius, bishop of Constantinople, who was supported by the emperor and by most of the eastern clergy; in consequence of which a schism ensued between the Greek and Latin churches, which continued after the death of Felix, which happened in 492. He was succeeded by Gelasius I.

FELIX III., also called IV., a native of Beneventum, succeeded John I. A.D. 526, and died in 530. He was succeeded by Boniface II.

FELIX V. [Amadeus VIII.]

FELLOWSHIP, in books of arithmetic, the rule by which profit or loss is divided among those who are to bear it, in proportion to their investments or interests in the transaction. It is usual to divide this rule into two parts, of which the first supposes all the investments to have been made for the same time, and the second supposes the partners to have employed their money during different times. One simple case of each will be sufficient.

Question 1. A, B, and C embarked 10*l.*, 9*l.*, and 8*l.* in a venture which yielded 30*l.* of profit. How much belongs to each?

If 10+9+8, or 27 adventurers embarked 1*l.* each, it is clear that each of them should have the 27th part of 30*l.* Let 10 of them assign their shares to A, 9 to B, and 8 to C, and we have the case in question. That is A, should have 10-27ths, B 9-27ths, and C 8-27ths of the whole profit.

Question 2. A profit of 30*l.* was realized by A embarking 10*l.* for two months, B embarking 9*l.* for three months, and C embarking 8*l.* for four months. How much ought each to gain?

Here the 1*l.* of A and the 1*l.* of B are differently circumstanced: the second was employed half as long again as the first, and consequently should gain half as much again. Now let *one pound sterling employed during one month* be called a share: then A invested 20 shares, B 27 shares, and C 32 shares. Hence as before, 20+27+32 being 79 A should have 20-79ths, B should have 27-79ths, and C 32-79ths of the gain.

The first is a rule of very frequent occurrence, but the second is rare, for it seldom happens that money is withdrawn from an undertaking, except upon some specific agreement.

FELLOWSHIP (in a college) is an establishment in the college entitling the holder to a share in its revenues. The fellows are a part of the corporation. [College.] Fellowships are either original, that is, part of the foundation or scheme of the original founder; or ingrafted, that is, endowed by subsequent benefactors of a college already established. Where the number of fellows is limited by the original foundation, new fellows cannot be made members of the corporate body without a new incorporation. If the number is not limited by the charter, it seems that the corporation may admit new fellows as members, who will be subject to the statutes of the original foundation in all respects. Graduates of each several college are in general only eligible to fill a vacant fellowship in the establishment to which they are elected after having undergone an examination by the master and fellows in being. But in some cases special rules which control the election prevail, as where the fellow must be of the blood of the founder, or where he must be a native of a particular county, &c., and in some few cases fellowships are open to the graduates of several colleges, or even the whole university. In Downing College graduates of both universities are eligible. These rules are prescribed by the founder, modified in some cases by the bye-laws of the several colleges. Some few fellowships may be held by laymen, but in general they can be retained only by persons already in holy orders, or who are ordained within a specified time. Fellowships are of unequal value, varying from 30*l.* and less to 250*l.* a year and upwards, the senior fellowships being in general the most lucrative; but all confer upon their holders the right to apartments in the college, and certain privileges as to commons or meals. They are in general tenable for life, unless the holder marries, or inherits estates which afford a larger revenue, or accepts one of the livings belonging to the college which cannot be held with a fellowship. These livings are conferred upon the fellows, who in general have the option of taking them in order of seniority, though in some colleges the holders of particular offices have priority of choice, as for instance in Trinity College, Cambridge, where the vice-master has such right by a bye-law of the college.

FELLTHAM, OWEN, lived in the time of James I.; but the particulars of his life are entirely unknown. To the lover of English literary antiquities he is known as the author of a curious book called 'Resolves,' consisting of pious and moral treatises collected into *centuries*. It somewhat resembles Lord Bacon's essays, and exhibits an exuberance of wit and fancy that is perfectly astonishing. Metaphor follows metaphor; and they are not merely introduced as an idle and unmeaning sport, but are the exponents of thoughts in themselves acute and profound. All liberal minds must admire the spirit in which the book is written. Felltham displays himself as a man delighting in reflection, and at the same time as a man of the world; as one of sincere and fervent piety, but at the same time as one of a cheerful and lively temper, loving the good things of this life, and always preserving a clear understanding. An excellent account of the book with copious extracts, will be found in the *Retrospective Review*, vol. x.

FELO-DE-SE (a felon of himself) is a person who, being of sound mind and of the age of discretion, deliberately causes his own death; and also in some cases, where one maliciously attempts to kill another, and in pursuance of such attempt unwillingly kills himself, he is adjudged a felo-de-se (1 Hawk. P. C. c. 27, § 4). When the deceased is found by the coroner a felo-de-se, all his chattels, real and personal, are forfeited to the crown, though they are, we believe, usually restored upon payment of moderate fees, and therefore a will made by him is void as to his personal estate, though not as to his real estate, nor is his wife barred of her dower. Formerly he was buried in the highway with a stake driven through his body. These laws, so highly repugnant to the feelings of humanity, being a punishment to the surviving relatives of the deceased, in addition to the general impression that no man in his sound sense ever does commit suicide, caused juries in general to find that the deceased was not of sound mind; and by a recent enactment (4 Geo. IV. c. 52) the legislature has so far yielded to the popular and herein the better opinion, as to abolish the former ignominious mode of burial, and to provide that a felo-de-se shall be privately interred at night in the burial-ground in which his remains might by law have been interred if the verdict of felo-de-se had not been found against him.

FELONY, in the general acceptation of the English law, comprises every species of crime which occasioned at common law the forfeiture of lands or goods, or both, and to which a capital or other punishment might be superadded, according to the degree of guilt. Various derivations of the word have been suggested. Sir Henry Spelman supposes that it may have come from the Teutonic or German 'fee' (fief or feud) and 'lon' (price or value), or from the Saxon 'feelen,' to fall or offend. Capital punishment by no means enters into the true idea and definition of felony; but the common notion of felony has been so generally connected with that of capital punishment that law-writers have found it difficult to separate them: indeed, this notion acquired such force, that if a statute made any new offence felony, the law implied that it should be punished with death. The number of offences, however, to which this punishment is affixed by the law of England is now very small; and several statutes have been passed in the last session of parliament (1 Vict.) founded upon the principle that the punishment of death should only be inflicted for crimes accompanied with violence. Thus c. 84 substitutes the punishment of transportation for that of death in those cases where the latter might still be inflicted for forgery; c. 85 materially lessens the severity of the punishment of offences against the person; c. 86 enacts that burglary unaccompanied with violence shall no longer be punished capitally, and provides that, so far as the offence of burglary is concerned, the night shall be considered to commence at nine in the evening and to conclude at six in the morning; c. 87 mitigates the punishment attending the crimes of robbery and stealing from the person; c. 88 renders piracy punishable with death only when murder is attempted; c. 89 regulates the punishment for the crime of arson; c. 90 mitigates the punishment of transportation for life in certain cases; and c. 91 abolishes the punishment of death in the cases there specified. (14 *Leg. Obs.* 426.) Great numbers of offences were formerly liable to this severe punishment; and it must seem strange to persons who do not observe the extreme difficulty with which old established customs and prejudices, however ill founded, are subverted, that this system should so long and so obstinately have withstood the most convincing arguments and conclusive statistical evidence. It is impossible, within the limits of this article, to enumerate the crimes which the law considers to be felonies; and the more so, as the word felony has long been used to signify the degree of crime rather than the penal consequences. It may be sufficient, therefore, to state generally, that murder, manslaughter, felo-de-se, robbery, arson, burglary, offences against the coin, &c. are considered and classed as felonies.

Besides the special punishment affixed to his crime by the law, a felon upon conviction forfeited the rents and profits of his lands of inheritance during his life to the king (which are now usually compounded for), and also all his goods and chattels absolutely; and as attainder of felony caused corruption of blood, his lands, except of gavelkind tenure, escheated to the lord of the fee. This last consequence, however, was taken away by stat. 54 Geo. III. c. 145, which enacted that, except for treason or murder, corruption of blood should not follow attainder; and as difficulties might sometimes occur in tracing descent through an ancestor who had been attainted, it was, by the 3 and 4 Will. IV. c. 108, § 10, enacted that descent may be traced through any person who shall have been attainted before such descent shall have taken place. [Escheat; Forfeiture.]

In connexion with this subject it may be interesting to refer to the distinction formerly taken between felony with and without benefit of clergy, as explained in the article Benefit of Clergy.

FELSO-BANYA. [Szathmar.]

FELSPAR, a mineral which occurs in every part of the earth, and one of the constituents of granite.

It occurs *crystalline* and *massive*. The primary form of the crystal is an oblique rhombic prism. Colour white, grey, green, red, of different shades. Transparent, translucent, or opaque. Lustre vitreous. Sp. gr. 2.5, 2.6. Hardness 6.0. Streak greyish white. Cleavage parallel to the terminal plane and oblique diagonal. Fracture conchoidal, uneven.

The variety known by the name of *adularia* occurs in large crystals, especially in Mont St. Gothard. *Moon-stone* is a variety which has a pearly lustre, and when cut and polished is chatoyant; the finest specimens of this are from Ceylon.

Massive varieties.—Amorphous. Structure granular, compact. A green variety has been found in Siberia. The several varieties differ but little in composition. *Adularia*, which is one of the purest varieties, according to Vauquelin, consists of

Silica . .	64
Alumina . .	20
Potash . .	14
Lime . .	2
	——100

FELT, FELTING. [Hat.]

FELTON. [Buckingham, Duke of.]

FELTRE. [Belluno.]

FELUCCA (Felúca in Italian, Felouque in French, Falúca or Falúa in Spanish), a vessel or small craft used in the Mediterranean for coasting voyages, being propelled both by oars and sails. It may be said to be a small galley. The feluccas carry two masts, main and fore, with lateen sails. They are very frequent on the coast of Italy, Spain, and the Levant. There are also armed feluccas which carry two guns, and which are in fact a kind of gunboats, and larger and stronger built than the merchant felucca. (*Encyclopédie Methodique, Marine*, art. *Felouque.*)

FEME-SOLE. [Wife.]

FEMERN. [Schleswig.]

FEMININE. [Gender.]

FENCES are necessary wherever cattle are depastured and properties divided; and according as they are intended to prevent men or cattle from trespassing over them, they are formed of various materials and dimensions.

When a park is inclosed to keep in deer and game, the best fence is a stone or brick wall, well built with lime mortar: but as this is expensive where stone and lime are not at hand, the common *park-paling* is more frequently met with. This is composed of posts and rails of oak morticed and pinned together, and split pales of the same material nailed upon these in an upright position. The pales are split out of the trunks of oaks, where there are no branches or knots, when the sap is still in them. They are about half an inch thick and with feather edges, that is, diminishing in thickness from one side to the other: their usual width is five inches. When they are nailed on the rails, which are usually of a triangular form, the thickest edge of one pale is nailed over the thinner edge of the preceding, forming thus a very close fence. Every alternate pale is placed three or four inches higher than its neighbour, which gives the top of the fence a castellated form. This is not done merely for the appearance; but it makes it more difficult to climb over, and the deer are not so apt to leap at it as if the top were a straight line. The distance between the posts is usually nine feet; and the three rails with the pales nailed on them is called a pannel, and may be conveniently moved at once when any alteration in the fence is required. A whole fence may be moved at a small expense, merely by digging out the posts, and placing them elsewhere. The pannels come in regularly, and are pinned into the old mortices in the posts. Sometimes the pales are nailed at a distance from each other, which makes the *open-paled fence*, and the pales are then generally cut to a point at top. This fence is peculiar to Great Britain and Ireland and is very seldom found on the Continent.

In the Jura and the Alps, where wood abounds, a rough fence is frequently made with strong split pieces of wood, which are fixed obliquely in the ground and supported at the upper end by two others placed in the form of a cross. It is not a very strong fence, but it is sufficient to prevent the cows from straying, for unless a bull with his horns makes a gap in it, they will not attempt to pass it.

In wild mountain pastures in Scotland and Ireland it is usual to separate the properties of different individuals or that of parishes by rough stone walls put together without any mortar. The materials are generally at hand, and a rough and efficient fence is made without much labour.

Some of these walls are built with considerable skill, and are very durable; especially if the stone is of a nature to split with a flat surface; in which case a dry wall may be built which has all the appearance of one built with mortar. Sometimes a layer of mortar is laid on the stones at a little distance from the ground and another near the top. The coping is usually made of flat stones, which are sometimes placed on edge in a direction across the wall, and wedged together along the top of it or set in mortar, forming a very rough coping, which it is not easy to get over.

Where stones are not at hand, or less trouble is taken, a high bank of earth faced with sods of grass is substituted for a wall. This is not so durable and is more easily surmounted, unless a hedge of some kind be planted along the top. Furze seed is often sown for this purpose, and soon forms an excellent fence, which by proper care and clipping will last a long time. But the most common kind of fence for fields is the hedge and ditch, the bank being raised with the sods and earth taken out of the ditch, and the hedge planted in the side of the bank towards the ditch, or on the top. Sometimes there is a ditch on both sides. In flat wet lands this last is extremely useful, not only as a fence but as a drain for the superfluous water. When the ditch is intended to carry off the water, and there is only one, it is of consequence that it should be so placed as to answer this purpose effectually; it should therefore always be on that side of the bank where the ground rises, for otherwise the bank will impede the natural flow of the water, and it will be necessary to cut through it in different places to let the water running from above have an outlet into the ditch. In some extensive inclosures of land great inconvenience has arisen from the neglect of the surveyor in not attending to this circumstance and setting out the bank on the upper side. Where they are not required as drains, it is a great waste of land to have any ditches, and a simple hedge planted on the surface of the soil is much to be preferred. Of all fences a live hedge, which is carefully planted, and kept properly cut, and trimmed when it is grown up, is by far the best. [HEDGE.]

When a fence is required within sight of a dwelling, and it is desirable for it to be concealed, a deep ditch is sometimes dug, and a fence placed in the bottom of it at such a depth as not to appear above the level of the ground. This is called a *sunk fence*. Sometimes a wall is built against a perpendicular side of a ditch, and some very light fence is placed obliquely outwards near the top of it and level with the ground. This is called a *ha-ha fence*, a name given to it from the surprise excited in a person unacquainted with it, when he suddenly finds himself on the top of a wall with a deep ditch before him. When it is desired to keep off sheep or cattle from a lawn or pleasure-ground without obstructing the view of the park or the fields, the ha-ha fence is very useful. A variety of *light fences of iron* have been invented for the same purpose: some of these are fixed and others moveable: some have upright pieces of cast-iron as posts let into oak blocks sunk in the ground, and rods of wrought-iron passing through holes in the uprights: some have wire for the same purpose. But the most common iron fence is composed of separate wrought-iron hurdles, which may be moved at pleasure, and are kept together by screwed pins and nuts. They are merely stuck into the ground, for which purpose they have the ends of the uprights sharpened and bent so as to form a foot. By having this bend alternately on the right and on the left, they form a very firm basis when two hurdles are joined, the left foot of the one being strengthened by the right foot of the other. A very neat fence may be made at a small expense by using as posts pieces of young larch trees about four or five inches in diameter, with the bark on, and passing iron rods through holes bored in them at certain distances from each other. A fence of this kind, five feet high, with five horizontal rods five-eighths of an inch in diameter, is an excellent protection against cattle, and takes up no ground.

The greatest objection to the ditch and bank fence is that it takes up so much room. If the ditch is three feet wide, the bank will be the same. There is a foot along the ditch, and another along the bank, where the plough cannot reach; there are therefore eight feet lost. If the fields are squares of ten acres each, which is a convenient size each field will have 1320 feet of fence in length, taking up 10,560 square feet of land, which is nearly a quarter of an acre. If to this be added the outer fences against roads, woods, or commons, it will be found that nearly one acre in 25 is taken up by banks and ditches. It is therefore a great saving to have a simple hedge without any ditch wherever the land is well drained or has a porous subsoil.

It is usual in England to plant trees in the hedge rows; and it is owing to this practice that England presents such a rich garden-like appearance, wherever there is a hill which enables one to see any extent of country. But trees are a great detriment to the farmer; and where the land is highly manured, the trees draw off much of the rich juices. The prudent tenant considers this in the rent; and although the landlord may now and then sell some timber, he pays dear for it in general by the annual deduction from his income on their account. Stone walls have a dreary appearance to the eye, but they are excellent fences; they take up little ground, they draw nothing out of the soil, they harbour no birds, and they are the best shelter against cold winds in spring. In an agricultural point of view, therefore, walls are to be preferred, unless the soil be favourable to the growth of the white-thorn or the holly; for clipped hedges are kept up at a much smaller expense than walls; and where there is no ditch, hedges take up as little room.

When hedges are preferred, whether with or without a bank and ditch, they must be protected until they are of a certain age; and for this purpose there are particular kinds of fences. When there is a bank and double ditch, and the hedge is planted on the top of the bank, which makes by far the most efficient fence, there are usually two fences, one on each side of the bank. These fences are made of rough posts, and rails morticed into the posts. The posts are a foot or 18 inches in the ground, and 2 feet 6 inches out. They are placed in the side of the bank, inclined somewhat outwards, about 4 feet 6 inches asunder. The two rails are let into mortices in the alternate posts, and nailed to the middle post, which is rather slighter. Thus a very formidable fence is made, which those who follow the diversion of hunting, and are not very well mounted, dread to encounter. If there is only a single ditch, it is usual to plant the hedge in the side of the bank a little above the level of the ground. To protect the young thorns from being cropped by the cattle, it is usual to make a dead hedge of stakes with bushes and brambles interwoven on the top of the bank; and if there is pasture land on the side where the ditch is, a post and rail fence is put up along the edge of the ditch till the hedge is grown sufficiently not to be injured by the cattle. When branches of thorns and bushes only are used without stakes, it is called a *foot hedge*; when the branches are interwoven, and the top of the hedge is finished with rods wattled in, it is called a *stake and edder hedge*. Wherever neatness and durability are consulted, the stake and edder hedge is always preferred.

Besides these common fences, there are various others of a light or temporary nature, which are chiefly used in gardens and pleasure-grounds, and also when sheep only are to be kept out, or when a new quick hedge along an orchard or garden has been planted. A cheap and neat fence of this kind is made with stakes only planted in the ground, forming a series of St. Andrew's crosses; or with osier or hazel rods worked between stakes like basket-work, either horizontally and lightly or obliquely and closely. When the rods are split, the appearance is still neater and lighter. A variety of light iron fences made of slender rods or wire have been invented to protect flower-gardens or shrubberies from the depredations of hares and rabbits, and their forms differ according to the fancy and taste of individuals.

FENELON, FRANÇOIS DE SALIGNAC DE LAMOTHE, was born at the Château de Fenelon, in Perigord, in the year 1651. So rapid was his progress that he preached a sermon at the early age of fifteen before a select assembly at Paris, whither he had been called by his uncle, the Marquis de Fenelon, who afterwards fearing lest the praises of the world should create pride and vanity caused him to enter the seminary of St. Sulpice, and there for several years imitate 'the silence of Jesus.' Here he took orders. His first work was a treatise, 'De l'Education des Filles,' which is well known, and has been translated into our language. The intimacy which he formed with

Bossuet, and Bossuet's example, led him to write a treatise against heretics, entitled 'Du Ministère des Pasteurs,' in which heretics are attacked, though with more moderation than they had been by Bossuet. Fenelon being intrusted by Louis XIV. with a mission to Poitou, to convert the Protestants, nobly refused the aid of dragoons, and employed persuasion alone as an instrument of conversion. His conduct on this occasion gained him many friends. In 1689 he was appointed tutor to the young duke of Burgundy, which brought him into attendance on the court. Though the polish and grace which pervade his writings extended to his conversation, he never seems to have been a great favourite of Louis; his political opinions always tended to liberality, and in a letter to Mad. de Maintenon he animadverted rather freely on the character of the king. Notwithstanding this, after he had been tutor for five years, Louis made him archbishop of Cambray. Unfortunately, at the very moment when he had gained this elevated post, that series of events commenced which caused his future disgrace. He formed an acquaintance with the celebrated quietist, Mad. Guyon, who was at first in high favour with Mad. de Maintenon, and who was encouraged by her to spread her doctrines at St. Cyr. This lady was afterwards persecuted by Bossuet; and as Fenelon was suspected of favouring her doctrines, Bossuet required him to condemn them. Not only did Fenelon refuse, but he published a book called 'Explication des Maximes des Saints,' in which the principles of quietism were openly avowed. Upon this, Bossuet denounced him to the king as a heretic. To increase his troubles, his palace caught fire about the same time, and all his MSS. and books were destroyed. The persecution of Bossuet continued; and the protection of Mad. de Maintenon, who had at first encouraged Fenelon, was withdrawn. Bossuet required that the difference should be settled by a controversy: Fenelon would not accede to these terms, but offered to submit his book to the tribunal at Rome. His persecutor however succeeded so far as to cause him to be banished from the court, and endeavoured, though unsuccessfully, to involve Beauvilliers, governor to the duke of Burgundy, in his disgrace. Pope Innocent VIII., though strongly urged by Louis, was not willing at once to condemn a prelate so noted for learning and piety, and a violent paper war was waged by both parties. At last the papal letter arrived, and the archbishop of Cambray was forced to submit; he signed a renunciation, and would have been restored to regal favour had not the celebrated romance of 'Telemaque,' which he had written some years before, been published against his will through the treachery of a servant. Several passages in this work were suspected by Louis to be directed against himself; it was suppressed in France, but rapidly circulated in Holland. Hearing of the unfortunate impression which his book had made, Fenelon resolved to remain quietly in his diocese. Cambray being situated on the frontiers of France, he was visited by many illustrious foreigners. Fenelon's acts of benevolence were munificent: in the year 1709 he fed the French army at his own expense. It has been already remarked that his political opinions were liberal; he had always conceived it just that the people should have a share in the government, and it was expected that the duke of Burgundy would have acted in accordance with his preceptor's views. But all hopes of this sort were cut off by the sudden death of that prince. Fenelon himself died in 1517.

The works of Fenelon are very numerous; consisting, besides the romance of 'Telemaque,' of a variety of religious and moral treatises. 'Telemaque' has been translated into every European language, and is read at almost every European school. Had it been written in this age, it is questionable whether its popularity would have been so great; the spirit of the Greeks is much better understood than it was formerly, and the classic reader, though he may admire the language of 'Telemaque,' as well as the general accuracy of the writer's information on matters of antient history and geography, will find it strange that the sentimental speeches, though good in themselves, should flow from the mouth of Homeric heroes, who of all beings were the least moralising, in the modern sense of the word. His religious and moral essays are only calculated for persons in whose mental constitution warmth and susceptibility are predominant, and who can suffer themselves to be led on by the fervour and eloquence of the author. To the cool and more intellectual inquirer after truth his works will be diffuse and tedious. So much use does he make of the imaginative faculties, that he exhorts teachers to impress on the minds of children that the Deity is sitting on a throne, with very bright eyes looking through everything, and supporting the universe with his hands. Hence his natural theology is chiefly the ejaculation of a pious man admiring the works of Nature. In politics, Fenelon's opinions are far in advance of his age and country: in one of his treatises he declaims against checking liberty of conscience, and boldly proclaims the injustice of levying taxes without the sanction of a parliament. A handsome quarto edition of his works was published at Paris in 1787.

FENNEC. [Fox.]

FENNEL. [Fœniculum.]

FENTON, ELIJAH, was born in Staffordshire in the year 1683. Being designed for the church, he was admitted a pensioner of Jesus College, Cambridge, in 1700. After taking a bachelor's degree, he was forced to leave the university in consequence of being a non-juror. He became secretary to the earl of Orrery, and accompanied that nobleman to Flanders. After his return to England in 1705, he accepted the situation of assistant at Mr. Bonwicke's school at Headly in Surrey, and subsequently became head-master of the free grammar-school at Sevenoaks in Kent. Mr. St. John (afterwards Lord Bolingbroke) persuaded him to retire from this school, promising to do great things for him, which promises were never fulfilled. Lord Orrery again befriended him, and made him tutor to his son, Lord Broghill. This office lasted for six or seven years, during which Fenton became acquainted with Pope, and assisted him in the translation of the 'Odyssey.' The first, fourth, nineteenth, and twentieth books are said to be the work of Fenton. In 1723 he produced at the theatre in Lincoln's Inn Fields a tragedy called 'Mariamne,' which was so successful that he is reported to have gained 1000*l.* by its representation, and to have employed great part of the money in paying off the debts which St. John's conduct had caused him to incur. In 1727 he revised a new edition of Milton's works, and prefixed a life of the author; and in 1729 he published a fine edition of Waller. Through the recommendation of Pope, he became tutor to the son of Lady Trumbull; and when that occupation was at an end, she made him auditor of her accounts. He died in 1730.

All biographers bear testimony to Fenton's character as an upright and honourable man. His poetical works are but few in number, and consist of short pieces, chiefly paraphrases from the antients. As they have scarcely any merit but that of correct versification, they will probably never be rescued from the neglect into which they now have sunk. The tragedy of 'Mariamne,' like most of that time, is totally forgotten.

FENUGREEK. [Trigonella.]

FEOD. [Feudal System.]

FEODO'SIA. [Kaffa.]

FEOFFMENT (in law) is that mode of conveyance of lands or real hereditaments in possession where the land passes by force of livery in deed, *i.e.* actual delivery of a portion of the land, as a twig or a turf; or where the parties being on the land the feoffor expressly gives it to the feoffee, &c.; or livery in law or within view, *i.e.* where the parties being within sight of the land, the feoffor refers to it and gives it to the feoffee. A feoffment was the earliest mode of conveying real hereditaments in possession known to the common law. A grant [Deed; Grant] was the mode used when lands subject to an existing estate of freehold, and when rents or other incorporeal hereditaments incapable from their nature of being the subjects of livery, were transferred. The term feoffment is evidently of feudal origin, its latinised form being feoffamentum, from feudare or infeudare, to infeoff, to give a feud. The mode of conveyance is however of much higher antiquity than the feudal system, the mode of transferring property by the delivery of possession being common to all nations in rude ages. (Gilb. *Ten.* 386.) It prevailed amongst the Anglo-Saxons, who gave possession by the delivery of a twig or a turf, a mode still common, particularly in the admission of tenants of copyhold lands. The form of an antient feoffment was singularly concise. There is a copy of one in the Appendix to the 2nd vol. of Blackstone's *Commentaries*, No. 1.

The essential part of this mode of conveyance is the delivery of possession, or, as it is technically called, livery of seisin. In former times land was frequently conveyed without any deed or writing, by simple delivery. Subsequently t became the custom to have a written instrument called the charter or deed of feoffment [CHARTER], which declared the intention of the parties to the conveyance. But now, since the Statute of Frauds (29 Car. II. § 3), a written instrument is necessary. Still however the land passes by the livery, for if a deed of feoffment is made without livery, an estate at will only passes [ESTATE]; though if livery is made, and the deed does not express that the land is conveyed to the feoffee and his heirs, an estate for the life of the feoffee only will pass. No less estate than an estate of freehold can pass by a feoffment with livery, the livery being in fact the investiture with the freehold.

Livery of seisin, of both the kinds previously mentioned, was at first performed in the presence of the freeholders of the neighbourhood, vassals of the feudal lord; because any dispute relating to the freehold was decided before them as pares curiæ, 'equals of the court,' of the lord of the fee. But afterwards, upon the decay of the feudal system, the livery was made in the presence of any witnesses; and where a deed was used, the livery was attested by those who were present at it.

Livery in deed may be made by the feoffor or his attorney to the feoffee or his attorney. When lands lie in several counties, as many liveries are necessary; and where lands are out on lease, there must be as many liveries as there are tenants, for no livery can be made but by the consent of the tenant in possession, and the consent of one will not bind the rest. But livery in law or within view can only be given and taken by the parties themselves, though lands in several counties may pass if they all be within view. Livery of this nature requires to be perfected by subsequent entry in the lifetime of the feoffor. Formerly, if the feoffee durst not enter for fear of his life or bodily harm, his claim, made yearly in the form prescribed by law, and called continual claim, would preserve his right. The security of property consequent upon the progress of civilization having rendered this exception unnecessary, it was abolished by the recent Statute of Limitations, 3 & 4 Will. IV., c. 27 § 11.

Since the Statute of Uses [BARGAIN; SALE; USES] has introduced a more convenient mode of conveyance, feoffments have been rarely used in practice, and then rather for their supposed peculiar effects, as wrongful conveyances [CONVEYANCES], than as simple means of transferring property. It has been usual to make corporations convey their own estates by feoffment, in consequence of the supposition that a corporate body cannot stand seised to a use, though it seems that this doctrine only applies to the case of lands being conveyed to a corporation to the use of others. (Gilb. *on Uses*, Sugd. Ed. 7 note.) Where the object to be attained was the destruction of contingent remainders or the discontinuance of an estate tail, or the acquirement of a fee for the purpose of levying a fine [FINE] or suffering a recovery [RECOVERY], a feoffment was usually employed. Such indeed was the efficacy attributed to this mode of conveyance by the earlier law writers, that where the feoffor was in possession, however unfounded his title might be, yet his feoffment passed a fee; voidable, it is true, by the rightful owner, but which by the lapse of time might become good even as against him. Being thus supposed to operate as a disseisin to the rightful owner, it was thought till recently that a person entitled to a term of years might by making a feoffment to a stranger pass a fee to him, and then by levying a fine acquire a title by non-claim. This doctrine led to very considerable discussion, and though strictly accordant to the principle of the old law, yet being alike repugnant to the principles of justice and to common sense, it has been overruled. In the progress of the discussion which ended in overturning the doctrine, arguments against its justice and expediency were used, rather than those founded upon the principles of law, and the bench even resorted to ridicule. Mr. Baron Graham in one case observed, 'Yet is this pretended possession of paper and packthread to be called by the tremendous name of disseisin.' The whole state of the question may be found in Mr. Knowler's celebrated argument in Taylor dem. Atkins *v.* Horde; 1 Burr. 60, Doe dem. Maddock *v.* Lynes, 3 B. & C. 382; Jerritt *v.* Wrace, 3 Price, 575; 1 Sand. *Uses*, 49 (4th ed.); 1 Prest. *Conv.* 32 (2nd ed.); and 4 Bythew. *Conv.* (Jarman's edit.), 117.

The owner of lands of gavelkind tenure [GAVELKIND] may convey them by feoffment at the age of 15; and therefore in such cases, which are necessarily rare, a feoffment is still resorted to. It is also frequently used for the sake of economy upon small purchases, in order to save the expense of a second deed, which is necessary where the conveyance is by lease and release.

FERÆ (Zoology), the third order of ***Mammalia***, according to Linnæus. The following is his character of the order: upper incisor teeth (*primores*) six, rather acute (*acutiusculi*); canine teeth solitary. The order contains the following genera:—1. ***Phoca*** (the Seals); 2. ***Canis*** (the Dogs, Wolves, Foxes, Hyænas, and Jackals); 3. ***Felis*** (the Cats, Lions, Tigers, Leopards, Lynxes, and smaller cats); 4. *Viverra* (the Ichneumons, Coatis, Skunk (*Putorius*), Civets, and Genets); 5. ***Mustela*** (the Otters, Glutton, Martens, Pole-cats, Ferrets, and Weasels, including the Ermine, &c.); 6. ***Ursus*** (Bears, Badgers, and Racoons); 7. ***Didelphis*** (the Opossums); 8. ***Talpa*** (the Moles); 9. ***Sorex*** (the Shrews); 10. ***Erinaceus*** (the Hedge-hogs). Linnæus places the ***Feræ*** between the orders ***Bruta*** and ***Glires***.

FERDINAND I. of Austria, younger brother of Charles V., born in 1503, was elected king of the Romans during his brother's reign, and succeeded him as emperor in consequence of the abdication of Charles, which was sanctioned by the diet of the empire in 1558. Ferdinand had married in 1521 Anna, daughter of Ladislaus VI., king of Bohemia and Hungary, and sister of Louis, who having succeeded his father in the crown of those realms, was killed in the disastrous battle of Mohacz by the Turks in 1526, and left no issue. Ferdinand, claiming a right to the succession in the name of his wife, the states of Bohemia acknowledged him, but in Hungary a strong party declared for John of Zapoli, palatine of Transylvania. This was the beginning of a long and desolating war, interrupted by occasional truces, in which Solyman, sultan of the Turks, interfered on behalf of John, and after John's death in 1540, on behalf of his son Sigismund, who continued to hold a part of Hungary till the death of Ferdinand. In Bohemia the religious disputes between the Callixtines, who were a remnant of the Hussites and the Roman Catholics, occasioned considerable uneasiness to Ferdinand, who found at last that it was his policy to tolerate the former. At the same time however he effected a thorough change in the institutions of that kingdom by declaring the crown of Bohemia hereditary in his family, without the sanction of the states. This gave rise to a confederacy which opposed Ferdinand by force of arms, but was at length overpowered and dissolved. On being proclaimed Emperor of Germany, after having signed certain conditions with the electors, which defined the boundaries of the imperial authority and gave security to the Protestant religion, Ferdinand notified his election to Pope Paul IV., expressing a desire to be crowned by his hands. Paul refused, under the plea that the abdication of Charles V. was effected without the consent of the papal see, and required a fresh election to be made. Ferdinand, indignant at these pretensions, ordered his ambassador to quit Rome. Paul however dying soon after, his successor, Pius IV., showed himself more tractable in acknowledging Ferdinand as head of the empire. It was then resolved by the electors, Protestant as well as Catholic, that in future no emperor should receive the crown from the hands of the pope, and that, instead of the customary form in which the emperor elect professed his obedience to the head of the church, a mere complimentary epistle should be substituted; and this was observed on the election of Maximilian, son of Ferdinand, as king of the Romans, a title which ensured his succession to the empire. Thus ended the last remains of that temporal dependence of the German empire on the see of Rome which had been the subject of so many controversies and wars.

Ferdinand continued throughout his reign to hold the balance even between the Protestants and Catholics with regard to their mutual toleration and outward harmony; he even endeavoured, though unsuccessfully, to effect a union of the two communions, by trying to persuade the Protestants to send deputies to and acknowledge the authority of the council assembled at Trent. This however they refused to do, unless their theologians were acknowledged as equal in dignity to the Roman Catholic bishops, and unless the council were transferred from Trent to some city of the empire. Ferdinand, on the other side, in order to conciliate some at least of the various dissenting sects in his own hereditary states, attempted to obtain of the pope, among other concessions, the use of the cup at the communion-table for the laity, and the liberty of marriage for the priests. Pius IV.

however, moderate as he was, would not listen to these two concessions, especially the latter, and the negotiations were still pending with regard to the former, when the emperor died at Vienna in July, 1564. He left three sons: 1, Maximilian, who succeeded him as emperor, archduke of Austria, and king of Bohemia and Hungary; 2, Ferdinand, whom he made count of Tyrol; 3, Charles, whom he appointed duke of Styria, Carinthia, and Carniola. Upon the whole, the administration of Ferdinand was able and enlightened; he maintained religious peace in Germany, he effected some useful reforms, and he saw the closing of the council of Trent. (Coxe, *History of the House of Austria*; Dunham, *History of the Germanic Empire.*)

FERDINAND II. of Austria, son of Charles, duke of Styria, and grandson of Ferdinand I., succeeded his cousin Matthias in 1619. But the states of Bohemia, who were already in open revolt against Matthias, both from political and religious grievances, refused to acknowledge Ferdinand, and declared the throne vacant. Count Thorn, who was at the head of the Bohemian insurgents, was joined by the dissidents of Moravia, Silesia, and Upper Austria, and Ferdinand found himself besieged within the walls of Vienna by the rebels, who threatened to put to death his ministers, as they had done with the governor of Prague and his secretary, whom they had hurled from the windows of the town-house, and to confine Ferdinand himself in a monastery, and educate his children in the Protestant faith. His friends however found means to raise the siege, and Ferdinand hastened to Germany to claim the imperial crown, having been acknowledged king of the Romans during the reign of his predecessor. He carried his election by means of the Catholic electors, who formed the majority. But the Bohemian states elected as their king Frederic, Count Palatine, son-in-law of James I. of England, and Hungary joined in the revolt, supported by Bethlehem Gabor, prince of Transylvania. This was the beginning of the Thirty Years' War, a war both religious and political, and one of the most desolating in the history of modern Europe. In the midst of these difficulties Ferdinand was ably supported by his general, Count de Tilly, who reconquered Bohemia and expelled Frederic. Hungary was soon after obliged to submit, and Bethlehem Gabor sued for peace. Another confederacy was formed against Ferdinand by the Protestant states of Saxony, supported by Christian IV. of Denmark, who put himself at their head in 1625. Ferdinand opposed to him Tilly and Waldstein, or Wallenstein, another commander of extraordinary abilities. In two campaigns the confederates were defeated, Christian was driven into his hereditary states, and the peace of Lubeck, 1629, put an end to the war. Ferdinand now adopted measures of retaliation which drove the Protestants to despair: he abolished the exercise of the Protestant religion in Bohemia; he exiled or put to death the leaders of that and other dissident communions; he confiscated their property; seven hundred noble families were proscribed, and the common people were forced to change their faith. Above 30,000 families, preferring their consciences to their country, sought refuge in Protestant states. Ferdinand intended to carry on the same sweeping measures throughout Germany, but here he adopted a more cautious plan. He began by dividing the Protestants or Lutherans from the Calvinists, and he called for the execution of a former act which allowed to the former only the free exercise of their religion, but condemned the Calvinists to apostacy or exile. He also insisted on the restitution of such ecclesiastical property as the Protestants had seized since the treaty of Passau in 1532. The Protestant princes were compelled in many cases to give up the lands and revenues which they had seized to the monastic and collegiate bodies, their former owners. But the Catholic princes prevented the entire execution of the decree. They had themselves, in the general confusion which followed the reformation, seized upon ecclesiastical property, which they did not wish to restore, and they moreover felt jealous of the threatening power of the house of Austria, allied as it was to the Spanish branch of the same house. They feared also that they might be made as completely dependent upon the emperor as the grandees of Spain had become upon their king. In this feeling they secretly encouraged their Protestant countrymen in resisting the further execution of the decree. The diet at Ratisbon, on Ferdinand's request that his son Maximilian might be elected king of the Romans, replied by insisting that the emperor should reduce his army and dismiss Waldstein, who had rendered himself hateful by the disorders of his troops. Soon afterwards Gustavus Adolphus landed in Pomerania, and put himself at the head of the Protestant party in Germany. The events of the memorable campaigns that followed are well known from Schiller's 'Thirty Years' War,' and other historians. [GUSTAVUS ADOLPHUS.] The Protestant cause triumphed in Germany until Gustavus fell at the battle of Lutzen, 1632, after which the Swedes and German Protestants continued the war; but the victory of Nordlingen, gained by Ferdinand, eldest son of the emperor, had the effect of detaching the elector of Saxony from the Swedes, an example followed by almost all the other German states. Ferdinand died in February, 1637, after having witnessed the election and coronation of his son Ferdinand as king of the Romans.

Ferdinand II. reigned in very troubled times; his bigotry and intolerance were the cause of most of his troubles, but he was not deficient in abilities or perseverance. His connivance at the assassination of his best general, Waldstein, whose ambition and arrogance had made him suspected and feared, is an everlasting blot on his memory.

FERDINAND III., son of Ferdinand II., had to continue the war against the Swedes, who had been joined by the French, for several years more, until the peace of Westphalia, 1648, put an end to the desolating struggle. This celebrated treaty forms an important epoch in the history of Germany and of Europe. The remainder of the reign of Ferdinand III. was passed in tranquillity. He died in 1657, leaving behind him the character of a wise, temperate, and a brave prince. He was succeeded by his son, Leopold I.

FERDINAND I. of Naples was the natural son of Alfonso V. of Aragon and of Sicily. His father obtained of the Neapolitan barons in parliament assembled, in 1442, the acknowledgment of Ferdinand, as duke of Calabria and heir to the crown of Naples, thus securing to his favourite and only son one of his several kingdoms, as Aragon, Sardinia, and Sicily devolved upon John of Aragon, Alfonso's brother. In 1458, after the death of his father, Ferdinand assumed the crown of Naples. Pope Calixtus III. refused him the investiture, which however was granted to him by Pius II., the successor of Calixtus. His reign began well, but a conspiracy of the barons, who called in John of Anjou, who had some remote claim to the throne, threw the country into a civil war. Ferdinand, assisted by Scanderbeg, prince of Albania, gave battle to John near Troja in Apulia and defeated him completely, in the year 1462. After the battle he concluded a peace with the revolted barons upon conciliatory terms, but in a short time, breaking the treaty, he put to death two of them, an act which kept alive the jealousy and fears of the rest. In 1480 Mohammed II. sent an armament on the coast of Apulia, which took the town of Otranto and caused great alarm in all Italy. Ferdinand, however, quickly recalled his son Alfonso, duke of Calabria, who was then in Tuscany at the head of an army, and who retook Otranto. A fresh conspiracy of the barons broke out, encouraged by Pope Innocent VIII., but it was again repressed, and Ferdinand solemnly promised a general amnesty. But he kept his word no better than before, for having contrived, on the occasion of the marriage of his niece, to collect at Naples most of the leading barons, he arrested them all, and threw them into prison, where most of them were strangled. The whole of this tragedy, which was attended by circumstances of fearful treachery and cruelty, is eloquently related by Porzio in his work, *La Congiura dei Baroni contra il Rè Ferdinando I.* Ferdinand continued to reign for several years after this, feared and hated by his subjects, and himself in perpetual anxiety, which was increased by the advance of Charles VIII. of France, who was coming for the purpose of asserting his claims, derived from the Anjous, to the throne of Naples. In the midst of the alarm at the approaching storm, which he had not the means of averting, Ferdinand died in 1494, at the age of 71. He was succeeded by his son Alfonso, a gloomy and cruel prince, who, terrified at the approach of the French, abdicated in favour of his son Ferdinand, and retired to a convent in Sicily.

FERDINAND II. was very young when he found himself occupying a throne threatened by enemies from without and by disaffection from within. He endeavoured to rally his troops against the French, but being forsaken by all, he withdrew to Sicily with his uncle Frederic. The French occupied Naples, where their conduct soon disgusted the Neapolitans, while the other states of Italy formed a league against them in the North. Ferdinand seized the opportunity to ask assistance from Ferdinand V. of Spain, who sent him his great Captain Gonzalo of Cordova with a body of troops, who soon reconquered the kingdom of Naples. Ferdinand returned in triumph to his capital, but did not long enjoy his prosperity; he died suddenly in 1496, at the age of 28 years, regretted by his subjects, who had formed great hopes of him from his amiable qualities and abilities. He was succeeded by his uncle Frederic, who was soon after treacherously deprived of his kingdom by his pretended ally, Ferdinand of Spain.

FERDINAND III. of Naples is the same as **Ferdinand V. of Spain.**

FERDINAND IV. of Naples, afterwards styled Ferdinand I. of the United Kingdom of the Two Sicilies, born in January 1751, was the son of Don Carlos of Bourbon, king of the Two Sicilies, afterwards Charles III. of Spain. The life of Ferdinand is remarkable, not so much on account of his personal character, as from the uncommon length of his reign and its many vicissitudes being closely connected with all the great events of Europe during the last half century, as well as the singular good fortune which attended him to the end of his life with little or no exertion on his part. The education of Ferdinand was greatly neglected. He was little more than eight years of age when his father Charles, being called to the throne of Spain by the death of his brother Ferdinand VI., made over to him the kingdom of Naples and Sicily, appointing a council of regency, at the head of which he placed the Marquis Tanucci, an able minister, who however does not seem to have been very anxious about the instruction of his young sovereign. In April 1768, Ferdinand, being now of age, married Maria Carolina of Austria, daughter of Maria Theresa, a princess accomplished, clever, and ambitious, who in fact ruled under her husband's name till her death, assisted by the various ministers who succeeded each other at the helm of affairs, the king himself being generally passive, and his time being much engrossed by hunting, shooting, and other diversions. Yet Ferdinand was by no means deficient in good sense or natural penetration; he often saw things more clearly than those around him, which is manifest from many of his shrewd though blunt remarks which are still remembered at Naples; but his want of instruction, of which he was aware, and his dislike of application, prevented him from exerting or enforcing his own judgment. The first 30 years of his reign, those of the regency included, were for Naples years of peace and comparative happiness; many useful reforms were effected by his ministers, and especially by Tanucci, who continued at the head of affairs till 1777. A detailed account of these reforms, in the various departments of public education, ecclesiastical discipline, feudal jurisdictions, financial economy, and the administration of justice, is given by Colletta, in his able and impartial 'Storia del Reame di Napoli,' 1834, and also by Count Orloff in the 2nd volume of his 'Mémoires sur le Royaume de Naples.' Ferdinand was very popular, especially with the lower classes; and as he was the first king born at Naples for centuries past, they called him emphatically 'our king.'

Tanucci being dismissed in 1777 for having objected to the queen taking her seat in the council of state, Caracciolo and others followed for a short time, until John Acton, an Englishman, and a naval officer in the service of Leopold of Tuscany, was sent for to organize the Neapolitan navy and army, which had fallen into decline during a long season of peace. The advancement of Acton was extremely rapid; he was made general, then captain-general of the kingdom, and lastly premier, or rather sole minister (for the other ministers were merely his creatures), and in this office he remained for many years. His administration was neither so economical nor so wise as that of Tanucci. Things went on however quietly and smoothly for several years, yet a considerable degree of liberty of speech, and even of the press, prevailed at Naples, and the country was prosperous and the people contented until the breaking out of the French revolution, of which Naples, however remote, felt the shock. The queen being the sister of Marie Antoinette, was indignant at the treatment her relatives of France met with at the hands of the revolutionists; and as many young men at Naples, mostly belonging to the higher ranks of society, seemed to approve of the principles of the revolution, the court took alarm, and the men who had always been averse to reform and improvement seized the opportunity to regain the ascendancy. This was an epoch of a re-action in the internal politics of Naples. Arrests were made, and a giunta, or state tribunal, was formed to try the real or pretended conspirators, three of whom were sentenced to death, others to perpetual imprisonment, but the majority (against whom the judges, notwithstanding all the exertions of the attorney-general, Vanni, could find no evidence), were acquitted after four years' confinement.

The court of Naples had joined the first coalition against France in 1792, and had sent some troops to join the Austrians in the North of Italy, and others with a squadron to the expedition against Toulon. In 1796, however, alarmed by the successes of Bonaparte, a peace was concluded with the Directory by paying a few millions of francs. In 1798, the French having occupied the papal state, the court of Naples formed a secret alliance with Austria, England, and Russia, but, instead of waiting for the opening of the campaign in Lombardy, which was to take place in the following spring, the Neapolitan army, 60,000 strong, began hostilities in November, 1798, and marched upon Rome, which it occupied only for a few days, as the French generals, having collected their forces, attacked and routed several divisions of the Neapolitans, and cut off the communications between the rest; a general panic spread through the army; the king, who had accompanied it as far as Rome, fled back to Naples; Mack, who was his commander-in-chief, followed his example; and of the various corps that were left to themselves without any concerted plan or preparations in case of a reverse, some were dispersed or made prisoners, and others made good their retreat to their own frontiers, whither the French followed them closely. The greatest confusion prevailed at the court of Naples; the queen, beset by informers, fancied that the capital was full of conspirators, and determined to withdraw to Sicily. Ferdinand was easily persuaded to do the same, and the royal family left Naples on the 21st of December, 1798. The French meantime were approaching, and the populace, left without a government and excited by denunciations against the Jacobins, rose, murdered a number of persons, and for three days fought desperately against the advancing French in the streets of the capital. The events of Naples in 1799 form a romantic but most tragical episode in the history of the Continental war, and they have become the theme of numerous narratives. The best accounts are given by Colleta, already mentioned, by Cuoco, 'Saggio Storia sulla Rivoluzione di Napoli,' and in a work called 'Sketch of Popular Tumults,', London, 1837. The reverses of the French in Lombardy in the spring of 1799, obliged them to abandon Naples, leaving only a small garrison in it. The native republicans, or patriots as they were called, were few, and disliked by the lower classes. Cardinal Ruffo landed in Galabria from Sicily, and preached a sort of political and religious crusade against the French and their partisans, and the whole kingdom was re-conquered for Ferdinand in a short time. A dreadful re-action took place, in which thousands lost their lives, either murdered by the royalists, or condemned by the courts instituted to try all those who were accused of republicanism.

Ferdinand returned to Naples, and in 1801 he concluded, through the mediation of Russia, a treaty of peace with France. But the past events and the proscriptions that had taken place in his name had destroyed all confidence between the government and the more enlightened part of the nation. In 1805 the court of Naples committed a second political error, worse than that of 1798. While professing to be at peace with France, it entered secretly into the coalition against that power; and while Napoleon was defeating the Austrians on the Danube, Russian and English troops were landed at Naples to join the army of that kingdom for the avowed purpose of attacking the French in the north of Italy. The consequence was, that Napoleon, after his victory at Austerlitz, declared that 'the Bourbon dynasty had ceased to reign at Naples,' and he sent a force under Massena to occupy that kingdom. Ferdinand and his court withdrew to Sicily a second time, where, being protected by the English forces, they remained till 1815. A desultory but cruel warfare was carried on for several years in Calabria between the partisans of Ferdinand and those of Murat, whom Napoleon had made king of Naples, the details of which are vividly described by Botta, 'Storia d' Italia,' 24th book, towards the end. But even in Sicily the reign of Ferdinand did not run smooth The court wa extravagant in its expenditure, the queen was as arbitrary as ever, and great jealousy existed between the Sicilians and the Neapolitan courtiers and emigrants. But Sicily had a parliament consisting of three orders, barons, clergy, and deputies of the towns, and the parliament would not sanction the levying of fresh taxes. The queen then ordered the imprisonment of five of the most influential barons. Meantime it was suspected that that princess, who had conceived a dislike against the English, whom she considered as a check upon her, entertained secret communications with Napoleon, who in 1810 had married her grand-niece, Maria Louisa. A conspiracy against the English was discovered at Messina. All these circumstances obliged the English government to interfere, and in January, 1812, Ferdinand resigned his authority into the hands of his eldest son, Francis. A parliament was assembled, which abolished feudality, and framed a new constitution upon a liberal basis. The queen's influence was now at an end, and after some fruitless intrigues she embarked in 1813 for Constantinople, from whence she went to Vienna, where she died in the following year. For an account of these important Sicilian transactions see Botta, and also a work styled *De la Sicile et de ses Rapports avec l'Angleterre à l'époque de la Constitution de* 1812, Paris, 1827. In 1814 Ferdinand resumed the reins of government, and opened in person the Sicilian parliament of that year. In 1815, after the defeat of Joachim Murat by the Austrians, Ferdinand was recalled to the throne of Naples, and in June of that year he returned to his old capital. In a well written proclamation to the Neapolitans he promised them peace, a complete forgetfulness of the past, impartial justice, and a steady administration. And now that he for the first time acted by himself, he kept his word. The government of Ferdinand at Naples from 1815 till 1820 was mild, impartial, and orderly. This is attested by Colletta, a liberal writer, b. viii. sec. 50, of his History. But in Sicily, having dissolved the parliament, he never convoked it afterwards. By a decree of December, 1816, he assumed the title of Ferdinand I., King of the United Kingdom of the Two Sicilies, declaring that Sicily and Naples formed no longer distinct states, but were both subject to the same system of government.

Meantime a secret society, called Carbonari, were spreading themselves fast through the kingdom, especially among the landed proprietors in the provinces, and consequently through the ranks of the provincial militia. The land-tax, which was more than 20 per cent. on the rent, made this class of people dissatisfied and ready for change. The origin of this society or sect, for it was religious as well as political, is somewhat obscure: it seems to have come from France into Italy, and was established in the kingdom of Naples under Murat, with his sanction; but was afterwards proscribed by him, and it then found favour with the court of Sicily. (*Memoirs of Secret Societies of the South of Italy*, London, 1821. See also Botta, book xxiv., and Colletta, book viii.) Colletta thus describes its tendency: 'The Carbonari spread among the minor orders of society, who, rallying round the principle of civil equality, move forward in a body pressing upon the higher orders; an impulse which in a virtuous and moral community tends to establish democratic institutions, but which in our own corrupt and profligate state of society tends only to a change of matters under the forms and the language of democracy.

On the 2nd of July, 1820, a military revolt, led by two subalterns, broke out in a regiment of cavalry stationed near Naples; other troops joined in it, and the Carbonari of the capital and provinces openly espoused its cause, demanding a representative constitution for the kingdom. Ferdinand, pressed by his ministers, promised to establish a constitution in a given time; but the Carbonari would not wait, saying it was better to adopt one already made, namely, that of the Cortes of Spain, and thus the Spanish constitution was proclaimed, and a parliament was convoked at Naples. Meantime the Sicilians, ever jealous of their nationality, demanded a separate parliament for themselves and a repeal of the union of the two kingdoms, which the parliament at Naples refusing, a revolt broke out at Palermo, which was put down after much bloodshed. Soon after, the sovereigns of Austria, Russia, and Prussia, assembled at Troppau, wrote to King Ferdinand, inviting him to a conference at Laybach, in Carinthia, without which they stated that they could not acknowledge the new system of government established at Naples. Ferdinand, after some demur, obtained leave of the parliament to proceed to the congress in December, 1820, leaving his son Francis as his vicegerent at Naples. In February, 1821, Ferdinand, by a letter written from Laybach, signified to his son that the allied sovereigns were determined not to acknowledge the actual constitutional government as established at Naples, deeming it incompatible with the peace of that country and the security of the neighbouring states; but that they wished Ferdinand himself, assisted by the wisest and most able among his subjects, to give to his kingdom institutions calculated to secure peace and prosperity to the country. Soon afterwards the Austrian army passed the Po, moving on towards Naples. The parliament of Naples determined upon resistance, but at the first encounter, near Rieti, a Neapolitan division was defeated, and the rest of the army being alarmed at the thought of fighting against the will of their own king, disbanded, and the Austrians entered Naples without any further opposition at the end of March, 1821. Ferdinand soon afterwards returned to his capital on what may be styled his third restoration. The leading constitutionalists were allowed to emigrate; but of those who remained some were tried and sent to the Presidii. The government again became absolute, but not so lenient or liberal as it was before 1820. After reigning four years longer, Ferdinand died suddenly on the morning of the 4th of January, 1825, aged seventy-six, having been king sixty-five years. He was succeeded by his son, Francis I.

FERDINAND, or FERNANDO I., styled the Great, the son of Sancho, called Mayor, king of Navarra and Castile, succeeded his father in 1035, and having defeated and killed Veremund, king of Leon, in 1038, succeeded him as king of Leon and of Asturias. Navarra became the appanage of Ferdinand's brother Garcia. Ferdinand, called the Great, made war against the Moors, whom he drove away from the northern part of Portugal as far as the Mondego. He died in 1065, leaving three sons, Sanctius, to whom he gave Castile; Alfonso, who had Leon; and Garcia, who retained Gallicia.

FERDINAND II., second son of Alonso VIII. of Castile and Leon, succeeded his father in the latter kingdom only in 1157. He was engaged in wars with Alfonso Henrique, king of Portugal, and also with his own nephew, Alonso of Castile. He died in 1187.

FERDINAND III., called the Saint, son of Alonso IX., king of Leon and of Berengaria of Castile, inherited both crowns after the death of his parents. Ferdinand was successful in his wars against the Moors beyond any of his predecessors: he took from them Badajoz and Merida in 1230, Cordova in 1236, and Jaen, Seville, and Murcia in 1243. He was making preparations for carrying the war into Africa when he died, in 1252. Ferdinand collected the laws of his predecessors into a code; he established the council of Castile; he cleared his states from robbers, and checked the arbitrary acts of the nobles. He was one of the most illustrious sovereigns of the old Spanish monarchy. His son Alonso X., called 'the Wise,' succeeded him on the throne.

FERDINAND IV. succeeded his father, Sancho IV., in 1295, while yet a minor. His reign was engrossed chiefly by wars with the Moors; he died in 1312, and was succeeded by his son Alonso XI.

FERDINAND V. of Castile and II. of Aragon, son of John II. of Aragon, married in 1469 Isabella, daughter of John II. of Castile, and heiress to that crown, by whom he had several daughters, one of whom married Emmanuel, king of Portugal; another, Catherine, was married to Henry VIII. of England, and the other, Joanna, married Philip, archduke of Austria, son of the emperor Maximilian I. Ferdinand succeeded to the crowns of Aragon and of Sicily by the death of his father, and his wife Isabella had already succeeded in her own right, and with the sanction of the Cortes, to the throne of Castile by the death of her brother, Henry IV., in 1472. Thus were the two great divisions of Spain united, though the two kingdoms remained under separate administrations, Castile was still governed in the name of the queen until the death of Isabella in 1504, followed by that of the archduke Philip in 1506, when Ferdinand, owing to the insanity of his daughter Joanna, assumed the government of Castile, which he retained till his death, when his grandson, Charles V., succeeded to the whole splendid inheritance.

Ferdinand took from the Moors the kingdom of Gra nada, their last possession in Spain, in 1492, after a war of several years; at the same time Columbus was discovering for him the new world, where the Spaniards soon after made immense conquests. Ferdinand's general, Gonzalo of Cordova, conquered for him the kingdom of Naples, partly by force, and partly by treachery. By similar means Ferdinand conquered Navarra, which he added to his other dominions. He was the most powerful monarch of his time, and was also the cleverest; but his abilities were disgraced by a total want of faith, and a recklessness of principle of which he made no scruple of boasting. He was styled the Catholic, a title which the kings of Spain have continued to assume ever since, in consequence of his having cleared the soil of Spain of the Mohammedans. He was also called the Prudent, and the Wise. He was ably assisted by his minister, Ximenes [CISNEROS], who emancipated the crown from the power of the feudal nobles by raising troops at the expense of the state, and by favouring the privileges of the municipal towns. Ferdinand established the Inquisition in Spain, which fearful tribunal continued till 1820, when it was finally abolished. Acting from the same intolerant principle he drove away the Jews from Spain; but he also established a severe system of police throughout his dominions by means of the association called the Santa Hermandad, which did summary justice upon all offenders without distinction of ranks. He also forbade any papal bull to be promulgated without the previous sanction of the royal council. He may be considered as the restorer, if not the founder, of the Spanish monarchy. Ferdinand died in January, 1516, at sixty-three years of age.

FERDINAND VI., eldest son of Philip V. of Bourbon, king of Spain, succeeded his father in 1746. He made several useful reforms in the administration, and gave encouragement to commerce and manufactures. He had the character of a good and wise prince, willing to administer impartial justice, and willing to redress the grievances of his subjects. He died without issue in August, 1759, and was succeeded by his brother Don Carlos, king of the Two Sicilies, who assumed the title of Charles III. of Spain, and continued the same laudable system as his predecessor.

FERDINAND VII., eldest son of Charles IV., king of Spain, and of Maria Louisa of Parma, was born on the 14th of October, 1784. When six years of age, he was proclaimed prince of Asturias. At that time Godoy, afterwards called the Prince of Peace, was the favourite minister and ruler at the Spanish court. Both he and the queen kept young Ferdinand, who was of a sickly constitution, in a state of thraldom and seclusion little suited to the heir apparent of the throne. He had however some well-informed preceptors; among others the canon Escoiquiz, who figured afterwards in the political events of his reign. In 1802 Ferdinand married his first cousin, Maria Antonietta, daughter of Ferdinand IV., king of the Two Sicilies, a princess of a superior mind, who endeavoured to restore her husband to his proper sphere and influence at court; in attempting which she drew upon herself the dislike of the queen and of the favourite, and from that time both she and her husband were kept in a state of retirement and humiliation. She died suddenly in May, 1806, under suspicious circumstances, and left no issue.

In the mean time the administration of Spain was in a wretched state; every thing was done through bribery or favour; the monarchy was sinking lower and lower in the estimation of Europe, having become a mere dependent of France, and the people were highly dissatisfied. Some friends of Ferdinand, and among others his preceptor Escoiquiz, formed a plan for overthrowing the favourite Godoy. Being in want of powerful support, they unwarily advised Ferdinand to address himself to the Emperor Napoleon, to whom the prince wrote a letter, dated 11th of October, 1807, in which he complained of Godoy's influence and the state of thraldom in which both the king his father and himself were kept, and expressed a desire to form a connexion with a princess of Napoleon's family, and to place himself under his protection. A memorial was at the same time penned by Escoiquiz, and copied by Ferdinand with his own hand, pointing out in vivid language the mal-administration of the kingdom, and asking, as the first remedy the dismissal of the favourite. Ferdinand was to have read this memorial to the king his father, but Godoy being apprised of the plot, hastened to Charles, and told him that his son was conspiring both against his crown and his life. Upon this Ferdinand was arrested, his papers were seized, and after some days of close confinement he was frightened into an acknowledgment of what he really was not guilty of—a conspiracy to dethrone his own father. This scandalous affair caused great excitement in the country, and the people in general, who disliked Godoy, took the part of the young prince, who from his infancy had been the victim of court intrigues. Meanwhile French troops had entered Spain under the pretence of marching against Portugal—had taken possession by surprise of several fortresses, and Napoleon's further intentions becoming more alarming, the court decided upon abandoning Spain and retiring to Mexico. The 17th of March, 1808, was fixed for the departure, when a revolt broke out among the guards at Aranjuez, and Godoy was in danger of his life; but Ferdinand himself came to rescue him from the hands of the mutineers, saying that he would answer for his appearance before the proper court. King Charles being alarmed for his own safety, and perceiving the popularity of his son, abdicated on the 19th of March in favour of Ferdinand, who assumed the title of king of Spain and the Indies. But this did not suit Napoleon, who contrived under specious pretexts to draw both father and son to Bayonne, and there obliged them both to resign in his favour. Ferdinand and his brother Don Carlos were sent to Talleyrand's country residence at Valençay, where they were treated with outward marks of respect, but kept under a strict watch. There Ferdinand remained passive and resigned till the end of 1813, when the reverses of the French both in Spain and in Germany induced Napoleon to restore Ferdinand to the throne of Spain, on condition that he should send the English out of the peninsula, who were, as Napoleon said, spreading anarchy and jacobinism in the country. A treaty to that effect was signed at Valençay between the two parties, but the Cortes of Madrid refused to ratify it, and wrote to Ferdinand that they would receive him in his capital as their lawful king, provided he would sign the constitution which had been proclaimed at Cadiz in 1812 by the representatives of the nation. [CORTES, and references therein.] Ferdinand set off from Valençay in March, 1814, and it was only on the road that he read for the first time a copy of the new constitution, having been kept in ignorance till then of the proceedings of the Cortes, except what he had read in the garbled accounts of the French newspapers. On arriving at the frontiers of Spain, instead of proceeding direct to Madrid, he went to Zaragoza, and thence to Valencia, where he was surrounded by a host of people, military and civilians, churchmen and laymen, who were hostile to the constitution, and who advised him to reign, as his fathers had done before him, an absolute king. The lower classes, excited by the clergy, and especially by the friars, were loud in their denunciations of the constitution, which they called heretical, and Ferdinand easily persuading himself that the constitution was unpopular, determined not to sanction it. At Valencia he appointed a ministry from among the serviles, or absolutists; and on the 4th of May, 1814, he issued a decree annulling the constitution and all the enactments of the Cortes made in his absence. Soon afterwards he made his entrance into Madrid among the acclamations of the populace and of the absolutists, or clergy party; an event which was speedily followed by a violent proscription of the constitutionalists, or liberals, as they were styled, including the members of the Cortes. As the British ambassador had obtained from Ferdinand at Valencia a promise that the punishment of death should not be inflicted for past political conduct, the courts appointed to try the leading constitutionalists resorted to every kind of subterfuge in order to find them guilty of some imprudent demonstration or expression since the king's return, and sentences of imprisonment, exile, banishment to the presidios in Africa, and confiscation, were freely awarded. The military insurrections of Porlier, Lacy, and others, came to add fresh fuel to the spirit of persecution. All the abuses of the old administrative and judicial system now re-appeared; the finances were in a wretched state, the American colonies were in open revolt, and Ferdinand was either kept in ignorance of the true state of things, or his natural indecision of character prevented him from altering his policy. He was overawed by the clergy and absolutist party, who, at that time, seemed to have on their side the great mass of the population, and he feared and hated the liberals, whom he looked upon as the enemies of his throne.

On the 1st of January, 1820, part of the troops stationed in the Isla of Leon, near Cadiz, under colonels Quiroga and Riego, proclaimed the constitution of 1812; the example was followed by other garrisons; the Ministers at Madrid hesitated, and Ferdinand, on the 9th of March of that year, swore his adherence to the constitution. The Cortes were assembled, and the deputies and other liberals, who had been exiled or imprisoned, re-appeared on the political stage. The events of the following three years are matters of contemporary history, upon which it is difficult as yet to pronounce a final judgment. Errors were committed by all parties. At one time Ferdinand appeared reconciled to the constitutional system, but now and then some fresh insult or other act of violence of the more zealous liberals came to rouse his old fears and antipathies; whilst, on the other side, the partisans of absolutism, who still lingered near the king's person, kept alive by their intrigues the mistrust even of the moderate constitutionalists. Of this period of Ferdinand's reign there is a pretty accurate sketch in a work written by a Spanish emigrant at Paris, styled *Revolution d'Espagne, Examen Critique*, 8vo., 1836.

At the beginning of 1823 Louis XVIII. declared to the French chambers that he was going to send his nephew, the duke of Angoulême, with an army of 100,000 Frenchmen into Spain to deliver Ferdinand VII. from the slavery in which he was kept by a factious party, and to restore him to his freedom of action. The English ministry protested against this interference, and the Cortes of Spain, on their side, rejected the mediation of the northern courts, who, to prevent the entrance of the French, required certain modifications in the constitution of 1812. The Cortes, on the 20th March, removed to Seville, where the king was induced to follow them. On the 7th April the French entered Spain, with little or no opposition, and on the 23rd they entered Madrid, where they were received with acclamations by the clergy and the lower classes, while the grandees or high nobility presented a congratulatory address to the duke of Angoulême. The Cortes, not judging themselves safe at Seville, removed to Cadiz, and, as Ferdinand refused to quit Seville, they passed a resolution, after a stormy debate on the 11th June, declaring the king in a state of incapacity, and appointing a regency *pro tempore*. Ferdinand was then compelled to set off with his family on the evening of the 12th, under a strong escort, for Cadiz, where he arrived on the 15th. In the following September the French besieged Cadiz, and after some negotiations Ferdinand was allowed by the Cortes to repair to the French camp to treat with the Duke of Angoulême. Before leaving Cadiz Ferdinand published a proclamation on the 30th September, in which he promised a general amnesty for the past; he acknowledged all the debts and obligations contracted by the constitutional government, and 'declared of his own free and spontaneous will that if it should be found necessary to make alterations in the actual political institutions, he would adopt a system of government which should guarantee the security of persons and property and the civil liberty of the Spaniards.' None of these solemn promises were kept. The liberals were persecuted worse than before, the debts contracted under the Cortes were disavowed, and the old system of absolutism with all its maladministrations was resumed. The sequel is well known. Ferdinand continued to govern, at least nominally, checked on one side by fear of the liberals, and on the other by mistrust of the more violent absolutists, or apostolical party as it was called, who found Ferdinand too moderate for them, and who would have re-established the Inquisition, and ruled Spain by terror. In his latter years Ferdinand seemed to take little or no interest in public affairs, leaving things to go on as they could. Having lost his third wife, who was a Saxon princess, and having yet no children, he married in November, 1829, Maria Christina, daughter of Francis, king of the Two Sicilies, and his own niece by her mother's side. By her he had two daughters—Maria Isabella, now queen of Spain, born 10th October, 1830, and Maria Louisa Ferdinanda, born 1832. Ferdinand died on the 29th September, 1833, after being long in a bad state of health, at the age of 49 years. He was buried with great pomp in the royal vaults under the chapel of the Escurial.

Accounts more or less accurate of the various periods of his reign may be gathered from the numerous contemporary public documents and journals, and also from the following works:—*Memoirs of Ferdinand VII. king of Spain, translated from the Spanish original MS. by* M. J. Quin, London, 1824; Toreno, *Historia del Levantamiento, Guerra y Revolucion de España*; Inglis's *Spain in* 1830, and a very interesting article *on Spanish Affairs* in No. 1 of Cochrane's *Foreign Quarterly Review*, March, 1835, from which something like a correct estimate of Ferdinand's character may be formed.

FERDUSI. [Firdusi.]

FERGUSON, JAMES, was born in 1710, at a short distance from Keith, a village in Banffshire. His father, who was a day-labourer, taught him to read and write, and sent him to school for three months at Keith.

When only seven or eight years old, having seen his father use a beam as a lever, with a prop for a fulcrum, in order to raise the roof of their cottage, which had partly fallen in, his curiosity was so much excited by the ease with which what appeared to him so stupendous an effect was accomplished, that he thought about it, and made trials, and constructed models, and drew diagrams, till he became acquainted with the chief properties of the lever, not only in its simple application, but as modified by the wheel and axle. The taste for practical mechanics thus formed continued to distinguish him through life, and, together with an equally decided taste for astronomy, conducted him in his later years to distinction and independence.

His astronomical pursuits commenced soon afterwards. His father sent him to a neighbouring farmer, who employed him in watching his sheep. While thus occupied, he amused himself at night in studying the stars, and during the day in making models of mills, spinning-wheels, and similar things. When a little older, he entered into the service of another farmer, who treated him with great kindness, and encouraged and assisted him in his astronomical studies. 'I used,' he says, 'to stretch a thread with small beads on it at arm's length between my eye and the stars, sliding the beads upon it till they hid such and such stars from my eye, in order to take their apparent distances from one another; and then laying the thread down on a paper, I marked the stars thereon by the beads.' 'My master,' he adds, 'that I might make fair copies in the day-time of what I had done in the night, often worked for me himself.' Mr. Gilchrist, the minister of Keith, having seen his drawings, gave him a map of the earth to copy, and furnished him with compasses, ruler, pens, ink, and paper.

At the house of Mr. Gilchrist he met Mr. Grant of Achoynaney, with whom, at the termination of his engagement with his present master, he went to reside, being then in his twentieth year. He had learnt vulgar arithmetic from books, and Mr. Grant's butler, Mr. Cantley, taught him decimal arithmetic and the elements of algebra, and was about to commence instructing him in geometry when he left the employment of that gentleman.

Ferguson soon afterwards entered into the service of a miller in the neighbourhood, where he was overworked, and scarcely supplied with food enough for subsistence. After remaining a year in this situation, he was engaged by Dr. Young, who was a farmer as well as a physician, and who promised to instruct him in medicine, but broke his promise, and treated him with so much harshness, that, though his engagement was for half a year, he left at the quarter, and forfeited the wages which were due to him. A severe hurt of the arm and hand, which he had got in the doctor's service, confined him to his bed for two months after his return home. During this time he amused himself with constructing a wooden clock. He afterwards made a wooden watch with a whalebone spring; and his talents having been turned in this direction, he began to earn a little money in the neighbourhood by cleaning and mending clocks.

He was about this time invited to reside with Sir James Dunbar of Durn, and, at the suggestion of Lady Dipple, Sir James's sister, began to draw patterns for ladies' dresses. He says, 'I was sent for by other ladies in the country, and began to think myself growing rich by the money I got by such drawings; out of which I had the pleasure of occasionally supplying the wants of my poor father.' His studies in astronomy however were not neglected, and he still continued to use his thread and beads.

Besides drawing patterns, he copied pictures and prints with pen and ink; and having left the residence of Sir James Dunbar for that of Mr. Baird of Auchmeddan, Lady Dipple's son-in-law, he drew a portrait of that gentleman, which was much admired, and now began to draw likenesses from the life in Indian ink: these appeared to his patrons to be so excellent, that they took him to Edinburgh with the intention of having him regularly instructed in drawing, but a premium having been unexpectedly demanded, he boldly commenced the practice of his art at once. The Marchioness of Douglas having assisted him with her patronage, he succeeded so well, that he obtained money enough not only to defray his own expenses, but to contribute largely to the support of his aged parents.

Though he continued to follow this profession for about twenty-six years, he seems never to have given his mind to it; and indeed, after having been two years in Edinburgh, he returned to the country with a supply of drugs with the intention of practising medicine, but soon found himself to be totally unqualified for his new occupation. He then went to Inverness, where he remained about three months. While there he drew an Astronomical Rotula, for exhibiting the eclipses of the sun and moon, which he transmitted to Professor Maclaurin at Edinburgh, who was highly pleased with it. He now returned to Edinburgh, and the Professor had the Rotula engraved, and it ran through several impressions, till, by the change of the style in 1753, it became useless. While at Edinburgh he made a wooden orrery, and delivered a lecture on it before the mathematical class.

In 1743 he resolved to go to London, where he continued his profession of drawing portraits, but devoted his leisure to astronomical pursuits.

In 1747 he published his first work, 'A Dissertation on the Phenomena of the Harvest Moon,' having been previously introduced at one of the sittings of the Royal Society by Mr. Folkes the president.

In 1748 he read lectures on the eclipse of the sun which happened in that year. From this period he began, under the patronage of the prince of Wales, afterwards George III., to deliver lectures on astronomy and mechanics: they were numerously and fashionably attended, and he now relinquished his former profession altogether. From this time to the end of his life he continued his lectures, and wrote several works on astronomy and mechanics.

Soon after the accession of Geo. III. a pension of 50*l.* a year was granted him out of the privy purse. In 1763 he was elected a Fellow of the Royal Society, and in 1770 was chosen a member of the American Philosophical Society.

He died in 1776, aged 66, leaving an only son, to whom he bequeathed a considerable sum acquired by his lectures and his writings.

Ferguson has contributed more than perhaps any other man in this country to the extension of physical science among all classes of society, but especially among that largest class whose circumstances preclude them from a regular course of scientific instruction. Perspicuity in the selection and arrangement of his facts and in the display of the truths deduced from them was his characteristic both as a lecturer and a writer.

The following are his principal works: 'Astronomy explained upon Sir Isaac Newton's Principles, and made easy to those who have not studied Mathematics,' 4to. 1756. There have been many editions of this work; one by Dr. Brewster, 2 vols. 8vo. 1811, containing the new discoveries since the time of Ferguson. 'Lectures on Subjects in Mechanics, Hydrostatics, Pneumatics, and Optics, with the Use of the Globes, the Art of Dialling, and the Calculation of the Mean Times of New and Full Moons and Eclipses,' 8vo. 1760; 4to. 1764. An edition of this work by Dr. Brewster was published in 1805, and another in 1806. 'An Easy Introduction to Astronomy for Young Gentlemen and Ladies,' 1769. 'Introduction to Electricity,' 8vo. 1770. 'The Art of Drawing in Perspective made easy to those who have no previous knowledge of Mathematics,' 8vo. 1775: this was his last work. Besides other works not mentioned here, he contributed several papers to the Philosophical Transactions.

(*Life* by himself, prefixed to his 'Select Mechanical Exercises;' Nichols's *Anecdotes; Pursuit of Knowledge under Difficulties*, vol. i., in 'Library of Entertaining Knowledge.')

FERGUSON, ADAM, born in 1724, was the son of a parish minister in Perthshire. He studied at St. Andrews and at Edinburgh. On being ordained, he was appointed chaplain to the 42nd, a Highland regiment, in which he remained till 1757, when he retired and was appointed keeper of the advocates' library of Edinburgh. In 1759 he was made professor of natural philosophy in the college of that city, and in 1764 he was appointed to the chair of moral philosophy, a branch of science to which he had more particularly applied himself. In 1767 he published his 'Essay on the History of Civil Society,' a work which was well received, and which procured him the notice of public men. It was reprinted several times, and translated into French, German, and other languages. In 1774 he accompanied the young Earl of Chesterfield on his travels, but remained with him only a twelvemonth. In 1776 he wrote 'Remarks on a Pamphlet of Dr. Price, entitled Observations on the Nature of Civil Liberty.' In 1778 he was appointed secretary to the commissioners who were sent to America in order to try to effect a reconciliation with the mother country, an office in which Ferguson took a clearer view of the state of the question and of the temper of the American people, than was common at that time with Englishmen. On his return in 1779 he resumed the duties of his professorship, and in 1783 he published his 'History of the Progress and the Termination of the Roman Republic,' 3 vols. 4to. This work, which has been reprinted several times, and by which Ferguson is most generally known, is not so much a regular narrative of the events of Roman history, as a commentary on that history; its object is to elucidate the progress and changes of the internal policy of the Roman commonwealth, the successive conditions of its social state, as well as the progress of the military system of the Romans, and the varied but studied course of their external policy towards foreign nations. He carries his work down to the end of the reign of Tiberius, when all remains of the old institutions may be said to have become effaced. Ferguson's work forms therefore a kind of introduction to that of Gibbon on the decline and fall of the empire. Ferguson and his contemporary, the French Abbé Auger, were foremost among those who, previous to Niebuhr, investigated the internal working of the institutions of the Roman republic. [AUGER.] In 1784 Ferguson resigned his professorship on account of ill health, and was succeeded by Dugald Stewart. In 1792 he published 'Principles of Moral and Political Science, being chiefly a retrospect of lectures on ethics and politics, delivered in the College of Edinburgh,' 2 vols. 4to. In this work the author takes a comprehensive review of the various systems of ethics antient and modern, especially with respect to moral approbation, public security, and individual happiness. Another work of Dr. Ferguson's on the same subject, though a more elementary one, the 'Institutes of Moral Philosophy,' which he first published in 1769, has been often reprinted and translated into foreign languages, and has also been adopted as a text-book in some foreign universities. Ferguson died at St. Andrews in February, 1816, being above 90 years of age. He had been on terms of friendship with Hume, Robertson, Adam Smith, Dugald Stewart, Playfair, and other distinguished contemporaries. His mind was independent, and his frankness and honest adherence to his opinions are said to have stood in the way of his advancement.

FERGUSON, or FERGUSSON, ROBERT, was born at Edinburgh about the year 1750, and educated at the University of St. Andrew's, where he received some encouragement from one of the professors named Wilkie, who employed him to transcribe his lectures. An anonymous biographer (Life prefixed to Ferguson's Poems, edition of 1807) has employed considerable research in discovering certain freaks of a kind neither ludicrous nor in good taste, in which he appears to have indulged during his residence at St. Andrew's; one of these was near being the cause of his expulsion; but the sentence was recalled, and he remained as it appears for four years, during which time he subsisted on a bursary or exhibition founded by a person of his own name. On leaving St. Andrew's, he paid a visit to an uncle from whom he had expectations of employment, but after a few months left his house under circumstances of which his anonymous biographer gives a very unsatisfactory account. During the remainder of his life he was employed in the office of the commissary-clerk of Edinburgh, with the exception of a few months spent in that of the sheriff-clerk; and was a constant contributor to Ruddiman's 'Weekly Magazine,' from which his poems were afterwards collected. The local celebrity which these productions obtained for him gave him so frequent opportunities of convivial and other excess as to ruin his health, and terminate his life at the early age of twenty-four years. His last days were passed in a mad-house, his debauchery having ended in repentance which took the form of melancholy, and ultimately that of insanity.

Ferguson's poems are written partly in English and partly in Lowland Scotch. Those in Lowland Scotch have been admired by persons conversant with the idiom in which they are written; but to an English ear they want the charm which makes Burns not the less sweet because he is sometimes not intelligible. There is a coarseness and clumsiness about Ferguson's, which render it wonderful how their author could have ever succeeded in gaining reputation as a poet. In praise of his English verses, a little more may be said; but we suspect that the similarity of his life to that of Chatterton created an interest about him to which most, if not all of his celebrity is owing.

His life has been written by Irving (Glasgow, 1799: reprinted in 1805), and by an anonymous author who dedicates his sketch to James Grahame, esq. This latter production contains more specimens of bombast and bad taste than are usually found in the space of eighty pages, and serves by its tone of panegyric to reproduce exactly those prejudices which it was intended to repress.

(Chalmers's *Biogr. Dict.*; and *Biographie Universelle*, vol. xiv.)

FERGUSONITE, a crystallized mineral, which is principally a columbate of yttria. It has been found only in Greenland, near Cape Farewell, imbedded in quartz.

Primary form a square prism. Colour brownish-black. Opaque, except in the splinters. Lustre slightly metallic. Specific gravity 5·838. Hardness 5·5, 6·0. Streak pale brown. Fracture conchoidal. Before the blow-pipe becomes of a greenish-yellow, and does not fuse, but with a phosphate it dissolves completely. According to Hartwall, this mineral consists of

Oxide of columbium	47·75
Yttria	41·91
Zirconia	3·02
Oxide of cerium	4·68
„ tin	1·00
„ uranium	0·95
„ iron	0·34
	99·65

FERISHTA (**Mohammed Kasim**), a celebrated Persian historian, was born at Astrabad, on the border of the Caspian Sea, in A.D. 1570. His father, whose name was Gholam Ali Hindoo Shah, and who appears to have been a learned man, left his native country when Ferishta was very young and travelled into India. He finally settled at Ahmudnugger, in the Deccan, during the reign of Murtuza Nizam Shah, and was appointed to instruct Mîran Hossein, the son of Murtuza, in the Persian language, but he died soon after this appointment. Mîran Hossein however patronized his son Ferishta, and through his influence the historian was advanced to high honours in the court. When Murtuza was assassinated, Ferishta, who was then only seventeen years of age, was captain of the royal guard.

In the troubles following the death of Murtuza, Ferishta left Ahmudnugger, A.D. 1589 (see the preface to his history), and went to Bejapore, where he was kindly received by the regent and minister, Dilawur Khan, who introduced him to Ibrahim Adil Shah II., the reigning monarch. In this court he spent the remainder of his life in high honour, engaged sometimes in military expeditions, as we learn from his own history, and devoting his leisure time to the composition of his great work. He died, in all probability, soon after A.D. 1611, at the age of forty-one. He makes mention in his history of the English and Portuguese factories at Surat, A.D. 1611.

The preceding account has been chiefly taken from the English translation of Ferishta, by Colonel Briggs, which was published in London, 1829, in 4 vols., 8vo. Portions of the history had been previously translated. Colonel Dow published a translation of the first two books in his 'History of Hindostan,' 2 vols., 4to., London, 1768, which is not considered to be very accurately done. A much better translation of the third book was given by Mr. Jonathan Scott in his 'History of the Deccan,' 2 vols., 4to., 1794. Mr. Stewart, in his 'Descriptive Catalogue of the Library of the late Tippoo Sultan of Mysore,' gives an account of the contents of the history, p. 12; and also a translation of part of the tenth book, accompanied with the original Persian, pp. 259—267.

The history of Ferishta is divided into twelve books, with an introduction, which gives a brief and imperfect account of Hindoo history before the time of the Mohammedans, and also a short account of the conquests of the Arabs in their progress from Arabia to Hindostan. The first book contains an account of the kings of Ghizni and Lahore, A.D. 977—1186. Here the detailed portion of his history begins. 2nd, The kings of Delhi, A.D. 1205 to the death of Akber, 1605; 3rd, The kings of the Deccan, A.D. 1347—1596; 4th, The kings of Guzerat; 5th, The kings of Malwa; 6th, The kings of Kandeish; 7th, The kings of Bengal and Behar; 8th, The kings of Multan; 9th, The rulers of Sind; 10th, The kings of Cashmir; 11th, An Account of Malabar; 12th, An Account of the European Settlers in Hindostan. At the conclusion of the work, Ferishta gives a short account of the geography, climate, and other physical circumstances of Hindostan.

Ferishta is certainly one of the most trustworthy of oriental historians. He seems to have taken great pains in consulting authorities. At the close of his preface he gives a list of thirty-five historians to whom he refers, and Colonel Briggs mentions the names of twenty more who are quoted in the course of the work. 'What is really remarkable in this writer,' says Colonel Dow, 'is, that he seems as much divested of religious prejudices as he is of political flattery or fear. He never passes a good action without conferring upon it its due reward of praise, nor a bad one without stigmatizing it with infamy.'

FERMANAGH, an inland county of the province of Ulster, in Ireland: bounded on the north-west, north, and north-east by the counties of Donegal and Tyrone; on the east by the county of Monaghan, and on the south and south-west by the counties of Cavan and Leitrim. The greatest length from the boundary of Donegal towards Ballyshannon on the north-west, to Shankill Loch, on the borders of Monaghan, on the south-east, is 45 statute miles; the breadth from Cuilcagh mountain, on the borders of Cavan, on the south-south-west, to Tappaghan mountain, on the borders of Tyrone, on the north-north-east, is 29 statute miles. The area, according to the Ordnance Survey map, consists of—

	A.	R.	P.
Land	409,783	1	12
Water	46,748	1	2
Total	456,531	2	14

Of this extent of water 36,348 acres and 21 perches are included in the upper and lower lakes of Loch Erne, which lie almost wholly within this county. [ERNE, LOUGH.] The gross population of Fermanagh in 1831 was 149,763.

Fermanagh is divided into two nearly equal portions by the line of Loch Erne, which passes through it diagonally. The portion lying south of the upper or western sheet of Loch Erne contains a large tract of waste and mountain, of the same character with the extensive highland districts of Leitrim and Cavan, on which it borders. This tract is bounded on the south by the lakes of Loch Melvir and Upper and Lower Loch Macnean; the waters of the first of which flow westward to the Atlantic, and of the two latter, eastward by the Arney river into Upper Loch Erne. The chief elevations of this tract on the north are, beginning from the west, Glennalong, 793 feet; Tiranagher, 875 feet; Bolusty, 1064 feet; Shean North, 1175 feet; Shean East, 1030 feet; and Blackslee, 1026 feet; which overhang the shore of Upper Loch Erne in a continuous range. More central are Drumbad, 1009 feet; Knockmore, 919 feet; Glenkeel, 1223 feet; and Belmore, 1312 feet; and on the south Slapragh, 846 feet; Ora More, 854 feet; and Aghamore, 1249 feet. The whole of this district abounds with small lakes, and is traversed by numerous ridges running generally in a direction from east to west. It is particularly remarkable for the number of cavities and subterranean channels which occur throughout the limestone and sandstone rocks of which it is composed. The Roogagh river, which brings down the waters of several small lakes and tributary streams to Loch Melvin, is absorbed in the rock, and emerges, after running a distance of about thirty perches underground. In like manner, several brooks running into Loch Erne from the range of Shean North and Blackslee, dip underground in their course. A natural bridge of rock crosses a stream which forms part of the boundary of the district on the south; and throughout the central parts caves and deep holes in the rock are of very frequent occurrence. On the east this rough tract slopes down to a well-cultivated district extending from Enniskillen along the neck of Loch Erne and up the valley of the Silees and Arney rivers. South of the latter river rises the mountain of Cuilcagh to a height of 2188 feet, being the highest ground in the county. This neighbourhood is distinguished by the same characteristics—holes in the rock, caverns, and natural arches—which mark the more extensive mountain district. Three streams, descending from Cuilcagh, sink into different cavities of the rock, and after flowing nearly a mile each underground, re-issue in a single river, called the Claddagh, a feeder of the Arney. At the foot of Cuilcagh is situated Florence Court, a noble seat of the earl of Enniskillen; and generally throughout the tract from Loch Macnean to Enniskillen, and thence along the left bank of the lake, the seats of resident proprietors are numerous and highly respectable. The remainder of that part of the county which lies south of Loch Erne is low, and cultivated.

The district to the north of the Upper Lake is not diversified by many eminences: the chief are Glenvannan, 730 feet; and Tappaghan, 1110 feet. Towards Enniskillen there are numerous and well-improved seats of proprietors; and close to the town is Castle Coole, the residence of the earl of Belmore, which is generally considered the most splendid residence in the modern style in Ireland. Tossid mountain, 909 feet in height, rises north-east of Enniskillen, and from its situation in a comparatively flat district, commands a very extensive and picturesque prospect. From Enniskillen to Upper Loch Erne the winding river is occupied on each side by demesnes and other improved lands; the upper lake, containing an immense number of wooded islands, is highly beautiful; the demesnes of Bellisle and Crum Castle terminate it at each extremity. The remainder of the county north of the upper lake is chiefly arable, and has a numerous and industrious population. The only towns of any consequence in the county besides Enniskillen and Irvinestown lie in this district, viz. Newtown Butler, Lisnaskea, Maguire's Bridge, Lisbellaw, and Tempo.

The rivers of Fermanagh are small. From the mountainous district on the south-west, the Silees and Arney run into Loch Erne: the Cladagh or Swanlinbar river flowing south-east of Cuilcagh has a like termination. The Woodford, which separates Fermanagh from a part of Cavan, is the largest river which discharges itself into Loch Erne within the bounds of this county. The Drumany or Colebrook river, one branch of which passes by Tempo, is the only considerable stream that flows into the lake from the north.

The climate is somewhat cold and moist: violent winds are common in winter, and render the navigation of the lake dangerous.

There has not hitherto been anything published on the subject of the geology of this part of Ireland. Limestone occurs throughout the mountainous district, and in the islands of Loch Erne. The general character however of this part of the county is understood to be the same with that of the Loch Allen coal district, of which sandstone and grit are the principal constituents. The remainder of the county would appear to belong to the greywacké formation.

The soil for the most part is naturally cold and moory; but has been brought into a good state of productiveness throughout the arable districts. Timber is generally of a good growth: at Florence Court in particular the timber is very large. As the condition of the peasantry in Fermanagh is better than in the neighbouring counties, and the potato does not constitute the whole of their food, the sales of grain at the local markets appear comparatively small. The following are the returns for 1835:—

	Wheat. Tons.	Oats. Tons.	Barley. Tons.	Rye. Tons.	Bere. Tons.	
Enniskillen .	26¼	1,355	..	50¼	408	Market increasing
Irvinestown .	..	90	..	..	..	„ stationary.
Kish . . .	..	37	..	..	19	„ increasing.
Lisnaskea . .	143¼	4,170	14	22¼	..	„ do.
Maguire's Bridge	..	3	1-5th	..	..	„ decreasing
Newtown Butler	125	97	..	..	..	„ stationary
Derrygonnelly .	..	37	..	..	..	„ do.

Fermanagh is divided into eight baronies, viz., Lurg on the north, containing the rising town of Irvinestown, population 1047; Tyrkennedy on the north-east, containing part of Enniskillen, total population 6056; and the village of Lisbellaw, population 242; Magherastephana on the east, containing the town of Maguire's Bridge, population 854; and the village of Lisnaskea, population 430; Clankelly, also on the east; Coole on the south-east, containing the village of Newtown Butler, population 412; Knockinny on the south; Clanawley or Glenawley on the south-west; and Magheraboy on the west.

The linen manufacture is carried on to some extent, but does not form any considerable branch of commerce. The fair of Maguire's Bridge is much frequented by purchasers of horses and young cattle. Still Fermanagh cannot be said to have any staple or brisk trade. The produce of the county is, in a great measure, consumed within it; and the absence of external traffic is perhaps in this case an evidence of the comfort of the people.

Table of Population.

Date.	How ascertained.	Houses.	Families.	Families chiefly employed in agriculture.	Families employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.
1792	Estimated by Dr. Beaufort .	11,969	..	..	..	..	..	..	71,800
1813	Under Act of 1812 . . .	19,291	..	..	..	..	..	..	111,250
1821	Under Act 55 Geo. III. c. 120	22,585	25,263	..	..	..	63,627	67,370	130,997
1831	Under Act 1 Wm. IV. c. 19 .	25,781	28,132	20,617	2,977	4,538	73,117	76,646	149,763

Fermanagh was first erected into a county by statute of the 11th of Elizabeth; but it was not till the time of the plantation of Ulster that it was finally brought under civil government. Having fallen to the crown by the attainder of Maguire, it was divided in like manner with the other five escheated counties among Scottish and English undertakers and native Irish. The precincts or baronies of Knockinny and Maghenaboy were allotted to Scottish undertakers: those of Clankelly, Magherastephana, and Lurg, to English undertakers; and those of Clanawley, Coole, and Tyrkennedy, to servitors and natives. The chief proprietors under the new settlement were the families of Cole, Blennerhasset, Butler, Hume, and Dunbar. The subsequent forfeitures of 1641 affected a large portion of Fermanagh, and considerably increased the possessions of those from whom many of the present proprietors are descended. The forfeitures consequent on the war of the Revolution affected only 1945 acres in this county, valued at 389*l.* per annum. [ENNISKILLEN.]

Fermanagh returns three members to the Imperial Parliament, viz., two for the county, and one for Enniskillen, the assize town, which is the only borough or corporate town within this county.

The public expenses of the county are defrayed by grand jury presentments: the amount so levied in the year 1829 was 18,832*l.* 14*s.* 3½*d.* The constabulary force employed in Fermanagh in the year 1835-6, consisted of 5 chief constables, 21 constables, 86 sub-constables, and 4 horses; the cost of which establishment was 4734*l.* 3*s.* 5*d.*

There has not been any statistical survey of Fermanagh published.

(*Ordnance-Survey Map of Fermanagh*; Harris's *Hibernica*; Inglis's *Ireland in* 1834.)

FERMAT, PIERRE DE, was born at Toulouse in 1595, and was brought up to the profession of the law. We have but few incidents of his private life, except that he became a counsellor of the parliament of his native town, was universally respected for his talents, and lived to the age of seventy years. His works were published in 1670 and 1679, in folio: the last volume contains his correspondence, besides some original scientific papers.

Fermat restored two books of Apollonius, and published

Diophantus, with a commentary. The whole of the actual works of Fermat fill an exceedingly small space; nevertheless they contain the germs of analytical principles which have since come to maturity. In fact they may be regarded, generally speaking, as announcements of the results to which he had arrived, without demonstrations, or any indications of the processes employed.

The properties of numbers were the subject of his enthusiastic researches, and no single individual has added more that is both curious and useful to this branch of mathematics than Fermat: the theorem now commonly called Fermat's is but a particular case of a much more general one given in his works.

His method for finding Maxima and Minima has only the merit of a moderate ingenuity, before the differential calculus was discovered; the analysts of that day hovered on the brink of that beautiful process of analysis which has been rather ridiculously termed the greatest discovery of the human mind. A method not very remote from Fermat's was practised by other analysts of his day; and in spirit also by the antient geometers: but it certainly is not the differential calculus, and Laplace has no ground for his attempt to snatch from the claims of the English and German nations this grand step of analysis in order to appropriate it to his own.

In Fermat's correspondence with Father Mersenne, we find him, in a bungling manner, contesting with Roberval the first principles of mechanics, and maintaining that the weight of bodies is least at the surface of the earth, increasing both within and without, which is the direct opposite to the truth: and in one of his letters, when greeted by Mersenne with the retractation of his errors, he very disingenuously attempts to deny them, asserting that no body has a centre of gravity, with many similar trifles, which place in bold relief the immortal discovery of Sir Isaac Newton of the law of universal attraction, and add lustre to his predecessor Galileo, who escaped from similar paradoxes, from which common sense ought to have guarded both Fermat and Descartes.

The correspondence of Fermat is sufficiently replenished with vanity, which was also well fed by some of his compatriots, who lauded his propositions as the finest things which had ever been discovered. But it is justly suspected that the discovery of many of his properties of numbers was effected by a tentative process, he himself possessing no demonstration, as no vestige remains in the works published by his son of any peculiar analysis for arriving at them; while there are abundant proofs that he and Frenacle, a young Parisian, employed the methods of tabulation and trial, to suggest properties, and by further trials, observe if they could generalize them. In a subject less barren than the theory of numbers this talent and industry would have produced more useful results; for what are the theorems of Fermat to the laws of Kepler?

Fermat conjectured that the path of light, in passing from air to a denser medium, ought to be such as to describe the shortest possible course. This is a particular case of the principle of least action, and requires some remark. First, we see that Fermat's method for finding maxima and minima was not the differential calculus, for though importuned from various quarters to try this principle he was deterred, as he says himself, for two or three years, by the dread of the asymetries of the process, though any tyro acquainted with the first principles of the differential calculus, with the proper data given, would now do it in five minutes: when Fermat at last did this, it was in a geometrical manner. Secondly, during the life of Descartes, he seems to have disbelieved this law of refraction. The foundations of both their reasonings in natural philosophy were of the slenderest description, if indeed we can at all use such a term as reasoning to the methods of Descartes, whose followers had the greatest faith when he employed the least of that useful faculty. But the law is truly attributable to Snellius, and, though this is well known, many French writers still ridiculously talk of the Cartesian law of refraction. Thirdly, Fermat did not attribute the truth of the principle to any mechanical laws, of which he seems to have known nothing, but to the pseudo-physical principle that nature should take the shortest course in performing its operations—for which, indeed, he was subjected to several cases of objection, to which he has given good answers, considering the position in which such an hypothesis placed him.

To give a more exact idea of the *man*, we shall give one of his problems, entitled 'Problem by P. de Fermat. To Wallis, or any other mathematician that England may contain, I propose this problem to be resolved by them.

'To find a cube number which, added to its aliquot parts, will give a square number? Example 343.

'If Wallis and no English mathematician can solve this, nor any analyst of Belgic or Celtic Gaul, then an analyst of Narbonne will solve it.'

Wallis gives an account of this in the *Commercium Epistolicum*, the correspondence having been conducted through Sir Kenelm Digby. The works of Fermat contain also the tangents to some known curves, and some centres of gravity.

Though thus strongly endowed with the faculty of self-esteem, and of that cunning which seeks to hide the tracks of discovery, we must still place Fermat among such men as Pascal, Barrow, Brouncker, Wallis; but he had none of the masculine mind of Descartes, nor a particle of the penetrating spirit of the glory of his age and nation, Newton.

It would be wrong to omit here the most curious of the theorems of Fermat relative to numbers. To make it more generally intelligible we may state, that a triangular number means the sum of any number of terms from the first of the natural numbers 1, 2, 3, 4, 5, &c.; thus 1, 3, 6, 10, &c., are triangular numbers; the square numbers are 1, 4, 9, 16, &c., and are the sums of the progression 1, 3, 5, 7, &c.; pentagonal numbers in like manner are the sums of the numbers 1, 4, 7, 10, &c. viz., 1, 5, 12, 22, &c. The theorem consists in this, that *every number* is the sum of 1, 2, or 3 triangular numbers; every number is the sum of 1, 2, 3 or 4 square numbers, and so on. In the works of Euler, Legendre, and Barlow, the demonstrations of the first two cases may be found; and though Legendre and Cauchy have both laboured to prove it more generally, yet our present impression (not having Cauchy's work at hand) is that the general theorem is still without proof.

FERMENTATION denotes the spontaneous changes which occur in certain vegetable and animal matters, and by which there are produced new fluid and gaseous compounds. Fermentation is of three kinds: the *vinous*, producing alcohol; the *acetous*, yielding vinegar; and the *putrefactive*, of which the products are very variable, and usually fetid.

When the expressed juice of grapes is exposed in warm weather to the air, which is necessary to the operation, it soon becomes turbid, its temperature rises a few degrees, a motion occurs in the fluid, and minute bubbles of air form and break. As the process goes on, a thick froth, consisting of these bubbles and viscid matter, rises to the surface; and when these bubbles have burst, a viscid substance falls to the bottom of the vessel: this possesses the property of causing fermentation to take place in other fluids, which, without its presence, would not undergo such a change. this substance is called *yest*. [YEST.]

In order to observe what happens during this *vinous* fermentation, dissolve some sugar in four times its weight of water, and add the solution to a small quantity of fresh yest, obtained as above described or from the fermentation of beer. Expose this mixture, in a flask with a bent tube and a bottle for receiving the gaseous products, to a temperature of about 75°; it will soon be found that the substances will so act upon each other as to produce carbonic acid, which will be found in the gas-bottle, while the sugar will gradually disappear, and the flask will contain a mixture of water and spirit, or alcohol; this is separated by distillation. These changes occur without the interference of the air or its oxygen; nor does it appear that water is decomposed, or that anything is added by the yest; it seems therefore that when sugar is deprived of oxygen and carbon, in the form of carbonic acid, it is converted into alcohol. Now alcohol consists of 3 equivalents of hydrogen = 3, 2 equivalents of carbon = 12, and 1 equivalent of oxygen = 8; its equivalent is therefore 23. In order then that alcohol and carbonic acid alone should be produced from sugar, this last substance must consist of 3 equivalents of hydrogen = 3, 3 equivalents of carbon = 18, and 3 equivalents of oxygen = 24, giving 45 as its equivalent. On this admission, the production of alcohol by the separation of carbonic acid from sugar may be thus shown:—

	Hydrogen.	Carbon.	Oxygen.	
Sugar . . .	3	3	3	equivalents.
Carbonic acid .	0	1	2	,,
Alcohol . . .	3	2	1	,,

This would however show that sugar contains a larger quantity of carbon than is usually assigned to it. According to Gay Lussac, 100 parts of sugar should yield 48·76 of carbonic acid and 51·34 of alcohol, which is very nearly in accordance with the above theoretic statement.

Although sugar appears to be the only vegetable matter which yields alcohol by its decomposition, yet it is to be observed that pure sugar suffers no fermentation. In the juice of the grape, as well as in some other cases, there is some accompanying matter which acts as a ferment; and when yest is thus spontaneously produced it causes fermentation in sugar, without, as far as appears, adding anything important; indeed it is stated that scarcely two per cent. of this substance suffer decomposition. It would therefore almost appear to produce the effect by what has been termed *an action of presence*, and by Berzelius denominated *catalysis*.

In brewing and distilling, and in vinegar-making in this country, the substance fermented is malt, in which the starch that the grain contains has by incipient vegetation been converted into sugar, and thus rendered fermentible.

In the *acetous* fermentation the materials employed are similar to those used for the vinous; but the temperature employed is higher. Little acetic acid is produced unless atmospheric air be present, the oxygen of which may combine directly with the requisite proportions of oxygen and carbon to constitute acetic acid; but as alcohol may be converted into vinegar, as indeed is practised in wine countries, it is possible, even when vinegar is produced from malt, that the previous formation of alcohol may occur; and this view will best explain what happens, and show that by the mere absorption of oxygen so as to form water, and without the evolution of any carbonic acid, acetic acid may be formed: thus—

	Hydrogen,	Carbon.	Oxygen.
Two equivalents of alcohol	= 6	4	2 equivalent
One equiv. of acetic acid	= 3	4	3 ,,
Hydrogen in excess . .	= 3		1 eq. deficient.
Absorb of oxygen . .	= 3		1 eq. absorbed = 4.
And form of water . .	= 3		

The above shows that by exposing 2 equivalents of alcohol to the air, and by the absorption of 4 equivalents of oxygen, there are formed 1 equivalent of acetic acid and 3 equivalents of water, while the 4 equivalents of carbon remain entirely in the acetic acid produced. [ACETIC ACID.] The constitution of acetic acid is then 3 equivalents of hydrogen = 3, 4 equivalents of carbon = 24, and 3 equivalents of oxygen = 24, giving 51 as its representative number.

With respect to the *putrefactive* fermentation, it is to be observed that it is the spontaneous decay and decomposition of vegetable and animal matter, which is unaccompanied with the production of alcohol or acetic acid. In vegetable putrefactive fermentation the principal product is carbonic acid, and probably water, both derived from the absorption of the oxygen of the air, which unites with the hydrogen and carbon of the vegetable matter. In the putrefactive fermentation of animal matter ammonia is a very usual product, owing to the presence of azote, which enters largely into the composition of animal matter in general, and thus, by uniting with the hydrogen, the alkali just mentioned is produced.

FE'RMO ED A'SCOLI, is the name of a Delegazione or province of the Papal State, east of the Apennines, bounded on the east by the Adriatic, on the north and north-west by the province of Macerata, on the west by the province of Spoleto, and on the south by the Abruzzi. It forms part of the old province of the Papal State called the Marches, the antient Picenum, which is now subdivided into three provinces, Ancona, Macerata, and Fermo. The province of Fermo is hilly, being occupied by various offsets of the Apennines, which, detaching themselves from the central ridge extend to the coast of the Adriatic, and form numerous valleys watered by rivers or rather torrents, the principal of which are, from north to south, the Chienti, the Tenna, the Aso, the Tesino and the Tronto. The length of the province along the Adriatic coast is 30 miles, and its breadth from the sea to the central Apennines is about the same. The area is about 1070 English square miles and its population 160,000 inhabitants (Calindri *Saggio Statistico dello Stato Pontificio;* Neugebaur, *Gemälde Italiens.*) The chief produce of the country consists in corn and cattle; wine and oil are also made. The principal towns are—1st, ASCOLI with 12,000 inhabitants; 2nd, Fermo, a pleasant town and a bishop's see, built on high ground, about four miles from the sea, and surrounded by old walls and ditches, with several churches and convents, and 6000 inhabitants, who carry on some trade by means of the neighbouring small harbour called Porto di Fermo. The exports are chiefly corn and wool. The antient Firmum, a town of the Piceni, afterwards a Roman municipium, was destroyed in the fifth century by Alaric, and the present town was rebuilt near its ruins. 3rd, Sant'Elpidio, near the mouth of the river Tenna, has 3000 inhabitants. 4th, Ripatransone, a walled town about five miles from the coast and near the Tesino, has 2000 inhabitants. 5th, Grottamare, a thriving town on the coast near the site of Cupra Maritima, an antient Etruscan colony, carries on some trade by sea, has some sugar refineries, and about 4000 inhabitants. Pope Sixtus V. was born in this place. 6th, Offida, on a hill south of the Tesino, has a handsome collegiate church, some manufactories of lace, and about 3000 inhabitants. 7th, Montalto, a walled town but decayed, has only 600 inhabitants.

FERMOY, in the parish of Fermoy and barony of Condons and Clongibbons, in the county of Cork, in Ireland, situated on the right bank of the Blackwater, on the great southern road leading from Dublin to Cork, distant from Dublin 112 Irish, or 142 English miles.

Fermoy is quite a modern town, and owes its origin to its late proprietor, Mr. Anderson, the introducer of mail-coach travelling into Munster. This enterprising individual began to build here about the beginning of the present century. The site being of equal importance in a military and in a civil point of view, induced the government to second his design by the erection of very extensive barracks. An act was obtained for providing the town with a police; and various manufactures, including a brewery, paper-mill, and bolting-mill, were set on foot by Mr. Anderson. In the erection of all the buildings a regular design was observed, and hence Fermoy presents an appearance of neatness and uniformity very rare among Irish towns. In 1815 trade in Fermoy was very brisk, but has since materially declined. The manufacture of ale and the purchase of corn are still carried on to a considerable extent, but want of employment is nevertheless severely felt.

The appearance of Fermoy is imposing: the town extends on each side of a handsome square, facing the northern end of the bridge. The church, from a design by Hargrave, is much admired: there is also a chapel, and a church of Wesleyan Methodists. The barracks, which are very extensive, occupy the brow of a bold elevation on the opposite side of the river. The surrounding country is rich and diversified, and the number of resident gentry considerable. The place is very important as a military station, and the garrison generally consists of several regiments. The population of Fermoy in 1821 was 6702, and in 1831 was 6976, the garrison included. In the parish of Fermoy there were in 1834 sixteen schools educating 470 males and 294 females. In the Fermoy National School, established Sept. 1833, there is an average daily attendance of 270 young persons. (Townsend's *Statistical Survey of Cork*, Cork, 1815; Inglis's *Ireland in* 1834; *Parliamentary Papers, &c.*)

FERNANDEZ, JOAN, a Portuguese, the first European who visited the interior of Africa. In 1446 he joined a Portuguese expedition of discovery, and from an ardent desire to procure information for Prince Henry, he got leave to remain among the Assenhaji, or wanderers of the great African desert, in its Atlantic extremity. His acount has been strikingly corroborated in our days by that of Mungo Park. (Kerr's *Systematic Collection of Voyages and Travels*, ii. p. 190.)

FERNANDEZ, DENIS, a Portuguese navigator, who, in 1446, discovered the river Senegal and Cape Verde.

FERNANDEZ, NAVARRETE, surnamed El Mudo (the dumb), born 1526 at Logroño, on the Ebro, became a distinguished pupil of Titian, and painter of Philip II., who employed him chiefly at the Escurial. His principal work is Abraham with the Three Angels. He painted with great ease and despatch On account of his colouring he was called the Spanish Titian. There are many of his paintings in the Louvre.

FERNANDEZ, FRANCISCO, born at Madrid, 1604, was, according to Palomîno, one of the most ingenious painters of his time. He was employed by Philip IV. of Spain to execute several considerable works.

FERNANDEZ, ANTONIO, a native of Madrid, became a distinguished painter at fourteen, and one of the most eminent of Spain at twenty-five. Among his best works are eleven pictures of the Passion of Jesus Christ.

FERNANDEZ, ANTONIO. [TELLEZ.]

FERNANDEZ, JUAN, is the name of a small group of islands in the Pacific, about 400 miles from the western coast of South America. The group consists of two larger islands, Masatierra (more landward) and Masafuera (more seaward), and a few small rocks. Masatierra, which alone is often called Juan Fernandez, is situated in 33° 40′ S. lat. and about 100° W. long. Masafuera, which is more than 2° farther west, in the same latitude, is a heap of immense rocks rising precipitously from the sea to the height of 3000 feet and more, without any convenient landing-place. Masatierra, the larger of the two, is about 18 miles long, but only 6 miles across in its widest part. Its northern half is also an elevated mass of trap and basalt rocks, furrowed with pleasant valleys and mostly covered with wood; its southern half, which is only slightly raised above the sea, is rocky and barren. Towards the northern extremity is Cumberland Bay, which affords safe anchorage for vessels of any size. Goats in a wild state are found here; and on the rocky shores seals and sea-lions. Fish are very plentiful, especially cod. It is not known when these islands were discovered by Europeans. The Buccaneers of the seventeenth century finding them uninhabited, made them a place of resort during their cruises on the coasts of South America. On one occasion, a Scotchman named Alexander Selkirk being left on the island of Masatierra, lived there more than four years. His adventures are commonly, though incorrectly, said to have supplied Defoe with materials for his Robinson Crusoe. Lord Anson refitted his vessels here in 1741, and in 1749 the Spaniards formed a settlement. It seems however that after some time it was abandoned, and remained without inhabitants up to 1819, when the republic of Chile occupied it for the purpose of using it for state prisoners, but it has been abandoned by them also. It is said that some Americans and Taheitians have lately settled in Cumberland Bay. The island is very subject to earthquakes. In 1751 the small Spanish settlement was nearly ruined; the sea rose and overwhelmed the houses near the sea-shore, and thirty-five persons perished. In 1835 an eruption burst through the sea near Bacalao Head, a mile from the land, where the depth is from 50 to 80 fathoms; smoke and water were thrown out during the greater part of the day, and flames were seen at night. In the present year (1837) the newspapers have reported that the whole island has been sunk to the bottom of the sea by an earthquake; but this report requires confirmation. (Anson's *Voyage*; *London Geographical Journal*, iv. and vi.; *Campaigns and Cruises in Venezuela and New Granada, &c.*; Meyen's *Reise um die Welt*; Ulloa's *Voyage to South America*; Byron's *Voyage*; Carteret's *Voyage*; *Extracts from* Capt. Moss's *MS.*, *published in the Athenæum*, vol. i. p. 581.)

FERNANDO PO, an island situated on the western coast of Africa, in the Bight of Benin, 3° 25′ N. lat., and 8° 50′ E. long., is about twenty-four miles long, and sixteen wide. Its surface, which is very uneven, rises towards the centre into two summits, whose elevation is estimated at more than 2000 feet above the sea. It is mostly covered with wood, and is everywhere well watered and fertile. Yams, palms, and other tropical plants, are grown abundantly; and turtles and fish are plentiful. The climate is considered healthy. There are several small harbours; the largest is Maidstone Bay, on the northern shore, which is formed by a headland called Point William, rising 150 feet above the sea, on which stands the English settlement of Clarence Town, established in 1827. This island was discovered in 1471 by the Portuguese, who in 1778 ceded it to Spain. The Spanish government tried to settle it, but the inhabitants destroyed the colony. These natives are not so black as the negroes, and their hair is longer, which some ascribe to their mixture with Spanish blood; their number amounts to about 1200. In 1827 the English, with the permission of Spain, took possession of the island, which promises to be of importance, since it has been discovered that the Joliba or Quorra, the largest of the African rivers, falls into the sea by several channels nearly opposite Fernando Po. This island is also of importance for the suppression of the slave trade, which cannot be so effectually checked from any other station as from this island (Monrad, *Gemählde der Kuste von Guinea.*)

FERNEY. [AIN.]

FERNS, a bishop's see in the archdiocese of Dublin, in Ireland. The chapter consists of a dean, precentor, chancellor, treasurer, archdeacon, and ten prebendaries. This diocese occupies the whole of the county of Wexford, and a small part of the county of Wicklow. In 1792 it was divided into 143 parishes, constituting 40 benefices, and contained 40 churches of the establishment. In 1834 the numbers were:—parishes, 140; benefices, 57; churches of the establishment, 62; other places of worship in connection therewith, 2; Roman Catholic houses of worship, 91; Presbyterians, 1; and other Protestant dissenting do., 14. In the latter year the gross population of the diocese was 197,780, of whom there were 24,672 members of the established church, 172,780 Roman Catholics, 19 Presbyterians, and 300 other Protestant dissenters, being in the proportion of one Protestant, of whatever denomination, to seven Roman Catholics nearly. There were at the same time in this diocese 301 daily schools, educating 15,970 young persons, being in the proportion of $8\frac{7}{100}$ per cent of the entire population under daily instruction, in which respect Ferns stands fifteenth among the thirty-two dioceses of Ireland. Of the above schools, 19 were in connection with the National Board of Education in 1834.

This diocese was founded about A.D. 598 by St. Edan, otherwise Moedoc, who had received a grant of Ferns from Brandubh, king of Leinster. During the life of Edan this see ranked as an archbishopric, and was head of the ecclesiastical province of Leinster. It was united with the see of Leighlin in the year 1600, which union still subsists; and is by 3rd and 4th William IV. c. 37 farther increased by the addition of the see of Ossory when next void.

The town of Ferns is a place of considerable antiquity, but much decayed. It is situated in the parish of Ferns and barony of Scarewalsh, in the county of Wexford. The cathedral, which is also the parish church, is a mean building; but the palace, built by Dr. Cope, is handsome and commodious. There are some remains of an abbey founded by Dermot Mac Murrough, king of Leinster, and a ruined castle, said to have been his residence at the time of the English invasion. In 1831 Ferns contained 571 inhabitants. (Beaufort's *Memoir of a Map of Ireland*; *Reports of Commissioners, &c.*)

FERN [FILICES.]

FERRA'RA, LEGAZIONE DI, the most northern province of the papal state, situated for the greater part within the Delta of the Po, is bounded on the north by the main branch of that river called Po d'Ariano, which divides it from Austrian Lombardy, on the east by the Adriatic, on the west by the duchy of Modena, and on the south by the legations or provinces of Ravenna and Bologna. Its greatest length east to west is about 50 miles, and its greatest breadth 35 miles, but it becomes much narrower towards its western extremity. Its area is reckoned at 1106 English square miles, and the population at 205,000 inhabitants, distributed among 5 città or walled towns, 17 terre or small towns having a communal council, and 153 ville or villages and hamlets. (Calindri and Neigebaur.) The soil is naturally rich, but the greater part is swampy, and a considerable portion of the surface in the east part of the province is constantly under water. The chief productions are rice, corn, pulse, hemp, grass, both natural and artificial, wine, and a vast quantity of fish. The principal towns are: 1. Ferrara; 2. Comacchio, with 5400 inhabitants, situated on an island in the midst of extensive swamps which communicate with the Adriatic, and receive its water; these swamps, called le Valli di Comacchio, are divided into estates or tenements for the purpose of fishing. Immense quantities of fish of various sorts, and especially large eels, are caught here and pickled at Comacchio for exportation. A curious description of the habits, industry, and diversions of the people of this peculiar district is given by Bonaveri, *Della Città di Comacchio, delle sue Lagune, e Pesche*, fol., 1761. 3. Cento, with 4000 inhabitants. 4. Lugo, with 8800 inhabitants, in the southern part of the province, near the borders of Ravenna: this town was plundered and nearly destroyed, in 1796, for having revolted against the French. 5. Bagnacavallo, with 3500. Among the terre or communes, the principal ones are: Argenta, with 4000 inhabitants, including its territory; Bondeno, 7000; Copparo, 7000; Cotignola, the birth-place of Attendolo, the celebrated Condottiere of the fourteenth century and the head of the ducal house of Sforza, has 5600 inhabitants; Fusignano, the birth-place of the musical composer Corelli and of the poet Monti, has 4700: Mesola, with 4000, lies near the principal æstuary of the Po, called Porto di Goro, and has a considerable tract of forest to the south of it, extending along the sea-coast as far as the mouth of Volano, and abounding with game, wild boars, deer, &c.; Pieve di Cento has 3500 inhabitants; Ponte di Lagoscuro, a frontier town and custom-house on the south bank of the Po, and on the high road leading from Austrian Lombardy into the papal state, has 3600 inhabitants; Porto Maggiore has 6500.

The air in general throughout the greater part of the province of Ferrara, especially in the vicinity of the great swamps, is more or less unwholesome, particularly in summer, though the malaria is not quite so bad as in the southern maremme or in the Pomptine marshes. The country is flat, and in many parts much below the level of the Po, the water of which is kept in by strong dykes; but the river sometimes breaks through and produces dreadful inundations. The cost of keeping the dykes in repair is one of the heaviest charges on the province, and watching the rising of the river during the floods is a constant care of the peasantry. The Po, in the territory of Ferrara, divides itself into three principal branches,—the main one, or Po d'Ariano, the Po di Volano, and the Po di Primaro or southernmost branch, which last receives the Reno, the Santerno, the Senio, and other numerous streams which flow from the Apennines of Bologna. These various branches of the Po communicate with one another by canals. The Naviglio of Bologna communicates between that city and Ferrara, and the Canal di Cento between this town and the Po.

FERRA'RA, the capital of the province of the same name, and the residence of the papal legate or political governor, and an archbishop's see, is situated in the midst of a flat country on the north bank of an arm of the Po, in 44° 49′ N. lat. and 11° 41′ E. long., about four miles south of the main branch of the Po, which forms the boundary between the papal and the Austrian states, and twenty-five miles north-east of Bologna, and thirty-eight north-west of Ravenna. It is a large and well-built town, with streets wide and straight, the principal of which, called San Benedetto, is about 2000 yards in length. Ferrara is enclosed by walls, and defended on the west side by a citadel regularly fortified, which, agreeably to a stipulation of the congress of Vienna, is garrisoned by Austrian soldiers, as well as the neighbouring town of Comacchio. In the middle of the town is a castle, flanked with towers and surrounded by wet ditches, which was once the residence of the dukes, and is now that of the legate. Ferrara has numerous churches, most of them rich in paintings, by Guercino, the Caracci, and other great masters of the Bolognese school; and also by Garofalo, Bastianino, Ortolano, and other painters natives of Ferrara, who are classed by some as forming a separate school, called that of Ferrara. The finest churches are: the cathedral, built in the twelfth century, adorned with sculptures, bronze statues, and frescoes; San Benedetto, in which Ariosto was buried; his monument however has been transferred to the Lyceum: in the hall of the refectory of the adjoining convent is the painting of the Paradise, by Garofalo, the friend of Ariosto, who introduced in it the likeness of the poet; San Domenico, which has several valuable paintings and the monument of Celio Calcagnini, one of the restorers of learning in the 16th century; Santa Maria del Vado, the oldest church of Ferrara, which is also very rich in paintings, and contains the tombs of Garofalo, Bastianino, Ortolano, and other native painters; and the churches San Francesco, i Teatini, il Gesú, &c. Among the palaces of Ferrara, the finest are those of Villa and Bevilacqua. The theatre is one of the largest and finest in Italy. The house of Ariosto, which he purchased himself, is shown to strangers, but his favorite garden has disappeared; the old house of his family, in which he had been brought up, still exists, and is called Casa degli Ariosti. The University of Ferrara, which is attended by about 300 students, has a valuable library of 80,000 printed volumes and 900 MSS., among which are autographs of Ariosto, Tasso, Guarini, and many editions of the fifteenth and sixteenth centuries, when the presses of Ferrara were among the most active in Europe. (Baruffaldi, *Della Tipografia Ferrarese.*) Ferrara has produced many distinguished writers, of whom Barotti has given a biographical list. (*Memorie Storiche dei Letterati Ferraresi*, 2 vols. 4to. 1792.) In the hospital of St. Anna is still seen the small room on the ground floor in which Tasso was confined for seven years.

Ferrara is one of the most interesting and handsomest of the modern towns of Italy, for it has no claims to classical antiquity, having risen after the fall of the empire. It was walled round by the Exarchs in the sixth century. Its present state of decay has been somewhat exaggerated: it lost part of its population in the seventeenth century, in consequence of having lost its sovereigns [Este], and having become a provincial town; but it is now again on the increase, having risen from 23,000, which it reckoned under Napoleon, to 31,000 inhabitants, of whom above 2000 are Jews, who occupy a separate quarter, and have a synagogue. (Valery, *Voyages Littéraires en Italie*, and Calindri, *Saggio Statistico.*) It carries on a considerable trade in corn and other produce of the soil. Society is said to be very agreeable at Ferrara, and its natives hospitably inclined towards strangers. The air, though not positively bad, is not very wholesome, on account of its situation. (Frizzi, *Memorie per la Storia di Ferrara*, and *Guida al forestiero per la Città di Ferrara;* De Rossi, *De typographia Hæbræo-Ferrariensi;* and Barotti, *Pitture e Sculture che si trovano nelle Chiese e Luoghi pubblici di Ferrara.*)

FERREI and FERRARI, the names of two Italian mathematicians, who were nearly contemporary with each other, and who are liable to be confounded. Scipio Ferrei (Cossali calls him Ferro and Dal Ferro) was a native of Bologna, and taught mathematics there from 1496 to 1526. He is said to have been the first who possessed a method of solving any case of cubic equations: this method he communicated to his pupil Antonio del Fiore, who proposed a question to Tartaglia as a challenge; and this, it is also said, was the cause of the latter turning his attention to the subject.

Ludovico Ferrari was also born at Bologna, and was the pupil of Cardan. At the instigation of the latter, he turned his attention to biquadratic equations, and produced the method known by his name, being the first which had been invented. The method is found in the work of Cardan (from whom the account of Ferrari is taken), and in all works of algebra which treat on the solution of equations.

FERREIRA, ANTONIO, the reformer of the national poetry of Portugal, and surnamed the Portuguese Horace, was born at Lisbon, 1528. While studying law at Coimbra he devoted his time more particularly to classical and Italian literature, and composed his drama of 'O Bristo' (which is the name of the principal character), to which he gave subsequently a much higher polish. Growing tired of a university life, he went to court, where he obtained a dignified situation, and while entertaining still higher expectations he was carried off in the prime of life by the plague in 1569.

Although not a first-rate poet in imagination and originality, Ferreira possessed taste, correctness, and deep thought. He often succeeded moreover in elevating the mind and warming the heart. His sonnets, without displaying any affected imitation of Petrarca's, remind us of the Italian poet and his Laura. His odes and his bucolics have great merit in the expression, but the former want the genuine lyric spirit, and the latter the simplicity of the idyl: qualities perhaps irreconcilable with Ferreira's philosophical turn of mind and didactic seriousness. Among his elegies, that on May is a classic masterpiece. His epistles, written evidently when he was in his maturity, are the first productions of the kind in Portuguese literature. His tragedy of 'Ines de Castro,' written about the same time that the Dominican Bermudez wrote the similar and superior one in Spanish of 'Nise Lastimosa*,' abounds with beautiful passages, but is deficient in true pathos, and displays a forced imitation of the Greek manner and style. As it was preceded only by Trissino's 'Sophonisba,' it has been considered as the second regular tragedy produced after the revival of letters in Europe. His 'Poemas Lusitanos' appeared at Lisbon first in 1598, 4to.; and all his works were printed under the title 'Todas as Obras de Ferreira,' Lisbon, 1771, 2 vols. 8vo., which contain Ferreira's biography, a valuable authority for the reader, in addition to that of Bouterwek.

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* 'Primeras Tragedias Españolas de Antonio de Silva,' Madrid, 1577. Introduccion to the 6th vol. of the 'Parnaso Español.'

FERRE'RAS, DOCTOR DON JUAN, born at Labañeza, in the diocese of Astorga, a most minute and accurate historian, and one of the writers who have done great service to Spain, as Feyjoo did after him in banishing prejudices, and Flores in his researches on ecclesiastical antiquities. Having gone through a complete course of classical and theological learning, Ferreras displayed his eloquence in the pulpit, and obtained the patronage of the great by his merit, and the esteem of all by his gentleness and modesty. Various honorable distinctions and situations were bestowed on him, but he constantly refused all high dignities. Next to the duke of Escalona, he was at the head of the litterati who founded the academy of the Lengua Española in 1713, and he was a very useful member of that body, especially in the compilation of its dictionary, in 6 vols., folio, published in 1726—1739, to which he contributed the articles in the letter G, besides a preliminary discourse on the Castilian tongue. At his death, 1735, in addition to his other appointments, he held that of librarian to Philip V. Ferreras, though not so elegant a writer as Mariana, is much more to be depended upon. He wrote in all thirty-eight works, some of which remain unpublished; the most important is the 'Synopsis Historica y Chronologica de España,' Madrid, 1700—1727, 16 vols., 4to. It extends to the close of Philip II.'s reign in 1588, and not merely to the three years previous to the capture of Granada, as it is very strangely stated by the writer in the 'Biographie Universelle,' after mentioning its reaching to the year 1589, which is near a century after the re-conquest of Granada. Hermilli translated it into French, with valuable notes, in 10 vols., 4to., Paris, 1742.

FERRET. [MUSTELIDÆ.]

FERRO, or HIERRO, is a small island belonging to the group of the Canaries. [CANARIES.] Its surface occupies only 10¼ square leagues, and the population is about 4500. The name Ferro is familiar to most persons from the circumstance of the first meridian having been drawn through it. Geographers wishing to have a meridian circle which should intersect only the seas that divide the old from the new continent, and none such existing but that which traverses the island of Ferro and cuts off only a small part of the north-eastern extremity of Asia, this island was accordingly fixed upon as the first meridian. For the purposes of navigation, however, it was necessary that charts should be constructed with reference to the meridian of a place where chronometers could be adjusted with the greatest exactness. Accordingly, the first meridian was removed from the island of Ferro to the several places where observatories are erected; by the English to Greenwich, by the French to Paris, and by the Spaniards to Cadiz. The French finding that Paris was nearly 20° 30′ east of Ferro, removed the first geographical meridian to exactly 30′ east of Ferro; so that at present the island of Ferro is considered as being about 30′ west of the meridian of Ferro. The meridian of Greenwich is 17° 41′ east of that of Ferro, and the meridian of Cadiz 6° 16′ west of Greenwich, or 11° 25′ east of Ferro. Other nations, whose navigation is less extensive, generally use English charts, and hence the meridians of their own observatories are not mentioned except in scientific works.

FERROCYANIC ACID was discovered by Porret, and by him called *ferruretted chyazic acid.* He procured it from the decomposition of ferrocyanide of potassium by the action of tartaric acid, or from ferrocyanide of barium by means of sulphuric acid. According to Berzelius it is best prepared by diffusing recently precipitated ferrocyanide of copper or lead through water, and passing hydrosulphuric acid gas through the mixture; the sulphur precipitates the copper or lead in the state of sulphuret, while the hydrogen uniting with the cyanogen and iron they form ferrocyanic acid, composed of (when dry and not crystallized)—.

Hydrocyanic acid	46.57	
Cyanide of iron	45.77	
Water	7.66	
		100,

and it contains 23.27 per cent. of iron.

Any excess of sulphuric acid is to be got rid of by adding ferrocyanide of the metal employed. The solution should be quickly filtered and evaporated in vacuo over sulphuric acid. A white residue is obtained which when dissolved in water is inodorous, sour, reddens litmus paper, decomposes the alkaline carbonates with effervescence, forms ferrocyanides with them, and exhibits other proofs of a strong acid. When exposed to spontaneous evaporation in a warm place, colourless radiating crystals are observed, which have the appearance of four-sided prisms. This acid is decomposed by long exposure to the air, Prussian blue being formed and precipitated; this is also produced by adding it to a persalt of iron.

The aqueous solution is also decomposed by boiling; and when submitted to destructive distillation it yields hydrocyanic acid, hydrocyanate, and carbonate of ammonia, and carburet of iron remains.

FERRO'L, a sea-port town of Gallicia in Spain, on a bay which is an arm of the bay of Betanzos, or of La Coruña, from which last town Ferrol is fifteen miles distant to the north-east across the bay, but the communication by land is much longer. The port of Ferrol is large and safe, and its entrance is defended by strong batteries. There are extensive docks for the Spanish navy, Ferrol being one of the three royal dockyards: Carthagena and Cadiz are the other two. The town of Ferrol is regularly built, the streets crossing each other at right angles. It has a school of navigation, about 13,000 inhabitants, some manufactures of hats, and carries on a considerable fishery of herrings and sardines, which are pickled and exported. The timber for ship-building comes from Asturias, and the hemp for cables from Aragon; but the coal and tar are brought in by foreign vessels. Ferrol carries on some trade with America, exporting the wine, brandy, and corn of Gallicia and other parts of Spain. It is the residence of a commandant-general, and other chief officers of the naval department, which however, owing to the present decay of the Spanish navy, is not in a very active condition. Miñano, in his *Suplemento al Diccionario Geografico de España*, gives a plan of Ferrol, with a long article on its docks which are among the finest in Europe.

FERRY, an exclusive privilege by prescription or the king's grant for the carriage of horses and men across a river or arm of the sea for reasonable toll. The owner of a ferry cannot suppress it and put up a bridge in its stead without a license; but he is bound to keep it always in repair and readiness, with expert men, and reasonable toll, for neglect of which he is liable to be punished by indictment. And therefore if a ferry is erected so near to an antient ferry as to draw away its custom, it is a nuisance to the owner of the old one, for which the law will give him remedy by action. The ferry is in respect of the landing place, and not of the water, and in every ferry the land on both sides ought originally to have been in the same person, otherwise he could not have granted the ferry. (13 Vin. *Abr.* 208.) Though as all existing ferries are of great antiquity, and generally connect roads abutting on either side of the water, the original unity of possession is mere matter of curiosity. A ferry is considered as a common highway. (3 Bl. *Com.*; 13 Vin. *Abr.* 208.)

FE'RULA, a genus of apiaceous or umbelliferous plants, whose species often yield a powerful stimulating gum-resin employed in medicine. It differs from Pastinaca and Peucedanum by its fruit having several vittæ in each channel, and from Opoponax, which it otherwise resembles, in the margin of the fruit being thin and flat, not thickened and convex. The fruit is in appearance extremely similar to that of a parsnip, it is compressed from the back till it is extremely flat, and it thins away at the edge. There are three approximated filiform dorsal ridges, and the two lateral ones are distant, obsolete, or lost in the edge. In each channel there are three or more vittæ, and on the commissure four, or a great many. The flowers are always yellow, and the stem solid, its cavity being filled with a spongy substance, in which fibres are vaguely dispersed.

The drugs called Sagapenum and Assafœtida are produced by species of this genus, but by which in particular is not known with certainty; and it appears probable that in fact several different species yield those substances.

1. *Assafœtida*, as the more important, deserves notice first. Kæmpfer, whose account is by far the best we have of this plant (*Amœnitates Exoticæ*. p. 537), says that it is found in

only two districts of Persia, namely, the fields and mountains of Herat, the capital of Khorassan, and the range of mountains in the province of Lar (Laristan), extending from the river Cur as far as the town of Congoon, along the coast of the Persian Gulf He states moreover that even here the plants do not always yield the drug; that it is only those of the desert near Herat and of the mountains round Disguun in Laristan that furnish it; and finally he figures a plant, with a naked simple stem, clothed with leafless sheaths, umbels without involucre, a coarse woody root rising above the ground, and pinnated leaves with pinnatifid segments and oblong obtuse lobes. This plant is the Ferula Assafœtida of Linnæus and De Candolle; what is supposed to be it has since been met with in Beloochistan, and Lieut. Burnes saw what he calls assafœtida growing in great luxuriance in the mountains of Hindoo Koosh at an elevation of 7000 feet. He states that it is an annual, and grows to the height of 8 or 10 feet, when it withers and decays. The milk which it exudes is first white, and then turns yellow and hardens, in which state it is put in hair bags and exported. Sheep browse upon the tender shoots, which are believed to be highly nutritious. (*Travels*, ii. 243.) It is however by no means certain that this was true assafœtida. Indeed if it was, as Lieut. Burnes states, an annual, it must have been some other plant; for Kæmpfer expressly describes the root of hingisèh, or assafœtida, as 'ad plures annos restibilem, magnam, ponderosam, nudam,' and in fact it is from wounds in this root that the gum-resin flows. We may however be pretty certain that assafœtida is in fact yielded by different plants. Prof. Royle obtained seeds of two kinds from the bazaar of India; and it appears from a communication made to Mr. Macneill from a medical gentleman at Soomeeana, in Beloochistan, that in that province a kind of ferula called hooshee yields a similar product, which however is not collected.

The F. assafœtida is said to arrive at as great an age as man himself, and in consequence its roots sometimes attain a considerable size. It is from wounds in this part that the drug is obtained. The roots are not wounded before they are four years old; the greater their age the better the quality of their produce. There were four operations each year when Kæmpfer visited the country; the first in the middle of April, the second at the latter end of May, the third ten days later, and the fourth in the beginning of July. The gatherers on the first occasion only cleared the hard sandy or stony soil away from the root to the depth of a span or so, pulling off the leaves, replacing the earth about the roots, and then heaping the leaves on them, pressing them down with a stone. On the subsequent occasions they slice the roots transversely, beginning a little below the top, and collecting the juice that flows from the wounds. After every operation they cover the root with the old leaves to screen it from the sun. After the last gathering the screens are thrown away, and the roots are left to perish.

2. *Ferula Persica*, a perennial species with a glaucous stem and supradecompound leaves with linear cut segments, has been reported to yield assafœtida. Dr. Hope entertained this opinion, from which Nees and Ebermaier do not dissent. Treviranus found it yielding a substance extremely like assafœtida, in the botanic garden of Breslau; and the same thing has often occurred in the Apothecaries' Garden at Chelsea. Nevertheless, Fée suspects, after Willdenow, that it is rather the origin of sagapenum. Olivier believed it to produce gum ammoniaeum; but according to Professor Don, that drug is yielded by his Dorema ammoniacum.

3. *Ferula orientalis* has also been quoted as the source of gum ammoniacum; and it appears that such a substance is really produced, either by that plant or a nearly allied species, in the empire of Marocco.

4. *Ferula ferulago* has been taken for the plant which furnishes galbanum; but Professor Don states that this drug is really yielded by quite a different genus, called by him Galbanum officinale.

FERUSSI'NA, a genus established by M. Grateloup for a fossil turbinated shell from Dax, which seems at first view very near the *Anostomata*, but which M. Grateloup thinks, from the examination of its aperture, approximates more to the *Cyclostomata*, an opinion in which M. Rang concurs, adding that the species, three or four, are all fossil. It is the same shell, he states, as that afterwards described in the first number (livraison) of the Bulletin of the Linnean Society of Bordeaux, under the name of *Strophostoma* by M. Deshayes.

Generic Character.—Animal unknown. Shell oval, globulous; aperture round, bordered, oblique, simple, toothless, 'retournée du côté de la spire;' umbilicus more or less large. Operculum?

FESCENNINE VERSES were rude licentious verses sung by young men at weddings, and before the door of the nuptial chamber. This was a very antient custom at Rome. the practice, and some of the verses themselves, are said to have been introduced from Fescennium, an old Etruscan town near the present site of Civita Castellana. Festus and others derive the name Fescennine from 'fascinum,' a charm or evil influence, which was supposed to have the power of depriving persons of their physical strength, and which the Fescennine verses were intended to avert. Valletta, a Neapolitan lawyer and poet of the 18th century, has written a curious book on the 'Fascino,' or evil eye, the belief of which is still prevalent at Naples. The Fescennine verses were distinct from the epithalamia, which were more refined and regular compositions. [EPITHALAMIUM.] Horace (Epist. ii. 1) says that Fescennine verses were sung by the country people at harvest time; and the custom of dealing out licentious jokes upon each other and upon strangers passing by, is still retained by the vintagers in various parts of Italy. The name of Fescennine was given in general to licentious and satirical epigrams. Octavianus is said to have written some of this character against Pollio, in the time of the Triumvirate.

FESCUE. [FESTUCA.]

FESTU'CA, a genus of grasses containing several species of agricultural importance. It is known among British grasses by having many flowered spikelets, the lower paleæ of which are neither awned as in Bromus, nor blunt as in Poa and its allies, but terminated gradually in a hard sharp point.

F. pratensis, or meadow fescue, is about three feet high, with a nearly upright branched one-sided panicle and broad coarse leaves. It is a native of moist meadows, and forms a portion of most good meadow herbage. Mr. Sinclair states that in point of early produce this grass ranks next to meadow fox-tail (Alopecurus pratensis), and is much more productive.

F. ovina, *rubra*, and *duriuscula* are other agricultural grasses, much smaller than the last, and contributing greatly to the value of pastures. *F. ovina* has a fine succulent foliage, and, according to Linnæus, sheep have no relish for hills on which it does not abound; it is, however, unproductive. *F. rubra* is more abundant in its produce, but less nutritive, and its creeping root-like stems are said to impoverish the soil very much. *F. duriuscula* is preferable to both the preceding; it withstands dry weather better than most grasses, and in combination with Festuca pratensis and Poa trivialis forms excellent pasturage. It is most prevalent on light rich soils. *F. dumetorum*, another species, will thrive in dry sandy situations, to which property its value is chiefly owing; but its nutritive qualities are slight, and it is altogether an inferior species. See *Hortus Gramineus Woburnensis.*

FESTUS, SEXTUS POMPE'IUS, a celebrated Latin grammarian, whose age is not clearly ascertained, though there seems reason to believe that he lived in the third century of our æra. He compiled an epitome of the voluminous work 'De Verborum Significatione' of Marcus Verrius Flaccus, a grammarian of the Augustan age, mentioned by Suetonius. The work of Verrius is lost, and that of Festus being afterwards abridged in the ninth century by Paulus Diaconus, who spoiled it, the text of the epitome became lost also for several centuries, until a mutilated copy, found in Dalmatia, came into the hands of Aldo Manuzio, who published it, together with the abridgment by Paulus Diaconus. Other fragments were found in the Farnesian Library, and Antonius Augustinus, Joseph Scaliger, and Fulvius Ursinus published improved editions of Festus 'De Verborum Significatione.' Lastly, A. Dacier published a new edition, 4to., Paris, 1681, adding to it the notes of Scaliger, Augustinus, and Ursinus. Dacier's edition was reprinted at Amsterdam in 1699. Festus, in a passage of his work under the head 'Profanum,' refers to another vocabulary which he had written explanatory of antient Latin words which had become obsolete, 'Priscorum Verborum Libri cum Exemplis,' which words he left out in his epitome of Marcus Verrius. This work, 'Priscorum Verborum,' is lost. Festus gives not only the meaning, but also in most instances the etymology, of words, with references to Verrius, Cato, and others of his predecessors; and his book, though incomplete, is justly classed by Scaliger among the most useful for understanding the language of antient Rome.

FEUD. [Feudal System.]

FEUDAL SYSTEM. In treating of this subject we shall endeavour to present a concise and clear view of the principles of what is called the feudal system, to indicate the great stages of its history, especially in our own country, and to state briefly the leading considerations to be taken into account in forming an estimate of its influence on the civilization of modern Europe.

The essential constituent and distinguishing characteristic of the species of estate called a feud or fief was from the first, and always continued to be, that it was not an estate of absolute and independent ownership. The property, or *dominium directum*, as it was called, remained in the grantor of the estate. The person to whom it was granted did not become its owner, but only its tenant or holder. There is no direct proof that fiefs were originally resumable at pleasure, and Mr. Hallam, in his 'State of Europe during the Middle Ages,' has expressed his doubts if this were ever the case; but the position, as he admits, is laid down in almost every writer on the feudal system, and, if not to be made out by any decisive instances, it is at least strongly supported not only by general considerations of probability, but also by some indicative facts. This however is not material. It is not denied that the fief was at one time revocable, at least on the death of the grantee. In receiving it, therefore, he had received not an absolute gift, but only a loan, or at most an estate for his own life.

This being established as the true character of a primitive feud or fief, may perhaps throw some light upon the much disputed etymology and true meaning of the word. *Feudum* has been derived by some from a Latin, by others from a Teutonic root. The principal Latin origins proposed are *fœdus* (a treaty) and *fides* (faith). The supposition of the transformation of either of these into feudum seems unsupported by any proof. These derivations, in fact, are hardly better than another resolution of the puzzle that has been gravely offered, namely, that feudum is a word made up of the initial letters of the words 'fidelis ero ubique domino vero meo.' The chief Teutonic etymologies proposed have been from the old German *faida*, the Danish *feide*, or the modern German *vehd*, all meaning battle-feud, or dissension; and from *fe* or *fee*, which it is said signifies wages or pay for service, combined with *od* or *odh*, to which the signification of possession or property is assigned. But, as Sir Francis Palgrave has well remarked, 'upon all the Teutonic etymologies it is sufficient to observe, that the theories are contradicted by the *practice* of the Teutonic tongues—a *Feud*, or fief, is not called by such a name, or by any name approaching thereto, in any Teutonic or Gothic language whatever.' (*Proofs and Illustrations to Rise and Progress of Eng. Com.*, p. ccvii.) *Lehn*, or some cognate form, is the only corresponding Teutonic term; *Laen* in Anglo-Saxon, *Len* in Danish, *Leen* in Swedish, &c. All these words properly signify the same thing that is expressed by our modern English form of the same element, *Loan*; a *loan* is the only name for a feud or fief in all the Teutonic tongues. What then is *feud* or *fief?* Palgrave doubts if the word *Feudum* ever existed. The true word seems to be *Fevdum* (not distinguishable from *Feudum* in old writing), or *feftum*. *Fiev* or *Fief* (Latinized into *Fevodium*, which some contracted into *Fevdum*, and others, by omitting the *v*, into *Feodum*) he conceives to be *Fitef*, or *Phitef*, and that again to be a colloquial abbreviation of *Emphyteusis*, pronounced *Emphytefsis*, a well known term of the Roman imperial law for an estate granted to be held not absolutely, but with the ownership still in the grantor and the usufruct only in the hands of the grantee. It is certain that emphyteusis was used in the middle ages as synonymous with Precaria (an estate held on a precarious or uncertain tenure); that precariæ, and also præstitæ, or præstariæ (literally loans), were the same with Beneficia; and that Beneficia under the emperors were the same or near the same as fiefs. [Beneficium.] (See these positions also established in Palgrave, *ut supra*, cciv.—ccvi.) It may be added that the word *Feu* is still in familiar use in Scotland for an estate held only for a term of years. The possessor of such an estate is called a *Feuar*. Many of these feus are held for 99 years, some for 999 years. A rent, or feu-duty, as it is called, is always paid, as in the case of a lease in England; but, although never, we believe, merely nominal, it is often extremely trifling in proportion to the value of the property. In Erskine's 'Principles of the Law of Scotland,' in the section 'On the several kinds of Holding,' (book ii. tit. 4), we find the following passage respecting feu-holding, which may be taken as curiously illustrating the derivation of fief that has just been quoted from another writer:—'It has a strong resemblance to the Roman *Emphyteusis*, in the nature of the right, the yearly duty payable by the vassal, the penalty in the case of not punctual payment, and the restraint frequently laid upon vassals not to alien without the superior's consent.' As for the English term *Fee*, which is generally, if not universally assumed to be the same word with fief and feud (and of which it may be the abbreviated form, as we may infer from the words 'feoffor,' 'infeoff,' and 'feoffment'), it would be easy enough to show how, supposing that notion to be correct, it may have acquired the meaning which it has in the expressions fee-simple, fee-tail, &c.

The origin of the system of feuds has been a fertile subject of speculation and dispute. If we merely seek for the existence of a kind of landed tenure resembling that of the fief in its essential principle, it is probable that such may be discovered in various ages and parts of the world. But feuds alone are not the feudal system. They are only one of the elements out of which that system grew. In its entireness, it is certain that the feudal system never subsisted anywhere before it arose in the middle ages in those parts of Europe in which the Germanic nations settled themselves after the subversion of the Roman empire.

Supposing feud to be the same word with the Roman emphyteusis, it does not follow that the Germanic nations borrowed the notion of this species of tenure from the Romans. It is perhaps more probable that it was the common form of tenure among them before their settlement in the Roman provinces. It is to be observed that the emphyteusis, the precaria, the beneficium, only subsisted under the Roman scheme of polity in particular instances, but they present themselves as the very germs of the Germanic scheme. What was only occasional under the one became general under the other. In other words, if the Romans had feuds, it was their Germanic conquerors who first established a system of feuds. They probably established such a system upon their first settlement in the conquered provinces. The word feudum indeed is not found in any writing of earlier date than the beginning of the eleventh century, although, as Mr. Hallam has remarked, the words *feum* and *fevum*, which are evidently the same with feudum, occur in several charters of the preceding century. But, as we have shown, feudum or feud, in all probability, was not the Teutonic term. 'Can it be doubted,' asks Mr. Hallam, 'that some word of barbarous original must have answered, in the vernacular languages, to the Latin beneficium?' There is reason to believe, as we have seen, that this vernacular word must have been *Lehn*, or some cognate form, and that feud was merely a corrupted term of the Roman law which was latterly applied to denote the same thing.

We know so little with certainty respecting the original institutions of the Germanic nations, that it is impossible to say how much they may have brought with them from their northern forests, or how much they may have borrowed from the imperial polity, of the other chief element which enters into the system of feudalism, the connection subsisting between the grantor and the grantee of the fief, the person having the property and the person having the usufruct, or, as they were respectively designated, the suzerain or lord, and the tenant or vassal. Tenant may be considered as the name given to the latter in reference to the particular nature of his right over the land; vassal, that denoting the particular nature of his personal connexion with his lord. The former has been already explained; the consideration of the latter introduces a new view. By some writers the feudal vassals have been derived from the *comites*, or officers of the Roman imperial household [Count]; by others from the *comites*, or companions, mentioned by Tacitus (*German* 3, &c.) as attending upon each of the German chief in war. The latter opinion is ingeniously maintained by Montesquieu (xxx. 3). One fact appears to be certain and is of some importance, namely, that the original vassali or vassi were merely noblemen who attached themselves to the court and to attendance upon the prince, without necessarily holding any landed estate or beneficium by royal grant. In this sense the words occur in the early part of the ninth century. Vassal has been derived from the Celtic *gwas*, and from the German *gesell*, which are probably the same word, and of both of which the original signification seems to be a helper, or subordinate associate, in labour of any kind.

If the vassal was at first merely the associate of or attendant upon his lord, nothing could be more natural than that, when the latter came to have land to give away, he should most frequently bestow it upon his vassals, both as a reward for their past and a bond by which he might secure their future services. If the peculiar form of tenure constituting the fief or lehn did not exist before, here was the very case which would suggest it. At all events, nothing could be more perfectly adapted to the circumstances. The vassal was entitled to a recompense; at the same time it was not the interest of the prince to sever their connexion, and to allow him to become independent; probably that was as little the desire of the vassal himself; he was conveniently and appropriately rewarded therefore by a fief, that is, by a loan of land, the profits of which were left to him as entirely as if he had obtained the ownership of the land, but his precarious and revocable tenure of which, at the same time, kept him bound to his lord in the same dependence as before.

Here then we have the union of the feud and vassalage—two things which remained intimately and inseparably combined so long as the feudal system existed. Nevertheless they would appear, as we have seen, to have been originally quite distinct, and merely to have been thrown into combination by circumstances. At first it is probable that, as there were vassals who were not feudatories, so there were feudatories who were not vassals. But very soon, when the advantage of the association of the two characters came to be perceived, it would be established as essential to the completeness of each. Every vassal would receive a fief, and every person to whom a fief was granted would become a vassal. Thus a vassal and the holder of a fief would come to signify, as they eventually did, one and the same thing.

Fiefs, as already intimated, are generally supposed to have been at first entirely precarious, that is to say, resumable at any time at the pleasure of the grantor. But if this state of things ever existed, it probably did not last long. Even from the first it is most probable that many fiefs were granted for a certain term of years or for life. And in those of all kinds a substitute for the original precariousness of the tenure was soon found, which while it equally secured the rights and interests of the lord, was much more honourable and in every way more advantageous for the vassal. This was the method of attaching him by certain oaths and solemn forms, which, besides their force in a religious point of view, were so contrived as to appeal also to men's moral feelings, and which therefore it was accounted not only impious but infamous to violate. The relation binding the vassal to his lord was made to wear all the appearance of a mutual interchange of benefits,—of bounty and protection on the one hand, of gratitude and service due on the other; and so strongly did this view of the matter take possession of men's minds, that in the feudal ages even the ties of natural relationship were looked upon as of inferior obligation to the artificial bond of vassalage.

As soon as the position of the vassal had thus been made stable and secure, various changes would gradually introduce themselves. The vassal would begin to have his fixed rights as well as his lord, the oath which he had taken measuring and determining both these rights and his duties. The relation between the two parties would cease to be one wholly of power and dominion on the one hand, and of mere obligation and dependence on the other. If the vassal performed that which he had sworn, nothing more would be required of him. Any attempt of his lord to force him to do more would be considered as an injustice. Their connexion would now assume the appearance of a mutual compact, imposing corresponding obligations upon both, and making protection as much a duty in the lord as gratitude and service in the vassal.

Other important changes would follow this fundamental change, or would take place while it was advancing to completion. After the fief had come to be generally held for life, the next step would be for the eldest son usually to succeed his father. His right so to succeed would next be established by usage. At a later stage fiefs became descendible in the collateral as well as in the direct line. At a still later, they became inheritable by females as well as by males. There is much difference of opinion, however, as to the dates at which these several changes took place. Some writers conceive that fiefs first became hereditary in France under Charlemagne; others, however, with whom Mr Hallam agrees, maintain that there were hereditary fiefs under the first race of French kings. It is supposed not to have been till the time of the first Capets in the end of the tenth century that the right of the son to succeed the father was established by law in France. Conrad II., surnamed the Salic, who became emperor in 1024, is generally believed to have first established the hereditary character of fiefs in Germany.

Throughout the whole of this progressive development of the system, however, the original nature of the fief was never forgotten. The ultimate property was still held to be in the lord; and that fact was very distinctly signified, not only by the expressive language of forms and symbols, but by certain liabilities of the tenure that gave still sharper intimation of its true character. Even after fiefs became descendible to heirs in the most comprehensive sense, and by the most fixed rule, every new occupant of the estate had still to make solemn acknowledgment of his vassalage, and thus to obtain, as it were, a renewal of the grant from the lord. He became bound to discharge all services and other dues as fully as the first grantee had been. Above all, in certain circumstances, as, for example, if the tenant committed treason or felony, or if he left no heir, the estate would still return by forfeiture or escheat to the lord, as to its original owner.

Originally fiefs were granted only by sovereign princes; but after estates of this description, by acquiring the hereditary quality, came to be considered as property to all practical intents and purposes, their holders proceeded, on the strength of this completeness of possession, themselves to assume the character and to exercise the rights of lords, by the practice of what was called subinfeudation, that is, the alienation of portions of their fiefs to other parties, who thereupon were placed in the same or a similar relation to them as that in which they stood to the prince. The vassal of the prince became the lord over other vassals; in this latter capacity he was called a mesne (that is, an intermediate) lord; he was a lord and a vassal at the same time. In the same manner the vassal of a mesne lord might become also the lord of other arrere vassals, as those vassals that held of a mesne lord were designated. This process sometimes produced curious results; for a lord might in this way actually become the vassal of his own vassal, and a vassal lord over his own lord.

From whatever cause it may have happened (which is matter of dispute), in all the continental provinces of the Roman empire which were conquered and occupied by the Germanic nations, many lands were from the first held, not as fiefs, that is, with the ownership in one party and the usufruct in another, but as allodia, that is, in full and entire ownership. [ALLODIUM.] The holder of such an estate, having no lord, was of course free from all the exactions and burthens which were incidental to the vassalage of the holder of a fief. He was also, however, without the powerful protection which the latter enjoyed; and so important was this protection in the turbulent state of society which existed in Europe for some ages after the dissolution of the empire of Charlemagne, that in fact most of the allodialists in course of time exchanged their originally independent condition for the security and subjection of that of the feudatory. 'During the tenth and eleventh centuries,' says Mr. Hallam, 'it appears that allodial lands in France had chiefly become feudal; that is, they had been surrendered by their proprietors, and received back again upon the feudal conditions; or, more frequently perhaps the owner had been compelled to acknowledge himself the man or vassal of a suzerain, and thus to confess an original grant which had never existed. Changes of the same nature, though not perhaps so extensive or so distinctly to be traced, took place in Italy and Germany. Yet it would be inaccurate to assert that the prevalence of the feudal system has been unlimited; in a great part of France allodial tenures always subsisted, and many estates in the empiro were of the same description'

After the conquest of England by the Normans, the *dominium directum*, or property of all the land in the kingdom, appears to have been considered as vested in the crown. 'All the lands and tenements in England in the hands of subjects,' says Coke, 'are holden mediately or immediately of the king; for in the law of England we have not properly allodium.' This universality of its application therefore may be regarded as the first respect in which the system of feudalism established in England differed from that established in France and other continental countries. There were also various other differences. The Conqueror, for instance, introduced here the practice unknown on the continent of compelling the arrere vassals, as well as the immediate tenants of the crown, to take the oath of fealty to himself. In other countries a vassal only swore fealty to his immediate lord; in England, if he held of a mesne lord, he took two oaths, one to his lord and another to his lord's lord. It may be observed, however, that in those times in which the feudal principle was in its greatest vigour the fealty of a vassal to his immediate lord was usually considered as the higher obligation; when that and his fealty to the crown came into collision, the former was the oath to which he adhered. Some feudists indeed held that his allegiance to the crown was always to be understood as reserved in the fealty which a vassal swore to his lord; and the Emperor Frederic Barbarossa decreed that in every oath of fealty taken to an inferior lord there should be an express reservation of the vassal's duty to the emperor. But the double oath exacted by the Norman conqueror did not go so far as this. It only gave him at the most a concurrent power with the mesne lord over the vassals of the latter, who in France were nearly removed altogether from the control of the royal authority. A more important difference between the English and French feudalism consisted in the greater extension given by the former to the rights of lords generally over their vassals by what were called the incidents of wardship and marriage. The wardship or guardianship of the tenant during minority, which implied both the custody of his person and the appropriation of the profits of the estate, appears to have been enjoyed by the lord in some parts of Germany, but no where else except in England and Normandy. 'This,' observes Mr. Hallam, 'was one of the most vexatious parts of our feudal tenures, and was never perhaps more sorely felt than in their last stage under the Tudor and Stuart families.' The right of marriage (maritagium) originally implied only the power possessed by the lord of tendering a husband to his female ward while under age: if she rejected the match, she forfeited the value of the marriage; that is, as much as any one would give to the lord for permission to marry her. But the right was afterwards extended so as to include male as well as female heirs; and it also appears that although the practice might not be sanctioned by the law, some of the Anglo-Norman kings were accustomed to exact penalties from their female vassals of all ages, and even from widows, for either marrying without their consent or refusing such marriages as they proposed. The seignorial prerogative of marriage, like that of wardship, was peculiar to England and Normandy, and to some parts of Germany.

It has been very usual to represent military service as the essential peculiarity of a feudal tenure. But the constituent and distinguishing element of that form of tenure was its being a tenancy merely, and not an ownership; the enjoyment of land for certain services to be performed. In the state of society however in which the feudal system grew up, it was impossible that military service should not become the chief duty to which the vassal was bound. It was in such a state of society the most important service which he could render to his lord. It was the species of service which the persons to whom fiefs were first granted seem to have been previously accustomed to render, and the continuance of which accordingly the grant of the fief was chiefly intended to secure. Yet military service, or knight service, as it was called in this country, though the usual, was by no means the necessary or uniform condition on which fiefs were granted. Any other honourable condition might be imposed which distinctly recognized the *dominium directum* of the lord. [KNIGHT-SERVICE.]

Another common characteristic of fiefs, which in like manner arose incidentally out of the circumstances of the times in which they originated, was that they usually consisted of land. Land was in those times nearly the only species of wealth that existed; certainly the only form of wealth that had any considerable security or permanency. Yet there are not wanting instances of other things, such as pensions and offices, being granted as fiefs. It was a great question nevertheless among the feudists whether a fief could consist of money, or of any thing else than land; and perhaps the most eminent authorities have maintained that it could not. The preference thus shown for land by the spirit of the feudal customs has perhaps left deeper traces both upon the law, the political constitution, and the social habits and feelings of our own and other feudal countries than any other part of the system. We have thence derived not only the marked distinction (nearly altogether unknown to the civil law) by which our law still discriminates certain amounts of interest in lands and tenements under the name of *real* property from property of every other kind, but also the ascendency retained by the former in nearly every respect in which such ascendency can be upheld either by institutions or by opinion.

The grant of land as a fief, especially when it was a grant from the suzerain, or supreme lord, whether called king or duke, or any other name, was, sometimes at least, accompanied with an express grant of jurisdiction. Thus every great tenant exercised a jurisdiction civil and criminal over his immediate tenants: he held courts and administered the laws within his lordship like a sovereign prince. It appears that the same jurisdiction was often granted by the crown to the abbeys with their lands. The formation of MANORS in this country appears to have been consequent upon the establishment of feudalism. The existence of manor-courts, and so many small jurisdictions within the kingdom, is one of the most permanent features of that polity which the Normans stamped upon this country.

In the infancy of the feudal system it is probable that the vassal was considered bound to attend his lord in war for any length of time during which his services might be required. Afterwards, when the situation of the vassal became more independent, the amount of this kind of service was fixed either by law or by usage. In England the whole country was divided into about 60,000 knights' fees; and the tenant of each of these appears to have been obliged to keep the field at his own expense for forty days on every occasion on which his lord chose to call upon him. For smaller quantities of land proportionately shorter terms of service were due: at least such is the common statement; although it seems improbable that the individuals composing a feudal army could thus have the privilege of returning home some at one time, some at another. Women were obliged to send their substitutes; and so were the clergy, certain persons holding public offices, and men past the age of sixty, all of whom were exempted from personal service. The rule or custom however both as to the duration of the service, and its extent in other respects, varied greatly in different ages and countries.

The other duties of the vassal were rather expressive of the relation of honourable subordination in which he stood to his lord than services of any real or calculable value. They are thus summed up by Mr. Hallam:—'It was a breach of faith to divulge the lord's counsel, to conceal from him the machinations of others, to injure his person or fortune, or to violate the sanctity of his roof and the honour of his family. In battle he was bound to lend his horse to his lord when dismounted; to adhere to his side while fighting, and to go into captivity as a hostage for him when taken. His attendance was due to the lord's courts, sometimes to witness and sometimes to bear a part in the administration of justice.'

There were however various other substantial advantages derived by the lord. We have already mentioned the rights of wardship and of marriage, which were nearly peculiar to the dominions of the English crown. Besides these, there were the payment, called a relief, made by every new entrant upon the possession of the fief, the escheat of the land to the lord when the tenant left no heir, and its forfeiture to him when the tenant was found guilty either of a breach of his oath of fealty, or of felony. There was besides a fine payable to the lord upon the alienation by the tenant of any part of the estate, if that was at all permitted. Finally, there were the various aids, as they were called, payable by the tenant. 'These,' observes Mr. Hallam, 'depended a great deal upon local custom, and were often extorted unreasonably. Du Cange mentions several as having existed in France; such as an id for the lord's expedition to the Holy Land, for marrying his sister or eldest son, and for paying a relief to his suzerain on taking possession of his land. Of these the last appears to have been the most usual in England. But this and other aids occasionally exacted by the lords were felt as a severe grievance; and by Magna Charta three only are retained—to make the lord's eldest son a knight, to marry his eldest daughter, and to redeem his person from prison. They were restricted to nearly the same description by a law of William I. of Sicily, and by the customs of France. These feudal aids are deserving of our attention as the beginnings of taxation, of which for a long time they in a great measure answered the purpose, till the craving necessities and covetous policy of kings substituted for them more durable and onerous burthens.'

The principal ceremonies used in conferring a fief were homage, fealty, and investiture. The two first of these cannot be more distinctly or more shortly described than in the words of Littleton: 'Homage,' says the Treatise of Tenures, 'is the most honourable service, and most humble service of reverence, that a frank tenant may do to his lord: for when the tenant shall make homage to his lord, he shall be ungirt and his head uncovered, and his lord shall sit and the tenant shall kneel before him on both his knees, and hold his hands jointly together between the hands of his lord, and shall say thus: I become your man, from this day forward, of life and limb, and of earthly worship, and unto you shall be true and faithful, and bear you faith for the tenements that I claim to hold of you, saving the faith that I owe to our sovereign lord the king; and then the lord, so sitting, shall kiss him.' Religious persons and women instead of 'I become your man,' said 'I do homage unto you.' Here it is to be observed there was no oath taken; the doing of fealty consisted wholly in taking an oath, without any obeisance. 'When a freeholder (frank tenant),' says Littleton, 'doth fealty to his lord, he shall hold his right hand upon a book, and shall say thus: Know ye this, my lord, that I shall be faithful and true unto you, and faith to you shall bear for the lands which I claim to hold of you, and that I shall lawfully do to you the customs and services which I ought to do at the terms assigned, so help me God and his saints; and he shall kiss the book. But he shall not kneel when he maketh his fealty, nor shall make such (that is, any such, *tiel*,) humble reverence as is aforesaid in homage.' 'Investiture or the actual conveyance of feudal lands,' says Mr. Hallam, 'was of two kinds; proper and improper. The first was an actual putting in possession upon the ground, either by the lord or his deputy; which is called in our law livery of seisin. The second was symbolical, and consisted in the delivery of a turf, a stone, a wand, a branch, or whatever else might have been made usual by the caprice of local custom. Du Cange enumerates not less than 98 varieties of investitures.' The present mode of conveying lands by feoffment is in fact the feudal investiture. [FEOFFMENT.]

The feudal system may be regarded as having nearly reached its maturity and full development when the Norman conquest of England took place in the middle of the 11th century. It appears accordingly to have been established here immediately or very soon after that event in as pure, strict, and comprehensive a form as it ever attained in any other country. The whole land of the kingdom, as we have already mentioned, was without any exception either in the hands of the crown, or held in fief by the vassals of the crown, or of them by sub-infeudation. Those lands which the king kept were called his demesne (the Terræ Regis of the Domesday Survey), and thus the crown had a number of immediate tenants, like any other lord, in the various lands reserved in nearly every part of the kingdom. No where else, also, before the restrictions established by the charters, were the rights of the lord over the vassal stretched in practice nearer to their extreme theoretical limits. On the other hand, the vassal had arrived at what we may call his ultimate position in the natural progress of the system; the hereditary quality of feuds was fully established; his antient absolute dependence and subjection had passed away; under whatever disadvantages his inferiority of station might place him, he met his lord on the common ground of their mutual rights and obligations; there might be considerable contention about what these rights and obligations on either side were, but it was admitted that on both sides they had the same character of real, legally binding obligations, and legally maintainable rights.

This settlement of the system however was anything rather than an assurance of its stability and permanency. It was now held together by a principle altogether of a different kind from that which had originally created and cemented it. That which had been in the beginning the very life of the relation between the lord and the vassal had now in great part perished. The feeling of gratitude could no more survive than the feeling of dependence on the part of the latter after feuds became hereditary. A species of superstition, indeed, and a sense of honour, which in some degree supplied the place of what was lost, were preserved by oaths and ceremonies, and the influence of habit and old opinion; but these were at the best only extraneous props; the self-sustaining strength of the edifice was gone. Thus it was the tendency of feudalism to decay and fall to pieces under the necessary development of its own principle.

Other causes called into action by the progress of events conspired to bring about the same result. The very military spirit which was fostered by the feudal institutions, and the wars, defensive and aggressive, which they were intended to supply the means of carrying on, led in course of time to the release of the vassal from the chief and most distinguishing of his original obligations, and thereby, it may be said, to the rupture of the strongest bond that had attached him to his lord. The feudal military army was at length found so inconvenient a force that soon after the accession of Henry II. the personal service of vassals was dispensed with, and a pecuniary payment, under the name of escuage, accepted in its stead. From this time the vassal was no longer really the defender of his lord; he was no longer what he professed to be in his homage and his oath of fealty; and one effect of the change must have been still farther to wear down what remained of the old impressiveness of these solemnities, and to reduce them nearer to mere dead forms. The acquisition by the crown of an army of subservient mercenaries, in exchange for its former inefficient and withal turbulent and unmanageable army of vassals, was in fact the discovery of a substitute for the main purpose of the feudal polity. Whatever nourished a new power in the commonwealth, also, took sustenance and strength from this ancient power. Such must in an especial degree have been the effect of the growth of towns, and of the new species of wealth, and, it may be added, the new manners and modes of thinking, created by trade and commerce.

The progress of sub-infeudation has sometimes been represented as having upon the whole tended to weaken and loosen the fabric of feudalism. It 'demolished,' observes Blackstone (ii. 4), 'the antient simplicity of feuds; and an inroad being once made upon their constitution, it subjected them in a course of time to great varieties and innovations. Feuds began to be bought and sold, and deviations were made from the old fundamental rules of tenure and succession, which were held no longer sacred when the feuds themselves no longer continued to be purely military.' But the practice of sub-infeudation would rather seem to have been calculated to carry out the feudal principle, and to place the whole system on a broader and firmer base. It would be more correct to ascribe the effects here spoken of to the prohibition against sub-infeudation. The effect of this practice, it is true, was to deprive the lord of his forfeitures and escheats and the other advantages of his seigniory, and various attempts therefore were at length made to check or altogether prevent it, in which the crown and the tenants in chief, whose interests were most affected, may be supposed to have joined. One of the clauses of the great charter of Henry III. (the thirty-second) appears to be intended to restrict sub-infeudation (although the meaning is not quite clear), and it is expressly forbidden by the statute of Quia Emptores (the 18 Ed. I. c. 1). This however was originally the only way in which the holder of a fief could alienate any part of his estate without the consent of his lord; and it therefore now became necessary to provide some other mode of effecting that object, for it seems to have been felt that after alienation had been allowed so long to go on under the guise of sub-infeudation, to restrain it altogether would be no longer possible. The consequence was, that, as a compensation for the prohibition of sub-infeudation, the old prohibition against alienation was removed; lands were allowed to be alienated, but the purchaser or grantee did not hold them of the vendor or grantor, but held them exactly as the grantor did; and such is still the legal effect in England when a man parts with his entire interest in his lands. This change was effected by the statute of Quia Emptores with regard to all persons except the immediate tenants of the crown, who were permitted to alienate on paying a fine to the king by the statute 1 Edw. III. c. 12. Thus at the same time that a practice strictly accordant to the spirit of feudalism, and eminently favourable to its conservation and extension, was stopped, another practice, altogether adverse to its fundamental principles, was introduced and established, that of allowing *voluntary* alienation by persons during their lifetime.

It was a consequence of feudal principles, that a man's ands could not be subjected to the claims of his creditors. This restraint upon what may be called *involuntary* alienation has been in a great degree removed by the successive enactments which have had for their object to make a man's lands liable for his debts; although, after a lapse of near six hundred years since the statute of Acton Burnell, the lands of a debtor are not yet completely subjected o the just demands of his creditors. This statute of Acton Burnell, passed 11 Ed. I. (1283), made the devisable burgages, or burgh tenements, of a debtor saleable in discharge of his debts. By the Statute of Merchant, passed 13 Ed. I. (1285), called Statute 3, a debtor's lands might be delivered to his merchant creditor till his debt was wholly aid out of the profits. By the 18th chapter of the Statute f Westminster the Second, passed the same year, a moiety f a debtor's land was subjected to execution for debts ecovered by judgment [ELEGIT]; and finally, by the everal modern statutes of bankruptcy, the whole of a ankrupt debtor's lands have become absolutely saleable or the payment of his debts. Further, by a recent act (3 nd 4 Wm IV. c. 104), all a deceased person's estate in and, of whatever kind, whether he was a trader within he bankrupt laws or not, is liable to the payment of his ebts, both those on specialty and those on simple contract.

An attempt had early been made to restore in part the ld restraints upon *voluntary* alienation by the statute 13 Ed. I. c. 1, entitled 'De Donis Conditionalibus,' which had or its object to enable any owner of an estate, by his own isposition, to secure its descent in perpetuity in a particular ne. So far as the statute went, it was an effort to strengthen he declining power of feudalism. The effect was to create hat were called estates tail, and to free the tenant in tail rom many liabilities of his ancestor to which he would be ubject if he were seized of the same lands in fee-simple. ESTATE.] The power which was thus conferred upon landolders of preventing the alienation of their lands remained n full force for nearly two centuries, till at last, in the eign of Edward IV., by the decision of the courts (A.D. 472) the practice of barring estates tail by a common reovery was completely established. [RECOVERY, COMMON.]

The practice of conveying estates by fine, which was of reat antiquity in England, and the origin of which is by ome referred to the time of Stephen or Henry II., was egulated by various statutes (among others, particularly y the 4 Henry VII.), and contributed materially to faciliate the transfer of lands in general, but more particuarly (as regulated by the statute just mentioned) to bar states tail. [FINE.] By a statute passed in the 32 Henry VIII. c. 28, tenants in tail were enabled to make eases for three lives or twenty-one years, which should ind their issue. The 26 Hen. VIII. c. 13, also, had delared all estates of inheritance, in use or possession, to be orfeited to the king upon any conviction of high treason, nd thus destroyed one of the strongest inducements to the ying up of estates in tail, which hitherto had only been foreitable for treason during the life of the tenant in tail.

Another mode by which the feudal restraints upon *voluntary* alienation came at length to be extensively evaded was he practice introduced, probably about the end of the reign f Edward III., of granting lands to persons to *uses*, as it was ermed; that is, the new owner of the land received it not or his own use, but on the understanding and confidence hat he would hold the land for such persons and for such urposes as the grantor then named or might at any time fterwards name. Thus an estate in land became divided nto two parts, one of which was the legal ownership, and he other the right to the profits or the *use;* and this use ould be transferred by a man's last *will* at a time when, he land itself being still bound in the fetters of feudal retraint, could not be transferred by will, except where it was devisable, as in Kent and some other parts of England, by special custom. The person who thus obtained the use or profits of the estate—the *Cestui que use*, as he is called in law—was finally converted into the actual owner of the land to the same amount of interest as he had in the use (A.D. 1535) by the statute of uses (the 27 Hen. VIII. c. 10), and thus the power of devising land which had been enjoyed by the mode of uses was taken away. But this important element in the feudal system, the restraint on the disposition of lands by will, could no longer be maintained consistently with the habits and opinions then established, and accordingly, by stat. 32 Hen. VIII. (which was afterwards explained by the stat. 34 Hen. VIII.), all persons were allowed to dispose of their freehold lands held in fee-simple by a will in writing, subject to certain restrictions as to lands held by knight service either of the king or any other, which restrictions were removed by the stat. 12 Chas. II. c. 24, which abolished military tenures. [USES.]

Notwithstanding these successive assaults upon certain parts of the antient feudalism, the main body of the edifice still remained almost entire. It is said that the subject of the abolition of military tenures was brought before the parliament in the 18th of James I., on the king's recommendation, but at that time nothing was done in the matter. When the civil war broke out in 1641, the profits of marriage, wardship, and of most of the other old feudal prerogatives of the crown, were for some time still collected by the parliament, as they had formerly been by the king. The fabric of the feudal system in England however was eventually shattered by the storm of the Great Rebellion. The Court of Wards was in effect discontinued from 1645. The restoration of the king could not restore what had thus been in practice swept away. By the abovementioned statute, 12 Car. II. c. 24, it was accordingly enacted that from the year 1645 the Court of Wards and Liveries, and all wardships, liveries, primer-seisins, values, and forfeitures of marriage, &c., by reason of any tenure of the king's majesty, or of any other by knights' tenures, were taken away and discharged, together with all fines for alienations, tenure by homage, escuage, aids pur file marrier and pur fair fitz chevalier, &c.; and that all tenures of any honours, manors, lands, tenements or hereditaments, or any estate of inheritance at the common law, held either of the king or of any other person or persons, bodies politic or corporate, were turned into free and common soccage, to all intents and purposes. [SOCCAGE.] By the same statute every father was empowered by deed or will, executed in the presence of two witnesses, to appoint persons to have the guardianship of his infant and unmarried children, and to have the custody and management of their property. It was not till after the lapse of nearly another century that the tenures and other institutions of feudalism were put an end to in Scotland by the statutes, passed after the Rebellion, of the 20 Geo. II. c. 43, entitled 'An Act for abolishing Heretable Jurisdictions;' and the 20 Geo. II. c. 50, entitled 'An Act for taking away the Tenure of Wardholding in Scotland, for giving to heirs and successors a summary process against superiors, and for ascertaining the services of all tenants, &c.' Nor have estates-tail in Scotland yet been relieved from the strictest fetters of a destination in perpetuity, either by the invention of common recoveries, or by levying a fine, or by any legislative enactment.

We have enumerated the principal statutes which may be considered as having broken in upon the integrity of the feudal system, considered in reference to the power which the *tenant* of land can now exercise over it, and the right which others can enforce against him in respect of his property in it. But the system of tenures still exists. The statute of Charles II. only abolished military tenures and such parts of the feudal system as had become generally intolerable; but all lands in the kingdom are still held either by soccage tenure, into which military tenures were changed, or else by the respective tenures of frankalmoyne, grand serjeanty, and copyhold, which were not affected by the statute.

Some of the consequences of tenures, as they at present subsist, cannot be more simply exemplified than by the rules as to the FORFEITURE and ESCHEAT of lands, both of which however have undergone modifications since the statute of Charles II.

To attain a comprehensive and exact view of the present tenures of landed property in England and their incidents and consequences, it would be necessary for the reader to enter upon a course of study more laborious and extensive than is consistent with pursuits not strictly legal. Still a general notion may be acquired of their leading characteristics by referring to several of the articles already quoted, and to such heads as ATTAINDER, BARON, COPYHOLD, COURTS, DISTRESS, ESTATE, LEASE, MANOR, TENURES, and such other articles as may be referred to in those last mentioned.

The notions of loyalty, of honour, of nobility, and of the importance, socially and politically, of landed over other property, are the most striking of the feelings which may be considered to have taken their birth from the feudal system. These notions are opposed to the tendency of the commercial and manufacturing spirit which has been the great moving power of the world since the decline of strict feudalism; but that power has not yet been able to destroy, or perhaps even very materially to weaken the opinions above mentioned in the minds of the mass.

We are not however to pass judgment upon feudalism, as the originating and shaping principle of a particular form into which human society has run, simply according to our estimate of the value of these its relics at the present day. The true question is, if this particular organization had not been given to European society after the dissolution of the antient civilization, what other order of things would in all likelihood have arisen, a better or a worse than that which did result? Some assistance in settling this question might perhaps be obtained by comparing the history of society, from this date, in the feudal countries, with its history in those parts of Europe to which feudalism never reached;—France or England, for instance, with Denmark, Sweden, or Hungary.

As for the state of society during the actual prevalence of the feudal system, it was without doubt in many respects exceedingly defective and barbarous. But the system, with all its imperfections, still combined the two essential qualities of being both a system of stability and a system of progression. It did not fall to pieces, neither did it stand still. Notwithstanding all its rudeness, it was, what every right system of polity is, at once conservative and productive. And perhaps it is to be most fairly appreciated by being considered, not in what it actually was, but in what it preserved from destruction, and in what it has produced.

The earliest published compilation of feudal law was a collection of rules and opinions supposed to have been made by two lawyers of Lombardy, Obertus of Otto and Gerardus Niger, by order of the emperor Frederic Barbarossa. It appeared at Milan about the year 1170, and immediately became the great text book of this branch of the law in all the schools and universities, and even a sort of authority in the courts. It is divided in some editions into three, in others into five books, and is commonly entitled the 'Libri Feudorum;' the old writers however are wont to quote it simply as the Textus, or Text. But the great sources of the feudal law are the antient codes of the several Germanic nations; the capitularies or collections of edicts of Charlemagne and his successors; and the various Coutumiers or collections of the old customs of the different provinces of France. The laws of the Visigoths, of the Burgundians, the Salic law, the laws of the Alemanni, of the Baiuvarii, of the Ripuarii, of the Saxons, of the Anglii, of the Werini, of the Frisians, of the Lombards, &c. have been published by Lindenbrogius in his *Codex Legum Antiquarum*, fol. Francof., 1613. The best editions of the capitularies are that by Baluze, in 2 vols. fol., Paris, 1677, and that by Chiniac, of which, however, we believe only the two first volumes have appeared, Paris, fol., 1780. Richebourg's *Nouveau Coutumier Général*, 4 vols. fol., Paris, 1724, is a complete collection of the Coutumiers, all of which however have also been published separately. All these old laws and codes, as well as the Milan text-book, have been made the subject of voluminous commentaries.

FEUERBACH, PAUL JOHANN ANSELM, the most celebrated German writer on criminal law, was born at Frankfort on the Mayn, May 14th, 1775. After having studied at Jena, he gave lectures there on law in 1798, and became successively professor at the universities of Giesen, Jena, Kiel, and Landshuth. While he was a lecturer at Jena he published his 'Anti-Hobbes, or on the Limits of Civil Power, and on the compulsory Right of Subjects against their Sovereigns' (Anti-Hobbes oder über die grenzen der bürgerlichen gewalt und das zwangrecht der unterthanen gegen ihren oberherren); and a number of essays inserted in the 'Magazine of Criminal Jurisprudence.' But the work which established his fame was his 'Review of the fundamental Principles and fundamental Ideas of Penal Law,' which appeared shortly afterwards. His 'Critique of the project of a Penal Law for Bavaria,' published in 1804, is another remarkable work. These purely theoretical essays exercised a very considerable influence on the criminal legislation of Germany, and were soon followed by practical effects. Almost immediately on the publication of the last-mentioned work, and while he was professor at Landshuth, the Bavarian government entrusted him with drawing up a project of a criminal code for the kingdom, which, after having been submitted to a commission, was adopted, with very few modifications. The principles previously promulgated by Feuerbach were all incorporated in this project, which is characterised by logical connection, strict definitions, complete development of the principle of penal law, correct generalization and specification of crimes and misdemeanours, and precise determination of penalties. Its consequences were immense, for previously to its publication criminal jurisprudence in Germany was most deplorable. Its excellence both in substance and form was such, that it was adopted as the basis of similar attempts at a reform of criminal law by other portions of Germany and Switzerland. Saxony, Wirtemberg, Hanover, Oldenburg and Weimar, and the cantons Zürich, St. Gall, Basle and the Grisons modified their codes in accordance with it. In 1808 Feuerbach was created privy councillor, and received a commission to adapt the Code Napoleon to the wants of Bavaria; the result of his labour however was not adopted.—That criminal law has become a science, and that this science has had a great influence on legislation all over the continent, is to be mainly attributed to this gifted man. Criminal law, which had been harsh and bloody became humane: liberty of action was substituted for previous restraint, and the conditions were pointed out under which the state ought to interfere by penalties with the rights of the citizens. The former arbitrary power of the judges was circumscribed; deep-rooted and vague notions gave way to the inflexible but necessary bounds of law. If, on the one hand, it must be admitted that Feuerbach, by his philosophical inquiries and liberal conceptions, powerfully influenced the elements and principles of modern criminal law, it is to be regretted, on the other hand, that by his subsequent publication, 'Considerations on the Jury,' he has promulgated singular opinions on the spirit and efficacy of that institution. The leading idea of this work consists in the proposition that the verdict of the jury is insufficient to establish the legal evidence of crime. After having been assailed by a number of eminent writers, and in particular by Grolman, Feuerbach modified his opinions on the jury in 1821, during a visit to France, Belgium, and the Rhenish provinces, on a mission from the Bavarian government to investigate the legal institutions of those countries. On his return he published the result of his inquiries in his 'Reflections on the judicial Organization and Proceedings in France,' a work remarkable for the sagacity with which he lays open the deficiencies and inconveniences of all the French civil and penal legislation. A very able part of that work is the comparison of the French and English juries, which is entirely in favour of the latter, as, according to Feuerbach's opinion, the principles of that institution are completely perverted in France by the rules laid down during the empire for the composition of the jury. Like Berenger, Dupin, and other French writers who have exposed the faults of the existing mode of criminal proceedings in France, Feuerbach has stigmatised the French jurymen by calling them the twelve commissioners of government. Notwithstanding he had altered his opinion on the jury generally, and although by his remarks on the English jury in particular he seems to have made amends for his former animosity against it, he still retained some prejudices against that institution, on account of its being fraught with too many democratic principles. This tendency of Feuerbach's opinion had a very unfavourable influence on the Bavarian government when the introduction of that institution came under consideration, and ultimately it was the cause of the jury not being granted to the country. This circumstance proves that although a liberal legislator he was by no means in favour of democracy. In 1817 he was made second president of the court of appeal at Bamberg, and in 1821 he was nominated first president of the court of appeal at Anspach; to those functions his sphere of action was latterly entirely confined, with the exception of opinions given in important civil and criminal cases. One of those was the notorious affair of Kaspar Hauser, which produced so much sensation all through Europe. With his wonted and acknowledged perspicuity he has investigated this revolting case, and has recorded the results of his inquiry in his last work, 'Kaspar Hauser, an instance of a psychological crime.' The two following passages of that book seem to implicate a reigning family of the south of Germany. Those passages are:—1. 'There are spheres of human society which are inaccessible to the arm of justice.' 2. Those spheres are defined as 'golden *castles*, the entrance of which is guarded by giants who do not allow a ray of light to penetrate.' A rumour prevails that his sudden death at Frankfort, in May, 1833, is not unconnected with that mysterious affair, the veil of which appears to have been lifted by him. His connection with the Bavarian government became in latter years very disagreeable in consequence of his decided opposition to its illiberal policy. Feuerbach was a man of polite acquirements as well as of professional eminence. The elegant diction of his productions has powerfully contributed to improve the style of recent German writers on law. In this respect his 'Exposition of remarkable Criminal Cases, founded upon documents,' merits particular mention. Previously to Feuerbach's time all similar essays were heavy and uninteresting, in consequence of all the documents being accumulated in their original uncouth form, without order or regard to the really interesting features of the case, namely the development of psychological considerations. It was he who first united to professional soundness of exposition elegant and convincing diction. This work, which is written with true poetical talent, is a remarkable specimen of investigation into the human heart, rendered still more striking by the most delicate and humane estimation of actions; it may be considered at once a model of exhaustive inquiry and a book of morals. In bold and vivid language he has promulgated the doctrine that it is impossible perfectly to harmonize the inflexible universality of law with individual culpability, and that it therefore is an unavoidable necessity, in particular cases, to modify and soften the sentence of the law by the prerogative of the sovereign.

FEVER, CONTINUED. It has been already stated that febrile diseases are divided into three great classes, according to the persistence or non-persistence of the morbid phenomena. [Ague.] Of these classes the first includes the Fevers called Intermittent, in which the morbid phenomena, after having continued a certain time, disappear, but after an interval of a certain duration again recur, this alternate recurrence and remission taking place many times. In the second class the febrile phenomena do not wholly disappear, but merely diminish in violence; do not intermit, but remit: these constitute Remittent Fevers. In the third class there is neither any intermission nor remission of the febrile state, but a constant and uninterrupted progression of the disease to a certain termination; fevers in which the phenomena are thus uninterruptedly continuous, constitute the class of Continued Fevers.

Since the concurrence and succession of phenomena which constitute a paroxysm of intermittent fever, or an attack of ague, afford a paradigm, or example, of the febrile state in general, of course the individual phenomena which take place in an attack of continued fever must be essentially the same as those which have been already described under Ague. There are however some modifications which require attention.

We may take, for the convenience of describing the condition of the system in the state of continued fever, the ordinary continued fever of this country, the disease denominated Common Continued Fever (Synochus Mitior). The phenomena which take place in this disease, and the order in which they succeed each other, are the following:—

The first event in the series is the derangement of the functions of the nervous system. There is reason to believe that this derangement takes place primarily in the organic system of nerves, that system which presides over the nutrition of the organs, and consequently that the very first effect of the noxious agent, whatever it be, which produces fever, is to disorder the health of the organs, and thereby to impair their energy.

Though it is probable that a disorder of the organic nerves is the first event that actually takes place in fevers, yet the first event of which we become conscious would seem to be a derangement in the second portion of the nervous system, the great nervous centres in which sensation, intellectual operation, and voluntary motion, have their seat, namely, the brain and spinal cord. The organic functions being carried on without consciousness, we can know that they are disordered only by their producing disturbance in some part of the sentient system. The organic portion of the nervous system is most intimately connected with the sentient portion, and any disorder of the former is quickly extended to the latter. In an attack of fever the disordered condition of the brain is indicated by a loss of mental energy. But this loss of mental energy, though it is probably the very first indication of fever of which any one can be conscious, is by no means the first symptom which usually attracts attention. In general the loss of mental power is not observed until it becomes distressing, which does not often happen until the progress of the disease is further advanced. The loss of mental power is indicated by the inability to perceive clearly the trains of ideas, and to attend closely to their relation; whence result indistinctness and confusion of mind, and the want of capacity to form a sound judgment.

As this state of the mind depends on the disordered condition of the organ in which the mind has its seat, the brain, and as the servant of the mind, volition, has its seat in the same portion of the nervous system: closely connected with this mental weakness, is the loss of energy in the muscles of voluntary motion. Lassitude is the result. The movements of the body are feeble and unsteady, as the energy of the mind is impaired.

From this morbid condition of the brain and of the muscles of voluntary motion, there results an uneasy sensation, of which no idea can be conveyed by words; it must be felt to be understood. It is not pain, it is more distressing than pain; even the mere restlessness which accompanies, and which forms so large a part of it, any one would gladly exchange for intense pain: it is this state which has been appropriately and expressively named 'Febrile Uneasiness.'

But very soon there is superadded to this uneasy sensation positive pain. In general pain is first felt in the back and loins, and in the limbs. It is rare that this symptom is absent in the commencement of this form of fever, and it often occasions more distress to the patient than anything else during the first stage of the disease.

The remaining part of the history of an attack of common continued fever has been thus given by a physician who has had the most abundant opportunities of witnessing the progress of the disease:—

'Already a remarkable change is commonly visible in the countenance. Its expression is that of dejection; it is often strikingly similar to that of a very weak person suffering from fatigue. The colour of the face is pallid, and the features are somewhat shrunk; but its general aspect is so peculiar and characteristic, that an experienced eye can distinguish the disease, even at this early period, and without asking a single question. The skin partakes in a remarkable degree of the debility which so early shows itself in the muscles of locomotion. This is indicated in a striking manner by its increasing sensitiveness to the physical agents by which it is surrounded, and by its inability to resist their influence. Ordinary degrees of temperature produce a sensation of cold which is sometimes intolerable; chilliness is felt even in a heated room, or in a warm bed: hence the sensation of cold, sometimes increasing to shivering, which has been considered one of the most constant signs of fever. But this feeling of chilliness by no means depends on external temperature: it is increased by cold, but it exists in spite of an elevated temperature; it arises from an internal cause, and is not to be counteracted by external heat.

While the patient experiences the sensation of cold, there is no diminution of the quantity of caloric in the system. The thermometer applied to any part of the body commonly rises as high as in the state of health; and the skin, touched by the hand of another person, communicates not the feeling of cold, but often, on the contrary, that of preternatural heat. There is no positive abstraction of caloric from the body, nor any failure in the process, whatever it be, by which animal heat is generated: there is only altered sensation, in consequence of derangement in the function of the skin. In this form of fever the chilliness in many cases never amounts to shivering; in others there is an attack of well-marked rigor, and in others, again, there is either no feeling of cold, or it is so slight that it escapes observation.

The symptoms now enumerated are all clearly referrible to derangement of the function of the spinal cord and brain. There is as yet no affection of any other organ obviously or at least much developed. The circulating system, it is true, is just beginning to be affected. The pulse is no longer perfectly natural; it is more languid than in the state of health; sometimes it is also quicker: at other times it is slower; now and then it is scarcely changed in frequency, but its action is invariably weaker than in its sound state.

At the same time the respiration is affected in a corresponding degree; it is shorter and quicker than natural; the chest does not expand so freely, and compensation seems to be sought in an additional number of respirations. Oftentimes neither the pulse nor the respiration appears to be much altered, if the patient remain perfectly still; but if he rise and walk across the room the pulse instantly becomes rapid, and the respiration is quickened almost to fainting.

The transition from the affection of the nervous and sensorial to that of the circulating and the respiratory systems is thus clear and striking. Physiology teaches us how closely these systems are connected, and how mutually they are dependant one upon the other, the closest observers and the ablest experimentalists candidly confessing that they are scarcely able to determine which is the least dependant, or the action of which is the least necessary to the other's performance of its functions. The nervous system being first deranged, it is thus consonant to what we know of the healthy function of the animal economy that the circulating and the respiratory systems should be the next to suffer.

How long the nervous system may continue thus deranged before any other organs are involved, excepting the circulating and the respiratory, to the extent just stated, is uncertain. There can be no doubt that in this mild form of fever the range of the duration of this isolated state of disorder, if we may so express it, is from a few hours to several days. The rapidity or the slowness with which other systems of organs become involved seems to depend very much upon the acuteness of the attack. In general, the more acute the fever, the more rapidly the individual phenomena succeed each other, and the entire series becomes complete. But this is not, and it is important to bear in mind that it is not, invariably the case, for experience teaches us that the severity and danger of the disease are not diminished by the slowness of its approach; and that cases occur which are slow in forming, and which do not for a while excite alarm, that ultimately become truly formidable.

It has been stated that the circulation languishes with the diminished energy in the sensorial faculties, and the loss of power in the muscles of locomotion. After a while the pulse, which was feebler than natural, becomes more full, more strong, and generally more quick than in a sound state; and now the skin, which was cold, becomes preternaturally hot. The previous cold consisted, for the most part, of altered sensation, there being little or no loss of caloric; but the feeling of heat, on the contrary, is the result of an actual increase of temperature: for the heat in the interior of the body, as well as on the surface, rises in some cases several degrees, as is ascertained by the thermometer, the range of increase being from the natural standard 98° to 105°, beyond which it is seldom found to augment in this form of fever. The heat is at first not uniform over the entire surface of the body: it often happens that some parts are cold while others are burning hot. The heat is oftentimes particularly intense over the forehead or over the back part of the head, or over the whole scalp, while the cheeks are commonly flushed. All these symptoms denote a morbid condition in the action of the heart and arteries. Since the generation of animal heat is so intimately connected with the circulating and the respiratory functions, it is probable that the increase of temperature is the result of some morbid action of the capillary vessels belonging to these systems. What the disordered action of these vessels is which produces increase of temperature we do not know; but the object of scientific observation is in some degree accomplished when it is ascertained that one condition of these functions is invariably connected with a morbidly diminished temperature; another with a morbidly augmented temperature; and another with the temperature of health.

Immediately the circulation is thus excited, the functions of secretion and excretion become deranged. The mouth is now dry and parched; the tongue begins to be covered with fur; thirst comes on; the secretion of the liver, probably also of the pancreas, and certainly of the mucous membrane lining the whole alimentary canal, is vitiated, as is proved by the unnatural quantity, colour, and fetor of the evacuations; the urine likewise is altered in appearance, and the skin is not more remarkable for the sense of heat than for that of dryness and harshness which it communicates to the touch. With the excitement of the pulse and the increase of the heat, the pain in the back and limbs, and the general febrile uneasiness are much augmented.

At this period, then, the fever is fully formed; the series of morbid phenomena is complete: anything more that happens is referrible to degree and to duration, and must be the result of one or other of these circumstances, or of their combined operation.

As soon as the preternatural heat comes on, pain begins to be felt in the head. The pain of the head is often slight at first, and occasionally it remains slight throughout the disease: at other times it is pretty severe. Cases sometimes occur, in which, instead of pain there is only a sense of giddiness, and now and then the uneasy feeling is described as that of lightness; or on the contrary, as that of heaviness or weight. But whether the feeling be pain, and that pain be slight or severe, or whether it be giddiness or lightness, or heaviness, it indicates a similar condition of the organ and requires a similar treatment.

With the accession of pain of the head there is a manifest increase in the disturbance of the sensorial functions. The inability to think, to compare, to reason, to judge, great as it was at the commencement, is now much greater. Instead of being more dull, there are certain states of the mind which now become more acute and vigilant even than in health. Sensation itself, at this period, is invariably acuter than natural, as is indicated in all the organs of sense. The eye cannot well bear the light: there are few cases in which the full glare of day does not excite uneasiness, while in many the ordinary light of a room cannot be borne: in these cases the opening between the eyelids is frequently observed to be contracted, as if from an involuntary effort to exclude a portion of that stimulus which in health excites no inconvenience, and this state of the eyelids assists in giving to the eye its dull and heavy expression so characteristic of fever. The increase of sensibility in the organ of hearing is equally striking. Sounds which were not noticed during health become acutely and even distressingly sensible, while accustomed noises, such as that of a crowded street, are always painful and often intolerable. The skin, considered as an organ of touch, is in a like morbid state. An impression barely sufficient in tho state of health to produce sensation excites the feeling of tenderness, and alternations of temperature which in ordinary states are scarcely perceptible are painful. The senses of taste and smell on the contrary, are nearly obliterated, owing to the altered condition of the membranes upon which the sensitive nerves are distributed.

From the earliest attack of the disease the sleep is disturbed and unrefreshing; now scarcely any is obtained; the febrile uneasiness will not allow of repose, the patient cannot remain in any position long, incessantly shifting his place, never eluding his pain. At this stage the sense of uneasiness in the limbs, oftentimes the severity of the pain over the whole body, is peculiarly distressing.

With this progressive increase in the affection of the spinal cord and the brain, the derangement in the circulating system is proportionally augmented. The pulse is invariably altered, both in frequency and character. Generally it rises to 90, sometimes to 100; but in this form of fever it seldom exceeds this number; and occasionally it never rises above 80. The stroke of the pulse is usually stronger and fuller than natural, though it commonly retains its softness, and does not impress the finger with that sensation of sharpness which is characteristic of ordinary inflammation. Occasionally, however, a degree of sharpness may be perceived in it, and it is not easily compressed.

The thin white fur which already had begun to appear on the tongue progressively increases in extent and thickness. The colour of the fur usually changes as the disease advances, from a dirty white to an ash colour; but in this form of the disease the tongue always remains moist and never becomes brown. This state of the tongue is almost always accompanied with thirst, but it is never urgent. There is always a loss of appetite. The bowels are generally constipated, and the secretions of the whole alimentary canal are vitiated.

Thus we perceive that the progress of the disease consists in increasing mental and corporeal weakness; increasing pain in the back, loins, and limbs; increasing heat of skin, acceleration of pulse, and general febrile uneasiness, together with the occurrence of pain in the head, and progressive derangement in the functions of secretion and excretion.

The fever in this mild form is now at its height. It remains stationary, or at least with very little change, for an indefinite period, generally for some days. The cerebral affection does not increase beyond what has been described: there are no greater indications of disease in the respiratory organs, and the mucous membrane of the stomach and intestines does not denote any progressive advancement in disease.

In the great majority of patients in whom the symptoms continue thus moderate, the disease disappears about the end of the second week, that is, they are convalescent at that period; but it usually requires eight or ten days longer before they have regained sufficient strength to leave the sick chamber. Sometimes, although there is no greater severity in the symptoms, the disease is more protracted, and the recovery is not complete until the fourth or even the fifth week. Beyond this period it is very rare for this form of the disease to be protracted.

Almost all who are attacked with the malady in this its mildest form recover: but now and then it happens that the symptoms go on with this degree of moderation until about the end of the second week. Then at the period when it is usual for convalescence to take place there is no perceptible improvement; the patients seem even to grow weaker; they lie more prostrate in the bed, and they are soon incapable of moving; still they complain of no pain or uneasiness, and it is not easy to detect any trace of disease in any organ; yet it is but too evident that they grow worse, and ultimately they sink exhausted. In these cases, on examination after death, it is commonly found that disease has been preying on some vital organ, although its presence could not be detected during life; and this termination of the milder type of fever rarely happens excepting in aged persons whose constitutions have been enfeebled by previous diseases, or worn out by the various causes which depress and exhaust the powers of life.

With an occasional exception of this kind, the disease in this form always terminates favourably; and the first indication of returning health is remarkably uniform: it is almost always marked by longer and more tranquil sleep. Instead of that restlessness which is so characteristic of fever, and which forms the most distressing part of it, the patient is observed to lie more still, and on waking for the first time from an undisturbed slumber, he often spontaneously says that he feels better. Better he may feel, for his febrile uneasiness is gone; the load that oppressed him is shaken off; he is a new being. The pain of the head and of the limbs is so much diminished, that often he cannot help expressing his thankfulness at the change. The countenance becomes more animated; its natural expression returns; the tongue begins to clean, and after this state of the system has continued for two or three days the appetite returns. While these favourable changes are going on the pulse usually sinks about ten beats below its highest point at the height of the fever; it is not uncommon however for it to remain quick during the entire period of convalescence; and for some considerable time it is easily excited on any movement of the body, or any emotion of mind. In some cases, on the contrary, when the attack has been very mild, it sinks considerably below the natural standard, and is intermittent, a sign which has been observed to be attended with a sure and steady convalescence. In the mean time the appetite becomes keener than natural; the strength gradually improves; and in a short time the patient is restored to his usual health and vigour.

What the condition of the brain and of the organs correlatively affected is, in these the mildest cases, we do not positively know, because we have no opportunity of inspecting them, their favourable termination being nearly without exception. But the more all the phenomena are considered in their entire series, in the order of their succession, in the uniformity, nay, even in the exclusiveness of their seat, as well as in the unchanging sameness of their effects, the more clear the evidence will appear of the soundness of the induction, that the condition of all the organs in all the types of fever is the same in nature, although there be no two cases of any type perfectly the same either in the degree of the affection or in the stage of the morbid process which it excites. If this induction be really just, we must conceive that, in the Synochus Mitior, while the morbid affection of the organs is slight, the diseased process which it sets up in them stops before it produces any change in their structure.

The transition of a mild case of fever into a severe one, or the progress of a case severe from the commencement, is accompanied with or depends upon certain changes that take place in certain organs. These changes occur with great regularity; the organs in which they take place are always the same; and the symptoms by which they are denoted are uniform. The organs affected are the spinal cord, the brain, the membranes of both, the mucous membrane of the lungs, and the mucous membranes of the intestines. Other organs become affected in the progress of the malady, but these are the organs which in a greater or less degree are invariably diseased, and which therefore must be considered as the true seats of the structural changes that take place in the regular course of fever. Accordingly in all the severer cases, the symptoms, which are only the external indications and expressions of the successive changes that take place in the internal organs, have their seat either in the head, in the thorax, or in the abdomen. Mixed and blended as these symptoms appear in the different cases which the practitioner is actually called upon to treat, they seem so complex and variable as to bid defiance to any arrangement: when analyzed, nothing is more remarkable than their simplicity and their uniformity.

Previous to the changes of structure that take place in the internal organs, it is probable that the different fluids undergo changes no less important. There is indeed a controversy whether the very first change that takes place does not take place in the fluids, and more especially in the blood. There cannot be a question that a morbid change takes place in the blood at a very early period of fever; that that change is different at different stages of the disease; that it is essentially different according to the particular type of fever, and that it is always great in proportion to the severity of the attack. Without entering here into the controversy whether the very first event in the series be a morbid change in the blood, it is manifest that this fluid cannot but become diseased in the progress of fever, because all the processes by which the depuration of the blood is effected are disturbed, and consequently matters which it is the office of these depurating organs to remove from the circulating mass accumulate in it. Moreover, there is evidence that the constitution of the blood itself becomes deranged, and that the natural proportions of its essential constituents are subverted. Of course, in a state of the system in which the most important secreting organs are diseased, and in which the fluid that affords the common materials from which the secretions are elaborated is also diseased, the secretions themselves must necessarily become vitiated.

Fever then is a malady in which disease is simultaneously established in the most important organs both of the organic and of the animal life, in the vital fluid which nourishes and stimulates the whole system, in the excretory processes by which the purity of the blood is preserved, and in the secreting processes by which all the different tissues and structures of the body are formed. That it should be always a dangerous disease is therefore not wonderful, but the real extent in which it is the instrument of death is not generally known. Taking together the whole class of febrile diseases, and including the ravages committed by them at all seasons and in all parts of the globe, it is estimated that of the deaths that take place in the human race one half is always produced by these maladies.

No age seems to be actually exempt from fever, but it has been clearly shown that there are particular periods of life when the human constitution is peculiarly susceptible to the disease. Thus from facts obtained from the records of the London Fever Hospital, it appears that in the year 1825, out of 588 patients, there were attacked under 10 years of age 42, under 15 years of age 67, under 20 years of age 172, under 25 years of age 133, under 30 years of age

81, under 35 years of age 29, under 40 years of age 28, under 50 years of age 10, while from the age of 55 to 85, the number attacked varies from 1 to 2. In the year 1826, out of 676 patients there were attacked under 10 years of age 27, under 15 years of age 87, under 20 years of age 170, under 25 years of age 143, under 30 years of age 102, under 35 years of age 46, under 40 years of age 37, under 45 years of age 28, under 50 years of age 13, while from the ages of 55 to 85 the largest number attacked at any period does not exceed 5. In the year 1827, out of exactly the same number of patients, 676, there were attacked under 10 years of age 25, under 15 years of age 70, under 20 years of age 163, under 25 years of age 164, under 30 years of age 107, under 35 years of age 35, under 40 years of age 50, under 45 years of age 20, under 50 years of age 13, while from the ages of 55 to 85 at one period that of 60, there were attacked 13, but at all other ages the numbers attacked were only from 2 to 4.

The same records incontestably show that fever, that grand agent of death, carries on its ravages in a ratio which steadily and uniformly increases as the age of its victim advances. The experience of the London Fever Hospital for the ten years preceding 1834, an observation including nearly 6000 patients affected with fever, having been submitted to Mr. Finlaison, he found, among other curious and instructive results, that the mortality of fever resolves itself into the following remarkable progression. Thus, suppose 100,000 patients to be attacked with this disease between the ages of 5 and 16, of these there would die 8266; and of an equal number between—

15 and 26	. there would die	11,494
25 and 36	. . .	17,071
35 and 46	. . .	21,960
45 and 56	. . .	30,493
55 and 66	. . .	40,708
65 and upwards	. .	44,643

Thus the risk of life from this malady is twice as great at the age of 31 as it is at 11. It is also nearly twice as great at 41 as it is at 21. It is five times as great at 61 as it is at 11, and nearly four times as great above 65 as it is at 21.

It appears further that sex produces an appreciable difference in regard to susceptibility to the disease. Thus, in the year 1825 the total number attacked was—of males 289; females 299. In the year 1826—males 325; females 351. In 1827—males 337; females 339 But while the female is the more susceptible to the disease, she appears to be capable of resisting it better than the male. Thus, in 1825, out of the total number of deaths, 104, there died—males 53, females 51. In 1826, out of the total number of deaths, 110, there died—males 56; females 54. In 1827, out of the total number of deaths, 86, there died—males 48; females 38.

The causes of continued fever are ascertained with tolerable exactness. The exciting cause of continued fever is precisely the same as that of intermittent fever or ague, of which an account has been already given. [AGUE.] What modifications of the poison, or of the constitution, cause the same noxious agent to produce at one time ague, at another typhus, at one time yellow fever, at another plague, and at another sciatica or tooth-ache, are not yet well established; but there is reason to believe that intermittent and remittent fevers are dependent chiefly on a vegetable poison, while, on the other hand, continued fevers have their source chiefly in a poison of animal origin.

Without doubt, a febrile poison purely of animal origin, in a high degree of concentration, would kill instantaneously; and when not intense enough to strike with instantaneous death, it would produce a continued fever with the typhoid characters in the greatest possible degree of completeness and perfection. And this appears to afford the true solution of the origin of the plague. The more closely the localities are examined of every situation in which the plague prevails, the more abundant the sources of putrefying animal matter will appear, and the more manifest it will become, not only that such matter must be present, but that it must abound.

In assigning the reason why Grand Cairo, in Egypt, is the birth-place and the cradle of the plague, Mead states that this city is crowded with vast numbers of inhabitants who live not only poorly but nastily; that the streets are narrow and close; that the city itself is situated in a sandy plain, at the foot of a mountain which keeps off the winds that might refresh the air; that consequently the heat is rendered extremely stifling; that a great canal passes through the midst of the city, which at the overflowing of the tide (the river) is filled with water; that on the decrease of the river this canal is gradually dried up, and the people throw into it all manner of filth, carrion, offal, and so on; that the stench which arises from this, and the mud together, is intolerably offensive; and that from this source the plague constantly springing up every year, preys upon the inhabitants, and is stopped only by the return of the Nile, the overflowing of which washes away this load of filth; that in Ethiopia the swarms of locusts are so prodigious that they sometimes cause a famine by devouring the fruits of the earth, and when they die create a pestilence by the putrefaction of their bodies; that this putrefaction is greatly increased by the dampness of the climate, which, during the sultry heats of July and August, is often excessive; that the effluvia which arise from this immense quantity of putrefying animal substance, combined with so much heat and moisture, continually generate the plague in its intensest form; and that the Egyptians of old were so sensible how much the putrefaction of dead animals contributed towards breeding the plague, that they worshipped the bird Ibis for the services it did in devouring great numbers of serpents, which, they observed, injured by their stench when dead as much as by their bite when alive.

Nothing can be more striking than the cases recorded by Pringle, and which daily occurred to him, of the production of fever exquisitely typhoid (according to the language of that day, jail and hospital fever,) and of the sudden transition of intermittent and remittent into the continued and typhoid type, from the presence of a poison clearly and certainly of animal origin. Whenever wounded soldiers with malignant sores or mortified limbs were crowded together, or whenever only a few of such diseased persons were placed in a room with the sick from other diseases, with those labouring under intermittent and remittent, for example, a severe and mortal typhus immediately arose; nay, whenever men previously in a state of sound health were too much crowded together for any considerable time, typhus (jail or hospital fever) was sure to be produced. The instances of such occurrences that are detailed are too numerous to be cited, but they are so clearly stated and so striking that they ought to be consulted by whoever is desirous of clearly tracing the operation of this great cause of fever.

But by far the most potent febrile poison derived from an animal origin is that which is formed by exhalations given off from the living bodies of those who are affected with fever, especially when such exhalations are pent up in a close and confined apartment. The room of a fever patient, in a small and heated apartment in London, with no perflation of fresh air, is perfectly analogous to a stagnant pool in Ethiopia full of the bodies of dead locusts. The poison generated in both cases is the same, the difference is merely in the degree of its potency. Nature with her burning sun, her stilled and pent-up wind, her stagnant and teeming marsh, manufactures plague on a large and fearful scale. Poverty in her hut, covered with her rags, surrounded with her filth, striving with all her might to keep out the pure air and to increase the heat, imitates nature but too successfully; the process and the product are the same, the only difference is in the magnitude of the result. Penury and ignorance can thus at any time, and in any place, create a mortal plague: and of this no one has ever doubted. Of the power of the living body, even when in sound health, much more when in disease, and above all when that disease is fever, to produce a poison capable of generating fever, no one disputes, and the fact has never been called in question. Thus far the agreement among all medical men of all sects and of all ages is perfect.'

Since the above was written the true nature of these poisonous exhalations has been demonstrated by direct experiment. It has been found that if a quantity of the air in which these exhalations are diffused be collected, the vapour can be condensed by cold and other agents, and a residuum of animal or vegetable matter be obtained which is found to be highly putrescent, constituting a deadly poison. A minute quantity of this concentrated poison applied to an animal previously in sound health destroys life with the most intense symptoms of malignant fever. If, for example, ten or twelve drops of a fluid containing this highly putrid matter be injected into the jugular vein of a dog, the animal is seized with acute fever, the action of the heart is inordinately excited, the respiration is accelerated, the heat increased, the prostration of strength extreme, the muscular power so exhausted that the animal lies on the ground wholly unable to stir or to make the slightest effort, and after a short time it is actually seized with the black vomit, identical in the nature of the matter evacuated with that which is thrown up by an individual labouring under yellow fever. It is possible by varying the intensity and the dose of the poison thus obtained to produce fever of almost any type, endowed with almost any degree of mortal power.

When these facts are connected with the absorbing power of the lungs, explained in the same work from which the above passage is extracted (2nd vol. of the *Philosophy of Health*), we can no longer wonder that when the poison is in a high degree of concentration a single inspiration of it should be capable of producing almost instantaneous death; and that when it is diffused in the atmosphere in a less concentrated state, the continual inspiration of it should generate the mortal disease which experience teaches us that it produces.

It is impossible to estimate too highly the importance of these facts, in a practical point of view, as indicating the direction in which human industry and skill should be put forth to destroy the great sources of fever, that is, to put an end to that terrible malady by whose sole agency one half of the human race perishes, and whose principal ravages are committed at the very age when life is most precious to the possessor, and most useful to the community.

The treatment of fever, a subject of some difficulty, but of the utmost moment, belongs to the several heads of Synochus, Typhus, Petechial Fever, Plague, &c.

(Sydenham's works; Mead's *Short Discourse concerning Pestilential Contagion, and the Methods to be used to Prevent it*; Sir John Pringle's *Observations on the Nature and Cure of Hospital and Jayl Fevers, in a letter to Dr. Mead; and Observations on the Diseases of the Army*; Clutterbuck *on Fever*; Southwood Smith's *Treatise on Fever*; *Philosophy of Health*; Copland's *Dict. of Practical Medicine*: *Cyclopædia of Practical Medicine*.)

FEVERSHAM, or FAVERSHAM. [KENT.]

FEVRE, LE. [DACIER.]

FEZ. [MAROCCO.]

FEZZAN, a country in northern Africa, between 24° and 31° N. lat. and 12° and 18° E. long., may be considered as the greatest oasis of the Sahara, by which it is enclosed on the west and east, and partly also on the south. On the north it borders on a less desert region, which belongs to the regency of Tripoli. Where it borders on the desert, its boundary, of course, is not exactly fixed. On all sides it is surrounded by nomadic nations; on the north and east by Arabs, and on the south and west by the Tibboos and Tuaricks.

Its northern part is traversed by two ridges of stony and sandy mountains, or rather hills; for it seems that their elevation above their base does not exceed 1200 feet. They are called in the eastern district El Harush, but in the western they take the name of Ghurian Mountains and Soudah Mountains. The country south of these ridges contains large plains, covered with sand, and without any traces of vegetation; but some ridges of hills from 300 to 600 feet high, rise above the plains, and inclose valleys between them, which are the only parts capable of cultivation. The cultivable portion of the country hardly exceeds one-tenth of its surface, which according to Hornemann extends 300 miles from north to south, and 200 from east to west. The hills have rugged, irregular, and peaked summits, and are composed of thick beds of blue clay, alternating with sandstone, beds of alum-slate, and thick strata of porphyritic clay-stone (Denham); the tops consist of sandstone. The soil in the valleys is a stratum of sand, lying on chalk or clay, which is rendered fit for agricultural purposes by irrigation. As there are no rivers or brooks, and only very few natural springs, the irrigation is effected by wells, water being commonly found at a depth of about 100 feet. The heat in summer is very great, but in winter, during the northern winds, the cold is unpleasant even to Europeans. Rain is very rare: in some districts it does not rain for some years together; and in all of them it rains very little at a time. Violent gales are rather frequent, especially from the north and south, which fill the air with clouds of sand.

Date-trees, which constitute the principal wealth of the country, grow plentifully near the towns and on some plains where the soil is impregnated with saline matter. Some wheat, barley, and doura are cultivated, but not enough for the consumption. Goats and asses are reared in great numbers; cows, sheep, horses, and camels are not so numerous. All these animals feed on dates or their kernels.

The principal town, Mourzuck, is surrounded by a wall, and contains about 2500 inhabitants. Towards the northern boundary is Sockna, with about 2000 inhabitants. Zuila, east of Mourzuck, is not so large.

The number of inhabitants is estimated by Hornemann at 70,000 or 75,000. In the northern districts they resemble their neighbours, the Arabs, but in the southern they have rather the features of the Tuaricks or Tibboos, who belong to the widely spread nation of the Berbers. They are all Mohammedans, and commonly use the Arabic language. Their sovereign exercises despotic power, but is in some degree dependent on the bey of Tripoli, to whom he annually sends presents of gold-dust and slaves. He receives from his subjects a portion of the produce of the ground, and levies some duties on the merchandize which passes through his territories.

Fezzan is of some importance in a commercial point of view, being the most frequented road by which Soodan communicates with the countries along the Mediterranean. From October to February numerous cafilas arrive at Mourzuck from Cairo, Bengazi in Barca, Tripoli, Gadames, Twat, Bornou, and Soodan; and the neighbouring Tibboos, Tuaricks, and Arabs then visit its market. The traders dispose of part of the produce of their respective countries at Mourzuck, and carry the rest farther on. The industry of the inhabitants is limited to the manufacturing of coarse blankets, which form the principal dress of the lower classes. (Hornemann's *Journey from Egypt to Fezzan*; Denham and Clapperton's *Narrative of Travels and Discoveries, &c.*)

FIBER. [BEAVER, vol. iv. p. 121; MURIDÆ.]

FIBRE and FIBROUS TISSUE. A fibre is a minute thread or filament, apparently the form which solid animal matter, for the most part, assumes in its first stage of organization. It has been stated, that the different kinds of matter which enter into the composition of the animal body, when the analysis is carried to its ultimate point, are resolvable into two primitive forms: first, a substance capable of coagulation, but possessing no determinate figure; and secondly, a substance consisting of rounded particles. The coagulable substance is capable of existing by itself; the rounded particles are never found alone, but are invariably combined with coagulated or coagulable matter. Alone or combined with the rounded particles, the coagulable matter forms, when liquid, the fluids; when coagulated, the solids.

When solid, the coagulable matter is disposed in one of two forms, either in that of minute threads or fibres, or in that of minute plates or laminæ; hence every solid of the body is said to be either fibrous or laminated.

Fibrous or laminated, this concrete substance is variously modified, either alone or in combination with the rounded particles. These different modifications and combinations constitute different kinds of organic substance. When so distinct as obviously to possess a peculiar structure and peculiar properties, each of these modifications is considered as a separate form of organized matter, and is called a *primary* tissue. Of these primary tissues, the peculiar substance termed membrane appears to be the simplest, which is formed by the arrangement of this concrete matter into straight thready lines, at first so small as to be imperceptible to the naked eye. Vast numbers of these threads successively uniting, at length form a single thread of sufficient magnitude to be visible, but still smaller than the finest thread of the silk-worm. If the length of these threads be greater than their breadth, they are called fibres; if, on the contrary, their breadth exceed their length, they are termed plates or laminæ. By the approximation of these fibres or plates in every possible direction, and by their accumulation, combination, and condensation, is constituted the simplest form of organized substance, the primary tissue called membrane.

Membrane, composed for the most part of fibres, so disposed as to form a net-work, may be said to constitute the basis of the animal body. Into the meshes of this membranous net-work are poured the different kinds of animal matter which constitute the different kinds of animal tissue. Thus nerves are composed of nervous matter deposited in the interstices of a membranous net-work; muscles are composed of muscular substance deposited in the interstices of a membranous net-work; bones are composed of earthy particles deposited in the interstices of a membranous net-work. The threads of which this membranous net-work is composed preserve their fibrous arrangement when built up into complex structures. Hence, perfectly formed membranes, nerves, muscles, and bones, present a fibrous structure, often visible to the naked eye, and always manifest in the analysis of these organs. The larger fibres of which some of these organs, nerve and muscle for example, are obviously formed, consist of smaller fibres, and these of still smaller fibres, until we come at length to a primitive fibre of extreme minuteness. Professor Ehrenberg states that there are nervous fibres which can only be discerned by the aid of a magnifying power of 300 diameters, and others which can only be brought into view by a magnifying power of 800 diameters; and the primitive muscular fibres are commonly supposed to be still more minute.

But though membranes, muscles, nerves, and bones are composed of fibres, and present a manifestly fibrous structure, yet there is one particular tissue which is called fibrous by way of eminence; a bad name for it certainly, but still it has been so long and so extensively in use among anatomists that it is difficult to change it. The tissue specially called fibrous consists of the membrane that covers the bones and cartilages (the periosteum and perichondrium); the membrane that is spread over or that forms a part of certain muscles, constituting the muscular aponeuroses or fasciæ; the membrane that forms the sheaths in which tendons are included; the outer membrane that envelopes the brain and spinal cord (the dura mater and its continuation down the spinal canal); the firm membrane in which the more delicate muscles and the humours of the eye are contained (the tunica sclerotica): the outer membrane forming the bag that contains the heart (the pericardium); the membranes by which the bones in general are tied together and the joints in particular are secured, called ligaments; and the firm cords in which many muscles terminate and which form their movable extremities, termed tendons. Though these substances are extensively diffused through the body, and are apparently independent of each other, yet they are closely connected together, and form a peculiar system. The firm and resisting threads which constitute the basis of these different organs are composed of condensed cellular tissue. The peculiar animal substance of which they consist is coagulated albumen and gelatine, intermixed with a small quantity of mucous and saline matter.

All the proper fibrous organs possess, in the language of anatomists, a low organization; that is, they receive but a comparatively small quantity of blood, and their blood-vessels are so minute in size, that they are generally incapable of admitting the red particles of the blood. They receive few nerves, and these are so small that some anatomists have doubted whether they are supplied with any nerves at all; but their sensibility in certain states of disease proves that they are not absolutely destitute of sentient nerves. In like manner, few absorbents can be traced to them; yet the ravages of disease in the neighbourhood of joints, the sloughing of tendons, and the destruction of the periosteum by the pressure of aneurism, abundantly testify that they are supplied with absorbent vessels. But the office of all the fibrous organs is mechanical; they are adapted either to contain, support, and defend more delicate organs, or they constitute strong and unyielding bands which tie joints firmly together. A high degree of organization, great vascularity, great sensibility, would have disqualified them for their office. What they principally need is a power of cohesion sufficient to enable them to resist rupture, and to sustain the opposing shocks to which the joints are exposed in the violent movements of the body; the less sensibility they have the better, and accordingly they are so organized that while their physical properties render them by far the strongest parts of the animal frame, they are endowed only with just a sufficient degree of vitality to constitute them integrant parts of the living system.

(Grainger's *General Anatomy; Cyclopædia of Anatomy and Physiology, in loc.; Philosophy of Health*, vol. i.)

FIBRE, VEGETABLE, one of the most elementary forms of vegetable tissue. It consists of excessively delicate threads, twisted spirally in the interior of a cell or tube. It is uncertain whether the fibre is solid or hollow, its tenuity being such as to baffle all microscopical observers who have yet examined it. It is this elementary fibre which, being turned spirally round a long delicate tube with its spires in contact, forms the elastic spiral vessel. It occurs in the interior of common cells, when its turns cross each other and produce a netted appearance. It is frequent in the cellular tissue which forms the lining of an anther, and is supposed to have some connection with the opening of that organ. In its naked state, uncombined with membrane, it is supposed to be very rare. On the surface of some seeds, as Collomia linearis, it has been observed in this condition in great abundance, in the form of spiral threads of a highly elastic nature. It is also reported to appear in several minute fungi, but this is a point that requires confirmation.

Vegetable fibre should not be confounded with the woody fibre of plants, which consists of tough straight tubes either single or adhering in bundles. Of this, which forms the thread of hemp, flax, and the like, some account is given hereafter. [Woody Tissue.]

FIBRIN (coagulable lymph, gluten), an animal proximate principle consisting of the portion of the coagulum of the blood which remains after the removal of the red particles [Blood], and forming the basis of muscle. The fibrin of the blood is best obtained by what is called whipping the blood, that is, by rapidly stirring a quantity of fresh drawn blood with a spoon or a piece of stick. During this process the blood coagulates and the coagulum adheres to the spoon or stick. The red particles which are mixed with this coagulum may be removed by washing it in large and repeated portions of water; the substance that remains is fibrin nearly in a state of purity.

During the state of life the fibrin is contained in solution in the fluid part of the blood, the liquor sanguinis. Professor Müller obtained fibrin in a state of purity from frog's blood by opening one of its large arteries, or by laying bare and incising the heart itself. This blood being received into a watch-glass and the process of coagulation watched, it was observed that previously to the complete coagulation of the blood there formed a small colourless coagulum clear as water. 'Having brought a drop of pure blood,' says Müller, 'under the microscope, and diluted it with serum, so that the blood corpuscles lay completely scattered about and separated from each other, I observed that in the interval between the blood-corpuscles a coagulum of previously dissolved matter was produced, by which the whole separated blood-globules were connected together. I was then able to remove at the same time all the blood-corpuscles, notwithstanding their wide distribution and the size of the intervals between them, by raising with a needle the fibrous coagulum occupying the intervening spaces. As the blood-corpuscles of the frog are rendered by a microscope uncommonly large, this observation admits of the greatest distinctness, and allows no ambiguity to remain on the subject. There is still however an easier and more convincing method of proving that fibrin is dissolved in frog's blood. As I showed from experiment that the blood-corpuscles of the frog are about four times larger than the blood-corpuscles of men and mammalia, I concluded that perhaps the filter would keep them back, while it allowed the corpuscles of men and mammalia to pass. This is the case. The experiment may be made on a small scale with the blood of a frog alone; a small glass funnel and a filter of common white filtering-paper or thick printing paper are the only requisites. The paper must previously be moist, and it is well to add an equal quantity of water to the fresh blood of the frog. The liquid which flows through the filter is an almost colourless clear serum diluted with water, with a slight tinge of red, from the colouring matter dissolved by the water. As however the solution of the colouring matter of frog's blood by water requires a considerable time, the filtered fluid can scarcely be termed reddish, and is sometimes quite colourless. If, instead of water, a solution of sugar in water (one part of sugar to 200 or more of water be employed, no colouring matter will be dissolved during the filtration, and the filtered liquid is quite colourless and without the slightest trace of mixture. If the filtered serum be examined under the microscope, no trace of corpuscles can be detected. In this clear serum in the course of a few minutes a colourless coagulum is formed, so clear and transparent that it is not even detected after its formation until it is raised out of the fluid with a needle. It gradually thickens and becomes whitish and fibrous; it then assumes gradually the appearance of the coagulum of human lymph. In this way the fibrin of the blood is obtained in the purest state, and this has not hitherto been done.'

Pure fibrin is of a whitish colour, inodorous and insoluble in cold water; it is a solid substance, tough, elastic, and composed of thready fibres.

The relative quantity of fibrin contained in the blood varies greatly according to the state of the system at the time it is obtained.

It is stated by Brande, who has given a full account of the chemical properties of fibrin, that fibrin and albumen [Albumen], if not identical, are very closely allied, and appear rather to differ in organization than in essential chemical character. 'The ultimate composition of fibrin has been determined by Gay Lussac and Thenard, and by Michaelis, who made a comparative analysis of that of arterial and venous blood: the following are their results:—

	Gay Lussac and Thenard.	Michaelis.	
		Arterial.	Venous.
Nitrogen . .	19·934	17·587	17·267
Carbon . .	53·360	51·374	50·440
Hydrogen .	7·021	7·254	8·228
Oxygen . .	19·685	23·785	24·065
	100·000	100·000	100·000

The mean of these results gives nearly the following atomic composition:—

	Atoms.	Equivalents.	Theory.
Nitrogen . . .	1	14	19·72
Carbon	6	36	50·70
Hydrogen . . .	5	5	7·04
Oxygen . . .	2	16	22·54
	1	71	160·00

That variety of fibrin which constitutes muscular fibre is so interwoven with nerves, vessels, and cellular and adipose tissue, that its properties are probably always more or less modified by foreign matters. 'To obtain the fibrin of a muscle, it must be finely minced and washed in repeated portions of water at 60° or 70°, till all colouring and soluble substances are withdrawn, and till the residue is colourless, insipid, and inodorous; it is then strongly pressed between folds of linen, which renders it semitransparent and pulverulent. Berzelius observes, that in this state it becomes so strongly electro-positive when triturated, that the particles repel each other and adhere to the mortar, and that it still retains fat, which is separable by alcohol or æther. When long boiled in water, it shrinks, hardens, and yields a portion of gelatine, derived from the interstitial cellular membrane; the fibrin itself is also modified by the continued action of boiling water, and loses its solubility in acetic acid, which, when digested with it in its previous state, forms a gelatinous mass, soluble in water, but slightly turbid, from the presence of fat and a portion of insoluble membrane, derived apparently from the vessels which pervaded the original muscle. It is soluble in diluted caustic potass, and precipitated by an excess of muriatic acid, the precipitate being a compound of fibrin with excess of muriatic acid, and which, when washed with distilled water, become gelatinous and soluble, being reduced to the state of a neutral muriate of fibrin.

'When the fibrin of muscle is mixed with its weight of sulphuric acid, it swells and dissolves, and when gently heated, a little fat rises to the surface, and may be separated: if the mass is then diluted with twice its weight of water, and boiled for nine hours (occasionally replacing the loss by evaporation), ammonia is formed, which combines with the acid, and on saturating it with carbonate of lime, filtering, and evaporating to dryness, a yellow residue remains, consisting of three distinct products: two of these are taken up by digestion in boiling alcohol of the specific gravity of .845, and are obtained upon evaporation; this residue, treated with alcohol of the specific gravity of .830, communicates to it (1) a portion of a peculiar extractive matter, and the insoluble remainder (2) is white, soluble in water, and crystallizable, and has been called by Braconnot *leucine* It fuses at 212°, exhaling the odour of roasted meat, and partly sublimes: it is difficultly soluble in alcohol. It dissolves in nitric acid, and yields on evaporation a white crystalline compound, the *nitro-leucic acid*. The portion of the original residue, which is insoluble in alcohol (3), is yellow, and its aqueous solution is precipitated by infusion of galls subacetate of lead, nitrate of mercury, and persulphate of iron. It appears therefore that the products of the action of sulphuric acid upon the fibrin of muscle are, 1. an extractive matter soluble in alcohol; 2. leucine; and 3. extractive, insoluble in alcohol, but soluble in water.'

(Brande, *Cyclopæd. of Anatomy and Physiology in loc.*, Professor Müller *on Human Physiology; British Annals of Medicine; Philosophy of Health*, vol. i.)

FI'BULA. The fibula (*péroné*, Fr., *περόνη, a bodkin*) is a long slender bone swelling out at both ends, by which it is firmly attached to the outer side of the *tibia*, or main bone of the leg. The lower extremity forms the projection of the outer ancle: it is received into a deep longitudinal groove at the side of the tibia, to which it is connected by a ligamentous union; and is firmly knit to the foot by strong bands of ligament, which spread like the sticks of a fan from the tip of the ancle to the bones of the heel and instep. The upper extremity slants a little backwards, and is articulated with the side of the tibia below the knee, by means of a true joint, having cartilaginous surfaces and a synovial membrane as well as external ligaments. The tendon of the *biceps flexor cruris*, or muscle of the outer hamstring, is implanted into this part of the fibula, which is called its *head*, and spreads over the adjoining bony and muscular surfaces, connecting and supporting them in the double capacity of a ligament and an aponeurosis. There is no greater degree of motion between the tibia and fibula than is sufficient to give some elasticity to the play of the ancle-joint, which is secured on the outer side chiefly by the projection of the fibula beyond it. The shaft of the fibula—nearly straight, triangular, hard, a little twisted, and of great strength for its size—is about as thick as the middle finger, and extends like a bowstring across the arch formed by the gradual enlargement of the tibia towards the knee. A strong sheet of fibrous membrane, called the interosseous ligament, tightly stretched from one bone to the other, fills up the greater part of the interval between them, and gives surface for the attachment of muscles and strength to the limb, without adding inconveniently to its bulk or weight. Nine muscles are attached to the fibula. The *biceps cruris*, already mentioned, bends the leg back towards the thigh; three on the fore part raise and extend the toes; the remaining five unite in raising the heel, and press the toes and the ball of the foot against the ground; at the same time turning the sole outwards by lifting its external border. The muscles chiefly concerned in the last-mentioned action are the *peroneus longus* and *brevis*; their tendons pass behind the ancle, lying in a groove of the fibula, which acts as a fixed pully to change the line of their traction, and are inserted into two bones on the outer and inner edge of the sole near the base of the toes. They are very powerful muscles; and when they act with sudden and spasmodic force, in consequence of the foot coming unexpectedly to the ground, are capable of breaking the fibula above the ancle by pressing the foot against its projecting end. This accident happens not unfrequently from the foot slipping unawares over the edge of the curb-stone, and is complicated with various degrees of lateral dislocation, and with severe sprain of the ligaments of the *inner* ancle. The force may be sufficient to break off the tip of the inner ancle; and if the sharp edge of the broken tibia be driven through the skin, which sometimes happens, the cavity of the joint is exposed, and the injury becomes a compound dislocation of the ancle-joint. These accidents are sometimes secondary, the foot being in the first instance forced by the weight against the *inner* ancle, with sprain of the *external* ligaments, and then drawn up with a jerk by the peronei. However produced, the injury is a very serious one, and often requires much good management to prevent permanent lameness or even worse consequences. Minor degrees of it have a general resemblance to simple sprains of the ligaments, and the fracture of the fibula may be overlooked. It may, however, be easily detected, notwithstanding the swelling, by the unusual position of the foot, and by pressing the bones together higher up the leg; for if the fibula be fractured, this cannot be done without a sense of yielding of the otherwise solidly compacted parts, and increase of pain to the patient from the pressure of the broken end of the bone against the soft parts. From the name of the eminent surgeon who first delineated and described this injury, it is called *Pott's fracture*. [Foot, Fracture; Tibia.]

FI'BULA, a term used among the Romans for the broach or buckle with which their vests were usually fastened. It is derived from *figo*, 'to fix,' and the most antient form of the word is supposed to have been *figebula*. These fastenings were made in very great variety, both as to material and form, and were sometimes ornamented with engraved stones or gems. Fibulæ of gold were often used as presents. The most common were made of brass or iron. Count Caylus, in his 'Recueil,' pl. 110, fig. 4, has engraved a fibula which served the double purpose of a fastening to the garment and a key. *Fibula* was a term likewise applied by the antients to the iron brace or band used for joining or fastening beams, mentioned by Cæsar (*De Bello Gall.*, l. iv., c. 17) and described by Vitruvius (l. i., c. 5). The *fibula chirurgica* was an instrument used by surgeons for drawing the lips of a wound together, noticed by Pitiscus, in his *Lexicon*, p. 778, who also mentions the *fibula gymnastica*, sive *theatralis*, 'quæ cantoribus et comœdis inserviebat,' particularly described by Celsus, and several times alluded to by Juvenal and Martial. This was a ring of light workmanship.

FIBULA'RIA. [ECHINIDÆ, vol. ix. pp. 260, 261.]

FICE'DULA. [BECCAFICO, vol. iv. p. 125; SYLVIADÆ.]

FICHTE, JOHANN GOTTLIEB, was born in Upper Lusatia in 1762. After receiving a school education, he studied at the universities of Jena, Leipzig, and Wittemberg. He afterwards became acquainted with Kant and Pestalozzi; and in 1792 attracted general attention by his *Versuch einer Critik aller Offenbarung* (Attempt at a Critique of all Revelation), on account of which he was made professor of philosophy at Jena. Here he began to promulgate the system of philosophy which is known under the name of *Wissenschaftslehre* (Doctrine of Science). A treatise on Faith and Providence which he wrote at Jena having brought upon him the suspicion of irreligion, he retired to Prussia, and after living for some time at Berlin, removed to Erlangen, where he was appointed professor of philosophy, with leave to visit Prussia in the winter time.

The character of Fichte has always been held in high esteem. His 'Discourses to the German People' during the French invasion are justly valued, and he is said to have died, as he always lived, for a good cause. During his residence at Berlin in the year 1814, he urged his wife to visit the sick in the military hospital of that city; in consequence of which she caught a fever, from which she recovered, but communicated it to her husband. Fichte died at Berlin in 1814, leaving a son, Immanuel Hermann, now a professor at Bonn, and one of the most distinguished philosophers in Germany.

Fichte's *Wissenschaftslehre* grew out of the philosophy of Kant, of whom he at first considered himself a mere disciple. Kant had dogmatically assumed the school logic as the foundation of his system; the forms of propositions, as affirmative, negative, &c., had supplied him with his table of categories, and he never thought that any one would ask for the origin of these forms themselves. According to the system of Kant, time and space have no existence exterior to the mind, but are merely the forms in which it discerns objects, and which only abide in itself. An intuition (or immediate contemplation) was divided into matter and form: thus in a red surface, the mere colour red was called the matter of the intuition, and the extension its form. The first was held to be a manifestation of something external to ourselves; the latter as merely dwelling in our own minds. This was Kant's theory of sensation (*Transcendentale Æsthetik*) and it is followed by an investigation of the laws of the understanding. These laws he worked out from the table of categories, which, as before said, was constructed from the logical form of propositions. Thus, propositions are divided into universal, particular, and singular. Hence the objects of propositions considered in this light, are 'all,' 'many,' or 'one,' or may be said to come under the categories of 'totality,' 'multiplicity,' and 'unity.' In the same manner, from the divisions of propositions into affirmation, negative, and infinite, Kant got the categories of 'reality,' 'negation,' and 'limitation,' and from the division into categorical, hypothetical, and disjunctive, the categories of 'substance and accident'—'cause and effect'—'action and re-action.' A fourth series of categories obtained from the modal division are 'necessity,' 'actuality,' 'possibility;' and as we cannot think of objects at all except under the forms expressed by these propositions, it follows that all objects of thought must come under the categories. From this Kant concludes, that as time and space are the forms of our intuition, so are 'cause and effect,' &c. the forms of our thought, having likewise no existence without our own minds; and that when we say the law of cause and effect is a law of nature, no more is conveyed than that the law of cause and effect is that under which we are compelled to observe nature, having nothing to do with external things themselves. Kant compares his own system to that of Copernicus, observing that the latter makes the planets move round the sun, and that he in the same manner puts the mind in the centre, and makes the objects adapt themselves to the forms of the mind, instead of the mind following the laws of the objects. Hence, according to his view, we are altogether without knowledge of things in themselves, the extended form in which they appear being merely in our own mind, and likewise the laws by which we suppose they are regulated. We merely contemplate various phænomena, which are the exponents of things we cannot know anything about, and to which these very phænomena do not bear the slightest resemblance.[*]

Various contemporaries had found it strange that two regions so heterogeneous as those of mind and things in themselves (*dinge an sich*) should at the same time be so admirably adapted to each other, that the latter should accommodate themselves to all the forms of the former; and at the same time, the taking of a common book of logic, assuming all its *dicta* as self-evident axioms, seemed rather a superficial proceeding. The sceptical adversaries challenged the Kantists to prove that there was a necessary connection between the *form* and the *matter* of knowledge.

Aroused by these attacks, Fichte, as a disciple of Kant, began to inquire what was the absolute form of knowledge, and at the same time what lay at the foundation of logic, the mere assumption of which, as a self-evident science, did not satisfy him. He saw that all logic depended on the propositions of identity and contradiction. 'A is A,' and 'Non-A is not A.' He then asked himself what is meant by 'A is A;' does it imply that A exists? No, because the proposition 'A centaur is a centaur' is a true one, though the centaur does not exist at all. 'A is A' means no more than 'If A is *given*, it is A;' and A is not A, provided it is not *given*.[†] 'Given' implies *given to some conscious being*; and hence we find that the truth even of an identical proposition depends on the being of an I or Ego (*das Ich*). The proposition 'A is A' is converted into 'Ego is Ego;' and this is found to depend on no condition, as Ego gives itself, and its very essence consists in its giving itself. From this proposition is obtained the category of reality: reality is that which is given to the Ego. In like manner, 'Non-A is not A' is converted into 'Non-Ego is not Ego;' and from this proposition is obtained the category of negation. Then a question arises, 'How can Ego posit Non-Ego?' It is assumed as an axiom that every thing in Ego is posited by itself; how then can it posit a Non-Ego, which seems an act of self-destruction? It then turns out that Ego posits itself, as determined by Non-Ego. An undetermined being is nothing; determination implies limitation, and hence Ego by positing itself as a determined being, at the same time posits Non-Ego. The Ego is conceived at first as an unimpeded activity; it meets with a shock (*anstoss*), which causes it to perform an act of reflection, and from that moment it begins to construct a world without itself. It feels itself confined by certain sensations, and hence imagines there must be a being external to itself supporting these sensations. At the same time the very consciousness of confinement implies a consciousness of the capability of freedom; for no being can be aware of a curb that is not striving against it. Freedom manifests itself in the power of directing the attention to some objects to the exclusion of others, or in the imagination of such as are absent. Thus a child who sees its first object cannot divert its attention from that object and think of another; it is completely curbed by the present; while a person who has seen a variety can at pleasure call forth a distant object, and close his mind's eye upon those immediately before him. This is a state of comparative freedom. It is impossible, in this limited space, to follow the *Wissenschaftslehre* through all its ramifications; but what is given above will serve to convey an idea of the principle. Fichte's adversaries accused him of Nihilism and Atheism, and seem to have imagined that he (Fichte) thought he had constructed the whole universe. These objections are answered by his son, in an excellent little book entitled *Beyträge zur Characteristik der neuern Philosophie*, in which he shows that the very being of the Ego proves its own finity, and that consequently his father's doctrine necessarily leads to the assumption of the *absolute*, or God, a being that is infinite. In a tract called *Die Wissenschaftslehre in ihrem allgemeinen Umrisse dargestellt* (Berlin, 1810), the elder Fichte says plainly that God is the only true being, and thus banishes all suspicion of Atheism. His moral doctrines involve a contempt for nature, which he regards as a mere curb over which freedom should triumph; and hence he is averse to all speculative physics, considering nature as the absolutely *given* of which there can be no knowledge, and making all reality proceed from the *knower*, he denies reality to the former. These opinions have led the philosophers of nature (*Natur-Philosophen*) to accuse him of one-sidedness. His son attributes this tendency to the influence of the doctrines of Kant, which always treated nature as a mere appearance (*Erscheinung*), and from which Fichte never became absolutely free.

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[*] It is not to be understood that the above is intended as a complete view of Kant's system. Only so much is given as to render the account of Fichte intelligible.

[†] *Gesetzt*, 'posited,' is the proper translation, but 'given' is more familiar.

It is hardly to be expected that the *Wissenschaftslehre* will be rendered perfectly intelligible by the above short notice, when the reader might turn over the whole works of Fichte, and still find the subject intensely difficult and obscure. The design of this article has been to give a hint of the principle, and no more.

An opportunity is here taken of warning the English reader against mere *dabbling* in German philosophy. If he have taste and leisure for the study, is willing to devote to it a considerable portion of his time, and will not refuse to bestow on it the most painful attention, he will find it worth his labour to study the works of Fichte, Schelling, and Hegel. But if he cannot bestow this labour, let him refrain from the subject altogether. The doctrines of the German philosophers are only to be gathered from their own voluminous works, most of which are written in a hard crabbed style; and all the English books which would give a slight view of this philosophy, and a pretty essay on it, are worse than useless, as they generally mislead.

FICHTELGEBIRGE is a mountain-knot or mountain-mass in Germany, situated between 50° and 50° 15′ N. lat., and 11° 45′ and 12° E. long. Its greatest length from north-east to south-west, between the towns of Asch and Baireuth, does not exceed thirty-five miles; and its average width is about twenty-eight miles. It is calculated that this mass of rocks covers about 900 square miles.

The whole mountain-mass is furrowed on all sides by narrow valleys and glens; its most elevated parts extend in plains, on which a few summits rise in the form of domes. These summits form a series arranged along the axis of the mass from south-west to north-east. Those which attain the greatest elevation are the Kösseine, which rises to 3024 feet; the Ochsenkopf, to 3328; and the Schneeberg, to 3424 feet above the level of the sea. The base on which the whole mass rests is about 1700 feet above the sea-level towards the south and west, and towards the east and north about 1800 feet.

The Fichtelgebirge is the centre, in which three extensive mountain-ranges unite, and from which they may be considered to issue. The Erzgebirge begins at its northern extremity near Asch, and runs off in an east-north-east direction, dividing Saxony from Bohemia. From its north-western extremity branches off another range, which is first called the Frankenwald (Forest of Franconia), and farther on takes the name of the Thüringerwald (or Forest of Thuringia); the Harz itself may be considered as the most northern branch of this range. The third range, which is immediately connected with the Fichtelgebirge, is the Böhmerwald (or Forest of Bohemia), which runs off in a south-eastern direction.

In consequence of this disposition of the mountain-ranges which issue from the Fichtelgebirge, the waters collected on its slopes run off to the four cardinal points. On its southern declivity rises the Naab, which joins the Danube, by which its waters are carried to the Black Sea; the Main, rising on the western declivity, mingles its waters with the Rhine; and the Eger, which carries off the waters from the eastern slopes, falls into the Elbe, as well as the Saale, which rises near the northern extremity and runs northward.

The nucleus of the mass is composed of granite, gneiss, and mica-slate; but on the north-western side it is surrounded by extensive beds of clay-slate and grauwake. Its mineral wealth is not great. It contains extensive beds of iron ore, which is the only metal that is worked on an extensive scale. Copper ore occurs frequently, but always in such small quantities that it cannot be worked. Gold was formerly obtained by washing the sand of some rivulets. Alum, serpentine, and coal occur in some places in rather large quantities. In other places there are some precious stones, as garnets, tourmalins, &c.

FICI'NO, MARSI'LIO, born at Florence, A.D. 1433, was the son of Ficino, the physician of Cosmo de' Medici, who perceiving the happy dispositions of the youth, generously provided for his education. Ficino studied Greek, and applied himself especially to the works of Plato, which he translated into Latin. He afterwards translated Plotinus, Jamblichus, Proclus, and Porphyrius, and became a great admirer of the late Platonicians of the Alexandrian school. He was one of the preceptors of young Lorenzo, Cosmo's grandson. Cosmo appointed him president of the literary society which he assembled at his house, and which was called Academia Platonica, having for its object to explain the doctrines of the Platonists. Its meetings, which were greatly encouraged by Lorenzo, were cheered by symposia, or annual banquets, on the anniversary of Plato's birth-day, of one of which, held at the villa of Careggi, Ficino himself gives an interesting description. The Academicians were divided into three classes: 1st, the Mecenati, being the family of the Medici; 2nd, the teachers, who consisted of the most learned men of the time, such as Pico della Mirandola, Poliziano, Leon Battista Alberti, Landino, and others; 3rd, of pupils. (Bandini, *Specimen Literaturæ Florentinæ*, vol. ii.; Brucker, *Histor. Philos.*, tom. iv., period the 3rd, b. 1.)

At the age of forty Ficino resolved to devote himself to the church, and being ordained, his patron Lorenzo conferred upon him a canonry in the cathedral of Florence. He now made an attempt to amalgamate the theology of Plato with Christianity, and in so doing was at times carried by his zeal beyond the limits of sound criticism or taste. He was however sincere and single-minded, exemplary in his private conduct, mild and moderate in his temper, and, contrary to the practice of most of his contemporaries, was averse from literary feuds and rancorous polemics. Being of a diminutive size, and of very precarious health, he says himself that he hardly passed a day without bodily pain, and yet he constantly applied to study. Much of his time was spent at the various country residences of the Medici near Florence, in which he composed his works. He died in 1499, at the age of sixty-six, and his countrymen raised to him a monument in the cathedral of Florence, with his bust, and an epitaph written by his friend Poliziano. His works were collected and published at Basel, 2 vols., folio, 1491. They consist of translations from the Greek philosophers, original treatises on metaphysics and ethics, his Theologia Platonica, and other writings. His Latin epistles, which were published separately at Venice, 1495, are interesting on account of the details which they contain concerning the distinguished scholars collected at Florence by the fostering patronage of Lorenzo. Ficino wrote also a work 'De Religione Christianâ,' and a commentary on the Epistles of St. Paul. (Roscoe's *Lorenzo the Magnificent;* Corniani, *Secoli della Letteratura Italiana*.)

FICOIDEÆ. [MESEMBRYACEÆ.]

FICTION. [NOVEL; ROMANCE.]

FICTIONS (in Law) have been somewhat quaintly defined to be 'those things that have no real essence in their own body, but are so acknowledged and accepted in law for some especial purpose.' These especial purposes are various. The law, it is said (by which we must understand those who for the time are the interpreters of it), shall never make any fiction but for necessity, and in avoidance of a mischief (Coke's *Rep.* iii. 30). This is as much as to say that those who interpret the law will, in order to avoid a special hardship, or remove some unexpected difficulty not provided for by the law, resort to a fiction, that is, they will imagine something to be which is not. It is said that such fictions have always a good end in view, that is, an end considered good by those who make or maintain the fictions. It was wisely said, that fictions of law must not be of a thing impossible: but the reason is rather curious; 'for the law imitates nature.' If we object to the soundness of the reason in the instance last mentioned, we cannot but approve of the following rule as to fictions—that a man could never be subject to the penalty of a statute by a fiction of law. The law, it was said, would also make fictions in order to avoid absurdity; but this could hardly have been said in earnest.

Blackstone shows (iii. 43) by what manner of fiction the Court of King's Bench originally held pleas of all personal actions—'It being surmised that the defendant is arrested for a supposed trespass which he never has in reality committed; and being thus in the custody of the marshal of the court, the plaintiff is at liberty to proceed against him for any other personal injury: which surmise, of being in the marshal's custody, the defendant is not at liberty to dispute.' Such liberty of disputing the fiction would clearly spoil the whole business, and was therefore as necessarily disallowed as the fiction was allowed. Of the same kind is the fiction mentioned by Blackstone (iii. 107), by which a contract made at sea is feigned to be made at the Royal Exchange, or other inland place, in order to draw the cognizance of the suit from the courts of Admiralty to those of Westminster Hall. 'Such fictions,' as Blackstone remarks, 'are adopted and encouraged in the Roman law: a son killed in battle is supposed to live for ever for the benefit of his parents; and by the fiction of *postliminium* and the *lex Cornelia*, captives, when freed from bondage, were held to have never been prisoners; and such as died in captivity were supposed to have died in their own country.'

Fictions in law, though often ridiculous enough, have generally had their origin in some defect in the existing laws or course of procedure, and have pointed out in what respects the judges or interpreters of law, and, as we may suppose, general opinion also, under the influence of which judges must to some extent be, have felt that change was necessary. Many fictions, so far from being injurious, have been beneficial; but it must be remarked that they are the indications of a rude state of social organization, and must gradually disappear with the improvement of the institutions of society; for their existence supposes a defect which it is the business of legislation to remedy.

FICUS, a large genus of Urticaceous plants having the flowers, both males and females, mixed indiscriminately on the inside of a fleshy receptacle, which is so concave that its edges are drawn together into a narrow opening. This is illustrated by the common eatable fig, the receptacle of Ficus Carica, which, although resembling a fruit as simple as a gooseberry, is in fact a collection of a large number of minute unisexual flowers growing to a succulent base; at its apex will be found the narrow opening where the edges of the receptacle are drawn together, and when its interior is laid bare, the flowers are seen closely packed all over its surface, divided from each other by soft colourless bristle-like bracts or scales. What are called the seeds in the ripe fig are the pericarps, each of which contains a single seed. The calyx is variable in the number of its segments, sometimes having only 3, sometimes 7 or 8. The stamens are solitary in many species, 3 in others, and 5 in some. The pistil consists of a single ovary terminated by an awl-shaped style, ending in a two-lobed stigma.

The number of species of Ficus is very considerable, perhaps as great as that of any arborescent genus. They are all either tropical or inhabitants of warm countries. Some are small plants creeping upon the surface of rocks and walls, or clinging to the trunks of trees like ivy; others are among the largest trees of the forest. All travellers in the woods of South America speak of the noble aspect of the fig trees (meaning species of Ficus not of the cultivated sort), of their gigantic dimensions, and of the thick delightful shade cast by their leafy heads. They are especially remarkable for throwing out roots from their branches, which, after they have reached the ground and established themselves there, increase rapidly in diameter, produce other branches, and thus contribute to extend an individual over a considerable space of ground. Frazer speaks thus of what he saw of their habits in the forests at Moreton Bay in New Holland:—'I observed several species of Ficus upwards of 150 feet high, enclosing immense iron-bark trees, on which originally the seeds of these fig trees had been deposited by birds. Here they had immediately vegetated, and thrown out their parasitical and rapacious roots, which adhering close to the bark of the iron tree had followed the course of its stem downwards to the earth, where, once arrived, their progress of growth is truly astonishing. The roots of the Ficus then increase rapidly in number, envelop the iron-bark, and send out at the same time such gigantic branches, that it is not unusual to see the original tree, at a height of 70 or 80 feet, peeping through the fig, as if itself were the parasite on the real intruder. In the singular angles or walls, as they are here termed, which are formed by the roots of these trees, and of which I observed many 16 feet high, their is room enough to dine half a dozen persons. The fruit is eagerly sought by Regent birds (*Sericulus chrysocephalus*), blue pigeons, and swamp pheasants (*Cuculus Phasianus*), and the spreading and massy boughs support a number of superb parasitical plants.' Reinwardt assures us ('Ueber den Charakter der Vegetation auf den Inseln des Indischen Archipels') that he observed on the island of Semao a large wood whose trunks all proceeded from one single stem of a Ficus Benjamina, all united with each other by their branches though the trunks were distinct. The well-known Ficus Indica, or Banyan Tree, is another instance of this peculiar habit.

The species abound in a milky juice containing caoutchouc, and there is every reason to believe that what of this substance comes from Java is exclusively procured by tapping different species of Ficus. The best known on the continent of India is yielded by Ficus elastica.

Although the fruit of Ficus carica and some others is eatable, yet the whole genus abounds in an acrid, highly dangerous principle, diffused among the milky secretion. This is perceptible even in the common fig, whose milk produces a burning sensation on the tongue and throat; but when the fruit of that species is ripe, the acridity is destroyed by the chemical elements entering into new combinations. In some species it is so concentrated that they are among the most virulent of poisons. *Ficus toxicaria*, a Sumatra species, and *F. dæmona*, from Tanjore, derive their names from this circumstance, in which many more equally participate.

For an account of the *Ficus carica* see Fig; of a few others, remarkable for their interest, we shall give a brief account.

1. *Ficus Indica*, the Banyan Tree, is a native of most parts of India, both on the islands and the main land. Roxburgh states that it is found in its greatest perfection and beauty about the villages on the skirts of the Circar mountains. The leaves are ovate, heart-shaped, three-ribbed, and entire; when young, downy on both sides; when old, much smoother; they are from five to six inches long, and from three to four broad; at the top of the leafstalk on the underside is a broad, smooth, greasy-looking gland. The figs when ripe grow in pairs from the axils of the leaves, are downy, and about the size and colour of a middle-sized red cherry. The wood is light, white, porous, and of no value. Brahmins use the leaves as plates to eat off; birdlime is manufactured from the tenacious milky juice. If the seeds drop in the axils of the leaves of the Palmyra Tree (*Borassus flabelliformis*), the roots grow downwards, embracing the trunk in their descent; by degrees they envelop every part except the top, whence in very old specimens the leaves and head of the Palmyra are seen emerging from the trunk of the Banyan Tree as if they grew from it. The Hindoos regard such cases with reverence, and call them a holy marriage instituted by Providence. The Banyan Tree, covering with its trunks a sufficient space to shelter a regiment of cavalry, and used as a natural canopy for great public meetings, has been so often described by writers on India as to have become familiar to the reader. The branches spread to a great extent, dropping their roots here and there, which as soon as they reach the ground rapidly increase in size till they become as large as and similar to the parent trunk, by which means the quantity of ground they cover is almost incredible. Roxburgh says that he has seen such trees full five hundred yards round the circumference of the branches, and a hundred feet high, the principal trunk being more than twenty-five feet to the branches, and eight or nine feet in diameter. An excellent account of such a tree will be found in the Oriental Annual for 1834; and a graphic description of the mode of growth in Rumf's 'Herbarium Amboinense,' vol. iii., p. 126. See also 'Asiatic Researches,' iv. 310. It is called Vuta in Sanscrit, Bur or But in Bengâlî, Bagha in Cingalese.

2. *Ficus elastica*, the Indian Caoutchouc tree, is now a common tree in the hothouses of this country. It has large, shining, oval, pointed, thick leaves, small axillary uneatable fruits the size of an olive, and long pink or red terminal buds composed of the stipules rolled together. This species inhabits the Pundua and the Juntipoor mountains,

which bound the province of Silhet on the north, where it grows to the size of a European sycamore, and is called Kasmeer. It is chiefly found in the chasms of rocks and over the declivities of mountains among decomposed rocks and vegetable matter. It produces when wounded a great abundance of milk, which yields about one-third of its weight of caoutchouc. It grows with great rapidity; a tree is described as being twenty-five feet high, with the trunk a foot in diameter when only four years old. The juice of this valuable plant is used by the natives of Silhet to smear over the inside of baskets constructed of split rattan, which are thus rendered water-tight. Old trees yield a richer juice than young ones. The milk is extracted by incisions made across the bark down to the wood, at a distance of about a foot from each other all round the trunk or branch up to the top of the tree, and the higher the more abundant is the fluid said to be. After one operation the tree requires a fortnight's rest, when it may be again repeated. When the juice is exposed to the air it separates spontaneously into a firm elastic substance, and a fetid whey-coloured liquid. Fifty ounces of pure milky juice taken from the trees in August yielded exactly 15¼ ounces of clean washed caoutchouc. This subtance is of the finest quality, and may be obtained in large quantities. It is perfectly soluble in the essential oil of Cajeput. (Roxb., *Fl. Ind.* iii. 545.)

3. *Ficus religiosa*, the Pippul Tree, is a large tree common in every part of India, especially near houses, where it is planted for the sake of its extensive dark grateful shade. It is held in superstitious veneration by the Hindoos, because their deity Vishnoo is fabled to have been born under its branches. The leaves are heart-shaped, long, pointed, wavy at the edge, not unlike those of some poplars; and as the footstalks are long and slender, the leaves actually tremble in the air like those of the aspen tree (*Populus tremula*). Silk-worms prefer the leaves next to those of the mulberry. The leaves are used for tanning leather by the Arabs, who call the tree Mudáh or Vudáh, and also Uadi Zebid. See *Asiatic Researches*, iv. 309, for further information concerning this.

4. *Ficus Sycomorus*, the sycomore fig, is a large tree found in Egypt, where it is planted extensively by the road-side, near villages, and on the sea-coast, for the sake of the shelter of its very widely-spreading branches. The Arabs call it Djummeiz. Forskähl states that its head is often forty yards in diameter. The leaves are broadly ovate, repand, or somewhat angular, rather blunt, nearly smooth, heart-shaped at the base. The figs are not produced upon the young branches, but in clustered racemes upon the trunk and the old limbs. They are sweet and delicate, and eaten by the Egyptians. The timber appears to be of little value, for Forskähl excludes it from the lists of carpenters' wood, and places it among the trees which are used for firewood. It can hardly therefore have furnished the wood of which mummy-cases were made, as has been supposed. Professor Don, with greater reason, conjectures that they were made from the timber of Cordia Myxa. When old this tree becomes very gnarled and broken, as is shown in a plate in Salt's 'Abyssinia,' where it is figured under the name of Daroo tree, but it is so bare of foliage as to be hardly a picturesque object.

FIDDLE. [VIOLIN.]

FIDEI COMMISS. According to German civil law, the fidei commiss is intimately connected with the law of inheritance among the nobility, being the regulation according to which the whole or part of a family property is enjoyed by a certain member of the family, on the condition of leaving it unimpaired to the person pointed out by the particular family arrangement; either to the first-born male, when it is called *majorat*, or to the last-born male, when it is called *minorat*, or to the oldest member of the family without regard to direct descent, when it is called *seniorat*. Like the English law of entail, the object of this institution is to render the family property inalienable; it may however be mortgaged, but this is merely a temporary sequestration of the revenues which are applied to cancelling the debt. In modern times, this institution, like many others, has been abolished in some parts of Germany, partly by the introduction of the French law, as in the Rhenish provinces, and partly by the amalgamation of the former German civil law with the Code Napoleon, as in Bavaria. In the north of Germany, however, where the antient Saxon law was prevalent, as in Hanover, Saxony, and other countries, it has been maintained, and is still in force.

FIDEICOMMISSUM, in the Roman law, is something given by will or codicil, not directly to the person beneficially interested in it, but to some other person, with a request that he will transfer it to the party for whom it was intended. The person thus intrusted was called Heres Fiduciarius; and the person for whom it was intended Heres Fideicommissarius. It was necessary that an heir (*heres* in the Roman sense) should be named, or no property could be transmitted to the Fideicommissarius. (Gaius, ii., 248, &c.) Originally it entirely depended on the good faith of the trustee (fiduciarius) whether he performed the will of the testator or not.

The origin of these fideicommissa probably was in a desire to evade the strictness of the old civil law; as we see in the case of Q. P. Rufus (Val. Max. iv. 2, 9), who being an exile was incapacitated from taking a gift under the will of a Roman citizen, but yet could claim it from his mother, to whom it had been given in trust for him. In the time of Augustus the rights of the fideicommissarius became legally established by the emperor giving the consuls jurisdiction in such matters. Afterwards pretors were expressly appointed, under the name of prætores fideicommissarii, to take cognizance of such trusts, but the consuls still retained their jurisdiction also. In the provinces the governors (præsides) took cognizance of fideicommissa. (Ulpian, *Frag.* 25, 12.) Fideicommissa, or trusts of specific things, became gradually assimilated as to their qualities and incidents to legacies: the following remarks apply to fideicommissa, where the whole inheritance (hereditas in the Roman sense), or a determinate part, was given to a trustee in trust.

By the old Roman law the *heres*, on taking possession of the testator's property, became liable to all his debts and obligations, and consequently those who only took the property as trustees (*heredes fiduciarii*) often refused to encumber themselves with a burden from which they could derive no advantage, and might sustain great loss. To remedy this inconvenience, it was enacted by the Senatusconsultum Trebellianum, passed in the time of Nero, that when the trustee had given up the property to the fideicommissarius (*cestui que trust* of the English law), all right of actions by or against the trustee, in respect of the property, should be transferred to the cestui que trust.

If the trustee refused to accept the inheritance, the pretor, on the petition of the cestui que trust, could compel him under the Senatusconsultum Pegasianum, passed in the time of Vespasian, to accept and to transfer the property to his cestui que trust, who took it with all its burdens. No particular form was requisite in order to effect this transfer.

By the Senatusconsultum Trebellianum, if the heres was required to transfer not more than three-fourths of the inheritance to the cestui que trust, the two parties were liable to all suits and burdens in respect of the property according to their several shares. If he was required to transfer more than three-fourths or the whole, the S. Pegasianum allowed him to retain one-fourth, as the Falcidian law did in the case of legacies. If the heres let himself be compelled to accept the trust under the S. Pegasianum, he lost his one-fourth. (Dig. xxxvi. Tit. 1; Ad. S. C. Trebellianum.)

The cestui que trust was himself sometimes only a trustee for others, and in this case never had the benefit of the one-fourth: the same was the case if a legatee had to transfer a legacy to another.

FIEF. [FEUDAL SYSTEM.]

FIELD OF VIEW. [TELESCOPE.]

FIELDFARE. [MERULIDÆ.]

FIELD MARSHAL, a military dignity conferred on such commanders of armies as are distinguished by their high personal rank or superior talents.

It has been supposed that the term marshal is derived from *Martis Seneschallus*, but it is more probable that it came from the Saxon words *mar*, or *marach*, a horse, and *scalch*, a servant; and it appears to have designated the person who had the care of a certain number of horses in the royal stables. In the Teutonic laws such a person is called *maris calcus*, and the fine for his murder is particularly specified.

The earl-marshal of England had originally the chief command of the army; and history records the names of two noblemen, De Montmorency and Fitzosborne, on whom the title was conferred by William the Conqueror.

The office was by Henry VIII. made hereditary in the family of the duke of Norfolk; but it is probable that it had before that time ceased to be connected with the military service; for from the 'Anecdotes of the Howard Family,' we learn that while another person held the post of earl-marshal, Sir Robert Willoughby Lord Brooke was appointed by Henry VII. to be marshal of the army.

The title of Maréchal de France appears to have become a military dignity in that country in the time of Philip Augustus; and, according to Père Daniel, the first person who held it was Henry Clement, the commander of the French army at the conquest of Anjou in 1204. Originally there was but one Maréchal de France, but, in 1270, when the king, Saint Louis, went on his expedition to Africa, a second was appointed. Francis I. added a third; and the number has since been greatly increased.

The maréchaux de camp, in the old French service, were charged with the duty of arranging the encampment and providing subsistence for the troops; and in action they had the command of the wings or of the reserve of an army under the general-in-chief. From the title borne by this class of general officers is derived that of feld-marschall in the German armies; and from the latter title has arisen that which corresponds to it in the British service.

The number of British field-marshals is at present four—the dukes of Wellington and Cambridge, and the kings of Belgium and Hanover.

FIELDING, HENRY, born April 22, 1707, was the son of General Edmund Fielding, a descendant of the earls of Denbigh. He was nearly connected with the ducal family of Kingston, and thereby with Lady M. W. Montagu. Being designed for the bar, he was removed from Eton to the university of Leyden, where he is said to have studied with application; but owing to the limited nature of his finances, he was compelled to return to London, where he plunged into all the dissipation of the metropolis. His first resource as a means of support was writing for the stage; and between 1727 and 1736 he produced eighteen comedies and farces, none of which are now known or read, with the exception of two or three. This want of success may be attributed in part to the careless haste with which he appears to have written; but it is perhaps more probable, from the numerous instances of failure on record, that there is something in the qualities of a good novelist which render it almost impossible for him to become an admired playwright.

About the year 1736 Fielding married. His wife's portion and a small estate, inherited, as is supposed, from his mother, enabled him to retire from London; but his habitual extravagance again brought him into difficulties, and after three years he became a student at the Temple, with the view of retrieving his fortune at the bar. At the usual time he was called; but gout, the consequence of his early dissipation, rendered it impossible for him to practise with regularity sufficient to insure success. During the interval which preceded his call to the bar, he supported his family by pamphlets and essays on the passing occurrences of the day; and at this time two events happened which seem to have influenced the whole of his remaining career: the death of his wife, to whom he was fondly attached, and the publication of Richardson's novel of 'Pamela,' which gave him an opportunity to enter upon an employment which he found preferable to the study of law. He now wrote what professed to be the counterpart of 'Pamela,' the history of her brother, 'Joseph Andrews,' who undergoes a variety of trials of a kind similar to those which make Pamela's career so interesting. The whole book is intended as a satire on 'Pamela;' but the author visibly warms with his subject, and draws characters which perhaps none but he could have drawn in any case, and not even he himself had he kept his primary object distinctly in view.

The character of Parson Adams has been applauded and appreciated so often that it would be vain to say anything in its praise; Nichols ('Literary Anecdotes,' iii., 371) informs us, that it was taken from a clergyman named Young, and indeed it seems almost impossible that so peculiar a character should have been the work of imagination, for there is perhaps nothing so difficult for a novelist as to draw singularity without allowing it to lapse into improbability and extravagance. Sir Walter Scott relates (*Life of Fielding*, pp. 95, 96,) that Richardson took mean and petty methods of revenging himself upon his successful satirist, by depreciating him before members of his own family, and by endeavouring to diminish his reputation as an author. Fielding however did not make reprisals, but contented himself with noticing Clarissa in a favourable manner, in a publication which he at that time conducted, called 'The Jacobite Journal.'

After the publication of 'Joseph Andrews,' Fielding wrote another play, 'The Wedding Day,' and a tract called 'The Journey from this World to the next,' which were followed by 'Jonathan Wild.'[*] The Rebellion of 1745 induced Fielding to take the direction of a paper called 'The Jacobite Journal,' directed against the party known by that name, and in support of the Hanoverian succession. This, with other publications of the same kind, at last obtained him a small pension and the place of Justice of the Peace for Middlesex and Westminster, which he is said to have owed to the influence of Lord Lyttelton.

Horace Walpole, with his usual mixture of foppery and snappishness, gives a very unfavourable account of Fielding's habits at this period, but his conduct as a magistrate proved a strong contrast to the usual iniquity of the so-called trading justices, one of whom he describes so forcibly in 'Amelia' under the name of 'Justice Thrasher.'

Amidst the laborious duties of a magistrate and pamphleteer, for Fielding was both at once, he contrived to produce 'Tom Jones,' a novel which for graphic description, originality of characters, and interest of the tale, has been and ever will be held in the very highest admiration. The publication of 'Tom Jones' was followed by some works on Poor Laws, in one of which, according to Sir Walter Scott, he appears to have struck out a scheme the same in principle with that which is now adopted. He also wrote a Charge to the Grand Jury of Middlesex and some Law Tracts.

'Amelia' was Fielding's last important work. It was published in 1751, soon after which time he was attacked by dropsy, jaundice, and asthma, and when all remedies had been tried in vain, the last remedy of self-banishment was proposed by his physicians. He left England for Lisbon June 26, 1754, and died there in October of the same year, aged 47, leaving a widow and four children.

Fielding has been styled, with perfect justice, the father of the English novel. Sir W. Scott observes that Richardson by no means succeeded in escaping from the trammels of the French romance. His characters have a strong touch of the impossible virtue and improbable heroism of that class of writing; and the length of 'Sir Charles Grandison' bears no small resemblance to 'Le Grand Cyrus.' But in Fielding's works we find the most perfect delineations of individual character—Squire Western, Tom Jones himself, Allworthy, and perhaps above all, Amelia and Mr. Abraham Adams, are portraits which proclaim their own truth. Every reader of Fielding must have been struck with the deficiency of individuality in his heroines. This arose, we believe, not so much from want of power in the artist as from the low state of feeling then prevalent with respect to women, which placed them, while unmarried, in the light of a plaything; and when married, in that of an upper servant, or at most an humble companion. Such our author describes Mrs. Western to have been; and while this state of manners continued, it was impossible for any writer professing to give a true picture of the times, to attempt to invest his heroines with such mental attractions as are possessed by the female characters of modern novels. His waiting-maids and landladies are full of life and energy, which makes it still more improbable that his genius should not have been adequate to portray women of higher station.

Opinions have been much divided as to the tendency of Fielding's works. We have little hesitation in pronouncing it to be, on the whole, moral, and decidedly more so than that of Richardson's. It is true that scenes of extreme indelicacy occur, often very unnecessarily, but the manners of the time admitted allusions and even expressions at which we should now feel the greatest disgust. Squire Western addresses his daughter in terms and on subjects which would shock the ear of a modern waiting-maid, to say nothing of her mistress; and this under circumstances where no very grave annoyance was intended: but in spite of all this coarseness there runs through all Fielding's works an honest appreciation of right and wrong, with no attempt to palliate bad actions by specious phrases. The character of Tom Jones seems to us not to have met with a fair share of praise. His generosity and nobleness of nature are, it is true, partially obscured by connexions of a degrading kind into which he so often falls; but however much he may fail of perfection, he cannot be called depraved. His love for Sophia is an affection of a kind which no thoroughly bad heart could entertain. He has all the materials of a fine character, and therefore there is no poetical injustice in marrying him to Sophia, and thereby putting him in a situation to redeem himself from the folly and vice into which he has been thrown.

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[*] Nichols ('Literary Anecdotes,' vol iii. p. 396.) assumes that 'Jonathan Wild' preceded 'Joseph Andrews.' Chalmers enumerates it among his earlier works, 'produced before his genius had attained its full growth,' but it appears, from Sir Walter Scott, to have *followed* a miscellany which appeared in 1743, one year *after* the publication of 'Joseph Andrews.'

'Amelia,' the author's last important work, bears the stamp of declining powers, with an appreciation of female character perhaps more delicate than we find in 'Tom Jones,' or 'Joseph Andrews.' Booth and Amelia are said to have been portraits of Fielding and his second wife; and 'if he put her patience, as has been alleged, to tests of the same kind, he has, in some degree, repaid her by the picture he has drawn of her feminine delicacy and pure tenderness.' (Scott's *Life of Fielding*.)

In summing up our opinion of Fielding's works, we should say that the chief fault is a want of unity in the plots. A novel is not a professed record of all which happens to any two people during a certain number of years. To make it perfect it requires extraordinary combinations tending to a certain end—the happiness or misery of the parties concerned. We do not reject these as improbable, but acknowledge them as constituting an integral element of the work. But we are not satisfied by a succession of petty annoyances and pleasures which have nothing to do with the conclusion of the tale. These rather disturb than interest our attention, and we would prefer being without them. But this is a minor fault, and very little seen in 'Tom Jones,' the author's best work, while we have, to counterbalance its truth and originality of delineation, skill in language, considerable dramatic power, and brilliancy of wit which has never been surpassed. (Sir Walter Scott's *Life of Fielding*; Nichols' *Literary Anecdotes*, vol. iii.; Chalmers' *Biograph. Dict.*; and Fielding's *Works*.)

FI'ERI FA'CIAS, a judicial writ of execution issued on a judgment obtained in a personal action in the king's courts. It is directed against the goods and chattels of the defendant, and is called a writ of *fieri facias*, from the words in it whereby the sheriff is commanded 'quod fieri facias de bonis,' &c., that he cause to be made of the goods and chattels of the defendant the debt or sum required. [Execution.] It lies against privileged persons, as peers, &c., as well as other persons, and also against executors and administrators, so far as regards the goods of the deceased.

This writ, like all other writs of execution, being founded upon the judgment, must strictly conform to, and be warranted by, the terms of the judgment, or it will be void. By virtue of this writ, the sheriff may sell the goods and chattels of the defendant till he has raised enough to satisfy the judgment and costs, as well of the suit as of the execution; and also to satisfy any rent due to the landlord of the premises where the goods may be at the time of the taking, not exceeding one year's rent in the whole. If the goods of the defendant in the county where the venue was laid are not sufficient, a testatum fieri facias (as it is called) may be sued out, which is directed to the sheriff of any other county where there are goods of the defendant; and if the judgment is not satisfied by the sale of the goods of the defendant, the plaintiff may have a capias ad satisfaciendum for the residue. [Capias.]

The sheriff is not justified in breaking open any outer doors to execute this writ, but having peaceably obtained entrance, he may break open any inner door belonging to the defendant in order to obtain possession of the goods. The clothes which the defendant actually has on or in wearing cannot be taken, and royal palaces are privileged against the sheriff's intrusion for the purpose of levying upon the goods of a resident therein.

Formerly it was necessary that writs of execution should bear teste or date, and be returnable in term time; but now, by stat. 3 and 4 William IV., c. 67, they may be tested, that is, dated on the day when issued, whether in term time or vacation, and may be made returnable immediately after the execution thereof.

If a fieri facias is issued against a clergyman, and the sheriff returns that he has no goods upon which the judgment can be levied, but that the defendant is a beneficed clerk not having any lay fee, the plaintiff may sue out a 'fieri facias de bonis ecclesiasticis,' which is directed to the bishop of the diocese, or to the archbishop during the vacancy of the bishop's see, commanding him to make of the ecclesiastical goods and chattels of the defendant within his diocese the sum therein mentioned. It is tested and made returnable exactly in the same manner as a common fieri facias, and is executed by means of a sequestration issued by the registrar of the diocese. [Sequestration.] (3 Bl. *Com.*; Archbold, *K. B. Pract.*)

FIESCHI. [Doria.]

FIESOLE. [Etruria; Florence.]

FIFE, a very small flute with never more than one key, and seldom that, giving acute piercing sounds, and used, together with the side drum, for military purposes, in marching, &c. It is an octave higher than the flute, and in compass comprises two octaves. Fifes are of three sizes, named by the letters A, B, and C. The first is the lowest; the last, which is that in common use, is the highest.

FIFESHIRE is a maritime county on the east side of Scotland, comprising the peninsula between the Frith of Forth on the south, the German Ocean on the east, and the Frith of Tay on the north. On the west it is bounded by the counties of Perth, Kinross, and Clackmannan. It lies between 56° 3′ and 56° 25′ N. lat., and 2° 30′ and 3° 50′ W. long. The outline is very irregular. The extreme length of the county from north-east to south-west is about 45 miles. The area contains 504 square miles, or 322,56 acres, of which more than four-fifths are arable and pasture, and one-fifth consists of hills, moss, moors, roads, and woods.

General Appearance and Soil.—The county, when viewed from the loftiest summits, presents a pleasing variety of mountains, valleys, and plains. One of the two highest of the Lomond Hills on the west is 1720 feet above the level of the sea; the Largo Law on the east is 1020 feet; and the Norman Law on the north, 850 feet. A great number of noblemen's and gentlemen's seats appear in the midst of old plantations and extensive pleasure-grounds; and the scenery, on a closer view, exhibits deep, romantic, and well wooded glens. Fifeshire is justly considered one of the best of the Scotch counties. It is well cultivated, has an unusual proportion of gentlemen's seats and plantations, and its coast is thickly studded with villages and towns.

Pennant, in his 'Tour in Scotland' in 1772 (part ii. p. 212), remarks that 'the peninsula of Fife is so populous that, excepting the environs of London, scarcely any part of South Britain can vie with it. Fertile in soil, abundant in cattle, happy in collieries, in ironstone, lime, and freestone; blest in manufactures, the property remarkably well divided, none insultingly powerful, but most of the fortunes of a useful mediocrity. The number of towns is perhaps unequalled in the same extent of coast, since from Crail in the east to Culross in the west, about 40 miles, they appear to form one continued chain.'

The soil is of various kinds. In the most fertile districts it consists principally of a rich loam: in the poorer tracts it is mostly a wet clay, resting on a cold bed of till. A level tract of deep, rich, and very fertile loam extends from east to west along the whole southern side, varying in width from three miles to one mile from the shore of the Frith of Forth. It produces luxuriant crops of all the common kinds of farinaceous grain and esculent vegetables. A wide strip of land extending from the town of St. Andrews to the extremity of the county north-west of Dunfermline, consists of very wet clay, with moss, moor, and rocky hills. The western and north-western parts are also of little agricultural value, being partially covered with barren moor, and heathy mountain land. A valley called the Howe of Fife, drained by the Eden, commences at the mouth of that river and extends to the borders of Perthshire. From Cupar westward its width is from three to four miles. Its soil varies in different parts from a light friable and sandy mould to a strong and heavy loam, but the whole is generally well cultivated and very productive. The northern side of the county along the Frith of Tay exhibits a series of barren rocky hills partially covered with furze, yet intersected by numerous fertile valleys and carefully cultivated slopes.

Hydrography and Communications.—Fifeshire is watered by numerous streams, of which the Eden and the Leven are the chief. Fresh springs are found in almost every field. The small river Eden, which rises in the Lomond

Hills, flows about twenty miles east and north-east through the central vale, or Howe of Fife, past the town of Cupar, into an æstuary of the German Ocean. The stream is slow, and of little force; art, however, has made it available for the movement of mills and of powerful manufacturing machinery. [Cupar.] Red and white trout, pike, and eels, are abundant in the deeper parts, and salmon are taken near its mouth. The Leven issues from Loch Leven, and taking an easterly direction, it receives the Orr Water from Loch Fitty, and flows into the Frith of Forth at the village of Leven. In a course of twelve miles it turns forty-five mills for cotton, flax, paper, corn, fulling, oil, &c. The water being very clear and soft is well adapted for bleaching. Before the establishment of bleaching fields along its banks, it was the best trout stream in the county. Fine salmon were taken in the loch, and thousands of eels in their passage thence to the sea. There is still a salmon fishery at the mouth. In May and June the eel fry come up the stream in millions, and when full grown in the loch and its marshes, they descend in September to the sea. Some of the numerous small lochs of this county have been drained, and their sites have become cultivated fields. Several of those which remain greatly improve the picturesque beauty of the scenery. The Loch of Lindores in the north-west is a beautiful sheet of water, covering seventy acres, and the depth is twenty feet. Loch Fitty, near Dunfermline, is the next in magnitude. There are mineral springs in various parts, particularly two chalybeates of great repute, near the town of Dysart.

About three-fourths of the county boundary are formed by the ocean and the great æstuaries or Friths of the Forth and the Tay; along this extensive line of coast there are many commodious little harbours. Steam-boats ply regularly between the principal ports of Fifeshire and those of the adjacent counties, especially with Leith on the south, and Dundee and Perth on the north. The principal roads in the county are those which, commencing at the small towns of Burntisland and Kinghorn opposite Leith, lead to Perth, Cupar, St. Andrews, and Dundee. During the last thirty or forty years all the roads have been much improved. The turnpikes are kept in good repair by parliamentary trustees.

Climate.—An extensively prosecuted plan of draining and forming enclosures has considerably ameliorated the climate, by clearing the atmosphere of malaria arising from stagnant water and decaying vegetation. The air in general is dry, healthy, and exhilarating. Many instances occur of great longevity. No peculiar epidemics appear. Agues are almost unknown, and fevers have a character comparatively mild: indeed no diseases are ever attributable to local causes. Along the coast of the Frith of Forth the air is particularly mild and salubrious, in consequence of the slight elevation of the surface above the level of the sea, the absorbent quality of the soil, and the shelter afforded by numerous plantations and enclosures: but in the west and north-west districts, which have greater elevation, with a soil wet, cold, and less cultivated, the air is comparatively damp and cold. From the hills of Fifeshire lying generally in a line from north-east to south-west, the valleys are much exposed to severe easterly and north-easterly winds. But the greatest inconvenience experienced by the agriculturist in this county, and in every part of Scotland, is occasioned by the frequent sudden changes in the weather.

Mineralogy, Natural Productions.—The county of Fife, in a geological point of view, is one of the most interesting in Scotland: it is rich in organic remains. Coal and limestone of the best description are found in abundance in almost every part of the county south of the Eden; but they are not found in the upper division, north of this river. Along the shore of the Frith of Forth, from Torryburn in the west to Pittenweem in the east, the strata of coal are generally regular, dipping to the east and south-east. They terminate on the one hand at the distance of two or three miles from the water edge, and on the other they are continued beneath it. Another tract of coal, to the north of this, extends through the higher ground, nearly parallel, from the north of Dunfermline to Leslie, and thence to the parish of Denino, a little to the south of St. Andrews. The dip of these strata is almost invariably north and north-east. In the irregular hills along the southern bank of the Eden the strata are found in every variety of position, cropping out and dipping towards opposite points of the compass. The collieries are numerous, and some are very extensive, and employ a large number of hands. The working of those at Dysart commenced about 350 years ago. Some are about seventy fathoms below the surface. The extensive Fordel coal works, in the parish of Dalgety, are the most valuable in the western part of the county. The pits are 300 feet in depth, and have been wrought nearly 240 years.

Limestone quarries are numerous in various parts of the southern district. The lime works of the Earl of Elgin, three miles east of Torryburn, are perhaps the most extensive in Scotland, yielding annually above 100,000 tons; also in the parish of Burntisland, six miles east of Dunfermline, and in many other places, inexhaustible quarries are constantly worked.

Ironstone is plentifully obtained in several parts of the coal fields, especially near Dysart, and in the parish of Balgonie. It yields from 40 to 60 per cent. of metal, and several thousand tons are annually conveyed to the great foundry of the Carron Company. Lead mines have been worked in the Lomond Hills.

Freestone of a superior quality is found in great abundance south of the Eden, particularly at a fine quarry in the parish of Burntisland. An extensive bed of dark-red freestone, well adapted for paving, is quarried in the parish of Strathmiglo, and near Dunfermline and north of the Lomond Hills there are vast rocks of white freestone, susceptible of a fine polish, and especially suitable for mantel-pieces and similar ornamental work. Along the sides and summits of the northern hills there are boulders of the primitive rocks—granite, gneiss, quartz, mica-slate, with garnets and primitive green-stone: many of these are of very large dimensions.

Whin or green-stone is very abundant, especially in the northern parts; it is generally hard, firm, and very durable; and, when neatly dressed, is an excellent material for the construction of houses. On the shore near Burntisland, and in some other places, are found beds of a hard dark-coloured stone, which endures exposure to the most intense heat for several years without waste or injury; it is therefore much used for grates and ovens. Marl of a rich quality is found in some places very near the surface, but it is not much used by the farmers for manure. Clay is abundant for making bricks, not only of the common kind, but of fire-bricks of an excellent quality. Peat in some parts is plentiful. Agates and very beautiful crystals of carbonate of lime and sulphate of barytes are imbedded in the whinstone rocks of Monimail and Newburgh; and agates, carnelians, jaspers, and brilliant rubies have been found in the bed of the Eden and at Earl's Ferry. In the parish of Dysart fossil trees and numerous other remains have been found embedded in the rocks. The antlers and skeleton of a very large elk were dug up a few years ago in a marl pit in the parish of Collessie.

There are a few patches of natural wood in Fife. The plantations are numerous, and the timber in them, which is mostly aged and valuable, consists of ash, elm, beech, fir of different kinds, limes, chestnut, sycamore, and oak. The largest plantations are those of the Earls of Crawfurd and Leven. They are also remarkably fine at Leslie-house in the parish of Leslie, where there is an avenue of beeches of large dimensions, about 200 years old. In recent times many hundreds of acres of waste land have been planted with forest-trees, the want of shelter being one of the greatest disadvantages of this county. In the single parish of Collessie 1240 acres have been covered, chiefly with firs. Owing to the great number of opulent proprietors who reside or have family seats in the county, gardens are numerous, extensive and well attended to, producing abundance of all the usual esculent vegetables and hardy fruits. Orchards are rare and only recently planted. Near Newburgh about 40 acres laid out in orchards are yielding supplies of excellent apples and pears.

Most of the indigenous and other animals of Britain, wild and tame, are found in this county. Game birds, especially pheasants, are abundant, and the lochs are visited by wild geese, ducks, teal, coots, and occasionally by wild swans. Among the rarer birds are the Bohemian and Silken Chatterers, the Siskin, Kingfisher, and Passenger-Pigeon.

Agriculture, Buildings, &c.—It has already been stated that four-fifths of the surface of this county are arable. Farms vary in extent, from 50 to 500 acres. The average may be about 120 acres. Property in land is perhaps more equally divided, and distributed among a greater number of proprietors than in any other county of Scotland. The annual value of a large proportion of the estates is between 400*l.* and 3000*l.*, and a few from 3000*l.* to 6000*l.* A much greater number range from 40*l.* to 400*l.* a-year. The number of heritors paying cess taxes exceeds 1200. In the agricultural survey published in the year 1800 an enumeration is given of 175 elegant mansions, and since that period several hundred thousand pounds have been expended in new erections and architectural improvements.

Fifty years ago most of the rural dwellings and farmsteads were of the most wretched description. The farmers usually lived in low, smoky, badly-lighted cottages, without any interior divisions except those made by the furniture. The greater number of these have been replaced by neat and commodious houses, and the farm offices, which formerly were awkward and filthy, have given place to greatly improved structures. By far the greater portion of the county is now enclosed, and the fences consist either of stone dykes or thorn hedges. Drainage having been very extensively and effectually executed on tracts of flat and swampy lands, has greatly improved the appearance, productiveness, and health of the county, and the sites of several considerable lakes are now bearing the finest crops of grain. But much improvement in agriculture still remains to be accomplished, especially on the western side of the county, where enclosures are yet only partial.

Crops.—The principal crops are of oats, wheat, and barley. As oats are more generally adapted to the soil and climate, the cultivation is more extensive than that of any other kind of grain, and though the poorest families now eat wheaten-bread, oatmeal is still much used among this class of the people as an important article of food in the form of cakes, of porridge, eaten with milk or small beer, and of a pudding called *sowens*, which consists of meal obtained from the bran by steeping it in water, whence it acquires an acid flavour from the process of fermentation. Thirty or forty thousand acres are annually sown with oats, and they are generally found to be a very profitable crop.

About 20,000 acres are annually appropriated to the cultivation of barley. The meal of this grain is used for bread among some of the poorer class of labourers, who sometimes mix it for this purpose with pea and oat-meal. Of the quantity exported a considerable part is in the form of pot or pearl barley; but by far the greater proportion of the produce is consumed by the breweries and distilleries in the county.

The annual crops of wheat occupy from 8000 to 10,000 acres. This valuable grain is well adapted only to some parts of the soil, and requires more care and expense than oats and barley; the crops however are generally very fine and profitable. The exportation of oats, wheat, and barley, is carried on chiefly at the port of Kirkaldy.

Peas and beans, which occupy about 7000 acres annually, are found to thrive best in the northern and southern districts. In the midland and western parts the crop is more scanty and precarious. Much of the produce is exported, and the rest is consumed in the county chiefly as food for horses and hogs.

Potatoes, a hundred years ago, were cultivated only in the gardens of a few of the rich proprietors. Since the introduction of this useful root the county has not experienced the extremes of scarcity approaching to famine to which it was previously subject. At present, potatoes constitute one-third of the food of the poorer people during eight months of the year. On every farm a sufficient quantity is planted for the tenant and his cottagers, and abundant supplies are raised in the vicinity of every town and village. The number of acres annually appropriated to this crop may be about 6000 acres. Some cargoes of them are exported to the London and other markets.

Turnips are extensively used for fattening cattle, and feeding milk-cows and young stock in sheds. Sheep are not so commonly fed upon them. They probably occupy annually about 5000 acres.

Flax in Fifeshire is an important crop, occupying annually about 2000 acres; the produce is consumed in the large linen manufactures of this county, principally at Dunfermline.

Rye, cabbage, colewort, kail, tares, and carrots are cultivated to a small extent on particular farms. The number of acres in meadow and pasture, including, besides arable land, commons, hills, and parks, is stated in the 'Agricultural Survey' to be at least 140,000 acres. Of this extent about 12,000 acres are annually under rye-grass and clover.

Lime being abundant and cheaply obtained, is very generally used for manure. Compost dung-hills are very common, and in a smaller degree marl, peat, coal-ashes, and sea-weed are applied to certain soils and crops.

For particulars concerning the rotation of crops, which is very various in different parishes, see *The New Statistical Account of Scotland*, Nos. X. and XIII.

The county of Fife has been long distinguished for the excellence of its breed of black cattle. The prevailing colour is black, though in the true county breed every variety of colour is found. The body has a round and bulky form. The bone is small in proportion to the carcase. The limbs are short and well proportioned; the skin soft, and the horns small, white, bending forward, and erect at the points. The head is small, but very full about the ears and throat, and finely diminished at the muzzle. They are hardy, fleet, travel well; are tame, docile, and excellent for work in the plough or cart, and they fatten quickly and fill up well at all the choice points. When fat, they bring a much higher price at Smithfield market than any other kind, and are selected by the English butchers for the tables of their most luxurious customers. A Fife bullock will often bring a higher price in the London market than an English one ten stone heavier and equally fat. The Fife cows are also of high repute in the dairy. The best give from five to seven gallons of milk per day. They are usually milked thrice in the day. Calves are sometimes partly fed on hay-tea and oatmeal-gruel. The number of milk-cows in Fife at the time of the 'Agricultural Survey' (1800) was stated at 10,000, and the whole stock of black cattle at upwards of 60,000. The Ayrshire, Teeswater, and some English breeds have been, it is thought, injudiciously introduced, since none possess qualities superior to those of the native breed. Sheep are not very numerous in Fife, but recently a large number have been slaughtered at Kirkaldy and sent by the steam-vessels to London. The flocks are small, chiefly of the Cheviot breed. Hogs, though not considered as a primary article of farming stock, have lately become very numerous; and are kept by all the farmers and cottagers for the domestic supply of pork and bacon. A few cargoes of them are exported to the London and other markets. The breed of horses, which formerly were small, unsightly, and ill suited either for saddle or harness, has been greatly improved. All kinds of poultry and pigeons are abundant and skilfully reared. Modern improvements in agricultural implements are adopted throughout the county. Thrashing-machines, some of which are driven by steam, iron ploughs, &c., are in common use. The average rent of land in 1810 was 22*s.* 5*d.* per acre. Farm leases are generally for 19 years. Labourers' wages are generally about 1*s.* 6*d.* per day for men, and 9*d.* for women, and many are paid with provisions instead of money. There are several active agricultural societies in the county.

Manufactures and Commerce.—Small breweries and distilleries for the manufacture of malt liquor and malt spirits are numerous. About twenty flour-mills are employed in grinding wheat and oats, and not less than 25,000 cwts. of pot-barley are manufactured, chiefly for home consumption. The southern side of Fifeshire being washed by the sea, and abounding in coal, is most advantageously situated for the manufacture of sea-salt: accordingly this business has been here established for several centuries, chiefly at Dysart, Kirkaldy, and at several other places on the coast. The annual quantity manufactured is about 100,000 bushels. The annual produce of the coal-fields in the western parishes of Aberdour, Dalgety, Inverkeithing, and Dunfermline, is about 230,000 tons. Fordel Colliery yields annually 70,000 tons. About 10,000 ox and cow hides, as many calf-skins, and some seal-skins, are annually tanned and dressed at Kirkaldy, Cupar, Auchtermuchty, and Falkland, for which are consumed annually about 600 tons of oak-bark. About 300,000 pounds of soap are manufactured, and 200,000 pounds of candles. At Cupar, Kirkaldy, and Leven about 800,000 bricks and tiles are made annually, and at Burntisland a large quantity of vitriol is manufactured. At Dysart, forty years ago, about a hundred smiths made annually twelve millions of nails, value 2000*l.*, but this manufacture is now almost wholly discontinued.

The manufacture of linen is more extensive and valuable, and employs a much larger number of hands than any other in the county. The different kinds of linen goods manufactured are damasks, diapers, checks, ticks, Osnaburgs, and Silesias or brown linens, besides plain linen of various fabrics for shirting and other domestic purposes. Damasks and diapers are made chiefly at Dunfermline. [DUNFERMLINE.] Checks and ticks are manufactured principally at Kirkaldy, Dysart, and their immediate neighbourhood. Silesias, Dowlas sheetings, Osnaburgs, window-blinds, &c., are made in great quantities in Newburgh, Abbotshall, Auchtermuchty, Monimail, Falkland, Cupar [CUPAR], Kettle, Strathmiglo, Leslie, Markinch, Kennoway, Leven, Largo, East Wemyss, King's Barns, and by numerous individual weavers scattered in every part of the county. The following statements of the parochial clergymen relating to some particular places are taken from the 'New Statistical Account of Scotland.' In the parish of Monimail the value of the labour employed in the linen manufacture is about 3000*l.* per annum. The hours of work are very long, allowing little time for relaxation. The Dowlas sheeting manufactured at Newburgh finds a ready market in London, Leeds, Manchester, and in the West Indies and South America. Thirteen master-tradesmen employ all the weavers in Newburgh, and in probably twenty other towns and villages. The value of the finest fabric is about 6*l.* per web of 140 yards 1 yard wide, and about 24*l.* when the width is 3 yards. The number of hands in Newburgh employed in winding bobbins is about 350; looms, 570; number of webs annually manufactured, 24,000—containing 830,000 spindles of yarn, of which the cost, including bleaching, is about 130,000*l.* In the parish of Kettle the number of looms is 380: average wages received by the weavers 4*s.* 6*d.* per week. In the town of Leslie there are 260 weavers; the best earn one shilling per day by working 12 or 14 hours. Six flax-mills in the parish employ between two and three hundred hands, 12 hours every day; average daily wages of men 2*s.* 6*d.* and 3*s.*; of women about 10*d.*; and of boys and girls about 4*d.* Three bleachfields employ 140 men and women 10 hours per day; men's daily wages 1*s.* 8*d.*, women's 10*d.* The workers in the mills present a far less healthy appearance than the bleachers, though of late the requisite attention has been given to the ventilation of the rooms. In the parish of Dysart about 2090 looms are employed in making checks and ticks. The annual quantity manufactured is about 31,007,000 yards, value not less than 150,300*l.* It is sent to Glasgow, London, Manchester, Liverpool, Nottingham, and Leeds; to the Cape of Good Hope, and to the East and West Indies. Between five and six thousand hands are employed in the parish, in weaving, winding, &c., and the number of looms employed out of the parish exceeds 1000. Some of the weavers work from four or five o'clock in the morning until ten or eleven at night to earn 10*d.* or 1*s.* per day, which of course is very injurious to both the body and mind. At the mill where flax is spun the work-people are employed from half-past five in the morning to eight at night, the women earning from 1*s.* to 1*s.* 2*d.* per day. (*New Statistical Account of Scotland*, No. X., p. 138.) It is estimated that, in the flax-mills of this county, 2240 persons are employed, and that they manufacture 6500 tons of flax, the value of which is 438,750*l.*

Fisheries.—Besides considerable salmon fisheries in the rivers Leven and Eden, and at Newburgh, the herring fisheries along the north-eastern, eastern, and southern coasts are extensive, and large exportations of the produce are made, especially from the ports situated between St. Andrews and Inverkeithing. Cod, turbot, haddock, and the other common species of sea-fish are taken off the eastern coast, and conveyed to the market of Edinburgh.

Shipping.—The shipping belonging to the small ports of Fifeshire consists chiefly of brigs and sloops for the coasting trade, as the contiguity of the great ports of Leith and Dundee affords the convenience of steam conveyance to London and other distant places. There are however a considerable number of vessels engaged in the Baltic, American, and Australian trade, and a few are employed in the Greenland whale fishery.

Antiquities.—This county once formed a part of the district which, being bounded on the north and south by the Tay and the Forth, and extending from the Ochil hills on the west to the German ocean on the east, was called Ross, which, in the Gothic or Pictish language, signifies peninsula. Hence the part now comprising the county of Kinross was antiently called Kean-ross, head of the peninsula. So Culross signifies back of the peninsula, and Muckross, the old name of Fifeness, means the point or snout of the peninsula.

The origin of the name of Fife has puzzled all the antiquarian writers on this part of the county. The monkish chronicles attribute it to Fifus Duffus, a chieftain who rendered eminent services in the wars of the Caledonians. This county originally, like all the surface of Scotland, was one continuous forest, varied only by swamps and tracts of furze and heath overrun with ferocious wolves and other wild animals, especially boars of enormous size. The antient history of its people is involved in great obscurity. Prior to the eleventh century, this district was either the property or wholly under the jurisdiction of the powerful Thanes of Fife, who bore the family title of Macduff. Duncan Macduff was created first earl of Fife by King Malcolm Canmore (Malcolm the Third) at his first parliament held at Forfar about the year 1057. This Duncan being a man of great property and power, was much dreaded by the tyrant Macbeth. His influence disposed his countrymen to join the English who came with Malcolm Canmore, and the restoration of the latter to the crown of Scotland was accomplished by his important counsels. For these and other good services great honours and privileges were bestowed upon him. One of the most remarkable of the immunities granted by the king was connected with the curious cross of Macduff, hereafter noticed. Of Duncan Macduff, who is interesting as the ancestor of several existing families of the nobility and gentry of the county, and as being one of the most conspicuous characters in Shakspeare's tragedy of Macbeth, an elaborate account has been collected by the learned and voluminous antiquarian, Dr. Sibbald, from numerous monastic and other documents. This and similar accounts of the successive earls of Fife comprise chapter 1 of section 3 in the Doctor's topographical work, of which the full title is as follows—'The History, antient and modern, of the Sheriffdoms of Fife and Kinross, giving a description of both, and of the Firths of Forth and Tay, and the Islands in them, with an account of the royal Seats and Castles, and of the royal Burghs and Ports, religious Houses and Schools, and most remarkable houses of the nobility and gentry, and of the natural Products of the lands and waters; by Sir Robert Sibbald, M.D., new ed., Cupar Fife, 1803.' Chapters 4, 5, and 6 describe the language, customs, religion, &c. of the Caledonian and Pictish inhabitants of Fife, showing from Tacitus, Bede, and many other authorities that they were red-headed and big-limbed (rutilæ comæ, magni artus). Chap. 7 describes the invasion, domination, and remaining monuments and relics of the Romans; and in chap. 8 are described the wars and calamities caused by the invasions of the county by the Danes. After the termination of the jurisdiction of the earls, whose chief residences were at Cupar and Falkland, and whose courts had full powers to decide all civil and criminal questions, the most considerable jurisdiction was that of the sheriffs and stewards, and the baillieries of the churchmen, and wherever the king had a seat there was a constabularium. Fifeshire was the district where the Scottish Presbyterian reformation commenced. The inhabitants were strenuous supporters of the Covenanters, and still remain staunch adherents of ecclesiastical Presbyterianism, which however differs virtually not much from the Episcopalianism to which it is nominally opposed. There are 63 parishes and as many Presbyterian churches, besides about 40 meeting-houses of Presbyterian dissenters, but only 4 episcopal chapels. The county forms an ecclesiastical synod, divided into 4 presbyteries.

This county contains a great number of antient edifices once the dwellings of powerful nobles, but now either fallen or falling into decay. Some of these ruins are truly magnificent, and are striking monuments of the taste and opulence of the feudal and monkish ages. In the town of St. Andrews the remains of several superb structures are still to be seen. [ST. ANDREWS.] In Dunfermline too there are vestiges of many antient buildings of great extent and magnificence. [DUNFERMLINE.] Near Newburgh, in the middle of a large and fertile field, rising gently from the margin of the Tay, stand the venerable ruins of the abbey of Lindores, clothed with clusters of ivy. It was founded by David, earl of Huntington, in 1178, in commemoration of his taking Ptolemais in the Holy Land, was bestowed on the Benedictine monks, and was one of the most richly endowed monasteries in Scotland. Stately fruit trees rise from the floors of its once sacred halls and lofty aisles, interspersed with ivy, hazel, and wild flowers of various and brilliant hues, which cling to the mouldering fragments of the walls. The whole produces a very picturesque effect. In the same neighbourhood are the remains of two very curious antient crosses. One, called the cross of Mugdrum or Magridin (a saint), consists of a pediment or plinth, with an upright shaft adorned with remarkable sculptures of animals and scrolls. (See an engraving and description in *The New Statistical Account of Scotland*, No. x., p. 68.) Many similar crosses, found in this and the adjoining counties, are traditionally assigned to the age of King Arthur, about A.D. 800. The other is the famous cross of Macduff, on the Ochill hills, overlooking the beautiful valley of Strathearn. It now consists only of one large block of freestone, forming the base of a sculptured shaft, which, in 1559, was destroyed by the mob of fanatic reformers on their way from Perth to the abbey of Lindores. It is surrounded by cairns and tumuli, containing, it is said, the remains of those who, having committed murder, fled to this cross, but failed in establishing their claims of kinship with the powerful thane, who made it a sanctuary for his family; and the neighbouring rustics relate how benighted travellers have heard the shrieks of their ghosts. The following lines from Sir Walter Scott's poem on this interesting monument are finely descriptive:—

'Mark that fragment,—
I mean that rough-hewn block of massive stone,
Placed on the summit of this mountain-pass,
Commanding prospect wide o'er field and fell,
And peopled village and extended moorland,
And the wide ocean and majestic Tay,
To the far distant Grampians. Do not deem it
A loosened portion of the neighbouring rock
Detached by storm and thunder—'twas the pedestal
On which, in antient times, a cross was reared
Carved with words which foil'd philologists:
And the events it did commemorate
Were dark, remote, and undistinguishable
As were the mystic characters it bore.'

The wondrous words here alluded to have been preserved by Sir James Balfour, the celebrated annalist, as follow:—

'Maldraradum dragos, malria, laghslita, largos
Spelando spados, sive nig fig Knighthite guaros
Lothea leudiscos laricingen lairia liscus
Et colorurtos sic fit tibi bursia burtus
Exitus, et bladadrum sive lim sive lam sive labrum.
Propter Magridin et hoc oblatum.
Accipe smeleridem super limthide lamthida labrum.'

Mr. Cunningham, in his learned Essay on this singular inscription, considers the words with which the Latin is intermixed as Saxon Latinized; and the writing he believes to be a charter from Malcolm Canmore to Macduff, in virtue of which the latter reigned over 'the kingdom of Fife' by a tenure similar to that by which the famous Hugh Lupus held from William the Conqueror the government of the county of Chester.

Besides the abbey of Lindores, there are remains of many other religious houses, as the abbeys of Inchcolm and of Balmerino, the priory of Pittenweem, &c., for descriptions of which we refer to Grose's 'Antiquities,' Dr. Sibbald's 'History of Fife,' and 'The Beauties of Scotland,' vol. iv. The large palace or castle of Falkland deserves particular notice. It was one of the seats of the Macduffs, the thanes of Fife. By King James V. it was greatly enlarged and ornamented, and made a royal residence; being pleasantly situated in the midst of a fine country for the enjoyment of deer and boar hunting. The south front is yet entire, and partly inhabited. In the parish of Monimail stands an old tower, known as Bethune's or Beaton's Tower. It formed part of the palace of the archbishops of St. Andrews, and in 1560 was the residence of Cardinal Bethune, who is several times distinctly represented on the walls in relievo with his cap on, together with the arms of the Bethune family. The castle of Rosythe, near Inverkeithing, stands on a rock surrounded by the sea. It consists of a large square tower, in the midst of the ruins of an extensive pile of buildings. Sculptures and inscriptions remain on some of the interior walls. The castle of Loch Orr stands in the middle of this loch, in the parish of Balingry. It was built in the time of Malcolm Canmore, and consists of a tower and other buildings surrounded by a strong wall. The ruins formed a beautiful object in the lake before it was drained. Seafield Tower is an old ruin on a rock by the shore, in the parish of Kinghorn. The castle of Ravenscraig stands also on a precipitous crag projecting into the sea, in the parish of Dysart. It was inhabited in the time of Oliver Cromwell, and has been the scene of romantic legends. Macduff's Castle at East Wemyss stands on a high cliff overlooking the sea. Two square towers and some of the surrounding wall still remain. There are several other castles of Macduff in other parts of the county. Craig Hall, in the parish of Ceres, is an extensive ruin on the bank of a beautiful glen filled with luxuriant trees. It was the seat of Sir Thomas Hope, Charles I.'s advocate. In the same parish is Tarvet Tower, a beautiful old fabric of hewn stone, 24 feet square and 50 feet in height. It stands on high ground, and is seen at a great distance. From the battlement on the top, the great thickness of the walls, and smallness of the windows or loop-holes, it appears to have been a place of refuge and defence. Balgonie Castle, in the parish of Markinch, is a fabric of great antiquity and strength, built probably in the twelfth century, with the castle of Loch Leven, which it much resembles. It stands on the south bank of the river Leven, about 40 feet above the water. An embattled tower, 45 feet by 36, rises 80 feet in height, in a quadrangular court, with other buildings, surrounded by a wall and ditch. The ruins of the tower of Balwearie, in the parish of Abbots Hall, are interesting, as having been the residence of the famous sage, prophet, or wizard, Sir Michael Scott. The walls are nearly 7 feet in thickness. On the battlements, which were about 60 feet from the base, tradition describes the white-haired old man as accustomed to sit at midnight watching and conversing with the stars. He was born at this place in the beginning of the thirteenth century, and became a great proficient in mathematics, scholastic theology, medicine, alchemy, astrology, and divination, by studying successively at the universities of Oxford, Paris, and Padua, and in Germany and Norway. He is celebrated in Dante's 'Inferno,' canto 20, and in Sir Walter Scott's 'Lay of the Last Minstrel.'

In this county are found a remarkable number and variety of the vestiges of the Caledonian and Pictish inhabitants, and of their Roman and Danish invaders, antient military forts and mounds of encampment, groups of Druidical lithoi, cairns, tumuli, barrows, stone-coffins, skeletons, Celtic sepulchral urns, spear and arrow heads of flint, swords and battle-axes of brass and bell-metal, crosses, fonts, beads, Roman and other coins, weapons, &c. One of the small conical hills called cairns, opened not long ago in the parish of Scoonie, contained, besides a large quantity of loose human bones, twenty stone coffins, formed with rough slabs cemented with clay. They held some mouldering skeletons and small Celtic urns of clay filled with calcined bones. A finely ornamented stone font, sculptured with numerous coats of arms of the antient families, has been disinterred in the parish of Inverkeithing. It may be here also mentioned that the roof and walls of Earl's Hall, a venerable old edifice in the parish of Leuchars, are crowded with sculptured arms, crests, and inscriptions. In the same parish an urn, containing about 100 perfectly preserved silver coins of the Roman emperors, was turned up by the plough. Part of the church in this parish was built about the year 1100, and exhibits the most interesting specimen in Scotland of the Saxon style of architecture. The mansion of the earl of Rothes at Leslie contains curious and valuable collections of old manuscripts, paintings, and tapestry. In Chambers's 'Picture of Scotland' (2 vols. 8vo. 1827, pp. 163-225) there are notices of the most picturesque objects and interesting historical and legendary facts connected with the abbey and palace of Dunfermline, Falkland palace, the Valley of the Eden, or Howe of Fife, the castle and colleges of St. Andrews, Ravenscraig castle, &c. From Dunikier Law, and several other elevated points, the view extends beyond the county on every side.

Among the eminent individuals who have been natives of Fifeshire may be mentioned Sir Robert Sibbald, the antiquary; Dr. Andrew Marshall, distinguished in medicine and anatomy; Bishop Sage, a learned ecclesiastical writer; Robert Adam, an eminent architect; Dr. Watson, who wrote the life of Lord Gordon; Professor Tennant, of the university of St. Andrews, a distinguished oriental scholar; Admiral Greig, whose abilities raised him to the chief command of the Russian navy. Dr. Pitcairn was a native of Leslie. Dr. Adam Smith was a native of Kirkaldy, where not only the house but the room is shown in which he composed 'The Wealth of Nations.' It was in the parish of Leslie that, when a child, he was accidentally left in the fields and stolen by gipsies. Leslie Green is said by Allan

Ramsay to be the scene of King James the Fifth's poem of 'Christ's Kirk on the Green.'

Chief Towns.—Cupar is the county town. The two other principal towns are Dunfermline and St. Andrews. The former is important as a populous centre of the linen manufacture, the latter as the seat of the oldest university in Scotland. Of these three places separate descriptions are given under their respective names. The number of smaller towns and villages is about 40, lying chiefly on the line of coast. A detailed description of each is given in *The New Statistical Account of Scotland.* There are 13 royal burghs, namely, St. Andrews, East and West Anstruther, Burntisland, Crail, Dysart, Inverkeithing, Kilrenny, Kinghorn, Kirkaldy, Pittenweem, Cupar, and Dunfermline. All these, with the exception of the two last, are sea-ports; but in general they have greatly declined from their antient prosperity, and are now comparatively in a state of decay, a fact which is owing partly to their having originally possessed, like all other royal burghs, an exclusive privilege of trading, but principally to the union of Scotland with England, after which all the towns on the coast of Fife experienced more or less depression and loss of trade. The population of these burghs, including their respective parishes, is, according to the census of 1831, as follows:—

Anstruther, burgh and parish, 1437; Burntisland, do., 2366; Crail, do., 1824; Cupar, do., 6473; Dunfermline, do., 17,068; Dysart, do., 7104; Inverkeithing, do., 3189; Kilrenny, do., 1705: Kinghorn, do., 2579; Kirkaldy, do., 5034; Pittenweem, do., do., 1317; St. Andrews, do., 5621.

The whole population of the county in 1831 was 128,800. The increase in the decennial period from 1801 to 1811 was 8 per cent.; from 1811 to 1821, 13 per cent.; from 1821 to 1831, 12 per cent.

Dysart is a small antient town on the Frith of Forth, consisting of three narrow streets, of which the central, or high street, is full of substantial old houses, ornamented with inscriptions, dates, and piazzas under which the merchants in olden times exposed their goods for sale. It was made a royal burgh about the year 1500, but even in 1450 its salt-works were of great extent, and supplied the principal places in Scotland and Holland. Commerce, domestic and foreign, was then carried on to a great extent, and its markets exhibited a very superior degree of mercantile wealth and activity. At present the harbour is one of the best on the coast. There is also a wet-dock, but the shipping consists of only a few brigs and sloops engaged principally in the exportation of coal, corn, and other agricultural produce. A flax-mill and earthenware factory give each employment to about 100 persons. The manufacture of linen has been already noticed. On the east of the town are the Red Rocks, the scene of superstitious legends of the burning of witches. Sir Walter Scott, in his 'Tales of a Grandfather,' has largely used a MS. possessed by the earl of Rosslyn, respecting the antiquities of Dysart. Some memorials are preserved of Oliver Cromwell, whose army was quartered in this town. A curious observation made by the colliers and miners here, is that, some hours before a storm of wind and rain, a sound comes from the strata in the coal-pits and ironstone works resembling the drone of a bagpipe, or the loud humming of a bee, accompanied with a 'black damp' at the bottom of the pits which extinguishes the lamps. Inverkeithing is a small market and post-town near Dunfermline, at the bottom of a bay, which occasionally affords a safe asylum for large vessels lying in the Leith roads. It consists chiefly of one street; is very antient, was the royal residence of David I., and was made a royal burgh by William the Lion. In conjunction with Culross, Queensferry, and Stirling, it sends one member to parliament. Its coasting trade and maritime commerce are similar to those of the burghs already mentioned. Kilrenny, Anstruther, Pittenweem, and Crail, are small seaports and fishing towns not requiring particular notice, though in common with the other royal burghs many interesting facts are connected with their local history and antient prosperity. They unite in sending one member to parliament. The same remarks apply to Kinghorn and Burntisland, which jointly with Dysart and Kirkaldy return one member to parliament. Kirkaldy merits especial notice as a place of considerable commercial importance. It was antiently a seat of the religious order called Keldees, or Culdees (see Toland's *Nazarenus*, last chap.), whence the formation of its name by the prefixure of the word kirk. It belonged to the abbots of Dunfermline as a royal burgh in the year 1334. Charles I. in 1644 made it a free port with additional privileges and jurisdiction. At this period it possessed 100 ships, and the population was much larger than at present. It is pleasantly situated on the shore of the Frith of Forth, forming one handsome street nearly two miles in length, which has near its northern extremity the large village of Pathhead whose population exceeds 3000. Kirkaldy of late years has received many additions and improvements in houses and public buildings. It has an elegant modern-built church and town-house; with assembly-rooms, masonic lodge, subscription library, reading-rooms, and public grammar-school, and is lighted with gas. The market is well supplied, and many visitors resort to the town as a bathing place. The harbour has been rendered very commodious. Of the single article of coal about 50,000 tons are annually shipped, chiefly to places on the coast of Scotland. Corn, potatoes, sheep, and pigs also form large items of exportation to London and various other ports. There are several flax-mills, an extensive manufacture of coarse linen fabrics, an iron-foundry, tanneries, a large whisky distillery, several salt-works, breweries, &c. The harbours of Ellie and Newburgh on the Tay are safe and commodious, and the little town of Newburgh is an active and improving place of commerce.

Divisions, Fairs, &c.—The county is divided into 61 parishes. A neat and accurate map of these parochial divisions is given in the 'New Statistical Account of Scotland,' No. 13. For ecclesiastical purposes it is divided into four presbyteries, namely, St. Andrews, Cupar, Kirkaldy, and Dunfermline, so called from the presbyters being appointed to meet at these places. In all the towns and large villages numerous fairs and markets are held throughout the year, for the sale of agricultural stock and produce of every kind, as well as for all articles of domestic consumption, and implements of agricultural and manufacturing industry. The stated fairs in the county amount to 87; namely at Cupar, 8; at Dunfermline, 8; at Falkland, 8; at Leven, 7; at St. Andrews, 6; at Inverkeithing, 5; at Crossgates, 5; at Dysart, 4; at Auchtermuchty, 4; at Anstruther, 3; at Galine, 3; at Leuchars, 2; at Leslie, 2; at Kilconquhar, 2; at Kinglassie, 2; at Pittlessie, 2; at Ceres, 2; at Colinsburgh, 2; at Kirkaldy, 2; at Kinghorn, 2; at Newburgh, 2; at Strathmiglo, 2; at Pathhead, 2; at Torryburn, 1; at Wemyss, 1.

The courts for trial of crime and civil suits are—1, the burgh courts; 2, the sheriffs' courts; 3, the courts of the justice of peace.

The county sends one member to parliament and the burghs, as above stated, send three. The annual value of real property, as assessed in 1815, was 405,770*l.*, and the valued rent 363,192*l.*

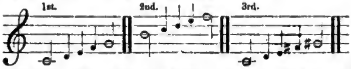
Education.—In this county, as in almost every other in Scotland, the means of elementary instruction are so generally established and so efficiently administered in every parish, that it is very unusual to find an instance, even among the poorest classes, of inability to read and write. According to the parliamentary reports on education in 1818 the number of parochial schools in the 61 parishes of Fifeshire was 71, of which the annual revenue was 1430*l.*, and the number of children taught in these schools was 3898. There were also of unendowed day-schools 132, teaching 6071 scholars, and of unendowed Sunday schools 59, attended by 2522 children. A general view of the present state of education in the whole county is not obtainable from the 'New Statistical Account of Scotland,' as reports of only about half the parishes are yet published; but on comparing with former accounts the reports of some particular parishes which have already appeared, the extension of education is evident, and a progressive improvement in the moral character of the people appears to be equally evident. Some of the parishes enjoy the advantage of several large donations from wealthy philanthropists for the promotion of education: thus, Mr. Robert Philip bequeathed about 80,000*l.* to Kirkaldy and three adjoining parishes for this purpose. Greek, Latin, Mathematics, and the modern languages are taught in many of the parochial schools. Subscription and circulating libraries, containing several hundred volumes, are not uncommon in the small towns and villages. However, in many parishes, especially where distilleries are established, public-houses for the sale of intoxicating liquors are very numerous. In the small parish of Dysart the number is 150. Several Savings' Banks in the county are well encouraged. No compulsory assessments are made for the relief of the poor. They are supplied solely from church collections and the interest of funded donations. (*New Statistical Account of Scotland;* Dr. Thompson's *Survey;* Dr. Sibbald's *History; Beauties of Scotland*, vol. iv.; Chalmers' *Caledonia;* MacCulloch's *Statistics;* Pennant's *Tour; Parliamentary Returns*, &c.)

FIFTEENTH, in music, is the interval of the double octave.

The *Fifteenth Stop* in organs, is a range of metallic pipes, tuned two octaves higher than the diapasons.

FIFTH, an interval in music, and the most perfect of concords, the octave excepted. Its ratio is 3 : 2. [CONCORD; HARMONY.]

There are three kinds of Fifths; the *Perfect Fifth*, the *Flat* or *Diminished Fifth* (called also the *Imperfect Fifth*), and the *Extreme Sharp* or *Superfluous Fifth*. The first (C, G) is composed of three whole tones and a semitone; the second (B, F) of two whole tones and two semitones; the third (C, G♯) of four whole tones. Ex.:—



FIFTH MONARCHY MEN, a sect of religionists, whose distinguishing tenet was a belief in the coming of a fifth universal monarchy, of which Jesus Christ was to be the head, while the saints, under his personal sovereignty, should possess the earth They appeared in England towards the close of the Protectorate; and in 1660, a few months after the Restoration, they broke out into a serious tumult in London under their leader Venner, in which many of them lost their lives, some being killed by the military, and others afterwards executed. Several Fifth Monarchy Men also suffered death in 1662, on a charge (most probably unfounded) of having conspired to kill the king and the duke of York, to seize the Tower, &c. They are the same who were sometimes called Millennarians, their notion being that the reign of Christ upon earth was to last for a thousand years. They seem also, from the extravagance and violence of conduct into which they occasionally broke out, to have been confounded, in the popular imagination, with the old Anabaptists of Münster. [ANABAPTISTS.]

FIG, the *Ficus Carica* of botanists, is a small tree with rough, lobed, deciduous leaves, naturally inhabiting the temperate parts of Asia, and now commonly cultivated in Europe for the sake of its fruit.

In the fertile islands of the Mediterranean, in Spain, Italy, and Greece, and even so far north as the south of France, the fruit is so well ripened as to form a valuable article of exportation in a dried state. A thousand tons are annually imported into Great Britain alone. The fruit is grown with some success even in the southern and milder parts of England, but it is seldom found in the northern parts or in Scotland, except under glass. It is only as an object of cultivation in this country that we have to consider it in this place.

The nomenclature of figs is in a greater state of confusion than that of most other fruits, and the descriptions of them generally so imperfect that the same kind is grown in different parts of the country under many different names; an account of their synonyms, as far as they have been determined, will be found in the Horticultural Society's Fruit Catalogue, ed. 2.

The following is a list of the best sorts:—

Black Provence.
Large Blue.
Brunswick.
Blue Burgundy.
Early White.
Large white Genoa.
Hamburg Brown.
Black Ischia.
Brown Ischia.
Green Ischia.
White Ischia.
Yellow Ischia.
Lees perpetual.
White Malta.
Large black Naples.
White Naples.
Small Green.
Brown Turkey.

The best sorts for forcing are—

The Ashridge Forcing.
Figue Blanche.
Early Forcing.
Marseilles.
Nerii. (This excellent sort will not bear a high temperature.)
Pregussata.

The following kinds are mended as a selection for a small garden in the southern and midland counties of England:—

Black Ischia.
Brown Turkey.
Brunswick.
White Malta.
Large white Genoa.
Marseilles.
Small early White.

The following sorts have been recommended for a succession from August to October in the south of England:—

Brown Ischia,	ripens in the middle of August.
Large white Genoa,	end of August.
Green Ischia,	beginning of Sept.
Murrey, or brown Naples,	middle of Sept.
Ford's Seedling,	end of Sept.
Black Provence,	beginning of Oct.
Yellow Ischia,	middle of Oct.
Gentile,	end of Oct.

The most approved methods of propagating fig-trees are either by layers or cuttings, and the former method is generally preferred, because the plants at the end of the season are stronger and more fit to be planted out where they are intended to grow. Trees raised from layers generally come into bearing the second year. Grafting succeeds upon these trees as well as upon any other, but it is almost unnecessary and seldom practised. Before the trees are planted the ground should be well drained, and made from two feet and a half to three feet deep, with a mixture of good friable loam and decayed dung. Miller remarks, that 'Fig-trees bear the greatest quantity of well-flavoured fruit when growing upon chalky land where there has been a foot or more of a gentle loamy soil on the top.'

It was generally believed until a few years back that pruning was injurious to the fig, but experience shows this opinion to be unfounded, and that it is as tractable in this respect as any other tree.

The object to be always kept in view is to have constantly a supply of fruit-bearing shoots, and for this purpose the old wood should be gradually cut away, and the young introduced to fill the space thus created. Since the climate of this country will not admit of two crops in one year being brought to maturity, as in other countries more favourable to its growth, the fruit formed after Midsummer should be removed, in order to strengthen the tree and render it more productive the following season.

Several modes of training are practised and recommended: some gardeners recommend the fan system, others the horizontal; but this must depend entirely upon the growth of the tree: if it be luxuriant the latter may be practised; if not, the former will answer better; as the more perpendicular a tree is trained the stronger it grows, and a contrary effect is produced by horizontal training. Mr. Knight recommends the branches to be trained in a downward direction as well as horizontally, and says, 'The young wood ceases to elongate very early in the season, and thence acquires perfect maturity, and by being trained close to the wall it is not so liable to be injured by frost.'

In many parts of the continent where the winter is very cold, but where the summer heat is sufficient to ripen the fig as a standard, the trees are planted in rows and bent down near the ground in winter, and then covered with leaves, which protect them from very severe frosts. Wall trees are unnailed and bent down on each side to within a few feet of the ground, and then protected in the same way as standards.

In this country the common practice is to stick yews, spruce-fir branches, or fern leaves amongst the branches of the fig upon the wall. Where any thing can be used for protection which can conveniently be removed in fine mild weather, it will be found of greater utility than having the branches covered up from the commencement of winter until the end of spring.

When the trees are planted in the border of a hot-house for the purpose of being forced, they are commonly trained to trellises; and the treatment is precisely the same as that recommended for open walls. After the fruiting season the border must be kept perfectly dry, in order that the trees may enjoy a season of rest; but a plentiful supply of water is given when they are in a state of growth

Those who have not a house which can be appropriated entirely to the forcing of figs may nevertheless obtain good crops by planting the trees in pots and forcing them in a cherry-house, peach-house, or vinery.

The time for beginning to force is from December to Fe uary, according as the fruit is wanted; and the temperature should be gradually increased from 50° to 65° or 70° Fahr. Some also approve of a bottom heat, and recommend the pots to be plunged in a bed of leaves or tan.

The fig-tree is very apt to throw off its fruit before it ripens, and various methods have been suggested to prevent this. In the Levant, to insure a crop, a process termed caprification is resorted to, which consists in placing among the cultivated figs branches of the wild fig, in which a kind of Cynips abounds. This insect, issuing from the wild fruit, enters the others, brushing about the pollen in the inside, and so fertilising the fruit. Or those figs that drop prematurely and are chiefly filled with male flowers are preserved and introduced among the green growing figs with a view to their pollen being carried by insects to the flowers where they are wanted. Nothing is done in this country except ringing the shoots sometimes, and this is said to be attended with beneficial consequences. (See *Hort. Trans.*, vol. i., new ser., p. 395.)

FIGEAC. [Lot.]

FIGUERAS. [Catalonia, p. 362.]

FI'GULUS. [Creeper, vol. viii., p. 148.]

FIGURATE NUMBERS. [Numbers, Figurate and Polygonal.]

FIGURE (Geometry), a finite space, which has a boundary in every direction. The figure of a space is the notion we receive from observing its boundary.

FIGURE OF THE EARTH. [Geodesy.]

FIGURED BASE, in music, is a line, or staff, written in the base clef, over the notes of which are placed figures representing certain chords. This is commonly called the *Thorough-Base.* [Thorough-Base.]

The *Figured Base* is fallen into disuse; though we are strongly of opinion that it might still be most beneficially employed in Scores. But in a piano-forte or organ part, when the harmony, or accompaniment is given fully in the treble staff, figures are not only superfluous, but perplexing and incorrect.

FILAMENT. [Anther.]

FILANGIE'RI, GAETA'NO, was born at Naples in 1752, of a noble family. In his early youth he did not exhibit any signs of extraordinary talent, but after being put under the care of Monsignor de Luca, bishop of Trivento, he made rapid progress in the classical languages, mathematics, and philosophy. In 1774 a reform in the judicial administration was determined on by the ministers of King Ferdinand, by which the judges of the various courts were in future to explain the grounds of their decisions by referring to some existing law applicable to each respective case, and in default of such a law, to ask the king for his decision. This determination, which checked the till then absolute discretion of the courts, was strongly opposed by the judges, supported by most of the law practitioners, as offensive to the dignity and independence of the courts, and they published a violent memorial on the occasion. Filangieri took up the matter, and wrote a reply showing the absurdity and impertinence of the objections as insulting alike to the liberty of the citizens and to the authority of the crown: *Riflessioni politiche sulla Legge Sovrana del* 23 *di Settembre del* 1774. The work was favourably noticed by the government, which enforced its decree regardless of the clamours of the interested party. Those were times of useful reforms and enlightened administration at Naples, when Genovesi, de Iorio, Galanti, Palmieri, Galiani, and other learned men were encouraged in suggesting improvements, which were at least in part acted upon. [Ferdinand IV. of Naples.] In 1780, Filangieri, then 28 years of age, published the first volume of his great work, 'Scienza della Legislazione,' which made him known throughout Europe; he went on publishing the successive volumes in the following years. In 1787 he was appointed a member of the Supreme Council or Board of Finances, a department which stood also in need of reforms. He died in July, 1788, 36 years of age, regretted by all Naples, and leaving his work on legislation incomplete. The work however has gone through many editions, and has been translated into several languages; one of the best editions of the Italian text is that of the 'Classici Italiani,' 6 vols. 8vo. Milan, 1822, to which are added his 'Opuscoli Scelti' or minor works. Among the translations the French one, Paris, 1822, contains a biography of Filangieri by his countryman, Salfi. Benjamin Constant wrote a 'Commentaire sur l'Ouvrage de Filangieri,' 2 vols. 8vo. Paris, 1822—24.

Filangieri has been styled the Montesquieu of Italy, but there are considerable discrepancies between these two writers. Montesquieu, a man of maturer years, more extensive reading, and stronger reflective powers, was rather the historian of the laws and social institutions such as they existed then or had existed before his time, and although he discovered and pointed out abuses, yet he seldom advised change. Filangieri on the contrary recommends a complete reform in the laws, and lays down the bases of a new order of things. Both occasionally fall into apparent contradictions. Montesquieu, vehement and strong-minded, inveighs at times most strenuously, and in spite of his veneration for privileges and inequalities of rank, against the abuses of those very institutions; whilst Filangieri, a professed innovator, is led by his natural mildness of character and out of deference to existing forms of society, to make concessions which seem opposed to his principles. Thus he awards as a punishment for high-treason not only the penalty of death but also that of confiscation of property, and this at the very time that the penal code published by Leopold in Tuscany proclaimed to the world that 'confiscation was a real act of violence and a usurpation of private property by the government.' Filangieri aimed at effecting a change in legislation without a corresponding change in the forms of the government, and in his time, and especially in Italy, where numerous and important reforms emanated from the sovereigns themselves, this course appeared both reasonable and prudent. He says, in the introduction to his work, that 'his only object was to facilitate to the sovereigns of his age the task of a new legislation,' and his strong recommendation to them is to abolish all pernicious or useless laws, and to be sparing in making new ones without a real necessity. Like his contemporary Beccaria, he adopted the theory then prevailing in France, of an original social contract, by which every individual had resigned for himself and his descendants his right of self-defence which he possessed in a state of nature to the collective body of society, giving it thereby the right of punishing any one who made attempts against the security of another (*Scienza della Legislazione*, 11, 26). This fiction has been since overthrown by other writers, and in Italy especially by Romagnosi in his *Genesi del diritto Penale*, 1791, and in his *Assunto primo della Scienza del Diritto Naturale*, 1820. See also on this subject another Italian, Professor Rossi in his *Traité du droit Pénal*, Paris, 1835.

On some questions of political economy, on population, agriculture, &c., Filangieri shared the opinions prevalent in his time, which have been since exploded or modified by modern economists. Notwithstanding these and other blemishes, the work of Filangieri has still great merit; it suggests many useful ideas, and is throughout inspired by a sincere love for mankind, and an honest sincerity of purpose. The commentary of Benjamin Constant forms a very useful supplement to it.

FILA'RIA. [Entozoa.]

FILBERT, the fruit of a variety of the hazel-nut, or Corylus Avellana. [Corylus.] The term was originally applied to those kinds of nuts which have very long husks, but owing to the number of varieties that have of late years been obtained, this distinction, which was never scientific, appears to be nearly disregarded, and nut and filbert are almost synonymous terms, excepting that the wild uncultivated fruit, and those varieties which most nearly approach it, are never called filberts.

The best sorts are the following:—

Frizzled filbert, excellent bearer.
Red filbert, } bad bearers.
White filbert, }
Cob-nut (Pearson's Prolific, *Hort. Soc. Cat.*), a very prolific kind.
Bond-nut.
Cosford.
Large square Downton.
Northamptonshire, prolific.

According to the most skilful cultivators, the soil on which the filbert succeeds best should consist of 'a hazel loam of some depth, upon a dry subsoil;' but as this is not always found convenient, it should be remarked that it is not essential to the growth of the filbert, and some even recommend a dry poorish soil. The ground should be frequently dressed (at least once in two years), and a small quantity of manure given; woollen-rags are often used for this purpose with the greatest success, but manure of any kind will be found beneficial.

Filberts are most successfully propagated by layers or suckers. The layering should be performed in the earlier part of the season, in order that the plants may be well rooted, and ready to plant either in a nursery, or where they are intended to remain, in the autumn. When they are raised from suckers, these are generally taken from the parent plant in the end of the season, and subjected to the same treatment as layers. If it be desirable that the trees should be dwarf, layering and grafting are recommended; but if strong plants are wanted, they are raised from suckers: it is also said they fruit sooner by the last method.

The method of pruning depends in a great measure upon the object the cultivator has in view: if dwarf trees are wanted, the layer or sucker is shortened to about one foot and a half or two feet; if what are termed riders be desirable, then the stem is cut much higher; but if the shoot is weak it is better to cut it near the ground, and leave it the proper height at the next year's pruning. Afterwards, when any sucker makes its appearance at the bottom of the stem, it should be carefully removed, and not allowed to draw the nourishment from the parent plant.

In the formation of the head, the chief thing to be observed is to form it regularly, cutting away all strong superfluous shoots, keeping it thin and open in the centre, and thus allowing the free passage of light and air. 'There will be produced from the two and three years' branches, annually, short twigs of six or nine inches in length, which generally bear a great many nuts the following year; these should be thinned out, but not shortened, leaving them in tolerable quantity wherever they are produced, cutting them clean out the following winter, and leaving others in the same manner as those had been left the previous season.' (Lindley's *Guide*, &c.)

About Maidstone, and other parts of Kent, the management of the filbert is better understood than in any other part of this country; and as the soil and other circumstances seem to suit its growth, immense quantities are grown for the London market. 'That part of Kent where the filbert is chiefly cultivated is a loam upon a dry sandy rock. The Rev. W. Williamson advises every one to plant them where they are to remain, whether they are intended for a garden or a larger plantation; and after being suffered to grow without restraint for three or four years, to cut them down within a few inches of the ground. From the remaining part, if the trees are well rooted in the soil, five or six strong shoots will be produced. In the second year after cutting down, these shoots are shortened; generally one-third is taken off, and that they may appear regular, a small hoop is placed within the branches, to which the shoots are fastened at equal distances; by this practice, two considerable advantages are gained, the trees grow more regular, and the middle of each is kept hollow so as to admit the influence of the sun and air: but this in a large plantation would be almost impossible, nor indeed is it necessary, though in private gardens, where regularity and neatness are almost essential, it ought to be practised. In the third year a shoot will spring from each bud; these are suffered to grow till the following autumn, or fourth year, when they are cut off nearly close to the original stem, and the leading shoot of the last year shortened two-thirds. In the fifth year several small shoots will arise from the base of the side-branches which were cut off the preceding year; these are produced from small buds, and would not have been emitted had not the branches on which they are situated been shortened, the whole nourishment being carried to the upper part of the branch.

'It is from these shoots that fruit is to be expected. These productive shoots will in a few years become very numerous, and many of them must be taken off, particularly the strongest, in order to encourage the production of the smaller ones; for those of the former year become so exhausted, that they generally decay; but whether decayed or not, they are always cut out by the pruner, and a fresh supply must therefore be provided to produce the fruit in the succeeding year. The leading shoot is every year shortened two-thirds, or more, should the tree be weak; and the whole height of the branches is not allowed to exceed six feet. Every shoot that is left to produce fruit should also be tipped, which prevents the tree being exhausted by making wood at the end of the branch. It frequently happens that a strong shoot springs from the root; and should any of the first year's or leading branches be decayed, or become unproductive of bearing wood, it will be advisable to cut that entirely away, and suffer the new shoot to supply its place, which afterwards is to be treated in the same way as is recommended for the others.' (*Hort. Trans.* vol. iv.)

Such, according to Mr. Williamson, is the method of cultivating the filbert in the far-famed grounds of Kent, by which thirty hundred-weight per acre has been grown on particular lands: at the same time he acknowledges that failures are by no means unfrequent, but he attributes this to the excessive productiveness of successful years.

The filbert is a monœcious plant, having its male organs in one flower and its female in another; and one modern writer, suspecting a want of male blossoms to be the cause of failure in particular seasons, suspended a quantity of the catkins of the common hazel over the female blossoms of some of his filberts, the result of which was a greater quantity of fruit than his trees had borne for many years. He then tried some *with*, and others *without*, the male flowers, when the former bore fruit, and the latter proved abortive, as he had anticipated. He therefore recommends unpruned hazels to be planted among the cultivated filberts, in order that impregnation may be effected.

Great quantities of filberts are rendered useless by being attacked by the *nut-weevil* (*Balaninus nucum*), which perforates the nut in its young state, and deposits its egg: in a few days the maggot is hatched, and then feeds upon the kernel. Some recommend the trees to be shaken in June or July, as this is the time when the insect makes its appearance, but no remedy is known which can be said to be effectual.

In order to preserve filberts in a fresh and plump state, it is only necessary to prevent their parting with their moisture by evaporation. Burying them in heaps in the earth, putting them in earthen jars in a wine-cellar, covering them with dry sand, are all very good plans, and many others equally efficient will suggest themselves.

FILICES. [Gleicheniaceæ.]

FILLET, a flat rectangular moulding, of very frequent occurrence in architecture. It is used to terminate or divide other mouldings, as in the cavetto, which is surmounted with a fillet, and in the flutings of columns, which are divided by a fillet. The fillet is much used in entablatures. [Column.]

FILTER, a strainer used in chemical operations for the purpose of rendering fluids transparent by separating the suspended impurities which make them turbid, or for the still more important use of separating, collecting, and washing the precipitates or insoluble compounds resulting from chemical research and analysis.

Filters are usually made of unsized or blotting paper and they are used either spread out upon cloth stretched on a wooden-frame, for larger operations, or folded and placed in funnels, and having consequently the form of an inverted cone.

Filters are either single or double: the former are usually sufficient for rendering fluids clear, but when the insoluble matter is to be preserved, double filters of equal weight are used; in this case, as it is always difficult and often impossible to remove the whole of the solid matter from the inner filter, the outer one, having been subjected to the action of the same fluid serves as a counterpoise to determine the weight of matter remaining on the inner filter when both have been dried.

In other cases a single weighed filter is used, and then the contained inseparable matter being heated to redness in the air with the filter in a crucible, so as to dissipate the carbonaceous matter of the paper, the quantity of earthy impurity remaining with the product is determined by burning an equal weight of similar paper. For the numerous precautions to be observed in filtration see Faraday's *Chemical Manipulation* and Berzelius's *Traité de Chimie*.

Within a few years various filters have been very usefully employed for the purpose of filtering water either for drinking or culinary purposes. These filters, though varying somewhat in construction, generally depend upon passing water through sand or small pebbles and charcoal. It is well known that the Thames water, though it contains but little saline matter in solution, is frequently turbid, owing to mechanical admixture of earthy matter, which the filters in question are well calculated to remove, so as to render the water, though not so agreeable as spring-water for drinking on account of its flatness, yet well adapted for other purposes, especially making tea and other similar uses.

FI'MBRIA (Zoology). [Veneridæ.]

FIN. [Fish.]

FINA'LE (Ital. *Fi-ná-le*), the concerted piece of musi by which the acts of an opera conclude: the last movement of a symphony, concerto, &c. The winding-up of the first act of a grand two-act opera is, *par excellence*, called *the* Finale.

FINCH. [Bullfinch; Chaffinch; Fringillidæ.]

FINCH. [Nottingham, Lord.]

FINE OF LANDS, one of the modes of conveying lands and hereditaments by matter of record. It was so called because it put an end not only to the actual suit of which it was the conclusion, but also to all other suits and controversies concerning the same matter. Divested of its technicalities, a fine may be described to be an amicable composition or agreement of a suit, either actual or fictitious, by leave of the king or his justices, whereby the lands in question become, or are acknowledged to be, the right of one of the parties.

This mode of conveyance, which was in use from the earliest periods of English history of which we possess any authentic judicial records, has been recently abolished by the stat. 3 and 4 Wm. IV., c. 74; yet the rules by which it was governed form a very considerable branch of real property law, and it is therefore desirable briefly to describe its nature and effect. Fines were of four kinds,—1. A fine 'sur conusance de droit, come ceo qu'il ad de son done,' *i. e.* upon acknowledgment of the right of the cognizee, as that which he (one of the parties to the fine) had of the gift of the cognizor (the other party to the fine). This was the best and surest kind of fine, for thereby the cognizor (the person in possession, also called the deforciant from keeping the cognizee out of possession,) in order to make good his covenant with the cognizee (the plaintiff), of conveying to him the lands in question, and at the same time to avoid the formality of an actual feoffment and livery, acknowledged in court a former feoffment, or gift in possession, to have been made by him to the plaintiff. This fine is therefore said to have been a feoffment of record, the livery thus acknowledged in court being equivalent to an actual livery; so that this conveyance was rather a confession of a former conveyance than a conveyance then originally made. 2. A fine 'sur conusance de droit tantum,' or upon the acknowledgment of the right merely; and not with the circumstance of a preceding gift from the cognizor. This was commonly used to pass a reversionary interest, for of such there could be no feoffment with livery supposed, as the possession during the preceding, or as it is technically called, particular estate belonged to a third person. [Feoffment.] This kind of fine was worded in this manner, 'that the cognizor acknowledges the right to be in the cognizee, and grants for himself and his heirs that the reversion after the particular estate determines shall go to the cognizee.' 3. A fine 'sur concessit'—which was where the cognizor, in order to make an end of disputes, though he acknowledged no precedent right, yet granted to the cognizee an estate usually for life, or for years, by way of supposed composition. And this might be done reserving a rent or the like, for it operated as a new grant. 4. A fine 'sur done, grant, et render,' which was a double fine, comprehended the fine 'sur conusance de droit come ceo,' &c., and the fine 'sur concessit.' This might be used to create particular limitations of estate, whereas the fine 'sur conusance de droit come ceo,' &c., conveyed nothing but an absolute estate of inheritance or at least of freehold. In this last species of fine, the cognizee, after the right was acknowledged to be in him, granted back again, or rendered to the cognizor, or perhaps to a stranger, some other estate in the premises. But in general, the first species of fine, 'sur conusance de droit come ceo,' &c., was the most used, as it conveyed a clear and absolute freehold, and gave the cognizee a seisin in law, without any actual livery, and it was therefore called a fine executed, whereas the others were but executory.

Fines of all four kinds were thus levied, to use the technical term,—First, the party to whom the land was to be conveyed commenced an action or suit at law against the party who was to convey, by suing out a writ or *præcipe*, called a writ of covenant. The action was founded upon the breach of a supposed agreement or covenant, that the one should convey the lands to the other. On this writ a fine, called a *primer fine*, amounting to about one-tenth of the annual value of the land, became due to the king. The suit being thus commenced, then followed,—Secondly, the 'licentia concordandi,' or leave to compromise the suit, upon which also another fine, called the king's silver, or sometimes the post fine, became due to the king, amounting to about three-twentieths of the annual value of the land. Thirdly, came the concord or agreement itself, which was required to be made either openly in the Court of Common Pleas or before the lord-chief-justice, or one of the judges of that court, or two or more commissioners in the county specially authorized; all of whom were bound by stat. 18 Ed. I., s. 4, to take care that the cognizors were of full age, sound memory, and out of prison. If a married woman was a cognizor she was privately examined by the parties before whom her acknowledgment was taken, whether she did it freely and willingly, or by compulsion of her husband. A fine was the only way in which a married woman could convey her freehold interest in lands.

By these several acts the essential parts of the fine were completed, and even if the cognizor died, still the fine might be carried on in all its remaining parts, of which the next was—Fourthly, the note of the fine, which was simply an abstract of the writ of covenant and the concord; naming the parties, the parcels of land, and the agreement, for the purpose of enrolment of record in the proper office. The Fifth and last part was the foot of the fine, which included the whole matter, reciting the parties, day, year, and place, and before whom it was acknowledged or levied. Of this indentures were made or engrossed at the chirographer's office, and delivered to the cognizor and the cognizee, usually beginning thus: 'hæc est finalis concordia;' 'this is the final agreement;' and then reciting the whole proceeding at length.

The note of the fine was read four times openly in the Court of Common Pleas, or as it was called, proclaimed, once in the term in which it was made, and once in each of the three succeeding terms, during which all pleas ceased, and these proclamations were endorsed upon the record. A table of the fines levied in each county in every term was affixed in some open part of the Court of Common Pleas all the next term, and a copy of the same was given to the sheriff of every county, who at the next assizes fixed the same in some open place in the court, for the more public notoriety of the fine. (2 Bl. *Com.* 349.)

Of the effect of a Fine.—A fine was a conveyance so effective that it bound not only those who were parties and privies to the fine, but all other persons whatsoever, unless they brought their action or made lawful entry within five years after proclamation made, except married women, infants, prisoners, persons beyond the seas, and such as were not of whole mind, who had five years allowed to them and their heirs after the death of their husbands, their attaining full age, recovering their liberty, returning into England, or being restored to their right mind. Persons also who had not a present, but a future interest only, as those in reversion or remainder, had five years allowed them to claim in from the time their right accrued by the stat. 4 Henry VII. c. 24.

In order to make a fine of any avail at all, it was necessary that the parties should have some interest or estate of freehold in the lands to be affected by it. (2 Bl. *Com.* 355.) But it was not necessary that the freehold should be in either of the parties by right, and therefore when a fine was levied to strengthen a title, it was frequently considered necessary to make a feoffment, in order that the freehold might be in one of them by disseisin. [Feoffment.] If neither of the parties had any interest at the time, although the fine had no proper operation, yet it might take effect as between them by way of estoppel. [Estoppel.]

A fine was principally used as the mode of conveying the estates of married women, and renouncing their right to dower, as a means of barring estates tail, and remainders and reversions dependent upon other estates, and also for the purpose of strengthening defective titles.

By the 3rd and 4th Will. IV. c. 74, fines are abolished, and provision is made for the conveyance of the interests of married women in land, with the concurrence of their husbands, and after being examined to ascertain if they are acting voluntarily, by a deed to be acknowledged in the Court of Common Pleas; and provision is also made for the barring of estates tail by a deed enrolled: but no provision is made for enabling parties whose titles are defective to strengthen them by any means analogous to a fine and nonclaim. (2 Bl. *Com.*; Cruse *On Fines.*)

FINGAL. [OSSIAN.]

FINGER. [HAND.]

FINGER-BOARD, the whole range of keys, white and black, of a piano-forte or organ.

FINGERING, in music, is the art of so applying the fingers to a musical instrument, the piano-forte and organ especially, as to accomplish the objects in view in the easiest and most effective manner. In a work of this kind practical treatises would occupy too much room, and the art of Fingering, accompanied by the necessary examples, would require many pages; we therefore shall only add that, as a system, Clementi's is the best that we are acquainted with; though some few modern improvements have been made in its details.

FINISTE'RE, a department at the western extremity of France, comprehending a part of the former duchy of Bretagne. It is of an irregular form, nearly resembling the Welsh county of Pembroke; the inlets of Brest Water, and the Bay of Douarnenez, occupying the same relative position in one that St. Bride's Bay does in the other. It is washed on the northern, western, and southern sides, by the Atlantic ocean; and bounded on the eastern side by the departments of Côtes du Nord and Morbihan. The greatest length is from the north-west coast, between the villages of Argenton and Kersaint, to the mouth of the river Quimperlé, 78 miles; the greatest breadth at right angles to the length is from the Bec du Raz to the mouth of the Douron, 68 miles. The area of the department is about 2676 square miles, being about an eighth larger than the average of the French departments, and rather larger than the English county of Lincoln. The population in 1832 was 524,396, about 196 to a square mile, being the average relative population of France in the proportion of nearly 5 to 4, and to that of the English county with which we have compared it in the proportion of nearly 5 to 3.

The coast, which is commonly high, presents a very broken outline, and on almost every side of it are innumerable islands and rocks. On the north side are the Ile de Bas, the Iles de Meloine, Los Cadoros, and others; on the south side the Iles de Glenan, Les Pourceaux, the Ile aux Moutons, and others; and on the west a group of greater importance than any of the foregoing, comprehending the Ile d'Ouessant (or, as it is frequently called by English writers, Ushant), Balanec, Molene, Queménès, and several others: this group is separated by the Passage du Four from the headland on the northern side of Brest Water. The Ile de Sein is also on the western coast of the department, and is separated by the Passage du Raz from the Bec du Raz on the southern side of the bay of Douarnenez. There are some others, very small.

The Ile de Bas has been noticed already. [BAS, ILE DE.] Ouessant has a very steep coast, difficult of access: it is about four miles long from east to west by three wide. There are on it a castle, a lighthouse, two churches, and four small chapels, and several hamlets or groups of houses. The soil is fertile: the inhabitants, who amount to about 1800, feed sheep and rear horses, the breed of which, though small, is hardy. This island formerly constituted a marquisate. A magistrate (juge de paix) resides in the village or hamlet of St. Michel. A drawn battle was fought off Ouessant in the year 1779 between the French fleet under the Count d'Orvilliers, and the English under the Admirals Keppel, Harland, and Palliser. Ouessant was known to the Romans by the names Uxantis or Axantos. The other islands do not require notice. The chief bays and inlets on the coast of the department are those of Brest, at the north-western extremity of which is the Pointe St. Mathieu; of Dinant; of Douarnenez, at the extremities of which are the Bec de Chévre and the Bec du Raz; of Audierne, at the extremities of which are the Pointe de Begalan and the Pointe de Penmarch; of Benodet, at the extremities of which are the Pointe Enizan and Pointe Labert; and de Forest. The headlands, Pointe Treignon, Pointe de Bechou, Pointe Douelan, and Pointe Pouldu, are on the south coast of the department.

There are two principal ranges of hills in the department, which commence respectively at the headlands north of the water of Brest and south of the bay of Douarnenez, and run eastward into the department of Côtes du Nord, in which their ridges unite: the northern range is known as Les Monts d'Arrée, and the southern as Les Montagnes Noires (the Black Mountains): they inclose between them the basin of the Aulne, the most considerable river of the department These mountains consist of granite of various kinds: the most common is coarse-grained, and is composed of mica, quartz, and felspar. The outline of the hills is picturesque, but their elevation is not great, they rarely exceed 900 feet. From the proximity of the mountains to the sea, the streams which rise on their slopes have a very short course. The following run into the sea on the northern coast, ranging from east to west:—the Douron, which in the lower part of its course forms the boundary between this department and that of Côtes du Nord; the Dourdu; the Relec, which receives the Jarlo; the Penze; the Fleche; and the Aber-Benoist, which receives the Leuban: on the west coast, ranging from north to south, are the Aber Ildul; the Elorn or Landernau, about 30 miles long, for seven or eight of which (viz., up to Landernau) it is navigable; and the Aulne or Châteaulin, of which below: on the south side, ranging from west to east, are the Odet, 33 miles long, navigable to Quimper, 10 or 12 miles above its outfal; the Boton; and the Ellé, about 33 miles long, which rises in the department of Morbihan, and receives the Isok or Isole from the junction of this stream the river assumes the designation of Quimperlé. The Aulne, the only one of these rivers that requires particular notice, rises on the southern slope of the Monts d'Arrée, near the boundary of the department, and flowing southward for 24 miles, receives the Hiere, nearly 30 miles long, from the adjacent department of Côtes du Nord: from the junction of the Hiere it winds westward past Châteauneuf du Faou to Châteaulin, 26 or 28 miles, and there becoming navigable, flows west-north-west about 12 miles into Brest Water; its whole course is from 62 to 64 miles. The Hiere is the only tributary of any considerable size which joins it on the left bank; on the right bank it receives the Elez, the Goanes, and the Doufine, all from the slopes of the Monts d'Arrée. There are many smaller streams, and a considerable number of small lakes or étangs.

The climate of the department of Finistère is cold and foggy: the quantity of rain which falls is very great. In some parts, on the coasts and on the hills, the winds, which blow chiefly from the west, the north-west, and the south-west, are very tempestuous, especially in winter; the frosts are also severe in many parts. In other places the climate, though always humid, is not so tempestuous or so cold. Thunder occurs chiefly in winter. The air is no otherwise unhealthy than by the changeableness of its temperature, the influence of which it requires a strong constitution to withstand, especially on the coast. Catarrhal affections are of frequent occurrence.

The soil is various: silex, alumine, and magnesia are its chief constituents. The adherence of the cultivators to old usages has been a barrier to the introduction of improvements in agriculture, and the value of the agricultural produce is considerably below the average of France. The quantity of wheat raised is not sufficient for the consumption of the department; rye, oats, buckwheat, flax and hemp are grown; and in some places abundance of pulse. Hay is plentiful and of good quality. Fruit is scarce; there are no vineyards. The quantity of woodland is small: there are some wastes which produce only heath and broom, which, in the scarcity of wood, are used for fuel. The cattle of the department are small, but grazing is carried on to a considerable extent: the horses are good; the sheep, which are not numerous, are of small size, and their wool is of ordinary quality. Many bees are kept; game is plentiful, and some wolves are found. The streams and pools abound in fish, as also the coasts, on which the fishery, especially of the sardine, or pilchard, is very actively pursued.

The mineral treasures of the department are of great value; mines of lead, in combination with which silver is found, and mines of iron, are wrought. There are coal-pits, quarries of common granite, fine black granite, sandstone, and slates. Cold mineral springs are of tolerably frequent occurrence, and some of them are of considerable efficacy, though they have not attained any great reputation.

The chief manufactures are linens of various sorts, pottery, paper, rope, leather, and some chemical productions. The trade carried on is considerable: the productions and manufactures of the department furnish the chief articles of exportation; the chief imports are wines, brandy, oil, and soap. The length of the coast-line, the number of the harbours, and the navigation of the rivers Elorn, Aulne, and Odet, are favourable to commerce. A canal from Nantes to Brest is in progress, if it is not completed; it enters the department on the east side, and follows the valley of the Aulne, which river it joins at or near Châteaulin. The high road from Paris to Brest enters the department on the north-east side, and runs through Morlaix, Landivisiau, and Landernau: this is the only road of the first class. A road of the third class enters the department on the east side near Carhaix, from which town it sends off three branches, one northward to Morlaix and St. Pol de Léon, one north-westward to Landernau and Lesneven, and one south-east into tho department of Morbihan; another road of the same class enters the department on the east side near Quimperlé, and runs through that town, Rosporden, and Quimper, to Douarnenez, Pont Croix, and Audierne; another of the same class runs from Quimper by Châteaulin and Le Faou to Landernau. The other roads are bye-roads.

The department is divided into five arrondissements, viz., those of Morlaix, in the north-east, population in 1832 131,580; of Brest, in the north-west, population 156,810; of Châteaulin, in the centre, population 94,302; of Quimper, in the south-west, population 100,676; of Quimperlé, in the south-east, population 41,028. These arrondissements are subdivided into 43 cantons, or districts, each under a justice of the peace, and again into 290 (or, according to others, 284) communes, which, in extent and population, may be compared with our parishes. In this department, as in the other parts of the antient Bretagne, the rural population considerably surpasses that of the towns. The chief towns are Quimper, the capital, on the Odet, population 9860; Morlaix, at the junction of the Relec, and the Jarlo, population 7797 for the town, or 9596 for the whole commune; and Brest, population 29,860. [BREST; MORLAIX; QUIMPER.]

Of smaller towns, there are in the arrondissement of Morlaix, Lanmeur, on a bye-road from Lannion (Côtes du Nord) to Morlaix; Guerlesquin, on the border of the department east by south of Morlaix; Landivisiau, on the road from Morlaix to Brest, and St. Pol de Léon (population 3106 for the town, or 6692 for the commune); Plouescat, (population of the commune 3017), and Roscoff (population of the commune 3332), all on the coast. St. Pol de Léon was from the sixth century to the time of the Revolution the capital of a diocese, the bishop of which was a suffragan of the archbishop of Tours. The town is built on the slope of a hill: the chief buildings are the town-hall; the cathedral, which is built of granite, and presents little that is worthy of notice except some handsome stained glass windows; and a lofty tower more than 180 feet high, called the tower of Creisker. There were several religious houses and a college before the Revolution. The town has a small harbour the inhabitants manufacture some cotton and linen, and trade in paper, leather, pottery, wax, honey, and horses, which last are in high repute. Turf is dug and stone quarried in the neighbourhood. Roscoff has a small port and an excellent roadsted, in which the vessels that navigate the Channel frequently anchor. Mary Queen of Scots, when she was brought to France to marry Francis II., landed at Roscoff, and caused a chapel, dedicated to St. Ninian (called in Breton St. Draignau) to be erected on the spot where she disembarked. Before the Revolutionary war the inhabitants carried on a considerable trade (probably contraband) with England in wine, brandy, and tea, and exported a considerable quantity of linen to Spain; this branch of trade has since passed to Morlaix. At Landivisiau are upwards of sixty tan-yards: trade is carried on in linen, corn, honey, candles, and butter.

In the arrondissement of Brest are Gouesnou or Goueznou and St. Renan, near Brest; Landernau or Landerneau (population 3905 for the town, or 4933 for the whole commune), on the river Elorn or Elhorn; Ploudiry near Landernau; Lesneven (population 2050 for the town or 2404 for the whole commune), on a road from Landernau to the coast; and Lannilis (population of commune 3179) and Ploudalmezeau (population of commune 3023), both on the coast. Landernau is in the Breton language called Landternock. In the contest for the duchy of Bretagne between the houses of Montford and Penthièvre [BETAGNE], Jean IV. (of the house of Montfort) took Landernau and put the garrison to the sword. The chief buildings of the town are the town-hall and two hospitals, one of them a marine hospital. There are a great number of tan-yards; trade is carried on in the agricultural produce of the surrounding district, grain pulse, flax, hemp, honey, wax, cattle, and horses, and in soap, tallow, leather, and soda. The navigation of the river commences here, and the high road from Paris to Brest passes through the town. Lesneven has a marine hospital a large unadorned building capable of receiving 500 patients. There is a large corn market held here.

In the arrondissement of Châteaulin are Châteaulin, the chief town, and Châteauneuf du Faou, both on the Aulne; Huelgöet and Pleyben (population of commune 4508), near the same river but not on it; Braspars, on the Doufine: Carhaix (population of town 1796, of commune 1939,) on the Hiere; Loc Renan near the bay of Douarnenez and Le Faou or Faon on Brest Water. Châteaulin is a small place in a pleasant situation; it is divided into parts by the Aulne, over which there is a bridge: the navigation of the river begins here. The principal trade of the inhabitants is in slates, some of which are exported to foreign parts, and in salmon, of which a vast quantity is caught and sent into the neighbouring departments and even to Paris. There are two ebbing and flowing wells in the neighbourhood of this town. Carhaix appears to have existed in the Roman times, and to have been the Vorganium of Ptolemy and the Vorgium of the Theodosian table, the chief town of the Osismii: it is supposed to have been ruined by the Normans in the ninth century. It was the birth-place of Theophile Malo La Tour d'Auvergne, a descendant of Turenne, a warrior and an antiquarian of considerable celebrity. He fell in the battle of Neubourg, A.D. 1799. Huelgöet has a lead mine which furnishes employment to 280 workmen and produces yearly 370,000 kilogrammes of lead ore and 300 kilogrammes of silver. The kilogramme is equal to rather more than 2lbs. avoirdupois. At the village of Poullaouen (population of commune 3544) is a yet more valuable mine, the most considerable in France, and one of the best in Europe: it yields annually 660,000 kilogrammes of lead ore, and 400 kilogrammes of silver. The machinery employed in working the mine and the buildings for smelting the ore are worthy of notice. Poullaouen is between Huelgöet and Carhaix.

In the arrondissement of Quimper are Douarnenez on the bay of that name; Audierne on the bay of Audierne, and Pont Croix near it; Pont L'Abbé, (population of town 1960, of commune 2785,) near the bay of Benodet; Concarneau in an island on the bay of Forest; and Rosporden on tha road from Quimper to Quimperlé. Douarnenez with a population of 2000, chiefly sea-faring people, and Audierne are fishing towns; the fish taken are the conger and the whiting: Audierne has a large and safe harbour, but the neighbouring coasts are an object of dread to mariners from the frequency of shipwrecks; Pont L'Abbé is in the midst of one of the most productive corn districts of the department: the butter of the neighbourhood is much esteemed. Concarneau was formerly a place of great strength: it is still defended by walls and by a castle built by Anne, heiress of Bretagne and Queen of France. The port does not afford good anchorage. The inhabitants are engaged in the sardine or pilchard fishery, in which [illegible] vessels are employed.

In the arrondissement of Quimperlé are Quimperlé on the Ellé or Quimperlé (population of town 3866, of commune 5275); Pont Aven, on a small river which unites with the Beton; and Bannalec (population of commune 4153), on the road from Quimper to Quimperlé. Quimperlé or its neighbourhood was not unfrequently the residence of the dukes of Bretagne, who had here a castle called Carnoet. In the civil dissensions of Bretagne and afterwards in those of France Quimperlé was the object of attack. The town is handsome: it has two good streets and a fine church: the sub-prefect's office, formerly a benedictine convent, is worthy of notice. The trade of the town is promoted by the navigation of the river Quimperlé, formed by the junction of the Ellé and the Isole or Isok: vessels of 50 tons can get up to the quays. There are several tan-yards and a paper-mill; and trade is carried on in corn, cattle, and shoes or sabots. There are a high-school and a society of agriculture. The name of the town was originally Avantot, then Quimper, then from the name of the stream, the Ellé, on which it stands (Quimper Ellé), Quimperlé. The inhabitants of Pont Aven are engaged in the salmon fishery; the stream on which the place stands abounds with excellent salmon.

The department forms the diocese of Quimper, the bishop of which is a suffragan of the Archbishop of Tours. It is in the jurisdiction of the Cour Royale or High Court of Justice of Rennes, and in the circuit of the Académie Universitaire or Educational Board of that city. It is comprehended in the 13th military division, the head-quarters of which are at Rennes. It sends six members to the Chamber of Deputies.

In respect of education this department is one of the most backward in France: the number of boys at school is to the whole population only as 1 to 199.

FINITE (in Mathematics), having a boundary, used as opposed to INFINITE.

FINLAND, the principality of, forms a Russian government composed of Finland, the two Lapmarks of Kemi and Tornea, and the province of Wiborg. It lies between 59° and 70° N. lat. and 28° and 31° E. long. On the north its boundary is Norway; on the north-east, the government of Archangel; the east, Olonetz; the south-east, St. Petersburg; the south, the gulf of Finland; the south-west, the Baltic; the west, the gulf of Bothnia; and the north-west, Sweden. Its present name was given to it by the Swedes; but the natives call it *Suomemna*, the region of lakes or swamps. Its area is variously estimated, and some have even carried it as high as 134,400 square miles; but Oldekop's estimate of 111,300 is probably nearest the truth. The number of inhabitants, which was 1,093,957 in 1815, and 1,177,546 in 1825, is at present computed by Arsenief to be 1,500,000. The Lapmarks of Kemi and Tornea, which constitute *Russian Lapland*, occupy the whole northern districts of the principality of Finland. The Lapmarks, which lie almost entirely within the polar circle, are so sterile as not to contain a population of more than 8000 individuals on an area of 31,500 square miles; frequently not a single dwelling is met with for 80 or 100 miles together.

The surface of Finland, in the eastern and central parts, is intersected by lakes, rivers, and swamps, between which there are flats of sand overgrown with moss and studded with low hills. In the northern and western parts it is covered with mountains belonging to the great Scandinavian chain, which are called the Russo-Lapland range. In the northern there is no height greater than the Poldoivi, on the borders of Norway, which is said to have an elevation of 2000 feet. The most extensive group of the range is in the southern part of Russian Lapland, whence it sends out its branches in all directions; the main range running parallel with the eastern coast of the gulf of Bothnia, until it gradually subsides, and at last disappears to the north of Biörneborg. The loftiest summits in this range are Narangavaara and Livaara, from which the sun may be seen during the whole twenty-four hours at Midsummer. It is said, however, that the highest point is not more than 3500 feet above the surface of the sea. In the more southern latitudes of the principality the valleys between these mountains contain good arable and rich meadow land. The coasts both of the gulf of Bothnia and Finland are lined with precipices, reefs, and rocky islands, which render navigation very hazardous, especially in the south-west. The centre of Finland is an elevated plateau, from 400 to 600 feet above the sea, full of lakes, and covered with low rocky elevations, mostly composed of red granite. The Kaselka, or main chain of mountains, which terminates above Biörneborg (61° 27′ N. lat., 27° 40′ E. long.), chiefly consists of primitive rocks. In some parts of the low lands the surface is overspread with enormous blocks of granite. Many of the lakes in the interior of Finland have their outlet in the gulfs of Bothnia or Finland. Independently of Lake Ladoga [LADOGA], which occupies a considerable portion of the south-eastern part of Finland, the largest of these waters is Lake Saima, or Saima Vési, a little to the north of Wiborg, which is more than 300 feet above the level of the sea, nearly 180 miles in length and from 20 to 25 miles in breadth. It is full of islands, the basis of which is granite, and it flows through the Vouoxa or Voxa into Lake Ladoga. Next to this is Lake Enare, or the Enare-Träsk, the latter word signifying a lake, in the northernmost part of Lapland, which covers above 1000 square miles, and has its outlet into the Frozen Ocean by the Palsyoki.

There are no rivers of any considerable length. The largest are the Voxa, which originates in the collected waters of numerous smaller rivers and lakes, in the northern part of the district of Kuopio, flows southward into Lake Saima, and thence eastward into Lake Ladoga. It is so full of granite rocks and falls as to be of little use for navigation. The Kymmene is a broad stream, issuing from Lake Pemena to the west of Lake Saima, seldom less than 250 to 300 feet in width and varying from 50 to 150 in depth; it falls into the gulf of Finland near Kymmenegaard, but, owing to the frequent falls, is not navigable. The Kumoyoki flows from a lake still more to the west, and falls into the gulf of Bothnia near Biörneberg. The Yananus, an outlet of Lake Yänisyārwi, flows into Lake Ladoga. The Sestra is the boundary between the governments of Finland and St. Petersburg; the Tornea and Muonio separate Finland from Sweden, and the Tana-elf divides it from Norway. The line of the Tana-elf is first from south-west to north-east at Palmayawry, where it quits the Finland border and flows through Finmark in Norway north-by east into the Tana-fiord.

The waters of Finland and its numberless swamps and moors occupy more than a third of its surface; but the climate is on the whole salubrious, and there are many cases of great longevity. The average duration of the summer, which is accompanied by great heat, is not more than three months; the winter, which lasts from seven to eight, is exceedingly severe, particularly in the north. During the latter season there is a direct road across the frozen gulf of Bothnia to Sweden. In the northern parts of Russian Lapland the sun disappears entirely from the end of November to the close of January; an interval which the people term 'skaabmo,' an abomination; but during which the moon and stars frequently shine with exceeding splendour throughout the twenty-four hours. The climate is less severe in the central and southern parts, but thick cold fogs are common.

There are extensive forests of firs and pines in the south, interspersed with oaks, elms, &c. both on the mainland and the islands; they are of peculiarly luxuriant growth on the soils which receive the exhalation from the lakes and swamps. In northern Lapland these trees are replaced by the birch, until, in the coldest districts, trees cease altogether. The mountains and hills are in general naked, but even where they are wooded, the wood is low and stunted.

The greater portion of the soil is either stony or sandy Rich vegetable earth is of rare occurrence, and scarcely ever unmixed with sand. In order to manure his land, the agriculturist is in the habit of setting fire to his forest or underwood. By this means he is enabled to grow his rye or oats for two or three years in succession, after which he plants the ground afresh and lets it lie for twenty or thirty years, until the wood is sufficient for another burning. By this process, practicable in so thinly a peopled country only, the soil of Finland is rendered capable of producing grain adequate to its consumption in common years, and more than adequate in favourable seasons. There was a time, indeed, when it was called 'the granary of Sweden:' no further back than the year 1795, its export of grain amounted to 50,000 quarters. Nyland and the south-western districts of Finland raise the largest quantities; Wiborg does not, one year with another, produce sufficient for its own consumption. Barley and rye are chiefly cultivated; oats are often sown the year after the land has borne rye; a little wheat is raised; and grey peas and beans in Wiborg, S. Michael, and Tavastehus. The frost, however, sets in so soon and the weather is so uncertain, that it is common for the farmer to use the precaution of gathering in his crops while they are green, in the early part of August, and afterwards to dry them. Hemp and flax hops, and a little tobacco are also cultivated. Potatoes, carrots, coleworts, parsnips, and onions are partially raised; but wild berries are the only fruit, except perhaps in the vicinity of Abo. The crab apple grows wild, but not beyond the sixtieth degree of latitude. The oak does not thrive beyond 61°, nor the ash beyond 62°. The forests have suffered greatly, particularly near the sea-coast, from wasteful use and firing; but large quantities of timber are still exported in the shape of deals, masts, &c.; and much pitch and potash, as well as fire-wood, are sent abroad The pasture-lands are ill managed, and the breeding of cattle and horses is therefore very limited. In this respect the neighbourhood of Kemiträsk, in the circle of Uleaborg, however, which abounds in luxuriant meadows, forms an exception. Moss, in the bleaker regions, is the only food for domestic animals, for which the reindeer is an inestimable substitute. The horse of Finland is small, but strong and active. Fowl and other wild game are plentiful. Bears, elks, wolves, foxes, martens, &c. afford a large supply of furs and skins. Reindeers abound in all parts of northern Finland; the stock in the district of Kuusamo alone is 12 000 heads; and in that of Ursjocki, in northern Lapland, it is between 40,000 and 50,000. These animals constitute, in fact, the wealth of the Laplander; they supply him with food, clothing, and other necessaries, as well as the means of barter for his principal luxuries, brandy and tobacco; nor is he accounted affluent unless he be owner of 200 or 300 of them.

Fish is the chief food of the Laplander, whose streams, such as the Tornea and Tana, are well provided with salmon, pike, a kind of eels, red-eyes, &c. The pearl muscle is found in some of the lakes and rivulets of the western parts.

Finland has few mineral products. Bog iron is obtained in some parts, and converted to domestic use; lead is also found, and a little copper here and there, but neither in large quantity. Marble is quarried in the district of Ruskeala and the island of Arasati in lake Ladoga. Slate is plentiful, and chalk abounds in some places. The want of salt is severely felt, and the attempts made to extract it from salt water have not been attended with much success. The whole annual metallic produce of Finland does not exceed 12,000 poods, or about 420 tons.

The majority of the population is of Finnish extraction. The Fins call themselves 'Suomalans' or 'Suomes,' but they are denominated 'Tschudes' by the Russians: they are slow, grave, and self-willed, but peaceable, brave, and hospitable, temperate and industrious: their complexion is dark, their countenance and manner are serious, and they are well knit, and of a robust make. They are all free, and many of them are landholders. A great number have leases of the crown, and hold their farms for life, with the privilege in some cases of bequeathing them to their children. Their dwellings, called 'Poertte,' are low, dark, and unclean, and built of wood. The Laplander is of the same extraction as the Finlander, and calls himself a 'Sameladz or Same;' he is indignant when styled a 'Lapp' ('lapor' in Russian), the name given to him by the Swedes, which signifies a coward, seer, magician, or poisoner. They resemble the Finlanders in all respects except that the upper jaw projects more, and their hair is of a deeper tint. There are not many thousands of them in this government; they lead a wandering life, and are divided into two classes, the reindeer Laplanders and the fishing Laplanders. Numbers of Russians and some Swedes have settled in the districts of Wiborg and Koxholm, as well as in the Finland towns.

According to the consistorial returns, the number of births in 1822 was 42,898, and in 1823 49168; the deaths in 1822 were 33,535, and in 1823 29,578; and the marriages in 1822 were 9809, and in 1828 10,764. In the five years' interval from 1815 to 1820 the excess of births over deaths was 81,589, which gives an annual increase of 16,317. Finland contains 26 towns, 1894 villages, and 28,735 'hemman,' hamlets, settlements, and homesteads. All the inhabitants, except the Russians, profess the Lutheran faith. Finland Proper is divided into two dioceses, Abo with 19 deaneries (probsteien) and Borgo with 7. The followers of the Greek ritual are under the archimandrite of St. Petersburg. The university of Abo has been transferred to Helsingfors since the year 1827. There are grammar schools in Wiborg, Abo, and Borgo, and inferior schools in the majority of the parishes; but public instruction is not widely extended, and the proportion of scholars to the general population was not more than 1 in 109 about four years ago.

Agriculture, the breeding of cattle, and in some parts the fisheries, constitute the principal occupations of the people. There are few manufactures except in the large towns, and these are principally of iron ware, sail-cloth, and stockings. The peasantry make what coarse woollen and linen they require under their own roofs: they also prepare tar, potash, and charcoal, make articles of wood for their own use and for exportation, and in some of the ports vessels are constructed. Navigation is much impeded by the severity of the winter, which shuts the harbours from six to seven months in the year. The trade of Finland amounts to about 250,000*l.* annually in imports and 280,000*l.* in exports; the latter consisting principally in the supply of St. Petersburg, by the channel of Lake Ladoga and the gulf of Finland, with timber, meat, butter, skins, tar, fish, &c. The same articles are likewise exported to Sweden. Salt is a great article of import.

There is a distinct establishment at St. Petersburg for the government of this vast province or principality. The governor-general, who resides at Helsingfors, has chiefly military duties to discharge. Though Finland has a constitution of its own, by which the inhabitants are classed in four orders, the diets are never convoked, except on the occasion of additional taxes being contemplated by the government. The senate in fact has been found a more convenient body to manage than the diets, and it has almost superseded them.

In the year 1831 the principality was re-moulded into eight circles or 'Loen,' at the head of each of which there is a superintendent called a 'Landshoefding;' each circle is divided into districts, or 'Foegderier; and each of the latter into bailiwicks, or 'Hoerad.' In judicial matters the Swedish system has been retained; and this is the case also with regard to fiscal concerns. In the absence of official data, the revenue has been estimated at 60,000*l.* sterling per annum.

The eight circles, or loens, commencing from the south, are Wiborg, St. Michael, Nyland, Tavastehus, Abo-Biörneborg, Wasa, Kuopio, and Uleaborg-Kaysna. The circle of Wiborg has the town of the same name for its capital, which was the antient capital of Carelia; it lies on a bay of the gulf of Finland, is well fortified, consists of the main town and two suburbs united by a wooden bridge to the island on which the castle stands, and has an elegant Greek cathedral, a church for the Swedes and Germans, and another for the Finlanders, a Roman Catholic chapel, a district school, besides other schools, and about 3000 inhabitants. In this circle is Frederikshamm, on a peninsula on the bay of Finland, a strong fortress, containing about 1400 inhabitants: it was here that the treaty of September, 1809, was concluded, by which Sweden made over Finland with part of Lapland and the Aland Islands to Russia. St. Michael, north-west of the preceding circle, contains St. Michael, a small town, and Nyslott, another small town with a strong castle. In Nyland, west of Wiborg, is Helsingfors, the capital of the principality, on a tongue of land in the gulf of Finland, with about 10,000 inhabitants, and the strong fortress of Sweaborg, at the entrance of the harbour. North of this place lies Borgo or Borgao, a small town on the river of the same name, with a cathedral, a church, gymnasium, manufactures of linen, sailcloth, refined sugar, and tobacco, and about 2500 inhabitants. Lowisa, formerly Degerby, north-east of Borgo, is a seaport, with two churches, and about 2800 inhabitants. The circle of Tavastehus, north of Nyland, has for its capital Tavastehus, lying on a lake, with a strong castle, a church and about 1700 inhabitants. Abo-Biörneborg, the westernmost circle of Finland, includes the islands of Aland in the gulf of Bothnia; its capital is Abo, Obo, or Turku, on the south-western coast of Finland, with about 13,300 inhabitants. In this circle are also Biörneborg, near the mouth of the Kumoyoki, a maritime town of about 4600 inhabitants, well built, with a church, grammar school, and boat manufactures and trade: Raumo, a town with 1700 inhabitants; and Nystad, a sea-port of about 1680, where the treaty by which Sweden relinquished the Baltic provinces and part of Finland to Russia in August, 1721, was concluded. North of this circle is that of Wasa, on the gulf of Bothnia. Its capital is Wasa, on the gulf of Bothnia, a regularly built town, with a handsome stone church, a school, an infirmary and about 600 houses and 3300 inhabitants. South of Wasa lies Christianästadt, a good sea-port on a peninsula, with a church, about 1200 inhabitants, and much trade. Kuopio, a circle east of the preceding, contains the town of Kuopio on a promontory of lake Kallavesi, with a church, school, well-frequented fairs, and about 1500 inhabitants. The circle of Uleaborg-Kuyana, in the most northern part of the principality, contains Uleaborg, its capital, on the Ulea, a well-built town, with a town-hall, two market-places, a church, and hospital, about 400 houses, and a population of about 4500, who carry on some trade: Brahestad, a seaport, with a church, and about 1200 inhabitants: Padajärviz-Kousoma, an inland town of about 1500: Kemi, a sea-port: and Tornea, on the river of that name at the northern extremity of the gulf of Bothnia, a neat town with two churches, one on an island, and about 700 inhabitants; this place is the centre of the Lapland trade in deals, salt fish, reindeer-skins, butter, &c.

(Rüh's *Finland*; Friccius; Meissner; Schnitzler; Hassel; Cannabich: &c.)

FINLAND, GULF OF. [BALTIC SEA.]

FINMARK. [NORWAY.]

FINS, a people from whom the present inhabitants of many of the most northern countries in Europe are descended, constitute a large proportion of the population of Eastern Russia, and of the countries adjacent to the gulfs of Finland and Bothnia and the Frozen Ocean. The name by which they are known among themselves is Suomilins, not Fins: nor do the Russians know them by this name, but by that of Tshukhutzys. The first mention of them under the denomination of Fins occurs in Tacitus, who says, in his 'Germania,' 'the *Fenni* ought to be ranked among the Germans.' They are apparently the Phinni of Ptolemy. Their present number is variously estimated: by some writers at 2,400,000, and by others at 3,000,000 and upwards. They are of Asiatic origin, and their dominion once extended from the sources of the Obi and the banks of the Volga to the shores of the Baltic, as far as the north-eastern parts of Prussia. The period of their migration westwards is unknown. Tacitus (cap. xlvi) observes that the Fenni were a savage race, without arms, horses, or iron: their arrows were pointed with bone, and their principal occupation was hunting. In fact their own name, *Suomilins*, designates dwellers among swamps. Most writers conceive that their original abode was among the Ural mountains, whence they spread chiefly westwards; but in no part established themselves as an independent nation, except in Hungary, where they erected the kingdom of the Magyárs. Addicted to a wandering life, they were easily reduced to subjection by the Norwegians, Swedes, and Russians, in succession. The Norwegians began by the conquest of Finmark, whence they made inroads at various times on the territory of the Permians, a branch of the Fins, who inhabited the country in the vicinity of the White Sea. These inroads were ultimately arrested by the princes of Novgorod, who made themselves masters of Permia, and by the Moguls, who diverted the attention of the Norwegians to the defence of their own independence. The Russians next overran the Finnish territories, possessed themselves of Carelia and the whole of Permia; and in the fourteenth century, Stephen, one of their bishops, having planted the cross on the shores of the White Sea, overthrew the worship of the great Finnish deity, Yomala. The whole of Lapmark, together with all the Finnish tribes in the East, in Siberia, and along the Volga, at last yielded to the Russians, who drove back the Norwegians in their attempt to re-establish their dominion over Lapmark. The Swedes next fell upon the Finnish territory which lay within their borders. In the middle of the twelfth century, Erik the Pious converted the inhabitants of what is now termed Finland to Christianity; and about a hundred years afterwards Sweden possessed itself of Tavasteland, and those parts of Carelia and Lapmark which were not in the hands of the Russians. In this way the whole nation of the Fins was gradually reduced to their present state of dependence. By migration they have become more or less intermixed with the Bulgarians, Moguls, and even the Turks, whose ancestors had been their southern neighbours from time immemorial.

The Fins of the present day are commonly divided into two distinct branches; the Eastern or Uralian Fins, and the Western or Baltic Fins, both of whom may be identified as having a common origin by their physiognomy, habits, and general character and usages. The *Eastern* or *Uralian Fins* include the tribes settled in Siberia, and about the Volga, and comprehend the Mardvas or Mardvings, who inhabit the Russian territory adjoining the Oka and Volga; the Permians or Permiaky, and Siryanes, of Permia and portions of Orenburg; the Votyaks, on the banks of the Viatka; the Ostyaks in the government of Tobolsk, who are also called Khoriti and Konniyungs; the Voghals or Voghalitchi of Permia and Tobolsk; and the Teptiarys, who dwell about the Ural mountains and in the land of the Bashkirs. The *Western* or *Baltic Fins* comprise the Savolaiseths, Yemes or Hemelaiseths, Tavastes and Kayanes of Finland; and the Sames or Sameladz, who people Lapland, together with the tribes of the Kurs or Livys, of whom there are scanty remains in Courland and Livonia; the Tchudes or Esthians; who inhabit Esthonia; the Ivortis, who are found in Ingria; the Tsheremys and Tshuvaks, who are scattered over Nijegorod or Nishegorod and Casan; and the Kyrials, between Lake Peyera and the Kymen, as far as Lake Ladoga. Schubert, in his account of the Russian empire, gives the subsequent enumeration, which does not differ essentially from that of Vsevoloysky, whom we have followed in the preceding classification.

1. Laplanders or Sameladz	22,000
2. Finlanders and Fins of Ingria and Carelia	1,200,000
3. Esthes or Esthians	500,000
4. Livys and Kurs	1,000
5. Permians	35,000
6. Suryanes or Siryanes	30,000
7. Voguls	100,000
8. Votyaks	100,000
9. Tsheremys	200,000
10. Tshuwashes or Tshuvaks	370,000
11. Mordwines or Mardvings	92,000
12. Ostyaks of the Obi	108,000
13. Teptyarys	111,000
Total	2,869,000

The Fins differ wholly from the Sclavonians and Livonians. They have an alphabet and language peculiar to themselves. The majority are attached to agricultural pursuits; some few tribes are nomadic, and some devote themselves exclusively to hunting and fishing. They are of middling stature, but of a strong robust make: their characteristic features are a flat face with hollow cheeks, dark grey eyes, and light brownish hair, a thin beard, and sallow complexion. The Tsheremys or Tshermisses and Tshuvaks approximate somewhat to the Tartars in their exterior appearance, the Mardvings to the Russians, and the Voguls to the Calmucks. The Fins are a brave, honest, and hospitable race of men, but headstrong, frequently ferocious, and repulsive in their manners. Some tribes are so indolent that the name of Fin is in many parts synonymous with laziness; they have little activity of mind, and are notorious for their want of cleanliness. They are destitute of the vivacity and social qualities of the Russians, and are serious, reserved, and fond of a retired life.

The Fins are, with few exceptions, Christians. The Eastern were converted by their Russian masters to the Greek faith; the Western, who at first embraced the Roman Catholic religion, have mostly followed the example of their former masters, the Swedes, and embraced Protestantism. Among the tribes who adhere still to paganism are the Tsheremys, Mardvings, Voguls, and a few others. In point of civilization none are so advanced as the Finlanders: many possess a natural taste for music and poetry

The Hungarians are descended from the Yuigurys of the Ob, who are now divided into Ostiaks and Voguls. The latter have dark-brown or black hair, and their dialect much resembles the Hungarian.

The Fins have no nobility. The peasant, however, always gives precedence to the citizen or merchant, and holds every servant of the crown in high respect. Independently of husbandry, fishing, and the chase, they are in some parts employed in the manufacture of tar, and in building barks and boats. Their dwellings in general are at a distance from one another, and consist of three cabins, one for summer, another for winter, and a third for culinary purposes: these are surrounded by a yard, which also contains a barn and stable or stalls for cattle. Their women are thrifty and much devoted to their domestic duties; they weave coarse woollens and linens for the use of their families, and their winter attire differs little from that of the men.

The Fins are fond of ardent spirits; yet longevity is common among them.

FIR. [ABIES.]

FIRDUSI, ABUL CASIM MANSUR, a celebrated Persian poet, was born at the village of Shadab, in the district of Tus, in the province of Khorassan. The Persian biographers differ considerably in the date of his birth, some placing it in the beginning and others in the middle of the tenth century; but as Firdusi himself mentions in the last chapter of the 'Shah Nameh' that he completed that work A.H. 400 (A.D. 1009), and that he was then nearly 80, he must have been born about A.H. 319 (A.D. 931).

His father was a gardener, and is said to have had the management of a beautiful estate called Firdus (*i. e.* paradise), whence the poet obtained the name of Firdusi, though, according to another account, this name was given to him by Mahmud in consequence of the excellence of his verses.

Firdusi appears to have spent the first fifty years of his life in his native village; till attracted by the encouragement which Mahmud gave to learning and the fine arts, he repaired to his court at Ghaznî, where his talents procured him an honourable reception. Soon after his arrival, Mahmud commanded him to write a history of the kings of Persia in verse, and promised to reward him with a thousand pieces of gold for every thousand couplets. The poet however preferred waiting for his reward till he had finished the work, which was completed, after a labour of thirty years, in 60,000 couplets. But instead of receiving the great sum he had anticipated, he was doomed to a cruel disappointment. It appears that he had offended some favourite courtiers, who prejudiced the mind of Mahmud against him, and accused him of having insulted the religion of the prophet by the praises which he had bestowed upon Zerdusht (Zoroaster) in his great poem. Instigated by these calumnies, Mahmud only sent him 60,000 silver dirhems. It is related that Firdusi was in the bath when the money was brought, and that disappointed and enraged at the meanness of the sultan, he distributed the whole sum among the attendants of the bath and the slave who brought it, adding, 'The sultan shall know I did not bestow the labour of thirty years on a work to be rewarded with dirhems.' In consequence of this insult, he was sentenced to be trod to death by an elephant, and with great difficulty obtained a revocation of the sentence. Feeling that he was no longer safe at Ghaznî, he left the city, after having written a bitter satire on Mahmud, which he gave to one of the courtiers, telling him that it was a panegyric on the sultan, which he must not present to his master till several days had elapsed. A translation of this satire is given by Sir William Jones, accompanied with the original Persian, in his *Poëseos Asiaticæ Commentarii* (Works, 8vo. edition, vol. vi., pp. 308-313), and also without the Persian in his *Traité sur la Poësie Orientale*, vol. xii., pp. 242-245.

The accounts given in the Persian biographies of Firdusi after his departure from Ghaznî are vague and unsatisfactory. The remainder of his life was spent in wandering from one kingdom to another, pursued by the emissaries of Mahmud, whose power was too much dreaded by the various monarchs of the East to allow them to harbour for any length of time the proscribed poet. He first took refuge with the governor of Mazanderan (Hyrcania), and afterwards fled to Bagdad, where he was hospitably received by the caliph Kadir Billah, who gave him the 60,000 pieces of gold which Mahmud had promised. While at Bagdad he is said to have added a thousand couplets to the Shah Nameh in praise of the caliph, and also to have written a panegyric on him in Arabic; but this statement is in all probability incorrect, since all trace of the latter is lost, and none of the copies of the Shah Nameh, collated by Mr. Turner, contain the former. During his residence in this city he is also said to have written the poem called 'Joseph,' which consists of 9000 couplets, in the same measure and style as the Shah Nameh, copies of which are now rarely met with even in the East. But even in the capital of the Abasside caliphs he was not secure from the power of Mahmud; the feeble Kadir Billah dared not disobey the commands of the sultan, and the unfortunate poet was obliged to seek in countries still more remote a safer retreat. It is uncertain at what court he next took refuge; but it appears clear from all accounts that his friends procured his pardon shortly after he left Bagdad, and that he eventually returned to his native town, where he died A.H. 411 (A.D. 1020), in the 89th year of his age. We know little of his family: the death of his son at the age of 37 is pathetically alluded to in the Shah Nameh, and his daughter is said to have refused the 60,000 pieces of gold, which were offered to her by the tardy justice of the sultan.

The Shah Nameh contains the history of the kings of Persia, from the reign of the first king, Kaiûmers, to the death of Yesdijird, the last monarch of the Sassanian race, who was deprived of his kingdom A.H. 21 (A.D. 641) by the invasion of the Arabs during the caliphate of Omar. During this period, according to Firdusi, three dynasties sat upon the Persian throne. The first, called the Pishdadian, lasted 2441 years. The second, the Kaianian, commenced with Kaikobad, and lasted 732 years. Alexander the Great, called Sikander by Firdusi, is included in this race, and is represented to be the son of Dârâb, king of Persia, by the daughter of Failakus (Philip of Macedon). After the death of Sikander, Persia was divided, during 200 years, into a number of petty monarchies called the 'confederacy of the kings.' The Sassanian race of princes succeeded these, and ruled over the whole of Persia for 501 years.

The poem of Firdusi is of little value as a history, though it certainly contains some of the antient Persian traditions. The whole history of Kaikhosrau, as related by Firdusi bears so great a similarity to the account which Herodotus gives of the life of Cyrus, as to put it beyond doubt that both authors present us with a faithful and accurate representation of the same tradition. 'It is utterly incredible,' says Sir William Jones (Works, vol. iii., p. 166), 'that two different princes of Persia should each have been born in a foreign and hostile territory; should each have been doomed to death in his infancy by his maternal grandfather; should each have been saved by the remorse of his destined murderer; should each, after a similar education among herdsmen as the son of a herdsman, have found means to revisit his paternal dominion, and, having delivered it after a long and triumphant war from a tyrant who had invaded it, should have restored it to the summit of power and magnificence.' The leading circumstances in the life of Alexander the Great are also preserved in the Shah Nameh. We read of his victory over Dârâ (Dareius), of his marriage with Roshung (Roxana), of his expedition into India and defeat of Faûr (Porus), and of his journey through the desert to Mecca to consult two trees from which a voice proceeded, which is evidently only another version of his visit to the temple of Ammon in Libya. The Persian biographers all agree in asserting that Mahmud placed in the hands of Firdusi the antient chronicles of the kings of Persia, from which it is supposed that he derived the historical narratives extant in his great work. We have the testimony of the book of Esther (x. 2) to the existence of such records, as well as a strong presumption derived from the fragments of Ctesias and many parts of Herodotus. But it appears very unlikely that these chronicles should have been preserved for so many ages, considering the various revolutions which Persia experienced. There is a romantic story told in the preface to the edition of the Shah Nameh, published by the command of Baysinghur Khan, which, though deserving of little credit, must not be omitted on account of its general currency in the East. It is related that Yesdijird, the last monarch of the Sassanian race, ordered all the chronicles of the kings of Persia to be collected and arranged, and that this book was known by the name of the Bastan Nameh. On the conquest of Persia by the Arabs it was found in the library of Yesdijird, and became in the division of the plunder the property of the Ethiopians, by whom it was conveyed to India; it was afterwards taken back again to Persia, where it remained unknown till a fortunate circumstance brought it to light in the reign of Mahmud. Little reliance can be placed on the existence of written documents in the time of Firdusi: the only value of the Shah Nameh, in an historical point of view, consists in the antient Persian traditions it has preserved; but it would require the learning and acumen of a critic like Niebuhr to arrive at the historical truth conveyed in the tradition, and to strip the real legend of the additions and embellishments of the poet. But it is not as a history that the Shah Nameh derives its reputation. Its poetry is read and admired by all well educated Persians even in the present day; and its author may be considered as the greatest of oriental poets, with the exception of Valmîkî and Câlidâsa. It is written in purer Persian than any other work in the language, and contains a very small number of Arabic words; it has thus become a model of Persian composition, and is as much distinguished in the East as the Homeric poems were in the West.

The copies of the Shah Nameh now met with vary greatly in the number of verses. 'It would be difficult to discover,' says Mr. Macan in his preface to the Shah Nameh, 'two copies which agree in the order of the verses or in the phraseology for 20 couplets together. Whole episodes are omitted, verses rejected from every page, and it is not now uncommon to find MSS. which contain only 40,000 couplets, though originally the poem is said to have consisted of 60,000.' Mr. Macan adds, that he had never seen a MS. with more than 56,685 couplets; the edition published by himself contains only 55,204. There have been three attempts made to collate MSS. of the Shah Nameh with the view of obtaining an accurate text.

1. The first was made by order of Baysinghur Khan, the grandson of Timur, A. H. 829 (A. D. 1426). The editor states in his preface that Baysinghur took great delight in reading the Shah Nameh, but found so many mistakes in the copies he used, that he ordered a fresh collation to be made in order to obtain an accurate copy for his own private use. The editor does not mention the MSS. he used; and this collation did not produce much benefit, as the copy was deposited in the king's library, to which no one was allowed access. All trace of it has disappeared; the preface alone is extant.

2. The second collation was made under the superintendence of Dr. Lumsden, professor of Arabic and Persian in the College of Fort William. Twenty-seven valuable MSS. were procured for this purpose; and the first volume containing an eighth part of the work was published at Calcutta in 1811.

3. The third collation was made by Mr. Turner Macan from 17 complete MSS. and four fragments containing the greater part of the work; all of which were written in Persian. The whole of the Shah Nameh was published by him at Calcutta, 1829, in 4 vols. 8vo.; this edition was printed at the expense of Nuseer-oodeen-Hyder, one of the native princes of Hindustan.

An epitome of the Shah Nameh in Persian made in A.D. 1657, by Shumshir Khan, is widely circulated in the East. There is also an abridgment of it in English in prose and verse by Mr. James Atkinson, London, 8vo., 1833; the same author had previously published at Calcutta in 1814, the episode of Sohrâb in English verse accompanied with the Persian text. The entire poem was translated into Arabic prose, A. H. 675 (A. D. 1277), by Caouâm-êddyn-Abul-Feteh-Isa, a native of Ispahan. A small portion of it was published by Wahl in the original Persian with a German translation and many valuable notes in the 5th volume of the *Fundgruben des Orients*, Wien. 1816, (pp. 109—131, 233—264, 351—389); which was reprinted by Vullers in a useful work for beginners, entitled *Chrestomathia Schahnamiana*, Bonnæ, 1833. The first eight books were translated by Champion in one volume, 4to., 1784; and a few extracts were also translated into English verse by Stephen Weston, B. D., Lond., 1815. Farther particulars of the life of Firdusi will be found in Silvestre de Sacy's translation of his life by Daulet Shah, published in the 4th volume of *Notices et Extr. des Manuscrits*, (pp. 203—238), and in the prefaces to the various works quoted above.

FIRE. [HEAT.]

FIRE-ARMS. [ARMS; ARTILLERY.]

FIRE-ENGINE, a term formerly applied to the steam-engine, but now confined to those machines which are employed to extinguish fires by throwing water from a jet upon the burning materials.

When we reflect upon the ravages which fires, whether accidental or kindled purposely by incendiaries, have occasioned in all ages, we may suppose that contrivances more or less appropriate have been at different times devised for extinguishing the flames or preventing them from spreading.

There were various modes of extinguishing fires previous to the invention of the modern fire-engine. A term employed by Juvenal and Pliny expressive of some implement used in extinguishing fires has given rise to some discussion. This term is *Hama*, which some commentators describe as a water-vessel; but Holstein contends that it was a very large hook or grapple fixed at the end of a long pole. Facciolati describes the *Hama* as a vessel used in putting out fires. Juvenal says in his 14th *Satire*, v. 305, &c

> 'Dispositis prædives *hamis* vigilare cohortem
> Servorum noctu Licinus jubet, attonitus pro
> Electro, signisque suis, Phrygiâque columnâ,
> Atque ebore, et latâ testudine.'

In the above passage Juvenal alludes to the anxiety of the rich, who took precautions to meet the ravages of fire. 'The opulent Licinus bids his train of servants watch by night, the water-buckets being set ready;—alarmed for his amber, and his statues, and his Phrygian column, and his ivory and broad tortoise-shell.' Pliny the younger speaks also of pipes (siphones) being used to put out fires. (lib. ep. x. 42.)

Augustus appointed seven bands of firemen in Rome, each of which had the care of two divisions (regiones) of the city: each band had a captain (tribunus); and at the head of the whole body was the præfect of the watch (Præfectus Vigilum). For further information the Title *De Officio Præfecti Vigilum* may be consulted. (Dig. i. Tit. 15.)

At the present day a species of squirt is used among oriental nations to extinguish fires.

With regard to such contrivances as might correctly come under the denomination of machines, it appears that they originated with Ctesibius, a distinguished Greek mechanician, who lived in Egypt in the reign of Ptolemy Philadelphus, and whose name is intimately connected with pumps of different kinds, and clepsydras, or water-clocks. Hero, a pupil of Ctesibius, describes a sort of forcing-pump with two cylinders, employed for the purpose of extinguishing fires. Apollodorus, architect to the Emperor Trajan, has left a description of a machine consisting of leathern bottles with pipes attached to them: when the bottle was squeezed, a jet of water flowed through the pipe, and was thus used to extinguish fires. Beckmann has found, in the accounts of many of the German towns, entries for the cost of machines, the existence of which would be very problematical without that evidence: thus, in the building accounts of the city of Augsburg for 1518, fire-engines are mentioned under the name of 'instruments of fire,' or 'water-syringes.'

But the earliest account on which we can depend of a machine at all resembling those now in use is given by a Jesuit named Caspar Schott in 1657. This account related to a fire-engine made by Hautsch, of Nuremberg. It consisted of a water-cistern about 8 feet long, 4 feet high, and 2 feet in width; and was drawn on a kind of sledge somewhat larger than the cistern. It was worked by 28 men, and a stream of water an inch in diameter was forced, by means of this engine, to an elevation of nearly 80 feet. Hautsch, like many other inventors, was unwilling to disclose the secret of its construction; but Schott supposed that it contained a horizontal cylinder, through which a piston worked, and thus produced a pump-like action.

In 1699 the king of France gave a patent-right to an individual of the name of Duperrier to construct fire-engines, under the name of *pompes portatives*, or portable pumps, and to keep them (17 in number) in repair and working order. Twenty-three years afterwards, the number of pumps amounted to 30, the management of which cost 20,000 livres annually.

We have seen an old engraving which purports that Mr. John Lofting, a merchant of London, was the inventor and patentee of the fire-engine. In one corner is represented the Monument, and in another the Royal Exchange. The engines are represented at work.

There are two important parts of a fire-engine which do not appear to have been brought into use for some time after such machines became general: we mean the flexible hose, or tube, and the air-chamber. Hautsch's engine, however, possessed the former, but not the latter. The purpose of a flexible tube is obvious, for it enables the operator to carry the stream of water in any direction from the engine; whereas without it the sphere of the engine's use is limited, from the impossibility of carrying the engine itself through narrow passages, &c.

The air-chamber is a contrivance which depends for its value on one of the most important laws of pneumatics, viz. the increased elasticity of air when compressed into less than its usual bulk. The manner in which the application of that principle increases the efficacy of fire-engines we shall treat of presently; but we may easily illustrate the action of an instrument without such an accompaniment, by reference to a common pump, in which we find that the water does not flow out in an equable continuous stream, but gushes forth at intervals every time the piston is raised by the action of the handle. Now it needs but little reflection to conclude that such a mode of projecting water against burning timbers, &c. must be very inefficacious when compared with that of a continuous stream. The addition of an air-chamber, therefore, which had been found of great advantage in different hydraulic machines, was an important improvement in the fire-engine.

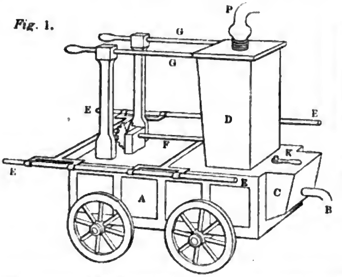
It is not exactly known who first applied this improvement, but an engine containing an air-chamber is stated by

Perrault to have been kept for the protection of the king's library at Paris in 1684. The first introduction of them, however, for common use appears to have occurred about the year 1720, when a mechanician named Leupold constructed engines consisting of a copper box securely closed and well soldered: each one weighed about 16 pounds, and ejected a continuous jet of water to a height of 20 or 30 feet. This engine contained one cylinder and piston.

The adaptation of leathern pipes was devised by two natives of Holland, both of whom were named Jan Vanderheide, and who were inspectors of fire-engines at Amsterdam in 1672. Five years after the invention, a twenty-five years' patent for the privilege of making those pipes was granted to them; and in 1695 sixty of them were kept in the city, of which six were to be used at each fire.

After the introduction of these engines into England, improvements were from time to time made in them, by Dickenson, Simpkin, Phillips, Furst, Newsham, Rowntree, and others; but from the time that the air-chamber was introduced the principle of construction has been nearly the same in all of them, the points of difference being principally in minor details. In briefly describing one of the common engines, therefore, on the construction of Newsham, we shall convey a general notion of the mode of action of most of them.

Fig. 1.

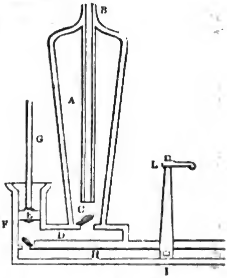


The annexed figure represents the outward appearance of the engine, such as our readers have doubtless frequently seen. The body, A, is about 9 feet long and 3 feet broad, inclosing the greater part of the mechanism of the engine. Along the lower part of this runs a metallic pipe, into which the water flows from the feed-pipe B, which is connected at the other end with a street plug or a cistern. If a supply of water cannot be obtained in this way, a cistern, C, is filled by means of buckets, and at the juncture between the cistern and the interior pipe a grating or strainer is placed, to free the water from dirt, gravel, &c. with which it may be mixed. The water having entered the interior pipe, is elevated and forced into the air-vessel by two pumps contained within the body of the box, D, and from the air-vessel is forced into the pipe P, which is connected with the leathern hose by which the propelled water is directed to the proper point. The two pumps are worked by a double lever connected with two long handles, E E E E, which are conveniently placed for being worked by several men, who alternately elevate and depress the end of the lever at which they are placed. This manual force may also be much augmented by one or two men standing on the body of the machine near F, who, holding by the bars G G, and treading alternately on each side of the fulcrum of the lever, on treadles conveniently arranged for that purpose, greatly increase the downward tendency of either side by throwing the weight of the body on that side. At K is a handle which turns a cock or valve, thereby regulating the supply of water to the interior pipe through the feed-pipe B.

Thus much for the exterior. We will now show the position and action of the air-chamber, and the connexion between it and the pumps; and in doing so we shall confine ourselves to that portion of the interior mechanism which is directly concerned with that part of the process.

Fig. 2 is a section through the middle of the air-chamber, and one of the pump-barrels. A is the air-vessel, made of metal, from the top of which proceeds nearly to the bottom a tube, B C, open at both ends. The air-chamber and tube are in communication with a horizontal pipe, D, which opens by two branches into two pump cylinders, one of which is hidden in the drawing, but the other is seen at F. Through this cylinder works the piston E, which is connected by the piston rod G with a toothed-wheel at the upper part (not given in the figure); to which wheel a reciprocating motion is given by the exterior levers to which it is attached. The horizontal pipe D, besides its communication with the air-vessel and the pump barrel is also open to another horizontal pipe, H, which is connected at the other end with the feed-pipe shown in the former figure. These communications however are closed at different parts of the operation by two valves, one of which opens upwards from the pipe H to the pipe D; and the other also upwards from D to the air-vessel A. At the point I in the lower pipe is situated the cock, of which we have spoken, and the handle of which is seen at L.

Fig 2



This being the relation of the parts to one another, let the reader now suppose the piston E and its rod G to have a reciprocating motion by the exertions of the men who are working the double lever on the outside of the engine, and he will be able to follow the rationale of the process. It must be understood that the piston-rods of the two pumps being connected with opposite sides of the fulcrum of the lever, it necessarily results that when one ascends the other descends, and *vice versâ*. The air chamber being full of air of the ordinary density of the atmosphere, and the cock I being opened, by which the pipe H becomes filled with water, we will suppose the piston to be drawn up to the top of the pump cylinder F. The consequent results are these: the piston draws up with it the air which the cylinder contains, and thus creates a partial vacuum beneath, because all communication with the external air is cut off. The valve between the two pipes having now a stream of water pressing it upwards, while the space above it contains rarefied air only, the valve is forced open, and the pump-barrel F and the pipe D become filled with water. When the returning stroke of the lever forces the piston down to its former position, the water is driven before it, but cannot return to the pipe H, because the valve communicating with the latter opens upwards. It is therefore forced through the other valve into the air-vessel A. At the second upward motion of the piston a partial vacuum is again produced beneath it, but the water now contained in the air-vessel cannot return to fill that vacated space, on account of the mode in which the valve opens. A fresh supply is therefore gained, as before, from the pipe H through the valve communicating with D. This supply is, by the subsequent downward pressure of the piston, forced into the air-vessel, in the same manner as to the first portion. Thus each successive ascent of the piston causes a rush of water into the pump-barrel, and each descent urges that portion into the air-vessel.

We must now inquire what takes place in the air-vessel into which the water is thus forced. The air in this vessel has no communication with the external atmosphere except through the pipe B C, which is fitted air-tight into the neck of the vessel at B. When the water ascends in this vessel above the bottom of the tube at C, the air above that level becomes compressed into a smaller space, as all escape is guarded against. With this compression its elasticity is also increased in the same ratio; and the effect of that increase we will now show. In the article **Barometer** it will be seen that the average pressure of the atmosphere, under ordinary circumstances, is about 15 pounds on the square inch, which is sufficient to balance a column of water about 33 feet high, or one of mercury 30 inches high; but when, through any external force, the air is compressed to one-half its former bulk, its elasticity is doubled, or becomes equal to the pressure of 66 feet of water. Now let us suppose that the influx of water into the air-vessel through the valve is such as to condense the air into half its former bulk: the contending forces are these—the air contained in the tube B C is pressing on the surface of the water beneath with a force of one atmosphere, or 15 lbs. on the square inch; while the condensed air in the vessel is pressing on the water with a force of two atmospheres, or 30 lbs. on the square inch. The latter pressure therefore exceeds the former by 15 lbs. on the square inch, and the water is driven up the tube with a force of that amount, which, as we have said, is sufficient to carry it to a height of about 33 feet. If the condensation of the air be less than the above, the effect will be proportionally diminished; but as long as the density exceeds that of the external air, so long will the water be forced up the tube; and thus a continuous stream is insured, which is the object desired. If the condensation be carried to a greater extent, the height to which the water will be ejected will increase in the same ratio; so that, if the bulk of the confined air were reduced to one-third, one-fourth, or one-fifth of its original bulk, the ascensive power gained would be about 66, 99, or 132 feet respectively.

These are the principles on which all such engines act, although the arrangement of the mechanism may greatly vary. A construction somewhat different has been employed by Mr. Rowntree for the Sun and other fire-offices, in which the entrance of mud and gravel with the water from the feed-pipe is more effectually prevented. Many improvements, more or less valuable, have been suggested and partly acted upon within the last few years. A fire-engine composed entirely of metal has been constructed by Mr. Tilley, of London. Another, which is both efficient and portable, has been made by Mr. Merryweather, and is used principally as a stationary engine for the protection of large buildings. Engines on this construction have been made for the mansions of the dukes of Devonshire, Northumberland, and Rutland.

But the most important deviation from the general construction of fire-engines is the steam fire-engine of Mr. Braithwaite. This was first employed at a fire at the Argyle Rooms, in London, in 1830, and displayed great power in throwing the water on to the building. The furnace and boiler of this engine are similar to those of the 'Novelty,' a locomotive engine constructed by the same engineer for railway traffic. The pipe by which the water is jetted turns on a swivel, by which means the stream can be directed to any quarter. The cylinders are placed horizontally, and the steam-piston is connected with the water-pump plunger by a rod working through two stuffing boxes. The steam-cylinder is 7 inches in diameter, and the number of strokes of the piston from 35 to 45 per minute. The water-pumps are 6½ inches in diameter. This engine, the total weight of which did not exceed 45 cwt., consumed 3 bushels of coals in 5 hours, by which expenditure it was enabled to throw out from 30 to 40 tons of water per hour, which it propelled to a height of upwards of 80 feet, and on one occasion to 90 feet. When an alarm of fire is given, the fire belonging to this engine is kindled, and in 18 minutes the water in the boiler is brought to 212°; and by an ingenious contrivance, bellows are worked by the motion of the wheels, by which the heating of the water is hastened.

Another engine, on the same construction, by Mr. Braithwaite, possessed 10-horse power (the former being about 6), and ejected the enormous quantity of 90 tons of water per hour.

In 1832 a steam fire-engine was made for the king of Prussia by the same engineer, in which the steam could be got up in 20 minutes to a pressure of 70 lbs. on the square inch. This engine ejected the water through a pipe 1¼ inch in diameter to the height of 115 or 120 feet: the number of strokes of the piston was 18 per minute, and the body of water ejected about 1¾ ton in that time.

The power of steam has likewise been applied to a *floating* fire-engine by Mr. Braithwaite, the machinery of which is so constructed, that the power of the engine can be at once changed from propelling the vessel to working the pumps, and thus does double duty. To propel the vessel, the gearing of the coupling-boxes is connected with the paddle wheels; but in order to apply the engine to the propulsion of water the gearing is altered, and the engine brought into connexion with the pumps.

In many cases a supply of water is obtained for the extinction of fires in large buildings by having a reservoir at the top of the buildings, from which pipes are conducted to various parts; and cocks or valves in those pipes being opened, the water will flow downwards.

The construction of the leathern pipes, or hose, for fire-engines has received much attention. The pipes were occasionally made, in former times, of canvass, covered with cement; another plan was to weave them into perfect tubes; but the use of leather seems to be now fully established in this country. An improvement in the materials of these pipes is said to have been lately made in France, by the substitution of flax for leather. The pipes are woven in the same manner as the wicks of patent lamps, and may be made of any length, without seam or joining. When wetted they swell and become water-tight. It is said that they are more portable than leather, and not so susceptible of injury. The expense also is not more than half that of leather.

The leathern tubes, or pipes, are usually sown up in the manner of boots; but Messrs. Hancock and Tellers, of Philadelphia, a few years ago, devised a mode of fastening the seams by means of metallic rivets, which plan has received further improvements from Mr. Jacob Perkins, of London.

The difficulty of directing the play of the stream of water in an apartment enveloped in flames, without great danger to the fireman, induced Mr. Bramah, about 40 years since, to devise a boss, or nose, for the end of the pipe. This boss is hemispherical, and perforated with small holes, and when thrown into the middle of the apartment a minute stream rushes from each hole; and as the directions of the holes are arranged at all angles, within 180° of each other, the ceiling, wall, and floor, become saturated equally with water, which could not be the case with one large aperture. This was the intention of the inventor, but we do not know whether it has ever been acted upon.

Within a few years the firemen belonging to the different insurance companies in London have been formed into a body—the Fire Brigade,—the establishment of which has been found to be attended with very beneficial results—results indeed which generally follow the adoption of a system of combined operation. Still more recently a smoke-proof dress has been introduced among the corps, invented by Lieut.-Col. Paulin, of Paris. It is a kind of tunic or hood of leather, covering the head and bust, and is fastened round the middle of the body. Into the head of the covering are inserted two glass eye-pieces, and a leathern air-tube is fastened to the back of the dress. A small lamp, somewhat resembling those used by the metropolitan police, is fastened in front, and a whistle for giving signals is placed opposite to the mouth of the wearer.

FIRE-ESCAPE. The perilous situation of human beings in the upper part of buildings, when on fire, has roused the ingenuity of many persons to devise the means of escape; and as the subject is one of great importance, especially in large towns, the following observations may not be without their use.

The means of escaping through the window of a burning house are obviously of two kinds; one from within by the individual himself who is in danger, and the other by the assistance of other persons from without. Of the first kind is a contrivance invented by Mr. Maseres, some years since, in which an assemblage of straps, or belts, form a kind of seat for the individual, who holds in his hand a rope which passes through a series of holes in a block, and is, at the same time, connected with two hooks or clasps, fastened to the sill of the window. The individual, standing in one strap and bound by others, lowers himself to the ground by allowing the rope, which is attached to the block, to slide through his hands. Contrivances of this kind, whatever may be the ingenuity displayed in their construction, are liable to this serious drawback:—that they require a calm attention to minutiæ of fixing, adjusting, &c., at a moment when agitation and fear render the mind ill fitted for the observance of rules of conduct.

Among the multiplicity of fire-escapes which have been devised, we will briefly mention a few for which premiums or medals have been awarded by the Society of Arts.

In 1809 Mr. Davis received a premium of fifty guineas for inventing an apparatus, which consisted of three ladders applied to each other by four clasp irons on the top of each of the two lowermost, which are so contrived that each ladder may slide into the one beneath it. On the top of the lowermost ladder two pulleys are fixed on the inside, over which two ropes pass, and are situated between the lower ladder and the middle one. The ropes are made fast to the bottom of the middle ladder on each side, in a proper direction with the pulleys at the top. The upper ladder is attached to the middle one in the same manner, and on the top it carries two horn-pieces, made of iron, and turned off at each end similar to two horns, which are four feet apart, and are sharp at the end to cling to the sides of the window, and thus keep the ladders steady. The compound ladder, which reaches to a height of about 45 feet, is fixed on a frame about 9 feet by 5, and drawn on wheels; and a windlass is so placed that the three ladders can be wound out from each other, and thus elevated to the position required.

In 1813 Mr. Young received a premium for a fire-ladder, consisting of a number of rounds, which form the steps of the ladder by being fastened to two ropes, which are suspended from an iron frame, terminating in hooks, which can be lodged on the sill of a window, and thus form a convenient ascent, which much resembles that of a common rope ladder. The rounds of the ladder are so made that they can be fitted to each other longitudinally, and elevated from the street in the form of a long straight rod, but without being detached from the ropes which are to form the two sides of the ladder. When the hooks at the top are fixed, a jerk at the bottom will unfix all the rounds from their vertical position, and allow them to fall into their proper places.

In 1816 a medal was presented to Mr. Braby for a contrivance, which consisted of a pole of any desired length, on the front of which is fastened a board or plank, fitted to a groove or rabbet in the back of a car, which, by means of this groove, slides upon the plank along the pole. A rope, attached to the car, passes over a pulley at the top of the pole, down a channel at the back of it (which is covered with plate-iron to guard the rope from injury by fire), and is then brought under another pulley at the bottom of the pole. With the assistance of this rope the car may be raised or lowered by persons below, and thus a communication established with an upper window.

Mr. Witty, in 1820, prepared a sort of settee, or chair, for a window recess, which may be hung on the sill of a window like a painter's machine. A bag is suspended from the chair, and is kept open by being made fast to a strong frame, and well secured by girth-web, which passes under it, and by which it hangs. These webs go over rollers, on one of which is coiled a sufficient quantity to reach from the top of the house to the bottom. When a person gets into the bag from a window the bag begins to descend, and as the web uncoils itself from the rollers it causes a flexible rope to wind round the middle part of the roller, by which means the descent is graduated.

The magistrates of Leith have within a few years caused several fire-ladders to be constructed for that town by Mr. Lamb, an inhabitant of Leith, on a principle somewhat resembling that of Mr. Davis, before described, but more simple in its action.

Recently, two fire escapes, one by Mr. Ford and the other by Mr. Merryweather, have been approved by several of the parochial authorities of London, and partially brought into use. That by Mr. Ford consists of a well-seasoned spar 35 or 40 feet long, capped with iron at the top, and having two projecting arms, furnished with prongs, by which a firm bearing against the wall of a house is obtained. The lower end is shod with iron, terminated by a spike to enter the ground. Just below the cap at the top, a grooved pulley is mortised into the spar, and a corresponding pulley is placed near the bottom. An endless rope runs round these two pulleys, at one point of which is attached a main rope; and another point of the endless rope is fastened to the semicircular brace of a large grooved roller, which traverses up and down the spar between the two pulleys. This brace carries a hook on the inner side of the spar, to which a car or cradle is fixed, by which persons may be lowered to the ground. The cradle, which consists of a seat and foot-board suspended from a cross head, and has a belt buckled round it, is drawn up by a rope passing over the pulleys.

The other contrivance, and the last which we have space to notice, is by Mr. Merryweather. It consists of ladders about six feet long, all of which are made exactly alike, the upper end being smaller than the lower each end is furnished with a pair of iron loops or sheaths, so contrived that the top of each ladder can be inserted into the loops at the bottom of another, and thus several can be joined end to end. The top of the upper ladder, when employed at fires, is made to wheel along the front wall in ascending by an ingenious appendage contrived by Mr. Baddely; which consists of two short side-pieces corresponding in form to the bottom part of a ladder. On the upper part is an iron axle carrying a pair of small light wheels. A semicircular connecting rod of iron preserves the proper position of the side-pieces when not mounted on the ladder. Each end of the axle is provided with rising springs similar to those in an umbrella-stick, which allows the wheels to be slipped on the axle, but effectually prevents their sliding off again until the springs are depressed. This apparatus is fitted on to the top of the ladder, in the same manner as one ladder is fitted to another.

Seven lengths of this ladder have been fitted to each other, and raised in half a minute by three persons; and by means of a pulley, passing over the top of the ladder, we have seen three persons descend from a height of 30 feet, by a belt fastened round the body, in about two minutes and a half.

Whatever kind of fire-escape be preferred, it is necessary that the localities where they are deposited and the mode of using them should be well and generally understood.

FIRE-FLY. [ELATERIDÆ; LAMPYRIS.]

FIRE, ST. ANTHONY'S. [ERYSIPELAS.]

FIRE, GREEK, an invention of the middle ages which was often employed in the wars of the Christians and Saracens. This subject has given rise to much inquiry and excited much discussion; the obscurity by which it is enveloped has been greatly increased by many causes, and especially by the love of the marvellous.

According to Gibbon, the deliverance of Constantinople in the sieges of the seventh and eighth centuries 'may be chiefly ascribed to the novelty, the terrors, and the real efficacy of the Greek fire. The important secret of compounding and directing this artificial flame was imported by Callinicus, a native of Heliopolis in Syria, who deserted from the service of the caliph to that of the emperor.'

It is justly observed by Gibbon that 'the historian who presumes to analyse this extraordinary composition should suspect his own ignorance and that of his Byzantine guides, so prone to the marvellous, so careless, and in this instance so jealous of the truth. From their obscure and perhaps fallacious hints, it should seem that the principal ingredient of the Greek fire was naphtha, or liquid bitumen, a light, tenacious, and inflammable oil which springs from the earth, and catches fire as soon as it comes in contact with the air. The naphtha was mingled, I know not by what method or in what proportion, with sulphur and with the pitch that is extracted from evergreen firs.' One of the properties here stated to belong to naphtha is well known to be and indeed is obviously incorrectly ascribed to it; if it were spontaneously inflammable it could not even be collected, and of course could not be mixed with the other ingredients which are named. Whatever may have been the precise nature of the mixture, the account of its effects, from which somewhat of the marvellous must be deducted, is thus strikingly portrayed by Gibbon:—'From this mixture, which produced a thick smoke and a loud explosion, proceeded a fierce and obstinate flame, which not only rose in perpendicular ascent, but likewise burnt with equal vehemence in descent or lateral progress; instead of being extinguished, it was nourished and quickened by the element of water; and sand, urine, or vinegar were the only remedies that could damp the fury of this powerful agent, which was justly denominated by the Greeks the *liquid* or the *maritime* fire. For the annoyance of the enemy, it was employed with equal effect by sea and by land, in battles or in sieges. It was either poured from the ramparts in large boilers, or launched in red-hot balls of stone and iron, or darted in arrows and javelins, twisted round with flax and tow which had deeply imbibed the inflammable oil: sometimes it was deposited in fire-ships, the victims and instruments of a more ample revenge, and was most commonly blown through long tubes of copper, which planted on the prow of a galley, and fancifully shaped into the mouths of savage monsters, that seemed to vomit a stream of liquid and consuming fire.' According to Gibbon, the secret of the Greek fire was confined above 400 years to the Romans of the East; it was at length either discovered or stolen by the Mohammedans; and in the holy wars of Syria and Egypt they retorted an invention contrived against themselves on the heads of the Christians. The *feu Gregeois*, as it is styled by the more early of the French writers, is thus described by Joinville: 'It came flying through the air, like a winged long-tailed dragon, about the thickness of a hogshead, with a report of thunder and the velocity of lightning; and the darkness of the night was dispelled by this deadly illumination.' The use of Greek fire was continued to the middle of the 14th century, when the more efficient employment of gunpowder was substituted. When Ypres was besieged by the Bishop of Norwich in 1383, the garrison defended itself with Greek fire. In a curious paper on the subject of Greek fire by the late Dr. MacCulloch (*Royal Inst. Journal*, vol. 14), he remarks that very different things were known by one name, and he supposes the various projectile means and combustibles employed to have been essentially different.

FIRENZE. [Florence.]

FIRKIN, a measure of ale, beer, and some dry commodities, now disused. Eight gallons of ale, soap, or herrings, made a firkin, and nine gallons of beer. But by a statute passed in 1689, the distinction between the firkin of ale and beer was abolished, except only in London, and eight and a half gallons were declared to make a firkin.

FIRM. [Partnership.]

FIRMA'N or **FIRMAU'N**, is the name of the decrees issued by the Turkish Sultan, which are signed with his own cipher or signet. Such are the firmauns by which he appoints the various pachas and other great officers of the state. Firmaun is also the name of a kind of passport which the pachas are in the habit of granting to travellers, especially Europeans, by which they enjoin the subordinate authorities to give the bearer protection and assistance. The 'firmaun of death' was a sentence of summary execution issued by the sultan against a pacha, the written order for which was entrusted to a chiaous, or state messenger, whose duty it was to see it executed.

FI'ROLA. [Nucleobranchia'ta; Carinaria, vol. vi. p. 294.]

FIRST FRUITS (Primitiæ), the profits of every spiritual living for one year, according to the valuation thereof in the king's books. [Annates.] They were claimed by the pope throughout Christendom; in England his claim was first asserted in the reign of King John, and then only so far as related to clerks whom he appointed to benefices. Afterwards, by Pope Clement V. and John XXII., about the beginning of the fourteenth century, they were demanded and taken by the pope from all clerks, by whomsoever presented. By the statutes 25 Henry VIII. c. 20, and 26 Henry VIII. c. 3, first fruits and tenths [Tenths] were taken from the pope and given to the king. In the thirty-second year of the same king's reign a court was erected for the management of them, but it was soon after abolished. Ultimately Queen Anne gave up this branch of the royal revenue to be applied towards the augmentation of small livings. [Benefice.]

First fruits arising in Ireland were by the 2nd Geo. I. c. 15, directed to be applied for the same purpose; but by the 3rd and 4th Will. IV. c. 37, the payment of first fruits in Ireland is abolished. (1 Bl. *Com.*; 2 Burn. *Eccl. Law*.)

FIRTH. [Frith.]

FISC, FISCUS, was the name given under the Roman empire, and afterwards in the monarchies which rose on its ruins, to the private treasury of the sovereign, as distinguished from ærarium, or the treasury of the state. The fiscus was chiefly replenished by fines and confiscations, and unclaimed property of deceased persons: the taxes and other revenues of the country were paid into the ærarium. Under absolute monarchies, however, the two treasuries have been often confounded both in name and in reality. Under the feudal system, fiscus regius and fiscales terræ signified the domains of the crown, and the peasants attached to those domains were called fiscalini. Fiscus by degrees came to be used figuratively for the rights of the crown in civil as well as criminal matters, and the king's attorney was called procurator fisci, procureur fiscal in French, avvocato fiscale in Italian. Fiscus, in the sense of 'feudum regium,' or fiefs granted by the crown, was contrasted with proprietas, or an allodial estate. The word fiscus meant originally a basket or frail in which the monies of the prince were collected. (Ducange.)

FISH (French, poisson; German, fisch), a name applied to all the species of a class of animals occupying the lowest station of the four great divisions of the section vertebrata.

A fish may be defined as a vertebrate animal, breathing through the medium of water by means of branchiæ, or gills, having one auricle and one ventricle to the heart, cold red blood, and extremities formed for swimming.

Having given the ordinary definition of a fish, it may now be well to proceed with a short account of fishes in general.

In considering fishes, perhaps the most important thing which offers itself to our attention is the apparatus called the branchiæ, or gills. This apparatus is situated on each side of the neck, and consists of numerous laminæ fixed on arches. These laminæ are covered with innumerable blood-vessels, and are so constructed as to present a considerable surface to the water, so that the blood may receive a sufficient portion of the oxygen contained in that element. As the water in contact with the gills becomes deteriorated, it is necessary that a constant current be caused to flow over them. In most fishes this is effected by their taking the water in at the mouth and expelling it from under the gill-covers. The blood, which is constantly sent to the branchiæ from the heart, is distributed by means of the arteries to every part of the body, whence it returns to the heart by means of the veins.

As the breathing apparatus in the fish is suited to aquatic habits, so likewise is every part of its structure. The body is generally of an elongate oval, compressed form, covered with scales directed backwards, and furnished with fins; thus being beautifully adapted for swimming. Many fishes moreover have a bladder filled with air situated immediately beneath the spine, by the dilatation or compression of which their specific gravity is said to be varied. The thoracic part of the body is thrown forwards towards the head (so that fishes may be said to have no neck), and thus the hinder part of the body is more free and fitted for motion. The limbs are formed into fins, the fore-legs constituting what is termed the *pectoral fins* (*fig.* 1 *a*), and the posterior extremities the *ventral* (*fig.* 1 *b*): besides these fins ordinary fishes are furnished with one or two *dorsal fins* (*fig.* 1 *c c*), an *anal fin* (*fig.* 1 *d*), and a *caudal fin*, or tail.

All these fins are not always present, nor when present are they always in the same relative positions; and we shall hereafter find that both the absence of certain fins, and the peculiar position of these organs, afford characters in the classification of fishes. The fins consist of a thin elastic membrane supported by rays. The rays are of two kinds—those which consist of a single bony piece, usually hard and pointed, are termed *spinous rays*; and when the rays are formed of numerous portions of bone united by articulations, and frequently divided longitudinally into several filaments, they are called *flexible rays*. The principal organ of motion is the tail; the dorsal and ventral fins apparently serve to balance the fish, and the pectorals to arrest its progress when required.

The bones of fishes are of a less dense and compact nature than in the higher orders of animals, and always remain in an isolated state, similar to that of the embryo of the mammalia. The skeleton may be divided into four chief parts—the vertebral column, the head, the respiratory apparatus, and the limbs. The vertebral column consists of vertebræ which are concave at each end and pierced in the middle; and when joined together the hollow space between each two is occupied by a gelatinous substance, which passes from one space to the next through the hole in each bone. This hole is usually very small, but in some of the Chondropterygians it is so large that the bodies of the vertebræ are mere rings. To the vertebræ are attached the ribs; in fact, the ribs are the main support of all the other bones. The head varies more in form than in any other class of vertebrate animals The same bones as those found in other oviparous animals are almost always traceable. We shall confine our observations to those which are most frequently referred to in technical descriptions.

The upper jaw consists of maxillary and intermaxillary bones; in the greater number of fishes the intermaxillary bones (*fig.* 1. *e*) constitute the chief portion of the upper jaw, the maxillary bones (*fig.* 1, *f*) being placed behind and parallel to them and articulated to the vomer (*fig.* 3, *l*). In the salmon tribe, and some other fishes, however, the intermaxillary bones (*fig.* 2, *e*) are smaller in proportion, and form a continuous line with the fore-part of the maxillary bones (*fig.* 2, *f*). In the Chondropterygians the maxillary and intermaxillary bones are reduced to mere rudiments, their functions being performed by the bones analogous to the palatines, and sometimes by the vomer.

Fig. 1

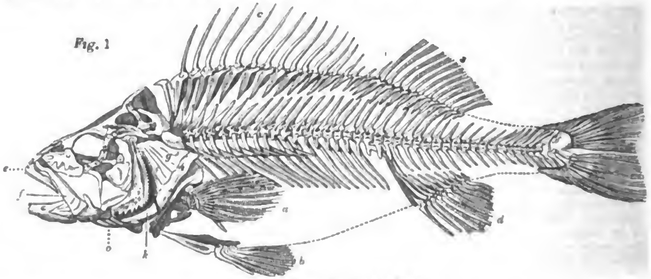


Fig. 1. Skeleton of the Common Perch.

a, the pectoral fin; *b*, the ventral fin; *c c*, the dorsal fins; *d*, the anal fin; *e*, the intermaxillary bone; *f*, the maxillary bone; *g*, the operculum; *h*, the sub-operculum; *i*, the pre-operculum; *k*, the inter-operculum.

Fig. 2.

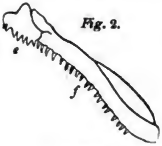


Fig. 3.

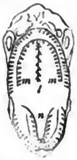


Fig. 2. Upper Jaw of a Trout.
e, the intermaxillary bone; *f*, the maxillary bone.

Fig. 3. Front view of the mouth of a Trout.
l, the vomer furnished with teeth; *m m*, palatine bones also furnished with teeth; *n*, the tongue with recurved teeth.

The *lower jaw* is generally composed of at least two bones on each side, the dental portion in front, and the articular portion behind.

The *palatines* (*fig.* 3, *m m*) are extended longitudinally on each side, and form part of the roof of the mouth; they are often furnished with teeth.

The *opercular bones*. The chief portion of the sides of the head behind the eye consists of the opercular bones: these are generally four in number, and are termed the *operculum* (*fig.* 1, *g*), the *sub-operculum* (*fig.* 1, *h*), the *pre-operculum* (*fig.* 1, *i*), and the *inter-operculum* (*fig.* 1, *k*). The first of these covers the gills.

The *Branchiostegous rays* (*fig.* 1, *o*), which are often mentioned in descriptions, are situated under the opercular bones.

The *teeth* in fishes are almost entirely osseous; they are usually of a simple spine-like form, and recurved at the tip. Teeth are found in almost every bone in the interior of the mouth; in the superior and inferior maxillary, and intermaxillary bones; likewise on the branchial arches, pharangeal bones (which are situated in the throat), and on the tongue. There is considerable variety in their structure, as will be found in the various descriptions of fishes found in other parts of this work.

The *scales* are composed of two substances, one resembling horn in its texture, and the other of a harder and bone-like nature; they are generally attached to the skin by their anterior edge, and consist of numerous concentric laminæ (secreted by the skin), the smallest of which is first formed. Certain scales, forming a continuous series, in a slightly waved line from the head to the tail of the fish, are pierced in or near their centre, and furnished with a tube through which a slimy matter is poured, which serves to lubricate the body of the animal. This series of tubes forms a line visible on the sides of the body, and which is termed the *lateral line*.

The structure, form, and position of the scales of fishes are very variable, and have furnished M. Agassiz* with characters for a new classification of these animals.

As regards the senses, those of taste and touch appear to be but slightly developed in fishes. When we find the tongue thickly covered with teeth (as is often the case), and used as an organ of prehension, and when we consider the quick manner in which the food is swallowed, it would certainly appear that their sense of taste is very slight. The sense of touch is probably most developed in the cirrhi attached to the mouth of those fishes that have them. The long filaments with which the fins of some fishes are furnished also perhaps serve, through the sense of touch, to indicate the vicinity of weeds, or other objects in the water.

The eyes are differently placed in the various species of fishes, in accordance with their habits: for the most part they are placed laterally, and in some (those that live at the bottom of the water) we find them directed upwards. In some of the species of sharks (those of the genus *Zygæna*) they are situated at the end of an elongated lateral process on each side of the head.

The sight in fishes is acute, the range of vision however is probably somewhat limited. The eyes (which are furnished with a spherical lens) are generally large: but in some species they are very small, whilst others appear to be destitute of them.

Although fishes appear not to possess certain portions of the auditory apparatus, observed in animals of a higher grade, they nevertheless possess the sense of hearing.

There are reasons for the belief that the sense of smell in fishes is tolerably acute: their olfactory nerves are of large size, and disposed over a considerable extent of surface.

By far the greater number of fishes are of carnivorous habits; there are some however which feed upon vegetable substances, and we find the stomach modified accordingly as in other animals.

The sexes of fishes, if we except the sharks and rays, offer no very decided external characters by which they may be distinguished: as in the higher animals, however, observes Mr. Yarrell, 'the respiratory organs occupy more space in the males than in the females; and, on the other hand, the abdomen is larger in the females than in the males: the males may therefore be known from the females by their somewhat sharper or more pointed head, the greater length of the gill cover, and the body from the dorsal fin downwards being not so deep compared with the whole length of the fish.'

The sexual organs of fishes are in the generality of the species of a more simple nature than is observed in the higher orders of the vertebrata, 'consisting, as will be found, towards the season of producing their young, of two elongated oval lobes of roe, one on each side of the body, placed between the ribs and the intestinal canal; the lobes in the female, called hard roe, contain a very large number of roundish grains, called ova or eggs, which are enclosed in a delicate membranous tunic or bag, reaching to the side of the anal aperture, where an elongated fissure permits egress at the proper time. In the males, the lobes of roe are smaller than in the females, and have the appearance of two elongated masses of fat, which are called soft roe; they remain however firm till the actual season of spawning, when they become by degrees more and more fluid, and the whole is ultimately voided by small portions at a time under slight abdominal pressure. * * *

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* See the 'Recherches sur les Poissons Fossiles' of Louis Agassiz.

'At the season for depositing the spawn, which varies with almost every genus, some species repair to the gravelly shallows of rivers, and others to the sandy bays of the sea. This movement is called by fishermen "going to hill, or roading;" other species resort to bunches of weeds. In many instances, when ready to deposit her spawn, a female is accompanied by two males, one on each side,—a provision of nature which seems intended to secure the impregnation of the largest quantity of ova, and the range of the influence of the male fluid is enormously increased by diffusion in water. The adhesive nature of the surface of each egg supplies the means of attachment to any of the various substances near which it may happen to be left; and the time required for the appearance of the young fish is very variable, depending upon the species, the season, and its temperature. The young fish is first apparent as a line wound round the central vitelline portion of the egg, and ultimately escapes by rupturing the external capsule with its tail.'

We now proceed to give an outline of Cuvier's classification of fishes, since it is that which is perhaps most generally adopted: it is nevertheless in many respects very artificial.

Fishes are divided by this author into two series, that of ordinary fishes, or *Ossei**, distinguished by having the skeleton bony, the osseous matter being disposed in fibres; the sutures of the cranium distinct; maxillary and intermaxillary bones, either one or both present: and that of the Cartilaginei or Chondropterygii, distinguished by having the skeleton cartilaginous; the bones destitute of fibres; sutures of the cranium indistinct; maxillary and intermaxillary bones either wanting or rudimentary, their place being supplied by the palatine or vomer.

These two series are subdivided as follow:—

Series 1. Ossei.
Section 1. Pectinibranchii.
Order 1. Acanthopterygii.

Family Percidæ
Loricati
Sciænidæ
Sparidæ
Mænidæ
Squamipinnati
Scombridæ
Tænioidæ

Family Theutyes
Pharyngiens labyrinthiformes
Mugilidæ
Gobiadæ
Lophiadæ
Labridæ
Centriscidæ

Order 2 Malacopterygii.

1. Abdominales
Family Cyprinidæ
Esocidæ
Siluridæ
Salmonidæ
Clupeidæ

2. Subbrachiales
Family Gadidæ
Pleuronectidæ
Discoboli
Echeneididæ

Order 3. Apodes
Murænidæ
Section 2. Plectognathi
Gymnodontidæ
Sclerodermi
Section 3. Lophobranchii
Syngnathidæ
Series 2. Cartilaginei or Chondropterygii
Order 1. Eleutheropomi
Sturionidæ
Chimæridæ
Order 2. Plagiostomi
Squalidæ
Raiidæ
Order 3. Cyclostomi
Pteromyzidæ

The characters of the two great series or sections into which fishes are divided it has been shown are taken from the nature of the skeleton. It remains for us now to make a few observations upon the minor subdivisions.

In the *Ossei*, or bony fishes, there are three sections. Those of the first, the Pectinibranchii, possess the following characters:—Branchiæ in continuous pectinated ridges, furnished with an opercular and branchiostegous membrane; jaws complete and free. Section 2, Plectognathi:—Branchiæ with the pectinations continuous; opercule and rays concealed beneath the skin; external aperture a simple cleft; jaws incomplete; maxillary firmly attached to the side of the intermaxillary, which alone forms the jaw; palatine arch united to the cranium by suture, and immovable. To this section belong the globe-fishes, file-fishes, &c. Section 3, Lophobranchii;—Branchiæ in small tufts; opercule large, confined on all sides by a membrane, with only a small hole for the external aperture; branchiostegous rays rudimentary; jaws complete and free. To this section belong the pipe-fishes, hippocampus, &c.

The two latter sections contain but a limited number of species: the *Pectinibranchii* on the contrary, contain all the ordinary and typical fishes, and, as is seen in the foregoing list, is subdivided into three orders. The fishes of the first of these orders, the *Acanthopterygii*, are distinguished by their having the anterior part of the dorsal, anal, and ventral fins furnished with simple spinous rays. The perches, mullets, gurnards, mackerels, &c., therefore belong to this order. In the second order, the *Malacopterygii*, all the fin-rays are flexible, with the exception sometimes of the first ray of the dorsal and pectoral fins. The three principal divisions of the *Malacopterygii* are founded either upon the position of certain fins, or their absence. In the first division, the *Abdominales*, the ventral fins are situated far behind the pectorals; as in the carp, tench, bream, dace, roach, pike, salmon, &c. In the second group, the *Subbrachiales*, the ventral fins are situated immediately beneath the pectorals (or even a little before them); as we find them in the cod-fish, haddock, and whiting. The flat fishes also belong to this group—such as the plaice, flounder, turbot, sole, &c. To the third and last of these greater divisions of the Malacopterygii belong the eels, which have received the name Apodes, from their possessing no ventral fins.

In illustration of the three orders into which the Cartilaginei is divided, the Sturgeon will serve as an example of the first, or the *Eleutheropomi*. The *Plagiostomi* contains the Sharks and Rays; and the Lampreys and Myxines *chiefly* constitute the Cyclostomi.

FISHER, JOHN, bishop of Rochester, was born at Beverley in 1456. He was educated at the collegiate school of his native place, and after some residence there removed to Michael House College, Cambridge, of which he became master in 1495. The patronage of Margaret countess of Richmond, Henry the Seventh's mother, first brought him into notice. The respect in which she held his character and her high opinion of his learning induced her to appoint him her chaplain and confessor. He was named the first 'Lady Margaret's Professor of Divinity' in the University of Cambridge, and became bishop of Rochester in 1504. It was some years after this time that the actions of this prelate first gained him an historical notoriety. When Henry VIII. (1527) was anxious to prove both to himself and to others the illegality of his marriage with Catherine of Aragon, he applied to the bishops for their opinions in the matter. One bishop alone refused to sign a declaration that the marriage was unlawful: this bishop was Fisher. Other persons indeed affixed his signature to the paper, affirming that they had his permission to do so; but the bishop resolutely denied that he had given them his consent; for in his conscience he believed the marriage to be valid. This refusal, and his continued advocacy of queen Catherine's cause, made him many powerful and lasting enemies. Not only did he become hateful to the king, who was desirous for the divorce, but the whole parliament took umbrage at his conduct. Sir Thomas Audley, then speaker, and thirty members of the House of Commons, were sent to complain to the king of certain derogatory words which Fisher was declared to have used respecting the assembled representatives; and it was with difficulty that he could persuade them to receive his explanation. Four years after, when both the parliament and the convocation were in debate upon the expediency of denying the pope's supremacy (1534), Fisher again stood alone. He dissented from all the other bishops, and could not, either by persuasion or argument, be induced to concur with their opinion. An event was now at hand which laid the foundation of his ruin. The imposture of Elizabeth Barton, the nun of Kent, was exposed by the diligence of Cranmer and others; and while the principal agents were condemned to death, it was likewise deemed fit that those who had been privy to the deception should not escape unpunished. Among these was Fisher, who, knowing this woman and her associates to be impostors, disgraced himself by not exposing the imposition; he made many vain excuses, but was found guilty of misprision of treason. It does not appear that the king proceeded against him upon this charge till he was moved by new provocations. When the oath touching the succession and the king's supremacy was offered to him, the bishop of Rochester, as Sir Thomas More had done, refused to swear it. The king, now more than ever irritated against him, caused him to be indicted upon the statute and committed to the Tower: 'his bishoprick was seized,' says Burnet (*Hist. Reformation*, vol. i.), 'and all his goods taken from him; only some old rags were left to cover him; and he was neither supplied well in diet nor other necessaries, of which he made sad complaints.' Books were also denied him lest he should write against the king's marriage or supremacy. These inexcusable severities met with the most bitter censure of the Roman Catholic party; while many of the Reformers, especially the Lutheran preachers who had frequently been persecuted by Fisher (see Burnet, *Hist. Ref.*, part i., book 2), privately rejoiced in his misfortunes. During his imprisonment Pope Clement, in spite to the king, and in kindness to Fisher, sent him a cardinal's hat. When the king heard of this, he desired that the bishop might be examined about it; but Fisher protested that he had used no endeavours to procure it: nevertheless his new dignity precipitated his ruin. His continued denial of the king's supremacy was no longer passed over: on the 17th of June, 1535, he was called to account for this offence. The Lord Chancellor, the duke of Suffolk, and some other lords, together with the judges, were appointed commissioners for his trial; he was found guilty, and condemned to die as a traitor. On the 22nd of June he was beheaded.

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* Cuvier gave no name to this section; the one here used is that given by Mr Jenyns: other sectional names have also been taken from the same author.

The character of Fisher is remarkable for firmness. In his steady maintenance of the fallen cause of queen Catherine, undaunted by the anger of the vindictive king, this quality peculiarly shone forth. Again, with regard to the supremacy, the obstinacy and tyranny of Henry VIII. were before him; it was clear that no circumstances or reasoning would alter the opinions of his opponents; if *he* did not change, certain persecution awaited him. He might have followed the example of numbers who, though zealous for papacy, had now deserted its cause: the spirit of the time was not only lenient to but favoured this species of hypocrisy. But, notwithstanding all this, Fisher was immovable, not being convinced that he was in the wrong; his fearless firmness allowed him to maintain an open profession that he was in the right. He was a learned and devout man, and his conduct fully proved his sincerity. (Burnet's *Hist. Ref.*)

FISHERIES are localities frequented at certain seasons by shoals or great numbers of fish, sometimes of one particular description only, where they are taken upon a large scale. The right of frequenting these fishing-grounds has frequently been matter of dispute between governments, and sometimes the subject of treaties, while exclusion from them or invasion of presumed exclusive rights to their enjoyment has been the cause of warlike preparations. The principal kinds of fish which are the object of these systematic occupations are cod, ling, hake, herrings, lobsters, mackerel, oysters, pilchards, salmon, whales, anchovies, sardinias, sturgeon, and tunny. With the exception of the four last-named descriptions, the fishermen of this country are engaged in the taking of all these fish, and pursue their calling to an extent which makes each an important branch of national industry. The quantity of other fish taken by British fishermen is in the aggregate exceedingly great, and furnishes constant employment throughout the year to a great number of men on almost every part of the coasts of Great Britain and Ireland; but it has not been usual to apply the word fisheries otherwise than as we have already mentioned.

Of the British fisheries, some are carried on in rivers or their æstuaries, and others in the bays or along the coasts. Our principal cod-fishery is on the banks of Newfoundland; and for whales our ships frequent the shores of Greenland, Davis's Straits, and the South Seas. Of late, whale-fisheries have also been carried on near the shores of New Holland and of the Cape of Good Hope.

The Appendix to the Report of the Commissioners of Inquiry into the State of the Irish Fisheries, which was presented to parliament in 1836, contains an historical sketch of the progress of the British and Irish fisheries, drawn up by Sir T. C. Morgan, M.D., one of the commissioners; and from this sketch the following particulars are principally taken:—

The taking of herrings was extensively pursued in Scotland in the ninth century, and continued until the Convention of Royal Burghs prohibited the exportation of fish before the resident population was supplied at a stipulated price. In consequence of this interference, many of the fishermen abandoned the pursuit at home, and settled in Holland—a circumstance which first drew the attention of the Dutch to the value of the Scotch fisheries. Several enactments were passed under James III., IV., and V. of Scotland for the promotion of the fisheries; and James VI., before his accession to the English throne, directed the building of three towns for the same purpose; but this measure failed of success. In 1633 Charles I. ordained 'An Association of the three kingdoms for a general fishery within the hail seas and coasts of his majesty's said kingdoms.' A standing committee was named for the government of the Association, which was joined by many persons of distinction. For the encouragement of this adventure the king ordered that Lent should be strictly observed: but the breaking out of the civil war put an end to this scheme. In 1654 the government, in order to give protection to the fisheries, remitted in favour of Sir Phineas Andrews, who had embarked in the same, the salt duties and 'customs, and excise duties upon all naval necessaries:' besides which, voluntary collections were made from wealthy and patriotic individuals for building wharfs, docks, and storehouses, and for defraying other expenses. These measures of 'protection' appear to have been unsuccessful; for six years later we find that the fisheries were undertaken by Simon Smith, who, in addition to all the advantages conceded to Sir Phineas Andrews, was also allowed the free importation of all commodities imported, in return for fish shipped to foreign countries. Charles II., on his restoration, appointed, in 1677, a 'Council of Royal Fishery,' to which the duke of York, the earl of Clarendon, and other persons of honour and wisdom were named, with powers to make laws for the management of the trade, and to punish any persons who should offend against their provisions. For further encouragement, a lottery was granted for three years; a collection was made in churches; and an exemption granted for seven years from customs, both inwards and outwards, on the sale of fish exported to the Baltic, Denmark, Norway, France, and some other countries. Besides this, all victuallers and coffeehouse-keepers were compelled each to take a certain number of barrels of herrings yearly at 30*s.* per barrel, 'until a foreign market should be established to the satisfaction of the council.' Beyond these *encouragements*, a duty of 2*s.* 6*d.* per barrel was imposed upon foreign herrings imported; and a promise was made of 'all such other advantages as experience should discover to be necessary.' Great as were these encouragements, no progress was made in the fishery for sixteen years, at which time a charter was granted to a new fishing company, which raised by subscription 11,580*l.* This company, which was renewed in 1690, also failed, and was dissolved by act of parliament early in the reign of William III. Two further efforts, made in 1720 and 1750, were alike unsuccessful. Various reasons have been assigned for these repeated failures. Among these reasons may be mentioned, the rule which made London the head-quarters of the fishery, it being the dearest port in the kingdom, and the superiority of the Dutch in the art. Andrew Yarington, in the second part of 'England's Improvement by Sea and Land,' sums up all other reasons in this one fact—'We fish intolerably dear, and the Dutch exceedingly cheap.'

In 1749 a committee of the House of Commons was appointed to inquire concerning the herring and white fisheries, and as the result of its labours a corporation was formed, with a capital of 500,000*l.*, under the name of 'The Society of the Free British Fishery.' A bounty of 36*s.* per ton on all decked vessels of from 20 to 80 tons employed in fishing was granted for fourteen years. This bounty was increased in 1657 to 56*s.* per ton, but without producing an adequate return to the adventurers, and in 1759, by the 33rd Geo. II., a bounty of 80*s.* per ton was granted, besides 2*s.* 8*d.* per barrel upon all fish exported, and interest at the rate of 3 per cent. was secured to the subscribers, payable out of the Customs' revenue. The whole number of vessels entered on the Custom House books for the fisheries in consequence of this act was only eight. In this year the whole buss fishery of Scotland, according to the statement of Adam Smith ('Wealth of Nations,' b. iv. c. v.), brought in only four barrels of 'Sea Sticks,' (herrings cured at sea) each of which, in bounties alone, cost the government 113*l.* 15*s.*, and each barrel of merchantable herrings cost 159*l.* 7*s.* 6*d.* The explanation of this fact is, that the bounty being given to the vessels and not to the fish, 'ships were equipped to catch the bounty and not the herrings.' By the 25th Geo. III. (1785-6) the tonnage bounty was reduced to 20*s.*, and a bounty of 4*s.* per barrel was given on the fish, limiting the whole payment to 30*s.* per ton, except when more than three barrels per ton were taken, in which case 1*s.* per barrel was given on the excess. On an average of ten years 54,394 barrels were taken annually, at a cost to the government of about 7*s.* 6*d.* per barrel.

In 1786 'The British Society for extending the Fisheries and improving the Sea Coasts of the Kingdom' was incorporated, and a joint-stock was subscribed 'for purchasing land and building thereon free towns, villages, and fishing-stations in the Highlands and Islands of Scotland.' This joint-stock was raised by the subscriptions of a few spirited individuals, who did not look for any profitable return. The members of the society were chiefly proprietors of estates, and their object was the improvement of their property. No dividend has yet been made upon the money expended by the corporation; but it is expected that the lands taken for fishing-towns, hamlets, and fishermen's allotments, with the harbours, stores, and other buildings which they have constructed, may yield a return in rent.

Another act was passed in 1808 for the regulation of the fisheries. The bounty was again raised to 60*s.* per ton on decked vessels of not less than 60 tons burthen, with an additional bounty of 20*s.* per ton for the first 30 vessels entered in the first year. Premiums amounting to 3000*l.* were also granted for boats of not less than 15 tons burthen. This act prescribed regulations for fishing, curing, inspecting and branding herrings, and a board of seven commissioners was appointed for administering the law. This act, which was at first passed for a limited time, was made perpetual in 1815 (55 Geo. III., c. 94). The tonnage-bounty had in the mean time been extended to fishing-vessels of not less than 45 tons burthen. During the year 1814 only five vessels had been fitted out for the fishery from Yarmouth, and not one for the deep-sea fishery from any other port of Great Britain. For the inspection and branding of herrings the whole coast of Great Britain was divided into districts. In each of these officers were appointed to oversee the operations of the fishermen, and to prevent frauds in regard to the bounty. The principal regulations affecting the curing of herrings were borrowed from the practice of the Dutch fishermen. In 1817 a further boon was granted to the fishermen by allowing them the use of salt duty free; a peculiar advantage, which ceased in 1823 by the repeal of the duty on that article.

The impolicy of granting bounties on production, the effect of which is to tax the people of this country in order that foreign countries may be supplied with articles of consumption at prices below their actual cost, came at length to be seen and acknowledged. In 1821 the tonnage bounty of 60*s.* above-mentioned was repealed; the bounty of 4*s.* per barrel, which was paid up to the 5th of April, 1826, was thereafter reduced 1*s.* per barrel each succeeding year; so that in April, 1830, the bounty ceased altogether. That this alteration of the system has not been productive of any serious evil to the herring-fishery will appear from the following table prepared from the reports of the commissioners of the British fisheries, wherein are stated the number of barrels cured, branded, and exported in each of the years ending the 5th of April, from 1815 to 1837. The average annual number of barrels of herrings cured and exported respectively in the five years that preceded the alteration was 349,488 and 224,370. In the five years from 1826 to 1830, while the bounty was proceeding to its annihilation, the average numbers were 336,896 cured, and 208,944 exported; and in the five years ending the 5th of April, 1837, the average numbers were 396,910 barrels cured, and 222,648 exported.

Year ending 5th of April.	Cured. Barrels.	Branded. Barrels.	Exported. Barrels.
1815	160,139	83,376	141,305
1816	162,651	116,436	107,688
1817	192,343	140,018	138,628
1818	227,691	182,089	162,689
1819	340,894	270,022	227,162
1820	382,491	309,700	253,516
1821	442,195	363,872	294,805
1822	316,524	263,205	214,956
1823	248,869	203,110	170,445
1824	392,190	299,631	239,630
1825	347,665	270,844	202.016
1826	379,233	294,422	217,673
1827	288,495	223,606	166,406
1828	399,778	279,317	211,659
1829	355,979	234,827	205,875
1830	329,556	218,418	181,654
1831	439,370	237,085	264,903
1832	362,660	157,839	217,499
1833	416,964	168,259	220,684
1834	394,916	178,000	272,093
1835	277,317	85,079	158,805
1836	497,615	192,317	273,393
1837	397,737	114,192	189,265

The number of boats and of fishermen, and other persons employed in taking, gutting, curing, and packing cod and herrings in each of the six years to April, 1837, were as follows·—

Year.	Number of Boats.	Number of Fishermen.	Number of Coopers, Curers, &c.	Total Number employed.
1832	11,059	49,164	31,402	80,566
1833	11,008	48,181	33,274	81,455
1834	11,284	49,212	33,054	82,266
1835	11,359	49,462	32,861	82,323
1836	11,427	49,720	37,178	86,898
1837	11,494	51,907	34,626	86,533

The impolicy of the bounty system has been placed in a very striking light by the evidence of Mr. Ternan, of Liverpool, a factor for the sale of fish. The fishermen of that part of the coast are mostly inhabitants of a village on the coast called Skerries, where the houses are neater and in better repair now than they were during the time of bounties, and the men themselves are 'better clothed, better fed, more industrious, and more temperate than they were during the bounty. Nothing was more calculated to demoralise them than the bounties, as they were given; nothing could have been more mischievous or more injudicious than the tonnage-bounty system; it was, in fact, a bounty on idleness and perjury Their increased prosperity has arisen from their astonishingly increased industry, and their greater reliance on their own exertions, without looking to extraneous aid.' In Scotland the fishermen have been able, from the profits of their business since the removal of the bounty, to replace the small boats they formerly used by new boats of larger dimensions, and to provide themselves with fishing materials of superior value.

A select committee of the House of Commons was appointed in 1833 to inquire into the state of the British Channel fisheries. A second committee was appointed in 1836 to consider the state of the salmon fisheries in Scotland, and in the previous year commissioners had been instructed to investigate the condition of the Irish fisheries. From each of these bodies reports have proceeded which have been laid before parliament and contain a considerable amount of information upon the subject.

Taking these branches of the inquiry in the order here given, we proceed to describe, as briefly as possible, the actual condition of the fisheries connected with the coasts and rivers of the United Kingdom. The appointment of the committee in 1833 arose out of the distress which was at that time said to affect the several Channel fisheries, and in its report the committee stated that these fisheries were generally in a very depressed and declining state; that they appear to have been gradually sinking since the peace in 1815; that the capital employed does not yield a profitable return; that the number of vessels and of the people to whom it gave employment is diminished; and that the fishermen who formerly could maintain themselves and their families by their industry were in a greater or less degree pauperised.

The cause of this unfavourable change, to which, as being in its opinion the most readily susceptible of remedy, the committee gave its principal attention, was the interference of the fishermen of France and Holland; but the principal cause of the distress was stated to be 'the great and increasing scarcity of all fish which breed in the Channel, compared with what was the ordinary supply 15 to 20 years ago, operating prejudicially to the fishermen, at the same time that a continued fall of prices has taken place in the markets.' This fall of prices could not have occurred in consequence of any scarcity in the supply. That there was a diminished quantity taken by the English fishermen may possibly have been true; but considering that the supply in our markets was actually increased so as to provide our growing population at progressively decreasing prices, we can only account for the facts adduced by the committee by supposing that the foreign fishermen, of whose interference such grievous complaint was made, were better skilled and more persevering in their calling than our own countrymen a supposition which seems to be borne out by the circumstance of our having, since this report was delivered, been still more abundantly supplied with fish for our tables; while the cry of distress on the part of the fishermen has passed away, doubtless owing to the greater degree of skill and industry which they have since exerted.

A complaint, the opposite to that brought forward by the committee, has of late been preferred against our fishermen by the owners of the boats, who allege that, having advanced all the capital necessary for the undertaking, and having probably also contributed to the support of the men during the dead season, under the faith of an agreement to receive at stipulated prices all the produce of their nets, the men so bound to them sell a considerable part of the fish which they take to boats despatched from the coast of France. These circumstances have been mentioned, because a great and it is thought a groundless impression was created by the result of the inquiry of 1833, which inquiry, it has been alleged, was undertaken to satisfy the desires of certain interested parties who wished to make out a case for the interference of government.

One branch of fishing wholly different in its object from all other branches has been described by the committee of 1833 under the title of the *Stow-Boat Fishery*. This fishery prevails principally upon the Kentish, Norfolk, and Essex coasts; and the object is the catching of sprats, not for food, but as manure for the land, for which there is a constant demand. This branch of fishing is represented by the committee to have much increased, and to give employment on the Kentish coast alone to from 400 to 500 boats, which remain upon the fishing grounds frequently for a week together and until each has obtained a full cargo of dead fish.

The facility which the pretence of employing vessels in fishing gives to the operations of smugglers has led to an act of parliament, 6 Geo. IV., c. 108, under which vessels and boats of certain descriptions are required to be licensed by the commissioners of the customs. The licenses thus granted specify the limits beyond which fishing-vessels must not be employed: this distance is usually four leagues from the English coast, and it is affirmed that our fishermen are injured by this restriction, because some valuable fishing grounds lie beyond the prescribed limits and are thus abandoned to foreigners.

The *pilchard fishery*, which is carried on upon parts of the Devon and Cornish coasts, is of some importance. The number of boats engaged in it is about 1000, which give employment to about 3,500 men at sea and about 5000 men and women on shore. The pilchards visit our shores in August and September, and again in November or December: they come in large shoals into shallow water. As soon as caught they are salted or pickled and exported to foreign markets, chiefly to the Mediterranean: the average export amounts to 30,000 hogsheads per year. The quantity was much greater formerly, when a bounty of 8*s.* 6*d.* per hogshead was paid upon all exported. This bounty has now ceased, and as additional reasons for the diminution of the fishery, it is said that Lent is not now so strictly observed as formerly in the countries to which the exports are made, and that the heavy duty, equal to 18*s.* per hogshead, imposed upon importation into Naples, which has long been the principal market, has checked consumption.

The extent of the British *herring-fishery* has already been noticed. The places where it is principally carried on are Yarmouth, Lowestoff, Hastings, Folkestone, Cardigan Bay, and Swansea, in England and Wales; the coasts of Caithness, Sutherland, Aberdeenshire, Banffshire, Morayshire, and Ross-shire, in Scotland; and Galway, Killybegs on the coast of Donegal, Mayo, the æstuary of the Shannon, the coast between Dingle Bay and Kenmare, Bantry Bay, Waterford, and from Mizen-head to Cahore point on the Wicklow coast, in Ireland.

The following table, constructed from the reports of the late commissioners of the Irish fisheries, shows the number of boats and men employed, and the produce of *cured* fish in each year from 1821 to 1829.

Years.	Number of Boats.	Number of Fishermen.	Barrels of Herrings cured.	Cwts. of Cod, Ling, Hake, Haddock, &c.	Barrels of Herrings exported.	Cwts. of other Fish exported.
1821	7,655	36,159	9,726	22,689	400	434
1822	9,304	44,892	12,258	28,314	1,569	72
1823	10,399	49,448	27,857	31,424	4,611	197
1824	10,882	52,482	41,633	24,866	1,693	269
1825	10,843	57,809	41,376	34,833	909	..
1826	12,025	58,044	26,698	33,921	..	..
1827	12,126	59,321	15,784	40,807	683	690
1828	12,611	63,421	13,513	39,750	..	..
1829	13,119	64,771	16,855	60,380	18	185
1836	10,761	54,119				

The principal herring-fishery off the coast of Norfolk and Suffolk commences in September and ends in the beginning of December. Mackerel fishing begins 1st May and ends 1st July. No material changes have occurred in the seasons, but herrings are more numerous of late years on the Yorkshire coast. For both fisheries decked-vessels of 30 to 60 tons register are generally used.

Our chief salmon-fisheries are carried on in the rivers and æstuaries of Scotland. As no bounty has been at any time payable upon the taking or exporting of this kind of fish, it has been difficult to ascertain its actual or comparative amount. Some partial returns have been obtained from persons who have rented the different fishing grounds, but these do not offer a complete view of the fishery, and its produce being consumed within the kingdom, the custom-house, which takes no note of goods conveyed from port to port, affords no help towards supplying the deficiency. A detailed account has been given of the produce of the salmon-fisheries in the rivers on the coast of Sutherland, from which the following table, giving the produce for three years to 1835, has been taken:—

		1833.	1834.	1835.
River Shin . .	lbs.	45,639	79,025	63,081
,, Brora . . .		23,467	40,351	40,343
,, Helmsdale . .		33,782	24,199	30,146
,, Naver and Borgie .		28,134	54,112	57,412
,, Hope . . .		10,966	29,962	25,343
,, Grudy . . .		1,163	12,314	13,207
,, Inchard . .		1,643	2,965	4,756
,, Laxford . .		9,135	17,456	24,015
		153,929	260,384	258,291

The produce of the salmon-fisheries in some other of the rivers of Scotland, during each of the same three years, was as follows:—

		1833.	1834.	1835.
River Foyle . .	lbs.	292,947	304,156	321,356
,, Beauly .	No. of fish	8,894	15,227	15,891
,, South Esk and North Esk	No. of fish	29,096	42,205	54,659

The average weight of the fish may be estimated at 1 pounds.

The produce of the fishings in the rivers Tay, Dee, Don, Spey, Findhorn, Beauly, Borriedale, Langwell and Thurso, and of the coasts adjacent, are conveyed in steam-boats and small sailing vessels to Aberdeen, where they are packed with ice in boxes and sent to the London market. The shipments thus made from Aberdeen, in each of the three years ending with 1835, were as follow:—

	Boxes.	Kits.
1833 . .	10,449	4,527
1834 . .	8,676	4,079
1835 . .	11,549	5,671

Each box contains on the average from 10 to 12 fish and weighs 120 lbs. A statement, which does not however appear to be entitled to much confidence, has been given of the quantity of salmon brought by sea to London from Scotland and Ireland in each of the years 1834 and 1835, viz.—

1834	18,254 cwt.
1835	20,557 ,,

The most productive salmon-fisheries in Ireland are situated near the mouths of the rivers; the most important are the following:—

The Boyne with its tributaries, the Mattock and Blackwater.
The Glenarm, the Main and the Glenariff, in Antrim.
The Bush with its tributaries, the Pound, Burn Gashet, and Dervock.
The Bann with its tributaries, the Roe, the Agivey, the Claudy, the Ballinderry, the Blackwater, the Upper Bann, and the Milltown.
The Foyle with its tributaries, the Roe, the Faughan, the Dermot, the Mourne, the Derg, the Mournebeg, the Killinburn, the Strule, and Cammon.
The Lennon or Rathmelton which joins Lough Swilly.
The Lackagh with its tributaries, the Owencary and the Clune.
The Ballynass and the Raye
The Esk or Donegal river, with its tributary the Driminy.
The Erne
The Newport and its tributaries, the Skudagh, Buckadoon, Glenisland, and Beltra.
The Moy and Ballycroy.
The Boyle and its tributaries, the Bella and Lung.
The Owenmore, the Gowla, the Galway.
The Shannon with its tributaries, the Fergus, the Maig, and the Annacotty.
The Laune and Maine, the Kenmare and the Currane.
The Middleton and its tributaries, the Ballinasloe, the Lisgoold, the Gurtaerue, and Dungouney.
The Ilenn and Bandon
The Blackwater and its tributaries, the Owbeg, the Funcheon, and the Annaglin.
The Suir, the Barrow, and the Nore.
The Bray and its tributaries, the Enniskerry, Powerscourt and Glencree, and the Liffey.

Mackerel are fish of passage which visit every part of our coasts in the spring and early part of the summer, and are taken in great abundance. In this country they are used fresh, and great quantities are conveyed by rapid land journeys from the coast to London. For the encouragement of the mackerel and other similar fisheries, the carriages in which the fish are thus conveyed are exempted from the post-horse duty. The general desire to obtain this fish in perfection has led to the well-known relaxation of our laws against Sunday trading, which permits the open hawking about of mackerel on that day, a practice which is punishable with regard to any other fish, or indeed to articles of any kind, with the exception of milk. The fishing-boats on those parts of the coast which are sufficiently near to the Thames are accompanied by fast-sailing cutters, which collect the takings of the fishing-boats and proceed with the cargo to Billingsgate market while the boats pursue their occupation. During a favourable season 100,000 mackerel are brought to Billingsgate market every week. Those fish which, as described, are brought by land conveyance to London are sold at a kind of auction on the beach by the fishermen to the owners of the carts or vans, whose success in the speculation depends mainly upon their quickness in bringing them to the market for consumption.

The principal fisheries on the eastern coast of England are in the neighbourhood of Whitby, Hartlepool, and Robin Hood's Bay. The fish-markets of Liverpool and Manchester, and, since the opening of the Grand Junction Railway, that of Birmingham also, are generally well supplied by land carriage with fresh fish, both round and flat, from those fishing grounds. A good deal of fish likewise comes to that port by steam-vessels from the Isle of Man.

The demand for fresh fish in the west of England is said to be extensive and increasing. In the season of 1835, according to the Report of the Commissioners, probably 12,000,000 of pilchards were sold for home consumption, besides a large supply of mackerel, hake, &c., fresh and salted. The fish is distributed throughout the country in carts and on horses. Pilchards are often sold at 1*s.* to 1*s.* 6*d.*, and herrings at 2*s.* per 126; cod-fish at 2*s.* each; red mullets 2*d.* to 6*d.* each; turbots 2*d.* to 6*d.* per lb.; mackerel 1*d.* to 3*d.* each.

The different fishing grounds of Scotland and Ireland, and the kinds of fish found most abundantly at each, are as follow:—

SCOTLAND.

Leith.—Herrings, cod, ling, haddock.

Burntisland.—Herrings.

Stonehaven.—Herrings, haddocks halibut, cod, ling, skate, mackerel.

Collieston.—Herrings, haddocks, cod, mussels (inhabitants all fishermen).

Peterhead.—Herrings, cod, haddocks.

Port Gordon.—Herrings.

Findhorn.—Herrings, cod, haddocks.

Cromarty.—Herrings, lobsters.

Caithness.—Herrings.

Wick.—Herrings, cod, ling, hake, salmon, haddock flounders.

Thurso.—Herrings.

Tongue.—Herrings.

Ullapool.—Herrings.

Loch Carron.—Herrings, cod, ling, hake

Inverary.—Herrings, cod, ling, salmon

Greenock.—Herrings, cod, ling.

Rothsay.—Herrings.

Campbelton.—Herrings, turbot, sole, flounders

Orkneys.—Herrings, cod.

Shetland Isles.—Herrings, cod, ling.

Stornaway.—Herrings, cod, ling.

IRELAND.

Coast of Dublin.—Cod, haddock, whiting, herrings, trout, salmon.

Louth.—Cod, haddock, conger, ling, mackerel, whiting herrings, hake, and flat-fish.

Down.—Cod, haddock, ling, whiting, conger, turbot soles, plaice, brill, mackerel, herrings (200 boats), mullet.

Antrim.—Cod, ling, conger, pollock, flat-fish, turbot, haddock.

Donegal.—Soles, plaice, oysters, herrings, turbot, cod, ling, eels, haddock, dorees, hake, whiting, conger, mackerel, sprat, glassen.

Sligo.—Turbot, cod, and all kinds of fish that frequent the Irish coast.

Mayo.—Turbot, sole, cod, ling, haddock, hake, whiting, glassen, conger, gurnet, pollock, mackerel, herrings, skate, sprat, bream.

Galway.—Cod, ling, pollock, mackerel, bream, herrings, conger, sun-fish, haddock, gurnet, whiting, hake, turbot, glassen, soles, plaice, doree, halibut.

Clare.—Turbot, cod, ling, haddock, hake, soles, whiting, gurnet, mackerel, thornback, doree, ray, skad.

Kerry.—Turbot, haddock, gurnet, pollock, plaice, sole, doree, cod, whiting, ray, conger, mullet, mackerel, shad, bream, herrings, pilchards, hake, ling, glassen.

Cork.—Turbot, sole, cod, ling, haddock, mackerel, conger, hake, whiting, shad, pilchards, herrings, plaice, pollock, halibut, doree, skate.

Waterford.—Cod, ling, hake, haddock, glassen, herrings.

Wexford.—Cod, ling, hake, gurnet, whiting, pollock, turbot, mackerel, herrings, pilchards, lobsters, conger, bream, soles, plaice.

Wicklow.—Herrings, cod, oysters, ling, haddock, whiting, mackerel, soles, plaice, pollock, trout, salmon.

Cod.—The cod fishery at Newfoundland was carried on as early as 1500 by the Portuguese, Biscayans, and French, but it was not until 1585 that the English ventured to interfere with them. In that year Sir Francis Drake being sent to the island with a squadron, seized the foreign ships which he found engaged in the fishery, and sent them to England, where they were declared lawful prizes. Seven years before that time attempts had been made to settle a colony upon Newfoundland under a charter granted by Queen Elizabeth, but without success. In 1610 a company was incorporated for the same purpose by King James I., and so successfully was the fishery prosecuted, that in 1614 there were near 200 vessels engaged in it: in the following year the number exceeded 250. The author of 'Considerations on the Trade to Newfoundland,' inserted in the second volume of Churchill's 'Collection of Voyages,' tells us that 'towards the end of the seventeenth century the French were in the habit of employing in these fisheries about 500 sail of ships, a great many of which were of good burthen, and mounted from sixteen to forty guns, to man which they have by a moderate computation about 16,000 men.' This writer adds, that 'the French by their extraordinary frugality, joined with their other great advantages, such as the cheapness of salt, and having the best and most convenient part of the country for fishing, have quite beaten the English out of this trade, as may be instanced in many of the outports of our nation, and particularly Barnstaple and Biddeford, which formerly employed in this trade above fifty ships, and now do not fit out above six or eight small ships.'

By the treaty of Utrecht, which acknowledged the sovereignty of the whole island of Newfoundland to be in the crown of England, the privilege of fishing on part of the coast was reserved to France, notwithstanding which the English fishery there increased to a great extent. In 1763 there were taken and cured by the English at the fisheries of Newfoundland 386,274 quintals or hundred-weights of cod-fish, and 694 tierces of salmon, besides 1598 tons of fish oil. In that year there were 106 vessels employed in carrying on the fishery, 123 ships for conveying the fish when cured to England, and 142 ships for its conveyance to British colonies. The principal fisheries of Newfoundland are prosecuted on the banks which nearly surround that island: the object of these fisheries is solely cod-fish. [NEWFOUNDLAND.] Salmon, mackerel, herrings, and some other kinds of fish, are taken off the coasts of the island; and the seal fishery is carried on successfully, yielding a considerable number of seal-skins and a large quantity of seal-oil for exportation.

The cod-fish cured and exported to England and to foreign countries in 1765 amounted to 591,276 quintals; and the subsequent success of the fishery will be seen from the following account of its produce exported in each of the three years from 1832 to 1834:—

		1832.	1833.	1834.
Cod-fish, dry	quintals	619,177	883,536	763,187
" wet	barrels	858	3,633	2
Herrings	boxes	86		
	barrels	1,728	3 039	1,823
Mackerel	"	477	326	202
Salmon	"	2,690	3,256	3,363
Seal-skins	number	442,003	384,699	315,241
Train-oil	gallons	2,522,508	2,860,388	2,297,618
Total value		£583,687	£699,174	£649,085

The total produce of the fisheries in these three years, exclusive of the oil, was valued as follows:—

1832	£458,662
1833	594,429
1834	485,926

These fisheries may be said to be the sole pursuit of the settlers in Newfoundland, and of the traders who frequent the island. Nearly every family has a small piece of land under garden cultivation, but agriculture is not pursued as a substantive occupation.

In the other British North American colonies, with the exception of Upper Canada, fisheries are established, and the produce enters more or less into their foreign commerce. The kinds of fish exported are chiefly cod, herrings, salmon, and mackerel. The actual value of these exports from each colony, in the three years 1832 to 1834, was as follows:—

	1832.	1833.	1834.
Lower Canada	£6,475	£4,680	£6,492
New Brunswick	31,885	34,789	35,973
Nova Scotia	155,189	162,195	143,712
Prince Edward's Island	65	11	89
Cape Breton	10,388	11,963	11,470
Total	£203,997	£213,638	£197,736

Whales.—The whale fishery was carried on successfully during the twelfth, thirteenth, and fourteenth centuries by the Biscayans. The whales taken by them in the Bay of Biscay appear to have been of a smaller species than those since found in more northern latitudes. The Biscayan fishery has long ceased, owing probably to the great destruction of the animals. It is to the voyagers who, near the end of the sixteenth century, attempted to find a passage through the northern ocean to India, that we owe the discovery which led to the establishment of the fishery in the seas of Greenland and Spitzbergen. The English and the Dutch were the first to embark in this adventure, but the French, Danes, Hamburghers, and others were not slow to follow their example. At first the whales were so numerous that the fishing was comparatively easy, and was so successfully pursued, that in addition to the ships actually engaged in the fishery, many other vessels were sent in ballast to the shores of Spitzbergen, and the whole returned home with full cargoes of oil and whalebone. It was then the practice to boil the blubber on the spot, and bring home the oil in casks. In the progress of the fishery the whales became less numerous, and, when found, more difficult to take. It therefore became necessary to pursue them farther to the open sea, and at length it was found more economical to bring the blubber home in order to its being boiled, and the settlements before used for that purpose were abandoned.

That part of the Arctic Sea which lies between Spitzbergen and Greenland, and which was formerly frequented by the whale ships, is now almost wholly abandoned because of the scarcity of the fish, and the northern whale fishery is now chiefly pursued in Davis's Straits. The change here noticed has occurred within the last twenty years, as appears from the following statement of ships which arrived from the northern fishery in each year from 1815 to 1834, distinguishing between those from Greenland and those from Davis's Straits. In this table will also be found the aggregate tonnage of the ships and the number of tuns of oil and tons of whalebone imported.

Years.	Number of Ships from		Total Number of Ships.	Total Tonnage.	Number of Whales taken.	Tuns of Oil.	Tons of Whalebone.	Tuns of Oil to each Ship.	Tuns of Oil to each Whale.	Number of Ships lost in each Season.
	Greenland.	Davis's Straits.								
1815	98	48	146	47,148	733	10,682	528	73	14½	1
1816	101	45	146	46,868	1,330	13,590	632	93	10	1
1817	97	53	150	48,084	828	10,871	539	72½	13¼	5
1818	94	63	157	50,362	1,208	14,492	666	92¼	12	2
1819	96	63	159	51,082	988	11,401	517	71¾	11½	12
1820	102	57	159	50,646	1,595	18,745	946	118	11¾	3
1821	80	79	159	50,709	1,405	16,853	923	106¼	11¾	14
1822	61	60	121	38,144	630	8,663	422	71½	13¾	6
1823	55	62	117	36,759	2,018	17,074	921	146	8½	3
1824	32	79	111	35,013	761	9,871	534	89	13	1
1825	21	89	110	34,751	500	6,370	350	58	12¾	3
1826	5	90	95	30,414	512	7,200	400	75¾	14	5
1827	16	72	88	28,273	1,162	13,186	733	149¾	11¼	1
1828	14	79	93	28,665	1,197	13,966	802	150	11½	3
1829	1	88	89	28,812	871	10,671	608	120	12¼	4
1830	—	91	91	29,396	161	2,199	119	24	13¾	19
1831	8	80	88	28,608	451	5,104	273	58	11¼	3
1832	19	62	81	26,393	1,563	12,610	676	155½	8	5
1833	3	74	77	25,294	1,695	14,508	802	188¼	8½	[illegible]
1834	7	69	76	24,955	872	8,214	442	108	9½	3

It appears from the foregoing table that the average results of the Greenland and Davis's Straits fishery, computed from twenty years' experience, are as follows:—

Number of ships returned to Great Britain	115⅝
Tonnage of ditto	37,013⅝
Number of ships lost	5
Tuns of train oil	11,313
Tons of whalebono	591⅝
Number of whales taken	1,024
Tuns of oil yielded by each whale	11¼
Tuns of oil procured by each ship	101½

The average prices during the twenty years embraced in this table were—of oil, 28*l*. 15*s*. per tun, and of whalebone, 163*l*. per ton; it follows therefore that the annual average produce of the fishery has amounted to 421,704*l*.

The proportions in which the different ports of the kingdom participate in this fishery is shown by the following statement, applying to the year 1834.

Ports.	Number of Ships.	Tonnage.	Number of Whales.	Tuns of Oil.	Tons of Whalebone.
Hull	27	8,906	273	2,696	146 10 c
Whitby	2	723	16	145	8 0
Newcastle	3	1,131	25	283	17 4
Berwick	1	310	34	220	11 3
London	3	953	22	177	9 10
Burntisland	2	688	25	177	9 10
Peterhead	11	3,076	99	1,093	57 15
Aberdeen	6	1,979	72	801	45 9
Dundee	8	2,789	115	1,036	53 10
Montrose	3	962	20	144	7 17
Kirkaldy	5	1,591	92	743	38 6
Leith	5	1,847	79	699	37 4
Total	76	24,955	872	8,214	441 15

Previous to the revolt of the North American provinces this fishery, as well as that in the Southern Ocean, was prosecuted with great spirit by the colonists of Massachusetts. Just before the beginning of the war they employed annually 183 ships of 13,820 tons in the Northern, and 121 ships of 14,026 tons in the Southern whale fisheries. This display of enterprize on the part of the colonists was thus noticed by Burke in a speech delivered by him in the House of Commons in 1774:—'As to the wealth which the colonists have drawn from the sea by their fisheries, you had all that matter fully opened at your bar. You surely thought these acquisitions of value, for they seemed to excite your envy; and yet the spirit by which that enterprising employment has been exercised ought rather, in my opinion, to have raised esteem and admiration. And pray, sir, what in the world is equal to it? Pass by the other parts, and look at the manner in which the New England people carry on the whale fishery. While we follow them among the trembling mountains of ice, and behold them penetrating into the deepest frozen recesses of Hudson's Bay and Davis's Straits; while we are looking for them beneath the Arctic circle, we hear that they have pierced into the opposite region of polar cold; that they are at the antipodes, and engaged under the frozen serpent of the south. Falkland Island, which seemed too remote and too romantic an object for the grasp of national ambition, is but a stage and resting-place for their victorious industry. Nor is the equinoctial heat more discouraging to them than the accumulated winter of both poles. We learn that while some of them draw the line or strike the harpoon on the coast of Africa, others run the longitude and pursue their gigantic game along the coast of Brazil. No sea but what is vexed with their fisheries—no climate that is not witness of their toils. Neither the perseverance of Holland, nor the activity of France, nor the dexterous and firm sagacity of English enterprize ever carried this most perilous mode of hardy industry to the extent to which it has been pursued by this recent people; a people who are still in the gristle and not hardened into manhood.'

It was not until after the breaking out of war between England and the American provinces had, for a time at least, interrupted this spirit of enterprize, that England embarked in the Southern fishery. Towards the close of the last century the number of English vessels so employed was considerable; in 1791 they amounted to 75; but the fishery has not always been maintained on so large a scale. It requires a considerable sum of money to fit out a ship. A new vessel of the size usually employed—350 tons—costs, when ready for sea and fully provisioned, from 12,000*l.* to 15,000*l.*; and the adventurer must wait three years for the return of his capital.

From the manner in which the Custom-house accounts are given, it is not possible to state from them the produce of this branch of the whale fishery. The following account of the importations of Southern oil during 13 years, from 1820 to 1832, was delivered in 1833 to a committee of the House of Commons by a gentleman who, of all our merchants, is the most largely engaged in the business:—

Years.	Spermaceti Oil.			Black Whale Oil.		Total.
	British Fishery.	New South Wales.	United States.	British Fishery.	Colonial Fishery.	
	Tuns.	Tuns.	Tuns.	Tuns.	Tuns.	Tuns.
1820	2264	none.	147	5061	none.	7472
1821	3005	..	..	3348	117	6470
1822	5009	..	..	1008	634	6651
1823	5743	247	..	1444	557	7991
1824	4940	125	..	619	515	6199
1825	3609	54	..	920	344	4927
1826	5695	388	..	454	289	6826
1827	4476	334	528	665	474	6477
1828	3216	116	399	136	338	4205
1829	4605	818	255	102	478	6258
1830	4157	498	137	419	904	6115
1831	5939	1576	90	192	1462	9259
1832	5576	1589	..	402	1785	9352

FISHGUARD. [PEMBROKESHIRE.]

FISSIROSTRES, the swallow tribe of birds, distinguished by a very broad bill with a very wide gape, and small and feeble feet. They belong to the order *Insessores*, or *Perchers*, and take their food on the wing. [HIRUNDINIDÆ; GOATSUCKERS; INSESSORES.]

FISSURELLA. [CERVICOBRANCHIATA, vol. vi. p. 443.]

FI'STULA LACRYMA'LIS. [LACRYMAL ORGANS, DISEASES OF.]

FISTULA'NA. [TUBICOLIDÆ; CLAVAGELLA, vol. vii. p. 241.]

FIT. [SYNCOPE.]

FITZJAMES. [BERWICK, DUKE OF.]

FITZSTEPHEN, WILLIAM, author of the earliest description of London extant, was of Norman extraction, but born in the metropolis. He became a monk of Canterbury, and was much connected with Archbishop Becket; he was one of his clerks, and an inmate in his family, filling different offices at different times in his train and household. He was also an eye-witness of the archbishop's murder at Canterbury, and continued with him after his other clerks and servants had deserted him. Fitzstephen is supposed to have died in 1191. His 'Description of the City of London' was part of another work, 'The Life and Passion of Archbishop Becket.' Dr. Pegge fixes the time of the composition of this work between the years 1170 and 1182: and adds, that we may challenge any nation in Europe to produce an account of its capital, or any other of its great cities, at so remote a period as the 12th century. It was accordingly noticed by Leland and Stow, the latter of whom inserted a translation of it in his 'Survey of London.' Dr. Pegge, in 1772, published Fitzstephen's original text, with a more accurate translation and notes. This is the best edition. Fitzstephen, if we may judge from his quotations, was well versed in the Latin, and had looked into some of the Greek classics. (Fitzstephen's *Descr. of Lond.* newly translated, &c., by an Antiquary (Dr. Sam. Pegge), 4to., Lond., 1772; Chalmers's *Biogr. Dict.*, vol. xiv. p. 342.) There is a fine uncollated MS. of Fitzstephen's history among the Lansdowne volumes in the British Museum, and a fragment of another copy among the manuscripts of the late Francis Douce, Esq., in the Bodleian.

FIU'ME, formerly St. Veit am Flaum (in the Illyrian language Raka or Reka), the chief town of the circle of the same name in the Austrian government of Trieste and kingdom of Illyria, is situated in a narrow valley at the efflux of the Fiumara into the gulf of Quarnaro in the Adriatic: 45° 20′ N. lat. and 14° 26′ E. long. The district, in the time of the Romans, formed part of Liburnia, and upon the partition of the empire became an appendage of the Eastern empire, from which it was wrested by Charlemagne in the reign of the Emperor Nicephorus. It was afterwards governed by its own dukes, one of whom, by name Chresimir, proclaimed himself king of Fiume about the year 900; and his posterity retained the title for more than a century afterwards. It subsequently became a fief of the patriarchs of Aquileia, then the property of the Valsee family, and was sold by them to Frederic III., emperor of Germany, in the year 1471. Fiume is well situated, and is composed of the old and new towns, in which there are altogether about 1050 houses and 9500 inhabitants. The new town lies next the sea, has a cheerful aspect, broad, handsome, and well paved streets, and a number of fine buildings, private as well as public; among the latter are the flesh, fish, and bread-markets, ranges of shops with colonnades, and the casino, a spacious structure, containing coffee-rooms, a hall for concerts, &c., and a theatre. The old castle, Festi Teriat, is situated on an adjacent height; and behind the new town is a steep rock on which the old town is built. The latter is a gloomy spot, laid out in steep narrow streets, and almost entirely inhabited by the lower classes. Here are the old chapter-church of the Virgin's ascension, and the elegant church of St. Veit, built in imitation of the church of Santa Maria della Salute in Venice. The other buildings of note are a magnificent sugar refinery in freestone, a nunnery, a gymnasium and head-school, a lazaretto, the government offices, and a hospital. Fiume has manufactures of linens, leather, woollens, liqueurs, sugar, wax, tobacco, paper, &c. It has been a free port ever since the year 1722, but the extensive trade which it once carried on in timber, grain, oil, tallow, dried fish, colonial produce, &c. has much declined. A handsome promenade with avenues of plantain trees and public gardens are at one end of the new town; several stone-jetties (*molos*) and a fine quay of freestone also embellish it.

FIXED AIR. [CARBONIC ACID.]

FLABELLA'RIA. [PSEUDOZOA.]

FLABELLI'NA. [NUDIBRANCHIATA.]

FLACCUS, CAIUS VALE'RIUS, was born at Padua according to some, or at Setia in Latium according to others, who ground their opinion chiefly on the names of Setinus Balbus, which are found added to his other names in some MSS. of the Argonautica. Some, however, have supposed that Setinus Balbus was merely a transcriber or reviser of the poem. Flaccus lived under Vespasian, and was a contemporary of Martial, who addressed to him one of his epigrams, inviting him to abandon poetry for the bar, as a surer means of making his fortune. He seems to have died young at Padua; and Quinctilian speaks of his death as a loss to literature. He wrote his Argonautica in imitation of Apollonius. The poem is full of digressions and episodes, amidst which the main action languishes, and is often lost sight of. Some of the descriptions however are remarkably fine and poetical; and it is observed that Flaccus is more elegant in those parts of the poem which are of his own invention than in those which he has borrowed or imitated from Apollonius. His style is at times obscure, and he is very fond of displaying his erudition, which is often out of place. We have only eight books or cantos of his 'Argonautica,' the last of which is incomplete; the whole poem is supposed to have consisted of ten or twelve cantos. This poem was first discovered by Poggio Bracciolini in the convent of St. Gall. G. B. Pio published in 1519 an edition of it, adding the termination of the eighth canto as well as the ninth and tenth cantos of his own composition.

FLAG, the ensign or colours of a ship; from the Anglo-Saxon *fleogan*, to fly or float in the wind. Flags borne on the masts of vessels designate the country to which they respectively belong; and they are likewise made to denote the quality of the officer by whom the ship is commanded.

The supreme flag of Great Britain is the royal standard, which is only to be hoisted when the king or one of the royal family is on board the vessel: the second is that of the anchor on a red field, which characterizes the lord high admiral, or lords commissioners of the Admiralty: and the third is the union flag, in which the crosses of St. George, St. Andrew, and St. Patrick are blended. This flag is appropriated to the admiral of the fleet, who is the first naval officer under the lord high admiral. The Custom-house and the East India Company have distinguishing bearings in their respective flags.

In the British navy a fleet is divided into three squadrons—the centre, the van, and the rear; the centre being distinguished by red colours, the van by white, and the rear by blue, and respectively commanded by an admiral, a vice-admiral, and a rear-admiral. When the fleet is very large, there are three divisions in each squadron; and each squadron has then its admiral, vice-admiral, and rear-admiral, who respectively hold the command of its centre, van, and rear divisions. The admirals are divided in like manner, there being an admiral, a vice-admiral, and a rear-admiral of the red squadron, and so of the white and blue squadrons; but in all cases an admiral carries his flag at the main, the vice-admiral at the fore, and the rear admiral at the mizen.

The three flags are plain red, white bearing the red cross of St. George, and plain blue; and the ensign worn by the ship that carries a flag, as well as by every ship belonging to the same squadron, is always of the same colour as that of the flag-officer commanding it.

FLAGELLANTS, FLAGELLATION. The idea of propitiating the Deity by self-torment dates from a remote antiquity. Herodotus relates (ii. 42) that the Egyptians flogged themselves at one of their annual celebrations. Flagellation was administered as a trial of fortitude to the young Lacedæmonians, who it seems, in accordance with the peculiar institutions of Lycurgus, did not attach to this castigation the idea of degradation which modern Europeans do. In Rome however the punishment of flagellation was only applied to slaves, and it seems to have been pretty common, as different classes of slaves derived their names from the kind of whips with which they were lashed. Some were called *Restiones*, because they were lashed only with cords; others *Bucedæ*, from being flogged with thongs of ox-leather. It is in reference to this custom that Plautus makes one of his personages say—'*Erunt Bucedæ inviti potius quam ego sim Restio.*' 'They shall be Bucedæ whether they will or no, before I be Restio.' The Jews employed flagellation as a punishment, but never as a voluntary act of devotional exercise. This practice was unknown to the primitive Christians; neither does it appear that the first hermits of the Thebaid added self-flagellation to the different modes of penance with which they tortured their body. The rules of the first monasteries in the East, drawn up by St. Anthony, Paphnutius, Macarius, and others, contain no ordinances as to that kind of discipline, neither is it mentioned in the original regulations of the Benedictine order, the first that was established in the West. The legends which describe the lives of the saints who lived before the beginning of the fifth century never speak of self-flagellation amongst the various torments which the above-mentioned saints inflicted on themselves, although they record frequent instances of the devil's venting his rage on those holy men by giving them a sound flogging. The first known instances of this kind of self-mortification occur about A.D. 400, and from that time they became continually more frequent till the year 1056 when Cardinal Peter Damian de Honestis promoted by all his influence the practice of self-flagellation, which the learned author of the 'Ecclesiastical Annals,' Cardinal Baronius, calls 'a laudable usage of the faithful.' Damian's efforts were attended with great success, and the chroniclers relate that persons of religious dispositions were seen everywhere armed with whips, thongs, and rods, lacerating their own skins in order to draw down on themselves the blessings of Heaven. This practice began to spread so widely that many of the less bigoted clergymen endeavoured to discountenance it, but unsuccessfully, and it became every day more prevalent among the besotted crowds of that dark age. About the year 1260 the intoxication was complete. People being no longer satisfied to practise similar mortifications in private, began to perform them in public on pretence of greater humiliation. Regular associations and fraternities were formed for that purpose; and the extravagancies which they committed were of such a nature that even the contemporary writers, although accustomed to such scenes, seem to have been struck with astonishment. Such at least was the case with the monk of St. Justina, the first author who gives a circumstantial account of these fanatics.

'When all Italy was sullied with crimes of every kind,' says the above-mentioned annalist, 'a certain sudden superstition hitherto unknown to the world first seized the inhabitants of Perugia, afterwards the Romans, and then almost all the inhabitants of Italy. To such a degree were they affected with the fear of God, that noble as well as ignoble persons, young and old, even children five years of age, would go naked about the streets with only their private parts covered, and without any sense of shame would walk thus in public, two and two, in the manner of a solemn procession. Every one of them held in his hand a scourge made of leather thongs, and with tears and groans they lashed themselves on their backs till the blood ran; all the time weeping and giving tokens of the same bitter affliction, as if they really had been spectators of the passion of our Saviour, imploring the forgiveness of God and of his holy mother, and praying that he who had been appeased by the repentance of so many sinners would not disdain theirs. And not only in the daytime but likewise during the night, hundreds, thousands, and ten thousands of those penitents, notwithstanding the rigour of the winter, ran about the streets and in churches with lighted wax candles in their hands, and preceded by priests who carried banners and crosses with them, and with humility prostrated themselves before the altars. The same scenes were exhibited in small towns and villages; so that the mountains and the fields seemed to resound with the voices of men crying to God.' The same annalist relates that music, songs, and every kind of merriment ceased, and that women vied with men in these devotions. This general superstition produced however some good effects.

'Then,' continues the same author, 'those who were at enmity with one another became friends. Usurers and robbers hastened to restore their ill-gotten riches to their right owners. Others who were contaminated with different crimes confessed them with humility, and renounced their vanities. Gaols were opened, prisoners were set free, and banished persons permitted to return to their native habitations.'

This sudden repentance was the effect of the terror inspired by the general belief that the end of the world was at hand. Such mental fever could not last very long, and indeed it seems to have soon subsided. But in the 14th century, when the imaginations of the people were excited by the terrible pestilence known under the appellation of the black death, which desolated all Europe during that century, the flagellation mania broke out with new fury. Not only all the scenes of the 13th century were re-enacted, but the excesses of fanaticism became even worse than before. The flagellants spread over all Europe, and a band of them reached London in the reign of Edward III. Their number consisted of 120 men and women. Each day at an appointed hour they assembled, ranged themselves in two lines and paraded the streets scourging their naked shoulders and chanting a hymn. At a given signal, all with the exception of the last, threw themselves flat on the ground; and he who was last, as he passed by his companions, gave each a lash, and then also lay down. The others followed in succession till every individual in his turn had received a stroke from the whole brotherhood. The citizens of London gazed and marvelled, pitied, and commended; but they went no farther. Their faith was too weak, or their skins too delicate; and they allowed the strangers to monopolise all the merits of such a religious exercise. The missionaries did not make a single convert, and were obliged to return without any other success than the conviction of having done their duty to an unbelieving generation. (Lingard's *History of England*, vol. iii. c. 18; and Stow's *Annals*, p. 246, ed. of 1631.)

The purity of the first flagellants was not long preserved by their followers, and it was but natural that a fanatical rabble, who thought that self-torment was a sufficient atonement for all possible sins, should fall into great excesses. The flagellants were soon accused of many crimes; the celebrated Gerson attacked them in his writings, and Pope Clement VII. declared them heretics and thundered out anathemas against them. The flagellants were persecuted everywhere, and many of them were burnt as heretics. It was however with great difficulty that this sect was completely extirpated. For farther particulars about the flagellants see all the ecclesiastical histories; and also Jacques Boileau, *Histoire des Flagellans;* an English paraphrase of the same work appeared under the title 'Memorials of Human Superstition by one who is not a Doctor of the Sorbonne;' see also Muratori's *Antiquit. Ital. Medii Ævi*, &c.

FLA'GEOLET, a small pipe, or musical instrument, of the flute kind, played on by means of a mouth-piece, in the manner of the old English flute and pitch-pipe. Its compass is two octaves, from F, the first space in the treble cleff, to F in altissimo. The scale of the *Quadrille Flageolet* is rather more limited; and that of the *Patent octave Flageolet* is an octave higher than the ordinary instruments.

The Double Flageolet consists of two instruments, united by one mouth-piece, producing, as its name indicates, double notes. The use of the Flageolet is now almost entirely confined to the ball-room; it is superseded by the Octave Flute, or *Flauto Piccolo*. [FLUTE.]

FLAMBOROUGH HEAD. [YORKSHIRE.]

FLAME is the combustion of gaseous or of volatilised fluid or solid matter. It is attended with great heat, and sometimes with the evolution of much light; but the temperature may be intense, when the light is feeble: this is the case with the flame of burning hydrogen gas, it being scarcely visible by day-light, though its heat is intense: the combustion of hydrogen is then an example of flame resulting from the chemical action between it and the oxygen of the air. As the quantity of solid matter contained in a given volume of this gas is small, the light which its flame yields is inconsiderable; but it is greatly increased by combining it with carbon, by which there are obtained two gases, namely, carburetted hydrogen, employed under the name of *gas light*, and olefiant gas. Now 100 cubic inches of hydrogen gas weigh 2·15 grains, but the same volume of carburetted hydrogen weighs 17·2 grains, and of olefiant gas 30·1 grains: the difference of weight shows that of the charcoal or carbon with which the hydrogen is combined, and thus it is that these gases give out more light than hydrogen, and in proportion to the charcoal which they contain.

In the burning of a candle, the wax or tallow being first rendered fluid by heat, rises in the wick, and although the wick supplies some hydrogen and carbon, by far the greater portion of these is yielded by the wax or tallow, which burn by the assistance of the oxygen of the air. The supply of hot vapour diminishes as it ascends, and eventually fails, and hence the flame of a candle gradually tapers to a point and then ceases.

Two opinions have been entertained as to the mode in which flame is produced and propagated. According to Sir H. Davy, the flame of combustible bodies 'must be considered as the combustion of an explosive mixture of inflammable gas or vapour and air; for it cannot be regarded as a mere combustion at the surface of contact of the inflammable matter: and the fact is proved by holding a taper or a piece of burning phosphorus within a large flame made by the combustion of alcohol; the flame of the candle or of the phosphorus will appear in the centre of the other flame, proving that there is oxygen even in its interior part.' (*On the Safety Lamp*, p. 45.)

In the opinion of Mr. Sym (*Annals of Phil.*, vol. viii. p. 321) 'the internal part of the flame is comparatively cool, the actual combustion being diffused over the surface, and concentrated at the apex.' Mr. Sym adduces many curious and important experiments in proof of his opinion; but the most decisive facts in its favour are those related by Mr. Davies (*Ann. Phil.*, vol. x. p. 447), and they appear fully to warrant the inference he has deduced from them, that the interior of flame will not support combustion, and that on account of its containing no oxygen.

A piece of phosphorus was placed upon a small wooden stand in a Wedgwood dish; spirit of wine was then poured into the dish in such a manner that it did not reach the phosphorus. The spirit of wine was lighted, and its flame completely enveloped the combustible body. In the course of a few seconds the phosphorus became fluid, and remained in that state upon the stand, and never in a single instance inflamed, until the alcohol was consumed or its flame extinguished, though in several instances the spirit of wine continued to burn for three or four minutes. The phosphorus always burst into a vigorous flame when the spirit of wine was extinguished. When the flame of the spirit of wine was blown upon, so that the edge of it came in contact with the phosphorus, the phosphorus immediately burst into a flame, but the flame was instantly extinguished and the boiling resumed, as soon as the flame of the alcohol was restored to its natural position.

Mr. Davies states also that a lighted wax taper, surrounded by alcohol, was extinguished when the alcohol was inflamed.

That flame is merely a thin film of white hot vapour, and that this combustion is entirely superficial, while inflammable matter is contained within which cannot burn for want of oxygen, is proved by inserting one end of a small hollow glass tube into the dark central portion of the flame of a large candle or of a gas light; the interior unburnt vapour or gas will escape through it, and may be lighted at the other end of the tube.

A most intense light, employed by Lieutenant Drummond in geodesical operations, is produced by passing a stream of oxygen gas directed through the flame of alcohol upon lime turned into the form of small balls. He found the light emitted by the lime when exposed to this intense heat to be 83 times the intensity of the brightest part of the flame of an argand burner of the best construction and supplied with the finest oil. Lime has since been used with the oxy-hydrogen blow-pipe for the illumination of the solar microscope. It appears that it is the vapour of the lime, raised to this high temperature, to which the intensity of the light is owing: this is shown by the roof of the lantern being covered with a sublimate of lime.

The brilliancy of flame is much diminished by various cooling processes. thus when a piece of glass is put over or into the flame of a candle, it becomes covered with charcoal in the state of soot, which the diminished heat of the flame is incapable of burning This takes place to a much greater extent with oil and tallow than with alcohol; the latter containing less carbon and more hydrogen than the former, its carbon is not so readily deposited by cooling.

It is on the cooling power of the metals with regard to flame, and especially of wire-gauze, that the construction of the safety-lamp depends. [SAFETY-LAMP.] The uses to which flame is applied are numerous and highly important: it is employed for the purpose of giving heat in reverberatory furnaces and in the blow-pipe, and for that of yielding light in lamps and candles. It is to be observed that flame is produced by various other chemical processes, and by other means than the combustion of substances containing hydrogen and carbon, though they are the elements from which it is obtained for all the numerous purposes of common life and manufactures.

FLAMEN, FLA'MINES, one of the orders of priesthood in antient Rome, like the Salii, the Feciales, and others, instituted, according to tradition, by Numa Pompilius. The Flamines were each destined to the service of some particular deity; there was the Flamen Dialis, who was consecrated to the worship of Jupiter, and was the first in rank, the Flamen Martialis, who attended to the worship of Mars, &c. They enjoyed great consideration, and their wives, called Flaminicæ, attended the sacrifices and other sacred ceremonies. The Flamines were distinguished by a peculiar pileus, or hat, of a conical shape, which was fastened under the chin. Their number, which was originally only three, was increased afterwards as new gods were introduced, and at last even the emperors, being deified after death, had a Flamen appointed for them. The Flamines were chosen both from among the patricians and the plebeians.

FLAMINGO, *Flammant* of the French, *Phœnicopterus* of the antients and moderns, a genus of birds whose natural position seems to be between the *Waders* (*Grallatores*) and the *Anatidæ*. The form approaches in some points to *Recurvirostra* [AVOSET] and *Platalea* (the Spoonbills), and in others comes nearest to the *Anserinæ* (Geese). C. L. Bonaparte places it in a family, *Hygrobatæ*, with *Recurvirostra* and *Platalea*, between his family *Pinnatipedes* (Phalaropes, &c.) on the one side and the *Anserinæ* on the other. Mr. Vigors, in his paper 'On the natural affinities that connect the orders and families of birds,' thus marks its position among the Grallatores: 'Intermediate between *Ardea* and *Ciconia* appear those forms which display so remarkable a dilatation of the bill, the *Cancroma* [BOAT-BILL] *Phœnicopterus*, and *Platalea* of Linnæus. The two last of these groups are equally distinguished by a greater development of the membrane that connects the toes than is observable in the other *Waders* which join them on each side; and in one of them, the Phœnicopterus, this character is carried so far to the extreme as to have occasioned some systematists to place the birds of this genus among the *Natatores* (swimmers). But the whole of the family have a membrane, more or less extensive, at the base of the toes; and if we compare the feet of the common *Ciconia alba* (Stork), of the *Platalea*, and the *Phœnicopterus* together, we shall see a gradual increase of this membrane in extent, until it reaches the extreme in the latter genus.' Mr. Swainson appears to be one of those who place the Flamingo among the swimmers. In his 'Natural History and Classification of Birds' (1836), he says, 'the Flamingo, which has the longest legs in the Natatorial order, is so good a walker that it only swims occasionally.' The close correspondence of many parts of the organization of the bird with the same parts in the *Anatidæ* will be remarked by the reader when he comes to the anatomical description hereinafter stated.

Generic Character.—Bill strong, higher than it is large, dentilated, conical towards the point, naked at the base; upper mandible suddenly bent, curved at its point on the lower mandible, which is larger than the upper. *Nostrils* longitudinal in the middle of the bill, pierced through and through near the dome of the upper *arête*, covered beneath by a membrane. *Feet* very long; three toes in front, hind toe very short, articulated high up on the tarsus; anterior toes united to the nails by a lunated membrane (membrane découpée). *Nails* short, flat. *Wings* moderate; first and second *quills* longest.

Temminck, whose generic character we have given, says that the Flamingoes live on the sea-beach or in marshes formed by salt lakes, where their food consists of testaceous mollusks, marine insects (crustaceans?), and the spawn of fish, which they collect by plunging their long neck into the water and turning the head upside down, so as to employ with greater advantage the bend of their bill. They join in large troops and live in societies. Their nest is made in the marshes, and consists of earth piled up, and upon this nest the birds sit astride, because their length of limb hinders them from incubating otherwise. Whether they are reposing or fishing, sentinels are appointed which keep a sort of guard. If anything alarms the védette he utters a trumpeting kind of cry, and the whole flock follow him into the air. They rarely take their repose in any other than open places; and it is asserted that their sense of smelling is so acute that they scent from afar the hunter and fire-arms. Their moult appears to be simple and ordinary, but the young birds differ much from their parents. The red or rosy plumage which covers the adult shows itself gradually, after many moults and a period of about four years. The females are less than the males, and the colours of the former want the purity which distinguish the latter; the young, at their departure from the nest, are white. The body of the Flamingo has hardly a greater covering of down than that of the other Waders, the Avosets alone excepted; and accordingly they do not swim habitually, like the latter birds, when they wish to go from one bank to another in deep water. The palmated feet of the Flamingoes appear to be given them to enable them to sustain themselves on the slimy bottoms of rivers and creeks into which they wade as far as their long legs will allow them, and to walk thereon. As they fly in flocks they make an angle like the *Geese*. In walking they often apply their upper mandible to the ground, and lean on it as a point of support.

M. Temminck positively asserts that the Flamingo of Europe and that spread over the warm climates of America are different. He states that he knows the plumage of the American Flamingo from its youth to its adult state, and declares that they are all different from the various states of the Flamingo of the antient continent. The orange-red which pervades the whole of the plumage of the American species when it has arrived at its complete state of development is sufficient to distinguish that bird from our European Flamingo, which is of a rose-colour, with wings of purple-red The young of the latter (*Phœnicopterus Antiquorum*) has the plumage whitish, covered with brown streaks (mèches), very distinctly marked and long, principally on the greater wing-coverts; the American Flamingo (*Phœnicopterus ruber*) is covered in its youth with a dull whitish-gray plumage. Three species then are recorded by M. Temminck.

1. *The Flamingo of the Antients, Phœnicopterus Antiquorum, Flammant Phœnicoptère*, of Buffon, the *Flammant* and *Flamingo* of old authors. Locality, south of Europe, Africa, and part of Asia.

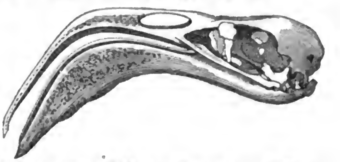
2. *The American Flamingo, Phœnicopterus ruber, Red Flamingo* of Wilson. Locality, South, and part of North, America.

3. *Phœnicopterus minor, Flammant Pygmée*, previously described by Vieillot as *Phœnicopterus parvus*. Locality, South Africa.

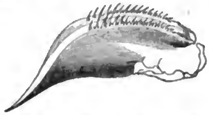
M. Lesson observes that at all events it would be more convenient to retain the original name of Linnæus, *Phœnicopterus ruber*, for the Flamingo of the Old Continent, and to suffer that given by Molina to the American bird, viz., *Phœnicopterus Chilensis*, to remain, although Wilson, who does not appear to have recognized any specific difference, records the last-mentioned Flamingo under the name of *Phœnicopterus ruber*. The latter is used by most of the English zoologists to designate the Flamingo of the Old World, and we shall, adhering to the law of priority, and to prevent confusion, adopt the nomenclature suggested by M. Lesson, wishing, at the same time, that Molina's name had not been a name of locality.

Before we enter into the history of these several species it will be advisable to inquire into the anatomical structure of the Flamingo, and Mr. Owen has enabled us to do this in his Notes on the Anatomy of the *Flamingo, Phœnicopterus ruber* of Linnæus, which died in the menagerie of the Zoological Society of London in the summer of 1832. After observing that the anatomical differences observable in the groups of the *Wading Birds* are so considerable, that we find them generally alluded to by Cuvier in the characters of the *Grallatores*, in the 'Règne Animal,' he remarks that, where they are omitted, we may presume that the illustrious author had not had the opportunity of examining the internal structure of the birds in question, and that they either had not before been dissected, or that their anatomy had been described with too little exactness to warrant his giving it on the authority of previous writers. This appears, in his opinion, to have been the case with the three genera which Cuvier has placed at the end of the order, viz., *Chionis*, Forster; *Glareola*, Gmel.; and *Phœnicopterus*, Linn.: and these, observes Mr. Owen, are the most interesting in an anatomical point of view, as being the representatives of as many distinct families. With respect to the Flamingo, Mr. Owen supposes that an opportunity of dissecting it had never occurred to Cuvier, and that probably the absence of any allusion to *cœca* in Perrault's anatomical description (*Mémoires de l'Académie*, t. iii., 3 P., p. 462) may have influenced Cuvier's silence regarding the internal structure of a bird which he considers as one of the most extraordinary and most isolated of its class. Cuvier, in allusion to the small tooth-like *laminæ* which are arranged along the margins of the upper mandible, points out the relation which the Flamingo bears, in this particular, to the *Anatidæ;* and Mr. Owen states that a like correspondence is observable in the rest of the alimentary canal. 'The horny denticles of the upper mandible,' writes Mr. Owen, 'and the transverse marginal furrows of the lower mandible, form together a sort of filter, and, like the plates of *whalebone* in the *Balænæ*, allow the superfluous moisture to drain away, while the small *mollusca* and other littoral *animalculæ* are detained and swallowed. The structure of the gullet is in accordance with the size of the substances which serve for nutriment. In the typical *Grallatores*, as *Ardea* and *Ciconia*, which swallow entire fish and other food in large morsels, the *œsophagus* is remarkable for its great and uniform capacity; but in *Phœnicopterus* it is not more than half an inch in diameter when dilated. At the lower part of the neck it expands into a considerable pouch, which measured, in the specimen here described, 3 inches in diameter, and 4½ inches in length. In Perrault's specimen the diameter was only 1½ inch, and it was probably in a state of contraction, as he describes it as furnished internally with many small longitudinal *rugæ*. The circular fibres around this part were very distinct. Beyond this pouch the *œsophagus* again contracts to about 4 lines in diameter, and so continues for 3½ inches, when it terminates in the *proventriculus*. This glandular cavity was 1 inch 8 lines in length, and 5 lines in diameter: the gastric follicles were broad, short, and simple, and were arranged in two long oval groups, blending together at the edges. The *proventriculus* terminates in a small but strong gizzard, of a flattened spheroidal form, measuring 1 inch 5 lines in length, and the same in breadth; the lateral muscles were each half an inch in thickness. The gizzard was lined with a moderately thick and yellow-coloured cuticle, disposed in longitudinal ridges, the extremities of which projecting into the pyloric aperture form a kind of valve, as in the gizzard of the *Ostrich*. In a *Flamingo* dissected by Colonel Sykes, in which the *duodenum* was blocked up by two large *tape-worms*, the muscles of the gizzard were 1 inch in thickness. The duodenal fold extended towards the left side 4 inches from the *pylorus*. This intestine was 4 inches in diameter. The *pancreas*, which occupied its common situation between the two portions of the fold, had a more complete peritoneal covering than usual. The intestinal canal soon diminished in diameter to 3 and then to 2 lines. The small intestines formed an oval mass, and were disposed in twenty-one elliptical spiral convolutions, eleven descending towards the *rectum*, and ten returning towards the gizzard in the interspaces of the preceding; a disposition analogous to that of the *colon* in *Ruminants*. The *villi* of the intestines were arranged in longitudinal zigzag lines. There were two cæca, each about 3½ inches in length, and 5 inches in diameter. The *testes* were about the size of grains of wheat, and were situated on the anterior part of the renal capsules. The latter bodies were about the size of hazel-nuts. 'Both these glands were of a bright yellow colour. The fat of this bird is of a remarkable orange tint. The principal diseased appearances were in the lungs, which were filled with tubercles and *vomicæ* I was much struck with finding the inner surface of the latter cavities, and that of most of the smaller ramifications of the branchial tubes, covered over with a green vegetable mould or *mucor*. As the individual was examined within twenty-four hours after its death, it seemed reasonable to conclude this *mucor* had grown there during the lifetime of the animal. Thus it would appear that internal parasites are not exclusively derived from the animal kingdom, but that there are *Entophyta* as well as *Entozoa*.'

'The tongue of the *Flamingo* is remarkable for its texture, magnitude, and peculiar armature. It is almost cylindrical, but slightly flattened above, and obliquely truncate anteriorly, so as to correspond with the form of the inferior mandible. The lower part of the truncated surface is produced in a pointed form, and is supported beneath by a small horny plate. The whole length of the tongue is 3 inches; its circumference 2½ inches. Along the middle of the flattened superior surface there is a moderately deep and wide longitudinal furrow, on either side of which there are from twenty to twenty-five recurved spines, but of a soft and yielding horny texture, measuring from one to three lines in length. These spines are arranged in an irregular alternate series, the outer ones being the smallest, and these, indeed, may be considered a distinct row. At the posterior part of the tongue there are two groups of smaller recumbent spines directed towards the *glottis*. The substance of the tongue is not muscular, but is chiefly composed of an abundant, yielding, cellular substance, with fat of an almost oily consistence. It is supported by a long and thin concave cartilage articulated to the body of the *os hyoïdes* by a shallow ginglymoïd joint allowing of a free motion. Excepting the straight *hyoglossi*, the muscles all terminate at the base of the tongue. The tendons of the former muscles run along the under part of the lingual cartilage, and expand to be inserted at its extremity, where a few fibres again proceed forwards to the extreme point of the tongue.' In the museum of the Royal College of Surgeons in London (Gallery) is a preparation, No. 524 E, of the crop, proventriculus, and gizzard of a *Flamingo*, *Phœnicopterus ruber* of Linnæus; and No. 1470 of the same museum is a preparation of the tongue of that bird.



Skull and mandibles of the Flamingo. From a specimen in the Royal College of Surgeons.



Tongue of Flamingo. From a specimen in the Royal College of Surgeons.

There were no *Entozoa* in the specimen dissected by Mr. Owen; but he characterizes the species found by Colonel Sykes, and above alluded to, as '*Tænia lamelligera:* length seven inches; breadth five lines; thickness one line. (*Zool. Proc.*, 1832, pp. 141 and 143.)

SPECIES OF THE OLD CONTINENT.

Phœnicopterus ruber (Linn.); *Phœnicopterus Antiquorum* (Temm.).

Description.—Length from the end of the bill to that of the tail four feet two or three inches, but to the end of the claws sometimes more than six feet. Bill 4½ inches long: upper mandible very thin and flat, and somewhat moveable, the under mandible thick, both of them bending downwards from the middle; nostrils linear and placed in a blackish membrane; end of the bill as far as the bend black, from thence to the base reddish-yellow, round the base, quite to the eye, covered with a flesh-coloured cere; neck slender and of great length; tongue large, fleshy, filling the cavity of the bill, furnished with twelve or more hooked papillæ on each side, turning backwards; the tip a sharp cartilaginous substance. The bird when in full plumage wholly of a most deep scarlet, except the quills, which are black. From the base of the thigh to the claw thirty-two inches, of which the feathered part takes up no more than three; bare part above the knee thirteen inches, and from thence to the claws sixteen; colour of the bare parts red, and toes furnished with a web deeply indented. Legs not straight but slightly bent, the skin rather projecting. (Latham.)

Nest formed of earth, and in the shape of a hillock, with a cavity at top; eggs two or three, white, of the size of those of a goose, but more elongated.

Utility to man.—Flesh pretty good meat: the young thought by some equal to partridge. The inhabitants of Provence, however, are said to throw away the flesh as fishy and only to use the feathers as an ornament to other birds at particular entertainments. Not so the Roman epicures. Apicius has left receipts for dressing the whole bird with more than the minute accuracy of a modern cookery book, and the 'Phœnicopterus ingens' appears among the luxuries of the table in Juvenal's eleventh satire. The brains and the tongue figure as one of the favourite dishes of Heliogabalus, and the superior excellence of the latter was dwelt upon by the same Apicius and noticed by Pliny where he records the doctrine of that 'nepotum omnium altissimus gurges.' (Lib. x., c. 48.) Neither has it escaped the pointed pen of Martial—

'Dat mihi penna rubens nomen: sed lingua gulosis
Nostra sapit: quid si garrula lingua foret? Lib. xiii.—lxxi.

The 'garrula lingua' most probably alludes to the tongues and brains of singing birds, which sometimes formed one of the monstrous dishes at the enormously expensive Roman entertainments. Dampier does not forget the delicious tongue of the Flamingo, observing that a dish of these tongues is worthy of a place at a prince's table. The bird itself seems to have been held in high repute by the antients, for it appears to have been one of the victims offered to Caligula,* who is said to have been sprinkled, while sacrificing, with the blood of a Phœnicopter the day before he was murdered.†

Phœnicopterus ruber.

Locality.—The European Flamingo is recorded as having been seen everywhere on the African coast and the adjacent islands quite to the Cape of Good Hope. There is a specimen in the South African Museum. Le Vaillant found thousands of Pelicans and Flamingos on the river Klein-Brak, where the water is brackish owing to the flowing of the tide. It has been occasionally observed on the coasts of Spain, of Italy, and on those of France which lie on the Mediterranean sea; it has been met with at Marseilles and some way up the Rhone. The prince of Musignano notes it as very rare and accidental in the neighbourhood of Rome. In some seasons it has been remarked at Aleppo and in the parts adjacent. It has been noticed on the Persian side of the Caspian Sea, and thence along the west coast as far as the Wolga, but at uncertain times, and chiefly in considerable flocks, coming from the north coast mostly in October and November. Col. Sykes records it in his catalogue of birds in the Dukhun (Deccan) as the *Rajah Huns* of the Hindoos. It breeds in the Cape de Verd islands. This species is very shy. Dampier killed fourteen at once by secreting himself and two more; they are not to be approached openly. Kolben speaks of their numbers at the Cape, where by day they resorted to the borders of lakes and rivers, and lodged at night in the long grass on the hills.

M. de la Mormora, in his voyage to Sardinia, gives the following interesting account of this species. It quits Sardinia about the end of March to return about the middle of August: then it is that from the bastion which forms the promenade of the inhabitants of Cagliari flights of these magnificent birds may be seen to arrive from Africa. Disposed in a triangular band, they show at first in the heavens like a line of fire. They advance in the most regular order, but, at the sight of the neighbouring lake, there is a pause in their progression, and they appear for a moment immoveable in the air; then tracing by a slow and circular movement a reversed conical spiral figure they attain the end of their migration. Brilliant in all the splendour of their plumage and ranged in line, these birds offer a new spectacle, and represent a small army ranged in order of battle, the uniformity and symmetry of which leaves nothing to be desired; but the spectator should content himself with observing this peaceful colony from afar. Woe to him if he dare approach the lake at this deadly season.

Phœnicopterus parvus, Vieill. *Phœnicopterus minor*, *Flammant Pygmée*, Temm. M. Temminck observes that no difference is perceptible between the Flamingo of the Antient Continent and that of the New World in the form of the mandibles; their upper mandible shuts on the lower one, and is so constructed as to offer, when the bill is shut, a very slight difference in the height of the two mandibles. In *Phœnicopterus parvus* the lower mandible, very deep and strongly arched, is formed to receive, within the space which separates its walls, the whole of the upper mandible, which it entirely hides, so that the upper edges of the lower mandible raise themselves to the height of the surface of the upper jaw.

The plumage of the adult is pure rose-colour without spot or streak; the head, the neck, the back, and all the lower parts are of this beautiful tint, which is more lively and pure in the living bird than in the preserved skin, for the fugitive brilliancy of this tint becomes tarnished and passes into whitish from exposure to the light. The great wing coverts and those of the tail are slightly deeper in colour than the other parts of the plumage. The whole wing is covered with feathers of a brilliant scarlet or purple, surrounded by a wide rosy border; the tail-feathers are black. Base of the bill, cere, and region of the eye deep purple: middle of the lower mandible orange-red, and the point black. Joint of the knee, toes, and their membranes of a fine red: the tarsus has a livid tint. Total length nearly three feet.

Young of the year.—White or whitish, marked with small brown streaks (mèches) spread over the head, the neck, the breast, and the coverts of the wings. The first red tints show themselves on the wings. *Bill* black. *Feet* of a reddish livid tint.

Locality.—Lakes of Africa. Those received by Professor M. Temminck were natives of the Cape of Good Hope. The young bird in the museum at Paris was brought from Senegal.

Phœnicopterus parvus.

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* Suet. in Calig. 22.

† Ibid. 57.

SPECIES OF THE NEW CONTINENT.

Phœnicopterus Chilensis (Molina), *Phœnicopterus ruber*, Red Flamingo (Wilson). This species *in its adult state* scarcely differs from the European Flamingo: it is perhaps not so bright. Catesby says, 'When they feed (which is always in shallow water, by bending their necks) they lay the upper part of their bill next the ground, their feet being in continual motion up and down in the mud, by which means they raise a small round sort of grain, resembling millet, which they receive into their bills; and as there is a necessity for their receiving into their mouths some mud, Nature has provided the edges of their bills with a sieve or teeth like a fine comb, with which they retain the food and reject the mud which is taken in with it. This account I had from persons of credit; but I never saw them feeding myself, and therefore cannot absolutely refute the opinion of others, who say they feed on fish, particularly eels, which seem to be the slippery prey Dr. Grew says that the teeth are contrived to hold.' The development of the gizzard in this genus makes it very probable that vegetable substances form part of the diet of the *Flamingoes*; but it is not likely that large fish, or indeed water animals of any great size, are ordinarily devoured by these birds. The bill is a colander, admirably contrived for separating the nutritious parts, whether animal or vegetable, from the mud and other useless parts.

Locality.—Warmer parts of North America, Peru, Chili, Cayenne, coast of Brazil, and the West India Islands, particularly the Bahamas, where they breed. Wilson speaks of it, but he gives Latham's description, &c. The prince of Musignano, in his 'Specchio Comparativo,' states that it is very rare and accidental in the neighbourhood of Philadelphia.

FLAMINI'NUS, TITUS QUINTIUS, was made consul, B.C. 198, before he was 30 years of age, and had the province of Macedonia assigned to him, with the charge of continuing the war against Philip, which had now lasted for two years without any definitive success on the part of the Romans. Flamininus having landed in Epirus, opposite the island of Corcyra, with a reinforcement of 8000 foot and 800 horse, marched up the country, where he found Philip posted in a rugged pass on the banks of the Aous, among the mountains of Eastern Epirus. After some fruitless negotiations with the king of Macedonia, the Romans, under the guidance of an Epirote shepherd, attained by a mountain path the rear of the Macedonian position, and Philip was obliged to make a hurried retreat across the chain of Pindus into Thessaly. He was followed by the Romans and their allies, the Ætolians and the Athamanians, who overran and ravaged the country. Meantime L. Quintius Flamininus, the brother of the consul, sailed with a fleet to the eastern coast of Greece, where, being joined by the ships of the Rhodians and of Attalus of Pergamus, he scoured the coasts of Eubœa, Corinth, and other districts which were allied or subject to the king of Macedonia. The consul himself marched into Phocis, where he took Elatea, and having there fixed his winter-quarters, he succeeded in detaching the Achæans from the Macedonian alliance. In the following year Flamininus, being confirmed by the senate in his command as proconsul, before beginning hostilities afresh held a conference with Philip on the coast of the Maliac gulf, and allowed him to send legates to Rome to negotiate a peace. The senate however having required the king to evacuate all the towns of Greece which he had occupied, including Demetrias in Thessaly, Chalcis in Eubœa, and Corinth, the negotiations were broken off and Flamininus resumed military operations. He marched from Phocis into Thessaly, where Philip was stationed near Larissa with a body of 16,000 phalanx men, 2000 peltastæ, and 5000 Thracian and other auxiliaries. After some previous demonstrations and partial attacks, the two armies met between Pheræ and Larissa, in a country broken by small hills called Cynoscephalæ, or Dogs' Heads. The Macedonians had at first some advantage, especially on the right wing where the king commanded in person, and where he had formed his phalanx on a hill, but Flamininus observing the left wing moving in column with a narrow front to their assigned post, attacked it with his elephants and threw them into confusion before they had time to form. In the pursuit of this body a tribune of the victorious legion being led beyond the flank of the right wing, ventured to attack it on the rear, and he succeeded in spreading disorder into the ranks of the close and cumbersome phalanx. Panic pervaded the Macedonians; many threw down their arms and fled, and Philip himself, seeing the rout becoming general, left the field, and rode off towards Tempe. The Macedonians lost 8000 killed and 5000 prisoners on that day. Soon afterwards the king asked for a truce, which was granted by Flamininus, in order that messengers might be sent to Rome to treat of peace. The senate appointed ten legates, who, in concert with Flamininus, drew up the conditions, which were that Philip should evacuate every Grecian town and fortress beyond the limits of his paternal kingdom, that he should give up all his ships of war, reduce his military establishment, and pay 1000 talents for the expenses of the war. Flamininus was then continued in his command for another year, 196 B.C., to see these conditions executed. In that year, at the meeting of the Isthmian games, where multitudes had assembled from every part of Greece, Flamininus caused a crier to proclaim 'that the senate and people of Rome and their commander Titus Quintius, having subdued Philip and the Macedonians, restored the Corinthians, Phocæans, Locrians, Eubœans, Thessalians, Phthiotæ, Magnetæ, Perrhæbi, and Achæans to their freedom and independence, and to the enjoyment of their own laws.' Bursts of acclamation followed this proclamation, and the crowd pressed forward to express their gratitude to Flamininus, whose conduct throughout those memorable transactions was marked with a wisdom, moderation, and liberality seldom found united in a victorious Roman general. He checked by his firmness the turbulence of his Ætolian allies, who vociferated for the entire destruction of Philip, while he satisfied all just claims of the rest; and although his Macedonian expedition led ultimately to the entire subjugation of both Macedonia and Greece, yet he was at the time the means of restoring peace to both countries, and of protracting the independence of the Greek states for half a century longer. In the following year, 195 B.C., Flamininus was entrusted with the war against Nabis, tyrant of Lacedæmon, who had treacherously seized the city of Argos. Flamininus advanced into Laconia and laid siege to Sparta, but he met with a brave resistance, and at last agreed to grant peace to Nabis on condition that he should give up Argos and all the other places which he had usurped, and restore the descendants of the Messenians to their lands. His motives for granting peace to Nabis were, he said, partly to prevent the destruction of one of the most illustrious of the Greek cities, and partly because of the great preparations which Antiochus, king of Syria, was then making on the coast of Asia. Livy suggests, as another probable reason, that Flamininus wished to terminate the war himself, and not to give time to a new consul to supersede him in his command and reap the honours of the victory. The senate confirmed the peace with Nabis, and in the following year, 194 B.C., Flamininus having settled the affairs of Greece prepared to return to Italy. Having repaired to Corinth, where deputations from all the Grecian cities had assembled, he took a friendly leave of them, signifying to them that he was going to withdraw all his army and garrisons, and leave them to themselves; advising them at the same time to make a temperate use of that liberty which the Romans had been the means of restoring to them, and above all to preserve concord in their councils, as civil factions would certainly lead to the loss of their independence; for those who find themselves the weaker at home are apt to apply to strangers for support. He accordingly delivered the citadel of Corinth to the Achæans, withdrew his garrisons from Demetrias, Chalcis, and the other towns of Eubœa, and having broken up his camp at Elatea in Phocis, he sent the soldiers to embark on the coast of Epirus, whilst he repaired to Thessaly to settle the internal affairs of that country, which were in a state of great confusion. He organized the various towns, choosing the magistrates and senate from among the wealthier class. He then repaired to Oricum, on the coast of Epirus, where he embarked for Brundisium. In Italy both he and his soldiers were received with great demonstrations of joy, and the senate decreed him a triumph of three days. On the first day were displayed the arms and the statues of brass and marble taken from the enemy; on the second the silver and gold, whether coined or in vases, shields, and various ornaments; and on the third the golden crowns, the gift of the liberated cities. Before the car of Flamininus appeared the captives and hostages, and among the latter Demetrius, son of Philip, and Armenes, son of Nabis, and in the rear followed the Roman prisoners who had been sold as slaves to the Greeks by Hannibal during the second Punic war, and whose liberation Flamininus had obtained from the gratitude of the Greek states. The Achæans alone are said to have liberated 1200, for whom they paid 100 talents as compensation money to their masters. Altogether there never was perhaps a Roman triumph so satisfactory as this to all parties, and so little offensive to the feelings of humanity. In the year 183 B.C. Flamininus was sent to Prusias, king of Bithynia, upon the ungracious mission of demanding the person of Hannibal, then, in his old age, a refugee at the court of Prusias. Hannibal, however, by taking poison, avoided being given up. In the year 166 Flamininus was made augur in the room of C. Claudius deceased (Livy, xlv. 44), after which he is no longer mentioned in history.

FLAMSTEED, JOHN. The life of the first astronomer royal was known to the world chiefly by the results of his labours, until the year 1832, since which time his private affairs have been brought to light in an unexpected manner, and have excited great interest, not without creating some party feeling among those who cultivate the sciences connected with astronomy. In 1832 Mr. Francis Baily discovered that a considerable collection of Flamsteed's letters was in the hands of a private individual; which, on being examined, was found to contain much that was not generally known. On searching the Observatory at Greenwich, Mr. Baily found a vast mass of MS. observations, letters, and other documents, in the handwriting of Flamsteed and his friends, containing the curious history of which we shall give a brief abstract. The result of this discovery was a representation to the Board of Visitors of the Royal Observatory, who recommended the republication of the *British Catalogue*, with extracts from the papers of Flamsteed. The Lords of the Admiralty having decided to print this at the public expense, Mr. Baily undertook the preparation of the work, which appeared in 1835, under the title of 'An Account of the Rev. John Flamsteed, &c., &c., to which is added his British Catalogue of Stars, corrected and enlarged.' From this work, which is certainly the most remarkable scientific biography of the present century, we have entirely drawn the materials of this article. The original account is in part drawn by Mr. Baily from a manuscript by Flamsteed, headed 'Self Inspections, by J. F.,' which is a very interesting autobiography.

John Flamsteed was born at Denby, near Derby, August 19, 1646. His father was in some business, it has been said that of a maltster; he lost his mother when very young. At the age of fourteen he caught cold while bathing, which produced a weakness in the joints, from which he never recovered. He began his mathematical and astronomical studies at a very early age, and showed talents for constructing astronomical instruments. In 1665 he visited Ireland for the purpose of consulting a Mr. Greatraks, who professed to cure disorders by the touch, and of whose experiments in London a curious account exists. [BOYLE, ROBERT.] No effect being produced on him by this treatment, he returned to Derby, where his father lived, and where he had received his education. Here he continued his studies till 1669, and with great success. In or before 1667 he discovered the real causes of the equation of time, and wrote a tract on the subject, which was afterwards appended by Dr. Wallis to his edition of the works of Horrox, published in 1673. In 1669 he made an astronomical communication to the Royal Society through Oldenburg, their secretary, concealing his name under the anagram

J. Mathesin a Sole fundes,

which, being transposed, gives

Johannes Flamsteedius:

this same anagram appears in the title-page of the tables appended to the doctrine of the sphere in Sir Jonas Moore's system of mathematics, in the preparation of which Flamsteed had a share. An answer from Oldenburg, addressed to himself, showed him that he was discovered, and from that time, or rather from the date of a visit which he very shortly afterwards paid to London, he was in correspondence with many scientific men, but particularly with Sir Jonas Moore, who, in 1674, proposed to establish Flamsteed in a private observatory, which he intended to build at Chelsea. In the mean time however the fact of the very large errors to which astronomical tables were subject came to the notice of Charles II., on the occasion of a proposal made by a French gentleman for finding the longitude [GREENWICH OBSERVATORY], and that king determined to establish an observatory. Flamsteed was appointed astronomer royal, or, as the warrant ran, 'astronomical observator,' and carried on his observations at the queen's house, in Greenwich Park, until the observatory was ready, which was in July, 1676. From this time Mr. Baily dates the commencement of modern astronomy; nor can such chronology be disputed if we consider that we now return to Flamsteed's observations as the earliest with which it is desirable to compare those of our day, and also that Flamsteed's catalogue is the first which attained a precision comparable to that of later times. Flamsteed was in fact Tycho Brahé with a telescope: there was the same capability of adapting instrumental means, the same sense of the inadequacy of existing tables, the same long-continued perseverance in actual observation. But Tycho Brahé, a rich noble, found his exchequer in a king's purse; while Flamsteed, a poor clergyman, defrayed the expenses of his instruments himself, upon an ill-paid salary of one hundred pounds a year. Up to the year 1684 he had imposed on him the task of instructing two boys from Christ's Hospital, as one of the duties of his post; and, besides this, he was obliged to have recourse to private teaching, to meet the charges of carrying on his observations. At the very same time, that part of the public which cared about the matter were beginning to require that he should print his observations.

Almost at the outset of his labours he was so well known that Dr. Bernard invited him to become a candidate for the Savilian professorship of geometry at Oxford, which he declined to do. He had at this time nothing but a sextant and clocks of Sir Jonas Moore's, and some instruments of his own. He borrowed some from the Royal Society, and after repeatedly urging the government to provide him with an instrument fixed in the meridian, he caused a mural arc to be constructed at his own expense, which was erected in the year 1683, but proved a failure.

In the mean time he had taken orders, in 1675, having in the previous year obtained the degree of Master of Arts from Cambridge. It is not certainly known that he had been a student in that university, though it is certain that he was for some months at Cambridge in 1674. Perhaps he obtained his degree by the celebrity of his name, on condition of a short residence.

In 1684 his father died, and he was presented to a small living by the Lord-Keeper North. Both circumstances increasing his means, he resolved to be at the expense of a new mural arc, upon an assurance from the government (which was never fulfilled) that the outlay should be repaid. This instrument was first used in September, 1689, and from that moment 'everything which Flamsteed did, every observation which he made, assumed a tangible and permanent form, and was available to some useful purpose.' When he died, the government of the day attempted to claim these instruments as public property.

The public career of Flamsteed, from this time to the end of his life, is described when we say that he collected that enormous mass of observations which furnished the first trustworthy catalogue of the fixed stars; that he made those lunar observations on which Newton depended for the illustration and verification of his lunar theory; and that he originated and practised methods of observing which may be said to form the basis of those employed at the present time. Were it not for the celebrated quarrel between him on the one side, and Newton and Halley on the other, there would hardly be a life of so much utility as that of Flamsteed, which would afford so little materials for a popular account. It is to be remembered that the following is an *ex parte* statement; but on the other hand, it is not one formally drawn up for the public, but partly contained in the manuscript autobiography which never was published by Flamsteed, and partly derived from his correspondence with his friends. Many confirmatory circumstances of the general tenor of the facts appear in the letters of Newton himself; and even those who have (since the publication of Mr. Baily's work) defended the character of Newton, have not attempted to invalidate the account, but have mostly confined themselves to an attempt to show that Flamsteed did not appreciate the pursuits of Newton. The following is a sketch of the transaction. Newton had been on terms of cordial intimacy with Flamsteed, but a coolness, the cause of which is not discoverable, had begun to exist in the year 1696. In a letter to Dr allis, intended for publication, Flamsteed mentioned his having supplied Newton with observations of the moon: this the latter took very ill, saying, in a letter to Flamsteed, 'I do not love to be printed on every occasion, much less to be dunned and teased by foreigners about mathematical things; or to be thought by our own people to be *trifling* away my time about them when I should be about the king's business.' Before this time he had furnished Newton with all the lunar observations which he had made.

When Flamsteed had completed his catalogue (having already expended 2000*l.* more than his salary), he began to think of printing his results. But Prince George of Denmark, having heard of the extent of Flamsteed's labours, offered, in 1704, to bear the expense of printing. A committee, consisting of Newton, Sir Christopher Wren, Dr. Arbuthnot, Dr. Gregory, and Mr. Roberts, was appointed to examine Flamsteed's papers, and reported in favour of printing all of them. The superintendence of the printing, the choice of workmen, &c. was in the hands of the committee, and not in those of Flamsteed. The latter gives the detail of various vexations to which he was subjected, and which ended (for the time) in a demand that Flamsteed should give up a manuscript copy of the catalogue of stars, which was the result of the observations, and was intended to be published at the end. This was done, with remonstrance, by Flamsteed; but the catalogue (as much of it as was ready) was sealed up; and Flamsteed declares that he understood it was to be kept sealed up until the whole of the rest was finished. It was three years before the first volume was printed; and during this time many small circumstances occurred which, if Flamsteed's colouring of the more important facts be correct, show a most determined intention on the part of the committee to give annoyance. Prince George died in 1708, before the second volume was begun; and the office of the committee was gone; but they still retained the papers in their keeping. Flamsteed, thinking nothing further about immediate publication, applied himself again to his observations. In March, 1710-11, he was surprised by being told that the seal of his catalogue had been broken, and that it was going through the press. Flamsteed immediately obtained an interview with Dr. Arbuthnott, who assured him that none of it was printed. This was not the fact; for in a few days Flamsteed himself received several printed sheets, and learned that Halley had publicly exhibited others in a coffee-house, and boasted of the pains he had taken in correcting their errors. The result was, that in 1712 appeared the book known by the name of Halley, and entitled 'Historiæ Cœlestis libri duo,' &c. Flamsteed, exceedingly irritated by the conduct of Newton and Halley, and being not naturally of a gentle temper, now kept no terms whatsoever with either. Newton had recommended the appointment of a board of visitors for the Observatory (made up of members of the Royal Society), and Flamsteed was summoned to the Royal Society, October 26, 1711, to know if his instruments (his own property) were in order, &c. Here a warm quarrel arose. Flamsteed declared to Newton that he had been robbed of his labours, and Newton called Flamsteed various names, of which *puppy* was the least. Newton reminded Flamsteed that he had received 100*l.* a year for thirty-six years, and Flamsteed asked Newton what he had done for 500*l.* a year which he had received since he came to London. Flamsteed charged Newton with having broken the seal of his catalogue, and Newton replied that he had the queen's order. After this interview, Flamsteed resolved to print all his observations, &c. at his own expense, and applied to Newton for the manuscript of 175 sheets of observations which were in his hands. The demand was refused, and Flamsteed commenced legal proceedings for their recovery. The result of the suit is not known; but Flamsteed states that Newton at last delivered all the contested manuscript to Halley. The additional expense caused to Flamsteed by this act of Newton was about 200*l.*

Queen Anne died in 1714, and the earl of Halifax, Newton's great supporter at court, in 1715. Flamsteed was now stronger with the government than his opponents; and the lords of the treasury, at his request, surrendered all that remained of Halley's edition (about 300 copies out of 400) to his mercy. These he immediately committed (in part) to the flames—a sacrifice, as he calls it, to heavenly truth—reserving only about ninety-seven sheets of each, which had been printed as he wished, and which afterwards formed part of his first volume. From this time to his death, which took place at the end of December, 1719, he was occupied in printing his 'Historia Cœlestis,' which, however, he did not live to finish. It was completed by his widow, with the aid of Mr. Crosthwait, his assistant, and his friend the celebrated Abraham Sharp, and was published in 1725. The maps, known by the name of Flamsteed's Atlas, were superintended by the same persons. The 'Historia Cœlestis Britannica' contains a complete account of the instruments and methods employed, together with a large mass of sidereal, lunar, and planetary observations, and the result of the former, namely, the British Catalogue. This work seems to us to occupy the same place in practical astronomy which the Principia of Newton holds in the theoretical part.

The very singular story of which we have given an outline did not, as might be supposed, appear without comment from the admirers of Newton's moral character. Mr. Baily, in a supplement to his account of Flamsteed, has condensed all the various replies (if so they are to be called) into four, to each of which he has given a rejoinder. To us it seems that the first three of the articles are utterly irrelevant, unless it be demanded as a postulate, that any one had a right to treat Flamsteed in any way which could be proved to be for the good of science.

1. It is said that Flamsteed did not appreciate Newton's lunar theory. 2. That he showed unwillingness to furnish Newton with the requisite lunar observations. 3. That he raised frivolous and vexatious objections to the printing. 4. That the committee had a right to break the seal of the packet.

To which it may be answered, 1. That very few of that day appreciated Newton's lunar theory, and that the same theory, as exhibited in the first edition of the 'Principia' (for the second was not published till after the quarrel), contained several points which were contradicted by observation, or, as Flamsteed says, 'rejected by the heavens.' 2. That it can be proved, from Flamsteed's lists of observations and from the correspondence of both parties, that the latter furnished Newton with every lunar observation which he had made; and that were it not so, he was under no obligation to supply lunar observations to any one. 3. That Flamsteed, besides depositing the imperfect catalogue and the 175 sheets of observations, appears, from the whole correspondence and from his subsequent exertions when he began to print for himself, to have been earnestly desirous of expedition.

With regard to the breaking of the seal, it is asserted that the contents were public property. This excuse did not occur to the mind of Newton himself, who, according to Flamsteed, only pleaded the queen's order. But the mere fact of the catalogue having been *sealed* proves that there was some understood reason for its not being immediately submitted to the inspection of the committee. If, as we have heard suggested, the deposit was a pledge on the part of Flamsteed that the manuscript should be printed, and if he refused to fulfil this pledge, undoubtedly the committee were justified in breaking the seal. But supposing it to be so, we may contend that the committee in such a case ought not, as men of honour, to have touched the seal, until they had first ascertained, by the fullest notice given to Flamsteed, that he was unwilling to fulfil the previous stipulation. It seems to us, on the whole, that the case is rather strong against Newton and Halley, and that their cause has been hurt, since the publication of the preceding details, by the attempt to defend where palliation was hardly tenable. It is by no means true that high intellect and high moral sense must exist together; and if, as Mr. Baily surmises, fifty years ago the editors of the 'General Dictionary' could not state what they knew of the quarrel from the fear that an exposure of Newton would injure their work, we see, in the recent publication, a gratifying proof of a better spirit.

Among the matters contained in Mr. Baily's preface is a complete refutation of a story derived from a provincial history, that Flamsteed, when very young, was convicted of highway robbery, and that a pardon was found among his papers. On searching the records, no such pardon is found entered, and various other circumstances make it physically impossible that Flamsteed could have been thus engaged at the time stated.

FLANDERS, EAST, a province of the kingdom of Belgium, bounded on the north by the province of Zealand, on the east by South Brabant and Antwerp, on the south by

Hainault, and on the west by West Flanders. It extends from 50° 42′ to 51° 22′ N. lat., and from 3° 25 to 4° 26′ E. long.

East Flanders is politically divided into six departments, *r*

Alost,	containing	3	towns and	74	communes.
Oudenarde,	„	2	„	55	„
Eecloo,	„	1	„	17	„
Ghent,	„	2	„	76	„
St. Nicholas,	„	2	„	26	„
Termonde,	„	1	„	25	„
		11	towns and	273	communes.

The principal towns are Ghent, the capital, Alost, Oudenarde, Deynze, Eecloo, Grammont, Lokeren, St. Nicholas, Ninove, Renaix, and Termonde, or Dendermond. [GHENT; ALOST; OUDENARDE; EECLOO; GRAMMONT; LOKEREN; ST. NICHOLAS; RENAIX; TERMONDE.]

Deynze, about 9 miles south-west from Ghent, and 11 miles north-north-west from Oudenarde, near to the western border of the province, is a very antient town: it was sacked by the Normans in 880, and was bought by Count Robert of Flanders in 1316. It contained in 1830 a population of 3644, living in 546 houses. The town contains two churches, four schools, a town-hall, and a prison. It is a place of much trade, and is celebrated for the quality of the Geneva which is made in 13 distilleries: a great part of the inhabitants are employed in linen-weaving.

Ninove is situated 20 miles south-east from Ghent, and 12½ miles west from Brussels, on the left bank of the Dender. It is a well-built town, containing 816 houses and 4409 inhabitants. There are two churches and a chapel, a town-hall, an hospital, and ten schools. The principal trades carried on are in grain, flax, linen, and oil; there are four salt-refineries, seven flax-mills, some potteries, tobacco-manufactories, and oil-mills. The town owes its origin to the Goths, who built the castle in 411: it was enclosed with walls in 1194.

The principal rivers that traverse this province are the Schelde, the Lys, and the Dender. It is further watered by several smaller streams and brooks, all of which are tributaries to the Schelde and the trade of the province is facilitated by many canals, the most important of which are those from Bruges to Ghent, from Ghent to the Neuzen canal, and the Moerwart canal, which branches off from the last-mentioned canal five miles north from Ghent, and joins the river Durme at Splettersputte.

East Flanders is low and level. In many parts of the province there are beds of peat, which are worked, and supply cheap fuel to the inhabitants, besides which the ashes are used as a dressing for the soil. Animal and vegetable remains, in a state of high preservation, are often found in these peat beds.

The chief productions of the earth are wheat, rye, barley, oats, potatoes, flax, hemp, hops, madder, and tobacco. There is but little wood of large growth in the province; plantations for fire-wood and hop-poles are of frequent occurrence. Oaks are planted for the sake of the bark, and are cut down before they attain any considerable size.

The draught-horses bred in the neighbourhood of Ghent and Alost are large, well-formed, and powerful animals. Many of these horses are used in London for drawing the drays of brewers. Oxen are seldom used in Flanders for purposes of labour. The province contains 28,000 horses, 120,000 horned cattle, and 35,000 sheep, estimated in round numbers.

The population of East Flanders at the beginning of 1833 amounted to 742,793, of whom 180,813 inhabited the towns, and 561,980 the rural districts. The births and deaths in 1829 were—

Births—Males	12,501	
Females	11,970	
		24,471
Deaths—Males	9,226	
Females	9,495	
		18,721

Various manufactures are carried on in the province. Coarse hempen cloths are made by the women and young persons in the country districts. Lace, to which the name of Valenciennes has been applied, is made principally at Ghent, Alost, and St. Nicholas. Tulle, or bobbin-net lace, has been introduced of late years. Silk-weaving is pursued at Ghent and St. Nicholas. Cordage, bricks, hats, soap, and woollen-cloths are made in various parts of the province, which also contains numerous potteries, sugar-refineries, distilleries, and breweries. In 1834 there were fifty-seven steam-engines employed in cotton spinning-mills, principally at Ghent.

The civil government of the province is administered by a governor, who resides at Ghent. Courts of assize are held at Ghent, Oudenarde, and Termonde. A court of appeal, which has jurisdiction likewise over the adjoining province of West Flanders, is established at Ghent. That city is also the seat of a bishop. The number of schools in which daily instruction is given is 762, of which 158 are in the towns, and 604 in the country districts. The number of scholars frequenting these schools in February, 1833, was 28,750 boys and 23,427 girls, together 52,177. There is also at Ghent a normal school, supported by the government. Besides the daily schools there are many in which instruction is given on Sunday; one of these, established in 1810, receives 1400 boys and 1600 girls, at the annual cost of 340*l*., raised by voluntary contributions.

FLANDERS, WEST, a province of Belgium, bounded on the north and north-east by the North Sea; on the east by Zealand and East Flanders; on the south-east by Hainault; on the south, south-west, and west, by France. It lies between 50° 41′ and 51° 23′ N. lat., and between 2° 33′ and 3° 30′ E. long.

This province is divided into eight departments, viz.:—

Bruges,	containing	1	town and	37	communes.
Ypres,	„	4	„	37	„
Courtray,	„	2	„	44	„
Thielt,	„	1	„	17	„
Roulers,	„	3	„	18	„
Furnes,	„	2	„	25	„
Ostend,	„	1	„	26	„
Dixmude,	„	1	„	25	„
		15	towns and	229	communes.

The principal towns are Bruges, Dixmude, Courtray, Ypres, Iseghem, Menin, Nieuport, Ostend, Poperinghe, Roulers, Thielt, Thourout, Furnes, Warneton, and Wervick. [BRUGES; COURTRAY; YPRES; ISEGHEM; MENIN; OSTEND; POPERINGHE; ROULERS; THIELT; THOUROUT; FURNES.]

Dixmude, a town containing 3189 inhabitants, is situated 16 miles south-west from Bruges, on the right bank of the Ysere. This place was no more than a hamlet until 958, when Baldwin III. caused it to be walled in. It was fortified in 1270, and early in the fifteenth century it enjoyed so many privileges, that great numbers of inhabitants were attracted to it, and it became necessary to enlarge the town. This place was nearly destroyed by fire in 1333, and a similar calamity befel it in 1513, when the town-hall and more than 300 houses were burnt. Dixmude contains a fine parish church, a chapel, a hospital, and two orphan-houses. The principal trade consists in agricultural produce the butter sold there is highly esteemed.

Nieuport, a fortified port, but little frequented except by fishermen, is situated about 5¾ miles north-west from Furnes, and 19 miles south-west from Bruges, with both which places it communicates by means of canals. Nieuport was formerly a hamlet, dependent on the town of Lombarsyde, which was destroyed by a storm in 1115. In the next century the harbour was constructed, and by little and little the place took the form of a town, when it received the name of Novus Portus, or Nieuport. It was surrounded by walls and a ditch in the fourteenth century, and was reduced to ruins by the English in 1383, but rebuilt and fortified two years after by Philip the Bold. It was besieged in 1488 by the French, and was successfully defended, although three times assaulted by the besiegers. The battle of Nieuport, in which the Archduke Albert was defeated by Prince Maurice of Nassau, was fought in 1600 near to this town: it was taken by the French in 1745, 1792, and 1794. The population at the beginning of 1830 consisted of 3028 persons, of whom 1450 were males, and 1578 females. The town at that time contained 528 houses: there is a handsome church, a chapel, a town-hall, two hospitals, an orphan asylum, and an arsenal. The fisheries, and especially the herring fishery, is the most considerable branch of industry carried on.

Warneton stands on the left bank of the Lys, six miles south-south-east from Ypres. This place belonged formerly to a family of the same name with itself, and it was fortified in 1127. At the beginning of 1830 it contained 1153 houses and 5614 inhabitants, of whom 2756 were males, and 2858 females.

Wervick is situated on the left bank of the Lys, by which it is separated from France: it is seven miles south-east from Ypres. The population in 1830 was 5461; viz. 2595 males, and 2866 females. The number of houses was then 939.

The principal rivers of the province are the Lys, the Schelde, and the Ysere. The Lys has its source in the department of the Pas de Calais, in France. It enters West Flanders near Warneton, passes in a north-east direction across the southern part of the province, and enters East Flanders near Deynze. The Schelde forms the south-eastern boundary of the province, separating it from Hainault. The Ysere rises in the department Du Nord, in France; entering the province of West Flanders near to Rousbrugge, it flows north-east to Dixmude, and thence north-west to Nieuport, where it joins the sea. There are several other inconsiderable streams in the province, and the communications between different places are facilitated by means of navigable canals: the most important of these are the canals between Ghent and Bruges, Bruges and Ostend, Dunkirk, Furnes, and Nieuport. The coast of the province is constantly threatened with encroachments from the sea, to prevent which unceasing vigilance and activity are required.

The soil of West Flanders is in general sandy, particularly towards the sea. Brick earth, pipe-clay, and peat moss, are also found in different places. The sand is in some parts covered with a stratum of vegetable mould, but in most other parts the soil is very light and poor. The whole province is a plain, with scarcely a rising ground to break the view. Wheat, oats, flax, rape, trefoil, turnips, carrots, potatoes, and tobacco, are all cultivated. The quality of the tobacco raised in the neighbourhood of Wervick is much esteemed.

There are considerable woods in the department of Bruges, Ypres, and Courtray, the greatest part of which woods belong to the state. The principal trees are the birch, oak, ash, hornbeam, elm, beech, poplar, pine, plane, lime, larch, chestnut, and elder. Willows are frequently seen, but always as pollards.

The horses of the province are large and heavy, fit only for draught; there are about 24,000 in the province. Of horned cattle there are 130,000, which exceed the wants of the inhabitants. Many oxen are accordingly fattened and sold, and a considerable quantity of butter is made for exportation. There are about 40,000 sheep.

The population of West Flanders in 1836 was 615,904. The numbers of births, marriages, and deaths, in the preceding year, were as follows:—

Births—Males—In towns . .	3,003	
„ „ In country .	8,241	
		11,244
Females—In towns .	2,863	
„ In country	7,662	
		10,525
		21,769
Marriages		4,354
Deaths—Males—In towns. .	2,446	
„ „ In country .	5,739	
		8,185
Females—In towns .	2,434	
„ In country	5,737	
		8,171
		16,356

A great proportion of the inhabitants of the province are employed in spinning flax, and weaving and bleaching linen. The manufacture is altogether a domestic one, and is carried on in the farm-houses during winter, and at other times when the operations of the field are necessarily interrupted. Damask and table-linen are made in the towns of Courtray and Bruges. Much lace is made at Bruges, Ypres, Courtray, and Menin, the thread for which is spun at Courtray. More than a sixth part of the population of Bruges are said to be engaged in this manufacture, and there are 200 schools in the town in which the art of lace-making is regularly taught. There are in the province 78 establishments for dyeing; the largest are at Courtray, Bruges, Poperinghe, and Roulers. Woollen cloths, mostly of homely quality, fitted for the use of the working classes, are made at Bruges, Ypres, and some other parts of the province: the wool employed is all of domestic growth. The principal articles imported are groceries, dyeing drugs, metals, timber, wine, and salt; the exports consist chiefly of linens, lace, linseed-oil, rape-oil, geneva, horned cattle, and grain.

Agriculture. Flanders was remarkable for the cultivation of its soil long before any other country north of the Alps or Pyrenees. This was the natural consequence of its commercial prosperity: and although very little change has taken place, and very few improvements have been introduced for more than a century, it still ranks foremost amongst agricultural countries.

It is not the richness of the soil which is the cause of the abundant harvests which the Flemish peasants reap, but their indefatigable industry. The greater part of the land in Flanders is naturally poor; and in extensive districts, which now have the appearance of the greatest richness at harvest time, the original soil was once little better than the blowing sands which are met with in the neighbourhood of the sea. Neither is it a genial climate which brings forward the fruits of the earth in abundance; for the climate is inferior to that of France or the southern parts of Germany; and if there are not so many or so sudden changes of weather as in Great Britain or Ireland, the winters are longer and more severe. The average temperature in summer may be somewhat higher than in the counties which lie in the same parallels in England, and the time of harvest somewhat earlier; but this does not make a difference of more than a week in the maturity of every kind of grain. The winters are more severe, in ordinary years, and the snow lies longer on the ground.

The soil may be divided into two classes. The first consists of the alluvial clay-loams near the coast; the second, of various sands and light loams which are found in the interior. The most fertile is that of the low lands which have been reclaimed from the sea by embankments: it is chiefly composed of a muddy deposit mixed with fragments of marine shells and fine sea sand. These lands are called polders, and their great natural fertility causes them to be cultivated with less art and industry than those lands which are much inferior [*].

The cultivation in the polders has nothing remarkable to entitle it to much notice. Barley seems peculiarly suited to the soil, and very heavy crops of this grain are obtained; especially in those polders which, having been more lately embanked, are not much exhausted. Eight and even ten quarters per acre have been obtained with little or no manure; and the second crop of barley sown in succession has often been the best. Oats are also very productive and of good quality, from ten to twelve quarters per acre. But these heavy crops soon reduce the natural fertility, and after a few years the produce is greatly diminished, and the land requires to be recruited by manure and cleansed by fallows. The usual rotation of crops in the polders consists of,—1. Winter barley after a fallow;—2. Beans;—3. Wheat;—4. Flax;—5. Clover;—6. Potatoes. If the potatoes have a favourable season, and the land can be cleared of weeds, the rotation begins again without a fallow year: but this is seldom the case, and the land is usually fallowed once in six years. The crops here mentioned are occasionally varied according to circumstances and manure, as well as the small quantity of dung made on the farm will permit. The polder farmer seldom thinks of purchasing manure; and even the ashes made by burning weeds are usually sold, to be sent to the poorer sandy soils, where their effects are more perceptible. They keep a sufficient number of horses to till the land, and often put four to a plough, which is the common turn-wrest plough, there called the Walloon plough. If this number is not absolutely necessary, they overlook

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[*] The soil of the polders, when first brought into cultivation, gives by analysis the following proportions in its composition:—

Calcareous sand, mostly broken shells . .	13
Silicious sand	5
Fine clay and vegetable matter . . .	81
Soluble matter and loss	1
	100

If this is compared with the soils as classed by Thaer (Arable Land, vol ii. page 223), it will be found to resemble his richest wheat soils which he places in his first classes.

the saving which might be effected, and pride themselves on the fat and sleek appearance of their team. No more cows are kept than are necessary for the supply of the family; and for want of winter provision for cattle few oxen are stalled. The dung is mixed in heaps, and turned over before it is carried upon the land. There are no tanks to receive the urine, this manure not being thought so useful in heavy soils as in the light. In short, the agriculture of the polders is far inferior to that of the interior, and not much advanced before that of the other nations in Europe. It is much inferior to that of Kent and Essex on similar soils. When the polders have been too much exhausted they are frequently laid down to grass; and in a few years a very rich pasture is produced. If, instead of sowing only a few refuse hay-seeds from the lofts, proper grass seeds were sown, after the land has been cleaned by a fallow, the pasture would much sooner come to perfection, and several years would be saved; but the improved modes of converting arable land into pasture, so advantageously practised in the north of England and in Scotland, are almost entirely unknown in Flanders. The extent of the farms in the polders is from 100 to 250 acres. The farmers in general are in good circumstances and the buildings substantial. There formerly existed a curious mode of letting farms, which still remains in some few places. The farmer hired the buildings and a portion of the land on his own account, and the remainder he undertook to cultivate on a joint account with the owner: that is, he did all the work, and the produce was sold on the ground: half of it went to the farmer and half to the landlord. No scheme could be more ingeniously devised to bring down the fertility of the soil; for it is evident that all the manure would go to that part of which the farmer had the whole produce. Accordingly this arrangement could only last for a short time, and on the newly embanked lands.

The air of the polders is unhealthy, and all those who are not inured to the climate are subject to fevers and agues. On this account land lets at a lower rate, and the wages of labour are higher in the polders than in more healthy districts.

In the interior of East and West Flanders the soil varies considerably; but the principal part is of a sandy nature. The sand, and a heavier loam which scarcely deserves the name of clay, are found much intermixed, which is owing to an alternation of layers of sand and loam, which are found by digging to a considerable depth. These layers are not of great thickness; and the accidental circumstance of the washing away of the sand in some places, and the depositions from the rivers in others, easily accounts for this variety. Some of the elevations, which are no where considerable, consist of a very poor sand, and suggest the idea of their having once been the sands of the sea blown into hills, as is observable on the coast. These hills, if they may be so called, are naturally so barren, that they were, not very long since, covered with heath or at best planted with fir-trees. But they have gradually been cultivated and improved, and only a few remain in their original state of heath or wood. These elevations of the surface have determined the course of the principal rivers, and the hollow or basin in which each of these flows is marked with some peculiarity of soil. Thus the basin in which the Schelde flows from the borders of France to Ghent consists chiefly of a good loam, in which there is a considerable portion of clay. To the east of this is the basin of the Dender from Grammont to Termonde, which consists of the stiffest soil in Flanders; to the west, that of the Lys, which is a sandy loam. That of the Langelede, which is intersected by the canal from Ghent to Bruges and Ostend, is mostly a poor light sand; and lastly, in that of the Durme, which is a branch of the Schelde, and between it and the main river, a very low flat country, the soil is a light sandy loam enriched by the deposition of mud from antient inundation of the rivers, which are now confined within banks or dykes. In each of these districts almost every variety of soil occurs; but the general character is distinct, and the cultivation of the land is varied accordingly.

The poorer sands have been brought into cultivation chiefly by the persevering industry of small proprietors and occupiers. Without an abundance of manure nothing can be effected there, and consequently every attention is paid to the procuring and collecting of it. The first process is always to trench the ground deep with the spade, and level it by means of the mollebaert. an instrument peculiarly Flemish, of which a drawing and description are given in vol. iii., p. 9. [BARREN LAND.] The next step is to procure liquid manure, which consists of the urine of cows and horses, the drainings from dunghills, and the emptyings of privies. The numerous towns and villages which are scattered over Flanders, and the canals which intersect the country in all directions, facilitate the collecting and transporting of manure. A regular trade is carried on in everything which can enrich the land; nothing which can be of any use for this purpose is lost or wasted. In every farm there is a large vaulted cistern, in which the liquid manure is collected, and where it is occasionally stirred to excite fermentation, and make it more efficacious when it is carried upon the land.

Experience has taught that manure put on light land in a liquid state is much more immediately effective than when the solid dung is ploughed in, but that its effects are also much less durable. This has led to the practice of frequently renewing the manure, and pouring the liquid over the growing crops as a top-dressing. Considerable care is required to give the proper quantity, and to regulate the strength according to circumstances; for too great a dose might destroy the crop, or produce great luxuriance on the leaf at the expense of the fruit or seed. The urine and other hot substances impregnated with saline particles are therefore diluted, if the weather is dry, before they are used, or they are poured over the soil some time before the seed is sown, that they may sink in and be more diffused.

At a distance from large towns it would be impossible to obtain the requisite quantity of manure, and accordingly it is made on the farm. The cattle are the principal source of the supply; but every expedient is resorted to in order to increase the quantity and improve the quality. Every kind of vegetable or animal matter is carefully collected, and made to undergo the putrefactive fermentation by being mixed with others already partially decomposed. Nothing excites heat and putrefaction more than urine when it is poured over substances subject to decomposition. In every farm-yard there is a cavity or pit into which the objects to be acted upon can be thrown, and into which the urine or drainings of the dung-hill can be made to flow: by frequently moving and stirring the mass, the decomposition goes on rapidly, heat is evolved, and the fibres and dried juices of vegetables are decomposed, and become soluble in water, in which state their effect on vegetation is greatest. The place in which this is going on is called in French a *croupissoir*, and in Flemish a *smoor hoop*. It is generally thought most advantageous that the manure should be ploughed into land in an active state of fermentation, and in order to secure this, it is in some places laid on the land in heaps, and each heap is moistened with urine. This soon renews the fermentation; and as soon as the heap begins to heat, it is spread out, and the manure is immediately ploughed under.

When the supply from the yard and from the vaulted cistern, together with what can be purchased, is not sufficient, recourse is had to the refuse cakes of colza from which the oil has been pressed out. These are dissolved in urine or in water, and put into the cistern to decompose. When it is in a proper state it is used chiefly on the land on which flax is intended to be sown, as it is a very rich manure, and perfectly free from the seeds of noxious weeds.

In the tillage of the land the Flemings use few and very simple instruments. The common plough for light lands is a small light foot-plough, so called from a piece of wood inserted in the beam, which is somewhat in the shape of a foot, or rather of the wooden shoe in common use in Flanders. It has no wheels, and is drawn by one or two horses. It is the parent of the Rotherham plough, from which most of the improved ploughs for light soils are derived. It is the most perfect plough for light sands, acting like a shovel at the fore part of the turn-furrow, which is concave, and completely turns over the soil. In the stiffer soils the turnwrest plough is sometimes used, made much smaller and lighter than the heavy Walloon plough. It has two small wheels attached to that part of the beam where a single wheel is sometimes put by means of a small iron bar, which is connected with the middle of the axle by means of a pin, so that whatever be the inclination of the axle caused by unevenness of ground, or by one of the wheels running in the furrow, this bar always remains upright, and supports the end of the beam. This plough is much steadier than he foot-plough, and better adapted to break up very stiff ground.

An instrument peculiarly Flemish is the *traîneau*. This is a wooden frame of a triangular shape, covered with boards, which is drawn over the ground to smooth the surface and press in the seed. The harrows in common use are also triangular, and made entirely of wood; the pins are driven obliquely and point forwards, so as readily to enter into the ground when the harrows are drawn by the angle. The blunt end of the pins projects about an inch or more on the side from which they are driven in: thus, by reversing the instrument, a slighter degree of harrowing is given, which has an effect intermediate between that of the harrows and the traîneau.

The mollebaert, another Flemish instrument for levelling ground, has been already noticed. The Hainault scythe and hook are generally used for reaping corn. The instrument is held in the right hand, and the hook in the left: by a swing of the arm the corn is cut close to the ground towards that which is standing; the hook collects it and rolls it up into a sheaf, which is taken up by means of the leg and the scythe, and laid down to be tied. It is better than a fagging-hook, and does the work more easily. These are the only instruments in common use which differ at all from those of other countries. None of the more complicated modern inventions have been introduced, nor would they be readily adopted, however ingenious or useful they might be; for an adherence to old established methods, and a repugnance to what is new are no where so firmly rooted as amongst the Flemish peasantry.

The most important instrument in Flemish agriculture is the spade, which is used to a much greater extent than in England; and in some instances is the only instrument of tillage. The trenching spade is made light and long, and is well adapted to the loose sandy soils. The first step to improvement is generally a complete and deep trenching; and in the Waes district a sixth part of the whole farm is trenched every year; and where this is not done, the intervals between the stitches in which the land has been ploughed are dug out with the spade a foot or sixteen inches deep, and the earth thrown evenly over the beds in which the seed has been sown. By shifting these intervals a foot every year, the whole of the land which lies in stitches six feet wide is dug, and the upper and under soil mixed regularly. This process is extremely useful in producing an even crop, especially of flax, the roots of which strike deep.

The rotations adopted in light sands and loams are various. In the poorest and least improved, buckwheat, rye, and oats are the chief crops, with potatoes and clover, which require more manure. Every crop is manured except buckwheat, which grows well in the poorest soils, and becomes too luxuriant to give much seed in rich and highly manured lands. Bones have not been introduced except by way of experiment; but when their value on light soils shall be more generally known, especially in raising turnips, there is no doubt but they will be extensively used. This may lead to the folding of sheep to eat them on the land, and thus introduce an important improvement into Flemish husbandry.

On the better kinds of light soils, which are not well adapted for wheat, the usual course is 1st, rye, with turnips in the same year after the rye is cut; 2nd, oats; 3rd, buckwheat; 4th, potatoes or carrots; 5th, rye and turnips; 6th, flax; 7th, clover.

When the sand becomes a good light loam, wheat is introduced in the rotation, after potatoes or after clover: the latter is thought the best practice, as the roots of the clover both enrich and consolidate the soil.

Rye recurs more frequently than would be thought prudent if it were not for the turnips sown after it, which seem to correct the effect produced on the soil by the seeding of the rye; so that rye and turnips are sometimes followed by rye, in which clover is sown in the next spring. Thus rye and turnips may alternate in light lands, as beans and wheat sometimes do in rich heavy clays. The turnips are never eaten on the land where they grow, but are always drawn and housed in the end of September, the green tops being cut off and given to the cows and pigs, and the roots stored in dry cellars. The land is then immediately ploughed after some dung has been put on; and if oats are the next crop which are sown in spring, it remains so all winter.

When the land is of a better quality, although still in the class of light loams, wheat recurs more frequently, and the rotation is varied as follows:—rye and turnips, potatoes, wheat, rye and turnips, oats, flax, clover, wheat. If the soil is fit for barley, this grain is substituted for rye. Carrots are frequently sown in the barley, and also in the flax. They strike deep into the rich light earth, but come to no size while the principal crop is on the ground. As soon as this is taken off, the land is harrowed and carefully weeded by hand; liquid manure, diluted if the weather is dry and warm, is spread over the surface, and in a short time the carrots throw out their green tops, and swell in the ground: by the end of September a considerable crop of them may be dug up. The best variety for this purpose is a large white carrot, which rises some inches out of the ground; it has been lately brought into notice in England, and will no doubt soon be more generally cultivated. [CARROT.] There is another variety which is yellow, and also attains a good size; but it is inferior to the first in good ground. The quantity of roots raised for the winter provision of the cattle is considerable, and forms a very important part of the husbandry of Flanders, where all the cattle are constantly kept in the stables in winter, and, except where there are natural pastures, in the summer also.

Flax is every where a most important crop, for it much exceeds all other crops in value. Where it can be raised of a tolerable quality, every other crop has a reference to this; and the rotation is arranged accordingly. There is no country where more attention is paid to flax than in Flanders, especially in the neighbourhood of Courtray. The land is brought into the highest state of richness and cleanness before flax is sown in it; and the most abundant manuring with rape cake and urine is thought essential to raise this crop in perfection. [FLAX.]

On the heavier loams colza, or rape [COLE], is an important crop for the seed from which the oil is expressed. It is sown in a bed in July or August, and planted out in rows two feet apart in October. The seed ripens early in the next summer, and a good crop of turnips may be had after it. The summers being in general warmer and drier than in England, the Flemish farmer is enabled to thrash out his rapeseed on a cloth in the field soon after the stems have been cut and laid gently on the ground to dry the pods. Any delay in this operation would cause a great loss: with every care and attention, much seed is always scattered in harvesting; because the pods do not ripen equally, and some will have shed their seeds before others are sufficiently ripe to be gathered.

Potatoes were introduced into Flanders from England about the year 1740, and from being at first only cultivated as a rarity, soon became an important part of the food of men and beasts. There is nothing peculiar in the Flemish mode of cultivating this useful root. The sets are planted with a blunt dibble, as is the case in gardens in England: sometimes they are laid in the furrows and covered with the plough: they are always earthed up round the stems, sometimes by a plough with a mould-board on each side, but generally by hand with a broad hoe. The manure usually put on the land in which potatoes are to be set is double the quantity used for a corn crop; and a good soaking of the soil with urine is thought to invigorate the growth of the plant greatly. The produce however is not much more abundant than it is usually in those parts of England where potatoes are raised in considerable quantities in the fields—about 300 bushels on an acre. There is a small yellow potato in Flanders, which is excellent when boiled, and which grows well in a stiff loam, but it is not so productive as the large cattle potato.

The cultivation of the sugar beet has been resumed lately, after it had been entirely abandoned. There are now several considerable manufactures of beet-root sugar, but it is not a favourite culture with the farmers, not even for their cattle, as it is too long on the ground. They prefer turnips and carrots, which can be raised on the same land which has borne another valuable crop the same year.

In the heavier loams, which are chiefly to be met with in West Flanders and about Alost, the following rotation is adopted:—flax, clover, barley or oats, beans, wheat, rye and turnips, potatoes, colza and carrots, flax; or flax, colza, wheat, rye and turnips, oats, clover, wheat, rye.

Beans are not a favourite crop, and are not carefully cultivated. They are sometimes sown very thick, mixed with pease and tares, to be cut up in a green state for the cows and pigs; and in this way they produce a great quantity of green food, and clean the ground by excluding the air and smothering the weeds. On a farm of 36 bonniers, in a very good loamy soil near Courtray, the land was divided into 6 equal parts of 6 bonniers each, and the crops were distributed as follows:—

<table>
<tr><td>Clover.</td><td rowspan="3">Wheat.</td><td>Wheat.</td></tr>
<tr><td>Carrots.</td><td rowspan="2">Beans.</td></tr>
<tr><td>Potatoes.</td></tr>
<tr><td rowspan="2">Rye
&
Turnips.</td><td>Flax.</td><td rowspan="2">Oats.</td></tr>
<tr><td>Colza.</td></tr>
</table>

The manure used for these crops was partly dung from the yard and cows' urine, but chiefly the sweepings of the streets and the emptyings of privies from Courtray.

In a very rich loam, not far from Ypres, the following crops were noticed in regular rotation:—1, turnips with chicory and carrots; 2, oats; 3, clover; 4, wheat; 5, flax; 6, wheat; 7, beans; 8, wheat; 9, potatoes; 10, wheat; 11, oats. All these crops are of an exhausting nature, and it requires a very rich soil, aided by abundant manuring, to bear this rotation for any continuance; but each of these crops had a good portion of manure.

Great attention is paid to prepare the land so as to secure a good crop from a small quantity of seed. The seed usually sown in Flanders is about one-third less than in England, even when the seed is drilled, which it never is in Flanders. The ground is rendered mellow and rich by the tillage and the liquid manure; and the seed, which has been carefully selected, is covered by earth spread over it with the spade: it is afterwards rolled or trod in with the feet. Every grain vegetates, and should there be any slowness in the growth, the urine-tank supplies an excellent stimulant. It is in the springing of the blade, after the farina in the seed is exhausted, that the liquid manure seems to produce the greatest effect. When the stem is shot up, it may perhaps too much encourage the increase of green leaves, and thereby hinder the formation of the flower and the seed: experiments made with liquid manure lead to this conclusion.

There are some very rich pastures in Flanders about Furnes and Dixmude, where excellent butter is made. A great many beasts are fed in the summer, and a moderately sized ox turned out in good condition in April or May will fatten on an acre of land by August or September. The best cows and oxen are of the Dutch breed; those which are bred in Flanders are inferior. The butter about Dixmude is churned from the cream only, although the most common practice is to churn the whole milk after it has stood some time and begins to be acid. It is always set in shallow pans immediately after milking, and left so twelve hours. The cream is then skimmed off, or the whole milk is poured into deep vessels till it is fit to be churned. The churning is performed in a barrel-churn or a plunge-churn: in either case, in the larger dairies, it is moved by a horse, which turns a wheel connected with the churn.

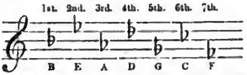
The breed of horses in Flanders is large and heavy, but deficient in activity and clumsy in form. The mares were once in repute for heavy carriages, but at present an equipage drawn by Flanders mares would be an object of wonder, if not of ridicule. Many horses have been imported into England from Flanders as cart horses; but they were preferred chiefly on account of the price at which they could be obtained, and of the apparent bulk of them. For active and enduring qualities they are much inferior to our best breeds of English cart horses.

The Flemish sheep are coarse in the wool, and much inferior in the carcase to the Leicester or South Down. Some good sheep have been imported which may much improve the native breeds. The pigs are as badly shaped as can well be imagined: long in the neck and head, and high on their legs. They are badly fed when young, and fatten slowly, although in time they acquire considerable weight. A better breed has been introduced which will soon supersede the old.

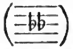
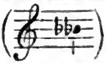
The farm buildings are very good and convenient in general. The farms are small, compared with those in other countries; 120 acres is considered a very considerable occupation. In the Waes country where the spade is extensively used in the cultivation of the land, the farms are very small, fifty acres being amongst the largest, and the average is not above fifteen. A farm of this description requires only one horse to cart the manure and plough the land; four or five cows are the usual complement, with two or three pigs. The cows are fed on clover in summer, and on barley or oats cut green; in winter on potatoes, beet-root, turnips, and carrots, which are chopped up together and boiled in a copper. This is given milk-warm three times a day, and is called brassin; when grains can be procured from the brewers they are added to the mess. The cows never move from their stalls: after having had three or four calves a cow is generally fattened and sold off; and a young heifer, of which a couple are reared every year, supplies her place.

FLANNEL. [Woollen Manufactures.]

FLAT, in music, a character originally represented by a small *b*, though time has somewhat altered its outline, and the following is now its form—♭. The Flat is used to lower, or depress, by the degree of a semitone, any note in the natural scale. In antient music, before the character of the Natural was introduced, the Flat was employed to reduce any note which had been made sharp, to its natural state. Where Flats are placed at the clef, they are always taken in the following order:—



When a Flat, not appearing at the clef, occurs in any other part of the composition, it only affects the bar in which it is placed, and is called an *Accidental Flat*.

The Double Flat () is frequently employed in very chromatic music. It lowers a note two semitones below its natural state. Thus, B *double-flat* () is, in fact, A *natural*, &c. This character is used chiefly in Enharmonic modulation [Enharmonic], in which it is practically convenient, if not absolutely necessary, occasionally to have an additional name for each note in the diatonic and chromatic scales.

FLAX (*Linum perenne*) is an annual plant, cultivated from time immemorial for its textile fibres, which are spun into thread and woven into linen cloth. It has a green stem from a foot and a half to two feet high, and a blue flower, which is succeeded by a capsule containing ten flat oblong seeds of a brown colour, from which an oil is expressed, which is extensively used in manufactures and in painting. There are several varieties of flax cultivated; the best seed comes from Riga and from Holland. As the different varieties arrive at maturity at different times, and the stem rises to different heights, it is very essential that the seed be not mixed, as this would occasion great inconvenience and loss in the pulling of the flax. There is a very fine long variety which is cultivated in the neighbourhood of Courtray, in Flanders; it requires a very good soil to grow in, and the stem is so long and slender that if it were not supported the least wind would break it and lay it flat, in which case the quality of the flax would be much impaired and the quantity reduced. To prevent this, short stakes are driven into the ground in a line at eight or ten feet from each other, and long slender rods are tied to them with oziers about a foot or eighteen inches from the ground, forming a slight railing to support the flax: a number of these are placed in the same manner at a short distance from each other in parallel lines all over the field, and the flax is thus prevented from being beat down. A better method, which is not commonly adopted, is to have stakes in regular rows, and thin ropes tied to them instead of rods: by having these lengthways and others across them at right angles, a kind of large net is spread over the whole field, and none of the flax can possibly be laid flat. By using cheap rope or strong tar twine from old cables, the expense is not very great, and much less room is taken up than by the rods. When the flax is pulled, the stakes are taken up, and removed to a dry place till they are wanted again.

The most common variety of flax is of a moderate length with a stronger stem: if it is not sown very thick it will throw out branches at top and produce much seed: it is therefore a matter of calculation whether it will be most profitable to have finer flax with less seed, or an inferior quality with an abundance of seed.

There is a small variety which does not rise above a foot, grows fast, and ripens its seed sooner. When linseed is the principal object, this variety is preferred; but the flax is shorter and also coarser.

Another variety of flax has a perennial root, and shoots out stems to a considerable height. It came originally from Siberia and was much recommended at one time, but its cultivation did not spread. If it were sown in wide rows and kept free from weeds by hoeing, it might perhaps be profitably cultivated for the seed; and if the flax is inferior in quality, it might still be of some value for coarse manufactures; it requires however to be renewed every three or four years and sown in fresh ground.

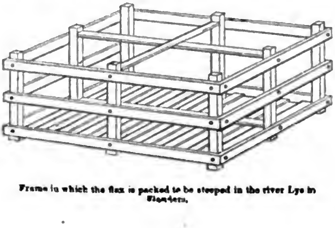
The soil best adapted to the growth of flax is a deep rich loam in which there is much humus, or vegetable mould. It should be mellow and loose to a considerable depth, with a sound bottom, neither too dry nor too moist: either extreme infallibly destroys the flax; it is therefore not suited either to hot gravelly soils or cold wet clays, but any other soil may be so tilled and prepared as to produce good flax. It thrives well in the rich alluvial land of Zealand and the polders, but it is also raised with great success in the light sands of Flanders, but much more careful tillage and manuring are required. The land on which flax is sown must be very free from weeds, the weeding of this crop being a very important part of the expense of cultivation. These circumstances suggest the best mode of preparing the land. A long fallow, such as is sometimes given to the land in Essex, including two winters and a summer, may be a good preparation on the heavier loams, which should be trench-ploughed and worked deep; the manure should be dung fully rotten, or a compost of earth and dung; it should be put on the land in autumn, and well incorporated before the seed is sown. If the land is sufficiently clean, a crop of potatoes well manured may be substituted with advantage for the fallow; but at least double the usual quantity of dung should be given to this crop that enough may remain in the ground for the flax. Lime may be used if the soil contains a great portion of clay; but in the lighter loams there is some doubt of its advantage for flax. At all events it should not be used immediately before the flax is sown, but for some previous crop. Peat-ashes are excellent; they improve the soil and keep off insects, which are apt to injure the roots of the flax. For want of peat-ashes, those made by the burning of weeds and earth in a smothered fire are a good substitute. But the most effective manure is the sweepings of the streets in towns mixed with the emptying of privies and the cleaning out of the butchers' stalls and shambles. On light soils much manure is required; and where night soil cannot be obtained in sufficient quantities, rape cakes, from which the oil has been expressed, dissolved in cows' urine, form the best manure. In many parts of Flanders 500 rape cakes are used for every acre of flax, besides the usual quantity of Dutch ashes and of liquid manure, which is the drainings of dunghills and the urine of cattle collected in a cistern and allowed to become putrid.

In southern climates flax is sown before winter, because too great heat would destroy it. It is then pulled before the heat of summer. In northern climates the frost, and especially the alternations of frost and thaw in the early part of spring, would cause the flax to perish; it is consequently sown as early in spring as may be, so as to avoid the effect of hard frost. This is in March or April in Great Britain and Ireland, and in Holland and Flanders. In no country is the ground better prepared for the growth of flax than in Flanders; and it may therefore be interesting to follow the whole process of Flemish cultivation for several crops preparatory to that of flax, which is the most important produce in that country, and that which, when well managed, gives the greatest profit to the farmer. The best flax grows near Courtray. The soil is a good deep loam, rather light than heavy. It is not naturally so rich as the soil of the polders in Flanders and in Zealand, but the tillage and cultivation are far more perfect, and the produce, if not more abundant, is of a finer quality. Every preceding crop has a reference to the flax, and is so cultivated as to improve the texture of the soil, which is abundantly manured in order to leave a considerable surplus in the ground. If the land has not been trenched all over with the spade to the depth of eighteen or twenty inches it has been equally well stirred by the narrow open drains which are dug out twelve or fifteen inches deep every year between the stitches in which it is laid by the plough. These drains, or water-furrows, are a foot wide, and from a foot to eighteen inches deep. The earth taken out of them is spread evenly over the land after the corn is sown. When the ground is ploughed again, care is taken that the place of these water-furrows shall be shifted a foot on each side. Thus in six years the whole soil is deepened and thoroughly mixed with whatever manure has been put on. This produces the same effect as trenching, and even more perfectly. The whole of the land in which the best flax grows has been so treated for several generations, and may be looked upon as a species of compost eighteen inches deep. Potatoes or colza are usually planted with a double portion of manure, after which wheat is sown, slightly manured; then rye with turnips sown the same year after the rye. These are taken up in September or October, and stored for winter use. The land has been well weeded while the turnips were growing, and all the manure is decomposed and mixed with the soil. It is ploughed in stitches before winter, some manure having been previously spread over it if necessary; and it is left exposed to the mellowing effects of frost and snow. As soon as the winter is over and the snow is melted the final preparation goes on. Deep ploughing and harrowing further divide and pulverize it: the surface is laid as level and smooth as possible; and if there is no fear of too much wet, which in this light loam soon disappears, the whole is laid flat and level as a bowling-green, or else divided into beds with water-furrows between them. On this the liquid manure is poured out, and the Dutch ashes spread if any are used, or the rape-cakes, as mentioned before. The harrows are drawn over the land, and it is left so a few days that the manure may sink in. It is then again harrowed and the linseed is sown broadcast by hand, very thick and even, about one hundred weight and a half to the acre. A bush-harrow or a hurdle is drawn over, merely to cover the seed, which would not vegetate if it were buried half an inch deep. According to the state of the land it is rolled or not, or the seed is trodden in by men, as is done with fine seeds in gardens. This is only in the lightest soils. Most commonly the traîneau is drawn over the land. This is a wooden frame with boards nailed closely over it, which is drawn flat over the ground to level and gently press it. In a short time the plants of flax come up thick and evenly, and with them also some weeds. As soon as the flax is a few inches high the weeds are carefully taken out by women and children, who do this work on their hands and knees, both to see the weeds better and not to hurt the flax with their feet. They tie coarse pieces of cloth round their knees, and creep on with their face to the wind, if possible. This is done that the tender flax, which has been bent down by creeping over it, may be assisted by the wind in rising. This shows what minute circumstances are attended to by this industrious people. The weeding is repeated till the flax is too high to allow of it.

The seed which is used is generally obtained from Riga, it being found that the flax raised from home-grown seed is inferior after the first year. But many intelligent men maintain that if a piece of ground were sown thin with linseed so that the flax could rise with a strong stem, and branch out, and if the seed were allowed to ripen, the Flemish seed would be as good as that from Riga; but it still remains to be proved whether it would be cheaper to raise it or to import it.

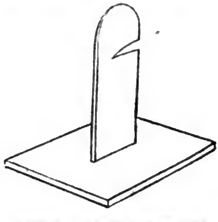
When the flax begins to get yellow at the bottom of the stem it is time to pull it, if very fine flax is desired, such as is made into thread for lace or fine cambric; but then the seed will be of little or no value. It is therefore generally left standing until the capsules which contain the seed are fully grown and the seed formed. Every flax-grower judges for himself what is most profitable on the whole. The pulling then begins, which is done carefully by small handsful at a time. These are laid upon the ground to dry, two and two obliquely across each other. Fine weather is essential to this part of the operation. Soon after this they are collected in larger bundles and placed with the root end on the ground, the bundles being slightly tied near the seed end; the other end is spread out that the air may have access, and the rain may not damage the flax. When sufficiently dry they are tied more firmly in the middle, and stacked in long narrow stacks on the ground. These stacks are built as wide as the bundles are long, and about eight or nine feet high. The length depends on the crop; they are seldom made above twenty or thirty feet long. If the field is extensive several of these stacks are formed at regular distances; they are carefully thatched at top; and the ends, which are quite perpendicular, are kept up by means of two strong poles driven perpendicularly into the ground. These stacks look from a distance like short mud walls, such as are seen in Devonshire. This is the method adopted by those who defer the steeping till another season. Some carry the flax as soon as it is dry under a shed and take off the capsules with the seed by *rippling*, which is drawing the flax through an iron comb fixed in a block of wood: the capsules which are too large to pass between the teeth of the comb are thus broken off and fall into a basket or on a cloth below. Sometimes, if the capsules are brittle, the seed is beaten out by means of a flat wooden bat like a small cricket-bat. The bundles are held by the root end, and the other end is laid on a board and turned round with the left hand, while the right hand with the bat breaks the capsules, and the linseed falls on a cloth below. The flax is then immediately steeped; but the most experienced flax-steepers defer this operation till the next season. In this case it is put in barns, and the seed is beat out at leisure in winter. When flax is housed, care must be taken that it be thoroughly dry; and if the seed is left on, which is an advantage to it, mice must be guarded against, for they are very fond of linseed, and would soon take away a good share of the profits by their depredations.

Steeping the flax is a very important process, which requires experience and skill to do it properly. The quality and colour of the flax depend much on the mode of steeping; and the strength of the fibre may be injured by an injudicious mode of performing this operation. The object of steeping is to separate the bark from the woody part of the stem, by dissolving a glutinous matter which causes it to adhere, and also destroying some minute vessels which are interwoven with the longitudinal fibres, and keep them together in a kind of web. A certain fermentation or incipient putrefaction is excited by the steeping, which must be carefully watched, and stopped at the right time. The usual mode of steeping is to place the bundles of flax horizontally in shallow pools or ditches of stagnant water, keeping them under water by means of poles or boards with stones or weights laid upon them. Water nearly putrid was supposed the most efficacious, and the mud was often laid over the flax to accelerate the decomposition: but this has been found to stain the flax, so that it was very difficult to bleach it or the linen made from it afterwards. The method adopted by the steepers of Courtray, where steeping flax is a distinct trade, is different. The bundles of flax are placed alternately with the seed end of the one to the root end of the other, the latter projecting a few inches: as many of these are tied together near both ends as form a thick bundle about a foot in diameter. A frame made of oak-rails nailed to strong upright pieces in the form of a box 10 feet square and 4 deep, is filled with these bundles set upright and closely packed. The whole is then immersed in the river, boards loaded with stones being placed upon the flax till the whole is sunk a little under the surface of the water. The bottom does not reach the ground, so that the water flows over and under it. There are posts driven in the river to keep the box in its place, and each steeper has a certain portion of the bank which is a valuable property. The flax takes somewhat longer time in steeping in this manner than it does in stagnant and putrid water, and it is asserted by those who adhere to the old method that the flax loses more weight; but the colour is so much finer that flax is sent to be steeped in the Lys from every part of Flanders. When it is supposed that the flax is nearly steeped sufficiently, which depends on the temperature of the air, the flax being sooner steeped in warm weather than in cold, it is examined carefully every day, and towards the latter part of the time several times in the day, in order to ascertain whether the fibres readily separate from the wood the whole length of the stem. As soon as this is the case the flax is taken out of the water: even a few hours more or less steeping than is necessary will make a difference in the value of the flax. If it is not steeped enough, it will not be easily scutched, and the wood will adhere to it. If it has been too long in the water, its strength is diminished, and more of it breaks into tow. The bundles are now untied, and the flax is spread evenly in rows slightly overlapping each other on a piece of clean smooth grass which has been mown or fed off close. Fine weather is essential to this part of the process, as rain would now much injure the flax. It is occasionally turned over, which is done dexterously by pushing a long slender rod under the rows and taking up the flax near the end which overlaps the next row and turning it quite over. Thus, when it is all turned it overlaps as before, but in the contrary direction. It remains spread out upon the grass for a fortnight, more or less according to the season, till the woody part becomes brittle and some of the finest fibres separate from it of their own accord. It is then taken up, and as soon as it is quite dry it is tied up again in bundles, and carried into the barn to be broken and heckled at leisure during the winter.



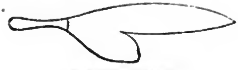
Frame in which the flax is packed to be steeped in the river Lys in Flanders.

In the domestic manufactures the flax is broken or scutched at home, when the weather prevents out-door work. The common brake consists of four wooden swords fixed in a frame, and another frame with three swords which play in the interstices of the first by means of a joint at one end. The flax is taken in the left hand and placed between the two frames, and the upper frame is pushed down briskly upon it. It breaks the flax in four places, and by moving the left hand and rapidly repeating the strokes with the right the whole handful is soon broken. It is then scutched by means of a board set upright in a block of wood so as to stand steady, in which is a horizontal slit about three feet from the ground, the edge of which is thin. The



Upright board to clear the flax of the wood.

broken flax held in handsful in the left hand is inserted in this slit, so as to project to the right, and a fla wooden sword of a peculiar shape is held in the righ



Flat sword or scutcher.

hand; with this the flax is repeatedly struck close to the upright board, while the part which lies in the slit is continually changed by a motion of the left hand. This operation beats off all the pieces of the wood which still adhere to the fibre, without breaking it, and after a short time the flax is cleared of it and fit to be heckled. But the operations of breaking and scutching are tedious and laborious when thus executed by hand. A mill is now used (where large quantities of flax are required for manufactures), having three fluted cylinders, one of which is made to revolve by horse or water power and carries the other two round. The flax plants are passed between these cylinders while thus revolving, and the stalk, or *boon*, as it is technically called, is by this means completely broken without injuring the fibres. The scutching is accomplished in the same mill by means of four arms projecting from a horizontal axle, arranged so as to strike the boon in a slanting direction until tho bark and other useless parts of the plant are beaten away. In the last process by which flax is prepared for the spinner, the *heckling*, the instrument employed, called the heckle, is a square piece of wood studded with rows of iron teeth about four inches long and disposed in a quincunx order. The fineness of the heckle is chosen with reference to the quality of the flax, and heckles differing in this respect from each other are used at different stages of the dressing, the coarsest first, and the finest to give the last degree of smoothness and finish to the flax. The operation of heckling is performed by the workman grasping a handful of flax by the middle and drawing first one side or end and then the other through the teeth of the heckle until every particle of extraneous matter is removed, and the whole of the filaments are arranged in distinct, even, and parallel fibres.

History and Trade.—Flax is found in every quarter of the globe, and has been cultivated for its fibrous stalk from the very earliest period of which we have any record. The art of preparing these fibres and weaving them into linen cloth had reached a high degree of perfection among the Egyptians so early as the time of Joseph. For some time it appears that the preparation of flaxen thread was confined to Egypt. Solomon obtained this material from that country, and linen cloths were made with it by tho Jews. Herodotus tells us that linen, in his time, was obtained by the Greeks from Egypt. In every country where flax has been cultivated, with the exception of India, it has been applied to this manufacture; but among the Hindus it is grown solely for the sake of the oil expressed from its seed, the stalk, in which its chief value resides, being thrown aside by them as useless.

In the time of Pliny flax was cultivated in several parts of Europe, but it is supposed not to have been produced in England until after the Norman invasion, because it is not found among the list of *titheable* articles at that period. In 1175 it was enumerated among titheable productions. England has never grown a sufficient quantity of flax for its own use, although its cultivation was made compulsory to a certain extent by a statute passed in 1531, which required that for every sixty acres of land fit for tillage, one rood, at least, should be sown with flax or hemp-seed. It has since been attempted to give encouragement to the cultivation by public rewards or bounties. A duty was imposed upon foreign linen in 1767, and its produce was appropriated by the legislature for the encouragement of English cultivators; but so little inclined were our farmers to apply the land to this purpose that fifteen years passed without any claim having been made for the premium. The plant will grow in almost every soil, but it is a very exhausting crop, and it is therefore not surprising that the farmers should be disinclined to cultivate it while they were imperfectly versed in the art of restoring its productive quality to the land. A considerable quantity of land is now sown with flax-seed every year in Somersetshire, Lancashire, and Yorkshire: it is largely grown in Scotland, and still more so in Ireland, which island produces nearly all the flax that is used in its extensive linen manufacture. The influence of the soil shows itself more in the quality of the fibre than in the quantity produced. Where the plants grow very thickly together the stalks are very slender, and as each stalk comprises the same number of fibres, these must, under such circumstances, be finer than where the stalk is thicker.

The quantity of flax imported into and exported from the United Kingdom, and the quantity taken for the purposes of manufacture in each year, from 1820 to 1836, were as follow:—

	Imported. Cwts.	Exported. Cwts.	Taken for home use. Cwts
1820	532,389	17,866	376,170
1821	498,554	8,773	491,582
1822	610,106	7,282	607,540
1823	553,937	9,719	553,599
1824	742,531	11,677	739,651
1825	1,055,233	7,571	1,018,837
1826	688,622	8,956	697,488
1827	907,079	6,331	896,889
1828	876,189	6,899	882,289
1829	922,040	8,580	909,709
1830	944,096	3,633	955,112
1831	936,411	10,548	918,853
1832	982,516	15,504	984,869
1833	1,129,633	18,202	1,112,190
1834	811,722	19,569	794,272
1835	740,814	12,255	728,143
1836	1,529,116	16,789	1,511,428

Up to the year 1825, the duty charged upon foreign grown flax was, when dressed, 10*l*. 14*s*. 6*d*., and when undressed, 5*d*. per cwt. In the year just named both kinds wero subjected to the same rate of duty, which was then fixed at 4*d*. per cwt.; and this rate was further reduced to 3*d*. per cwt. in 1826, to 2*d*. in 1827, and to 1*d*. per cwt. in 1828, at which nominal rate it has since been continued.

More than two-thirds of the whole quantity of flax imported come from Russia; the remainder is supplied by Prussia, Holland, and Belgium, with the exception of a small quantity brought from France.

Within the last four years, a part of the flax imported has been again exported in the form of linen yarn; and this, according to present appearances, is likely to become a considerable branch of our export trade. The quantity and declared value so exported in each year from 1832 to 1836 have been as follow:—

	Pounds.	£.
1832	110,188	8,705
1833	935,682	72,006
1834	1,533,325	136,312
1835	2,611,215	216,635
1836	4,574,504	138,772

A small part of these exports are taken by Germany; but the great bulk of the shipments are made to France, the value of the raw material having been increased by the operations of our spinning-mills at the rate of more than 100*l*. per ton. The improvements introduced into the flax-mills of this country, and which have led to the opening of the trade in question, may be explained by the fact that the length of yarn produced from a pound of flax of the average degree of fineness was, in 1814, only 3,330 yards, while the length of yarn of the average quality now produced from a pound of flax is 11,170 yards. Some yarns are now produced of a fineness much superior to this average; and it is of such fine yarns that the shipments to France consist. Flax-spinning is now carried on with most success in the West Riding of Yorkshire. Machinery for the purpose has lately been put up in Ireland; but hitherto the quantity spun has not equalled the demand of the Irish linen-weavers, for whose use large quantities are sent from England.

A considerable part of the fine yarn used by our weavers was formerly imported from Germany. This trade has of course declined since our spinners have begun to supply foreign countries. The quantity of linen yarn so brought to this country in each of the ten years preceding 1837 has been as under:—

1827	3,782,352 lbs.	1832	1,522,416 lbs.
1828	3,429,104	1833	1,564,640
1829	3,320,240	1834	1,624,448
1830	2,151,632	1835	1,378,183
1831	1,943,424	1836	589,526

FLAXMAN, JOHN. York may claim the honour of being the birth-place of this very eminent sculptor, he having been born in that city, July 6th, 1755; yet he may properly be considered a denizen of tho metropolis, for he was brought to London while yet an infant not more than six months old. At that time his father, who was a moulder of figures, kept a shop in New Street, Covent Garden, and subsequently in the Strand; and it was in this humble studio that the future artist received the first impressions of taste. In all probability it was not an unfortunate circumstance that a natural weakness of constitution and delicacy of health, which continued until about his tenth year, gave him a relish for solitary and sedentary amusement. That it was a fortunate one for him to have thus early and constantly before his eyes objects adapted to fix his feelings, and well calculated to rouse his intelligence, there can be no doubt. Seated behind the counter with paper and pencil, or with books, he studied more desultorily than would otherwise have been the case, yet perhaps more profitably and more diligently, because less compulsorily. Self-imposed tasks are but another term for enjoyments; for this reason is it that the self-taught, among whom Flaxman may to a certain extent be ranked, are generally found to apply themselves to whatever may be their pursuit with a zest and an earnestness that never accompany routine.

After the death of his mother, which occurred when he was in his tenth year, his father married a second wife, who treated young Flaxman and his brother with such tenderness as to win their affection and esteem. It was somewhere about this period that having attracted the notice of the Rev. Mr. Mathew, he was introduced by that gentleman to his wife, a lady of very superior acquirements, who took delight in making him acquainted with the beauties of Homer and Virgil, while he would attempt to embody with his pencil such poetic images or parts of the narrations as most caught his fancy. By those kind and judicious friends he was encouraged to study the original languages; and although here also he was chiefly his own tutor, he made such proficiency as enabled him to read the master poets of antiquity, if not very critically, yet with tolerable readiness; quite enough so to enter into their spirit and follow their conceptions, as is evident from his compositions after Homer and Æschylus.

Choice of profession for him there was none, both nature and circumstances having so determinedly predestined him for sculpture, that for any one to have entertained an idea of his following any other pursuit would have been absurd. Accordingly, in his fifteenth year, he became a student of the Royal Academy, and in 1770 exhibited, as his first subject there, a figure of Neptune in wax. Here, while he distinguished himself by the assiduity with which he prosecuted his studies, he received a lesson which taught him that application and enthusiasm combined are not always a match for mediocrity when backed by favour; for on his becoming a candidate for the gold medal (the silver one he had previously carried off), Reynolds, the then president, awarded the prize to Engleheart, a now utterly forgotten name. Mortified, yet not dispirited, Flaxman returned to his studies, with unabated relish, although for some time compelled to devote a considerable portion to providing for the exigencies of the passing day, which he did by designing and modelling for others, particularly for the Wedgwoods, to whom his talents and his taste were eminently useful. Moderate as was the remuneration, such employment put him at ease in his pecuniary circumstances, because he already possessed one very important fund towards pecuniary independence, namely a contented frugality and an utter disrelish of all expensive habits and amusements. And here it may be observed, that even in after-life, when he was in comparative affluence, and when his fame would have been a passport to the most brilliant circles, he continued to distinguish himself by perfect simplicity in his habits and mode of living, equally remote from affectation on the one hand and a spirit of penuriousness on the other. In this latter respect he stood in direct contrast to a contemporary artist of the chisel, whose undisguised object through life was money-making, and who was fortunate enough to amass upwards of 200,000*l*., so that he had the death-bed consolation of dying rich enough to make the world stare and talk. Very far different was the character of Flaxman: enthusiast as he was in his art, he would never have got on in it as a mere profession.

The year 1782 formed an important epoch in his life, since not only did he for the first time quit his paternal residence in the Strand, and venture to establish himself in a house in Wardour Street, but was guilty of what Reynolds at least considered the highest imprudence. 'So, Flaxman,' exclaimed the latter to him one day, 'I am told you are married,—if so, Sir, you are ruined for an artist.' Yet never was there augury less veracious than this ill-omened and rather uncourteous speech, for never was there a happier union than that of Flaxman and Ann Denman, a woman equally amiable for her virtues and her accomplishments. That the president's sinister prediction was not at all likely to be fulfilled became soon apparent by proofs of increased ability, which the artist gave in his monument of Collins the poet, and that of Mrs. Morley, in Gloucester cathedral; which latter is a work replete with that poetic simplicity and pathos which hallow so many of our artist's productions of that class. At length he determined upon visiting Italy, for which country he set out in 1787, accompanied by his wife. While he was at Rome he had an opportunity of giving proof to the world with what intellectual power and sympathy of genius an Englishman could realise to the outward sense the conceptions of a Homer, an Æschylus, and a Dante. It was for Mrs. Hare Nayler that he made a series of thirty-nine subjects from the Iliad, and thirty four from the Odyssey, illustrative of the principal events in those poems. For these compositions, so instinct with the intellectual power of art, it is said he received no more than the paltry sum of about fifteen shillings a-piece, a sum most incredibly small, amounting altogether to not more than a fashionable portrait-painter would make at a single sitting. But he was paid in worthi coin, for those productions at once stamped his reputation. Neither were they unproductive of more immediate good consequences, since they served to collect patrons around him; among the rest the Countess Spencer, for whom he composed his series of illustrations of Æschylus. He also obtained the patronage, if such it can be called, of that more eccentric than amiable character, the earl of Bristol and bishop of Derry, who had commissioned him to execute the group of Athamas, and paid him no more than 600*l*. This was the sum, it is true, actually bargained for, but so inadequate to the executed work, that the sculptor must have been a positive loser by it, actually out of pocket, besides relinquishing what it would have produced him had he retained it and offered it to some other purchaser. Flaxman however was not the man to retract from his engagements for that he was too honourable, and to complain he was too proud. During his stay at Rome he executed for the late accomplished Thomas Hope an exquisite small marble group of Cephalus and Aurora. It was for him too that he produced that third sublime series of poetic compositions, the Illustrations of Dante, amounting altogether to one hundred and nine subjects, viz. thirty-eight from the Inferno, as many from the Purgatorio, and thirty-three from the Paradiso. Here, being left almost entirely to the resources of his own imagination, without assistance from the previous ideas of other artists, he manifested still greater originality of mind and intellectual vigour than in the Homeric series, or that from Æschylus. All the three constitute an almost new province of art, combining the distinguishing qualities of picturesque and sculpturesque design.

On his return from Italy, where he had spent upwards of seven years, not quite unprofitably as regarded his pecuniary affairs, certainly most profitably as regarded both his studies and his reputation, he took a house in Buckingham Street, Fitzroy Square, and in a very short time distinguished himself by his noble monument to Lord Mansfield. It is hardly necessary to add that he now found the doors of the Royal Academy graciously open to receive him, he being unanimously elected an Associate in 1797. In that year he exhibited there his monument of Sir W. Jones, now in the chapel of University College, Oxford, and three bas-relief sketches of subjects from the New Testament, viz. Christ raising from the dead the daughter of Jairus, and two illustrative of the texts, 'Comfort and help the weak-hearted;' 'Feed the hungry.' These may be considered as the commencement of a cycle of scriptural compositions intended to show that the simple truths of the Gospel were fully capable of inspiring the sculptor and supplying him with appropriate subjects. Of this class are the reliefs of the monument of Sir F. Baring's family in Micheldean church, Hants, which expressively figure the ideas of the following sentences: 'Thy will be done'—'Thy kingdom come'—'Deliver us from evil.' To these may be added his beautiful illustration of the text, 'Blessed are they that mourn,' in a monument to Mary Lushington, of Lewisham, Kent, representing a mother sorrowing for her daughter, and comforted by an angel. His groups of 'Come, ye blessed'—'Lead us not into temptation'—'Charity,' and the monuments of Countess Spencer and Mrs. Tighe, the poetess, not to enumerate others, are also replete with religious sentiment and fervour. That he should have been pre-eminently happy in such subjects needs not greatly excite our surprise, because he was at home in them; in them his head and hand spontaneously obeyed the dictates of a heart tenderly alive to every sentiment of devotion. Hence it was that he so successfully broke through the conventional trammels of his profession, and opened an almost entirely fresh track for himself. On the contrary, when fettered down to common-place ideas and subjects, he did not rise at all higher than many others have done. Even his monument of Nelson, as well as others by him in St. Paul's, are equally cold in conception and execution, without any indication of their having been wrought by him *con amore*. Whether he would have succeeded very much better in the colossal figure of Britannia, which he proposed should be erected upon Greenwich Hill, admits of doubt; although that he could have executed such a work can hardly be questioned. A figure, however, of such stupendous dimensions, for its height was to have been not less than 200 feet, was treated as an absurdly extravagant, if not impracticable and utterly visionary scheme, though in these days of gigantic enterprise, even if rejected as useless, it would not have startled as overpassing the bounds of feasibility.

In 1810 he was appointed to the then new professorship of sculpture at the Royal Academy, to which circumstance the world is indebted for his series of Lectures on the art, which, although of no extraordinary merit as literary compositions, are full of good sense and good feeling, and may be studied with profit, not by those alone of his own profession, but by artists and men of taste generally.

Till the year 1820 he had enjoyed the best species of prosperity which Heaven can bestow, and which those who are outwardly the most prosperous often miss altogether,—a life of serenity and tranquil competence, with constant occupation in the art he loved, and increasing fame attending it; but he was now doomed to experience a most bitter bereavement in the loss of her who had been his affectionate companion for 38 years. He henceforth felt a blank in his existence which neither the solace of friendship nor the honours of public applause could fill up. Nevertheless, so far from yielding either to despondency or to the pressure of advancing age, he still continued to apply himself vigorously to his art, and some of his very latest productions are among his very best. The shield of Achilles, first modelled in 1818, afterwards cast in silver-gilt for George IV., is certainly one of the most splendid achievements of the art in modern times. To this period belong also his Psyche, and group of the Archangel Michael and Satan, both of them stamped with his genius. So far from having lost any of its energy, his mind and hand continued active till the very last; for when prevented by indisposition from doing more, he sketched and designed on paper. The interruptions he experienced from illness or infirmity were but few and brief; and until three days before his death he continued able to employ himself in his usual pursuits and studies without particular inconvenience. That event took place on the 7th December, 1826; and on the 15th he was followed to the grave (in the churchyard of St. Giles in the Fields) by the president and council of the Royal Academy.

Whether we contemplate him as a man or as an artist, so much does he command our love and our admiration, that for want of words to do justice to his excellence, it is difficult to avoid the semblance of overstrained panegyric. In him the man exalted and seconded the artist, for in all his best productions, those which are really to be regarded as the spontaneous offspring of his own mind and feelings, the workings of a good, a pure, and benevolent spirit are as discernible as those of a great and lofty one. It must indeed be confessed that in some of the mechanical parts of his art he did not greatly excel, neither do his works display that high finishing and delicacy of execution which captivate the eye and often mislead the judgment. 'If Flaxman,' says Cicognara, 'had possessed skill in modelling and execution equal to his talent in invention and composition, he would certainly have had a great share in the prosperous revolution which has taken place in the art. Nevertheless it is greatly indebted to him, since, as far as we are acquainted with his productions, we may affirm that they have mainly contributed to awaken sculpture from a certain monotonous lethargy, and to restore the golden style—the severity of the antique—which he knew how to apply to his own designs.' This praise, if not very warm, is sufficiently discriminating and just upon the whole. It is admitted that Flaxman helped to restore the art from the imbecile inanity and soul-less though occasionally graceful mannerism into which it had fallen, and in which it appeared inclined to remain. He rendered it more poetic, taught it to address itself to the heart, to touch the noblest feelings of our nature, and, while it touched, to elevate them to that sphere of holiness where his own affections constantly abided.

FLEA. [PULEX.]

FLE'CHE, LA. [SARTHE.]

FLE'CHE, a breast-work consisting of two faces, which form with one another a salient angle. It is constructed on the exterior of the glacis of a fortress, generally in a retired part, as at the foot of the place L [*Fig.* 1, BASTION], in order to defend by its fire the ground before the bastion and ravelin.

FLE'CHIER, ESPRIT, born in 1632 at Pernes, near Carpentras, studied in the college of the 'Fathers of the Christian Doctrine,' of which congregation his maternal uncle was then the superior. Being ordained, he went to Paris, and became preceptor to a young gentleman. He made himself favourably known by writing panegyrical orations in honour of saints and also of deceased distinguished contemporaries, which were much liked at the time as specimens of eloquence. In 1673 the Abbé Fléchier was named a member of the French Academy; and in 1682 he was appointed by Louis XIV. almoner to the Dauphiness. In 1685 he was sent at the head of a mission to reclaim to Catholicism the Protestants of Poitou and Brittany. On his return to Paris he was appointed by the king bishop of Lavaur, but was soon after transferred to the see of Nismes. The revocation of the edict of Nantes, 22nd October, 1685, had been followed by a species of persecution against the Protestants, or Huguenots as they were called, who were very numerous at Nismes and in the neighbouring districts. Fléchier, who was naturally of a mild disposition, while obeying the intolerant orders of the king towards this part of the population, executed them with as much temperance as could be expected from one in his situation. His letters contain painful evidence of the oppressions and cruelties committed at that epoch. When the persecuted Protestants rose in 1702-3 against their oppressors, they fearfully retaliated by killing the Catholics and burning their churches. This was followed by Louis XIV. sending a large force under a marshal of France, and the devastation of the mountainous districts of the Cévennes ensued. Fléchier repeatedly expresses his astonishment at the boldness and courage of the victims. (*Lettre* 138, in the last volume of *Les Œuvres de* Fléchier.) Fléchier died at Nismes in February, 1710. His scattered works have been collected and published:—'Œuvres complètes de Fléchier,' 10 vols., Nismes, 1782. They consist of biographies, sermons, panegyrics, and 'oraisons funèbres,' or funeral orations, in which last he was considered to rival and almost to excel Bossuet. Cardinal Maury (*Essai sur l'Eloquence de la Chaire*, vol. i.) examines with a critical eye Fléchier's oration in honour of Marshal Turenne, which was considered as his masterpiece, and points out its defects. Fléchier wrote a life of Cardinal Ximenes, rather too partial according to some critics, and a life of Theodosius the Great. His correspondence above mentioned furnishes some interesting materials for contemporary history.

FLECKNOE, RICHARD, is said to have been a Catholic priest. He was a minor poet and wit in the time of Dryden, and would have been long since forgotten had not that writer used his name as the title of a severe satire against Shadwell, and therein proclaims that he

> 'In prose and verse was own'd without dispute
> Through all the realms of nonsense absolute.'

Of course his name was transmitted to posterity with the same ignominy that has accompanied the heroes of Pope's 'Dunciad.' The reader of satires should not however take too much for granted, nor be too ready to admit as a fact that all objects of ridicule and invective are such fools and knaves as they are represented. Party feeling and private animosity may have occasioned the attacks directed by a powerful opponent, rather than a cool judgment and a rational inquiry into merits. In the case of the satires of Pope and Dryden, the satires themselves are in the hands of every gentleman possessing a moderate library, while the works of the persons satirised are utterly unknown, excepting to those who take an active interest in studying the literature of the period. Hence a vast number of persons are by name familiar to the mass of readers, on account of their having been by our great satirists denounced as the writers of unredeemed trash, without any opportunity being given of examining the justice of the sentence. Flecknoe, in particular, is a victim to these partial views. There is no doubt that the mere readers of Dryden take it for granted that Flecknoe was a most unqualified idiot, yet in the 'Retrospective Review' (vol. 5) there is an article which proves most satisfactorily that though he did not possess any great genius, and was sadly defective in his versification, he still possessed much fancy, and wrote some small pieces which for happy turns of thought would not disgrace even the first writers in the language. His description of 'a man troubled at nothing' (there quoted) is a masterpiece in its way.

FLEET PRISON, like the neighbouring street, takes its name from the brook or river of Fleet, which formerly ran by it, and still runs under Farringdon Street. The earliest mention of this prison is in the reign of Richard I., who, in his first year, confirmed to Osbert, brother of William Longchamp, chancellor of England, and to his heirs for ever, the custody of his palace at Westminster, with the keeping of his gaol of the Fleet in London. King John also, by patent dated in the third year of his reign, gave the archdeacon of Wells the custody of his palace at Westminster and his gaol of the Fleet, together with the wardship of the daughter and heir of Robert Leveland. (Stow, *Surv.*, edit. 1603, p. 393.)

Howard, in his *State of the Prisons in England and Wales* (4to., Warringt., 1784, p. 217), says, to this prison were committed formerly those who had incurred the displeasure of the Star Chamber; and adds that, in the 16th Char. I., when that court was abolished, it became a prison for debtors and for persons charged with contempt of the Courts of Chancery, Exchequer, and Common Pleas. But the prison of the Fleet was, in all probability, a place for debtors from its earliest existence; numerous instances to prove it so may be found through different centuries upon the rolls of parliament. Adam de Wythford, chamberlain of North Wales, was imprisoned there for debt in 1335 (*Rot. Parl.* vol. ii. p. 91); and we find a petition from one John Fraunceys, a debtor confined there, A.D. 1290, 18th Edw. I. (*Ibid.*, vol. i. p. 47).

As early as the 2nd Hen. IV., A.D. 1400, it was determined by parliament that the council, with the chancellor and justices, should settle what fees the warden of the Fleet was to take (*ibid.*, vol. v. p. 110); and it was determined in the parliament of the 23rd Hen. VI. that his office was not to be prejudiced by the statute of that year touching sheriffs and gaolers.

Howard (*State, &c. ut supra.*, p. 219) has given a table of the regulations observed in the Fleet, with another of the warden's fees, as both were finally settled in Hilary Term, 1729, 3 Geo. II. (See also Neild's *State of the Prisons*, 4to., Lond., 1812, p. 218—222.)

The warden is appointed by letters patent under the great seal. He receives no salary whatever, but is wholly remunerated by the fees above-mentioned. The liberty of permitting prisoners to reside within the Rules, upon giving an indemnity against an escape, has been granted by the warden for the time being from very antient times, and the practice is expressly recognised by the statute of the 8th and 9th Will. III., c. 27. (*Return to the House of Commons relating to the Fleet Prison*, 29 *Apr.* 1830.)

Strype, in his edition of Stow, fol., Lond., 1720, b. iii. p. 280, gives the extent of what are technically termed the Rules of the Fleet. He says, 'To this prison there have been, some years since, granted Rules; which are, all the north side of Ludgate-hill, the west side of the Old Bailey unto Fleet-lane, and down the same on the south side; and so the east side of the row of houses next the Fleet, taking in all the courts and alleys within the said limits.'

This prison was burnt in the Fire of London, and again by the rioters in 1780.

FLEETWOOD, CHARLES, notorious for the active part that he took in the Rebellion, was descended from a private family in Lancashire, from which several distinguished persons had sprung. From a trooper in the earl of Essex's forces he rose to be colonel of infantry, and was made governor of Bristol. In October, 1645, he was returned to parliament for Buckinghamshire, and in 1647 was one of the commissioners named to treat with the king. At the battle of Worcester Fleetwood distinguished himself so much that he gained great favour both with Oliver Cromwell and the army in general: indeed afterwards, when the king was executed, and the parliamentary army became more powerful, he was inferior to few in the influence that he possessed among the soldiery. Fleetwood had married Frances, the daughter of Thomas Smith of Winston in Norfolk, by whom he had three children, but this lady being dead, he was fixed upon by Cromwell, from political motives, to marry Bridget, his eldest daughter, the widow of Ireton. Soon after he became his son-in-law the Protector nominated him commander-in chief of the forces in Ireland, where he was also invested with a commissionership for the civil department. Cromwell, however, feeling that his interests were not perfectly secure in the hands of Fleetwood, who was a thorough republican, and strenuously opposed to the Protector being made king, sent his son Henry Cromwell to watch over his conduct. Some enmity was thus produced, and with the view of putting an end to it, Cromwell created Fleetwood one of the new lords, and made him the chief of the fourteen major-generals to whom the government of the nation was arbitrarily committed, and who were deputed to search for such royalists as had borne arms under Charles I., or were disaffected to the present government, with power to imprison them, and to decimate their estates. When Richard Cromwell became Protector, Fleetwood strove to obtain his title, and to supplant him in his authority; but while he was caballing against him, the nation, wearied with tumult and discord, recalled the exiled king.

At the immediate time of the Restoration it was supposed that Fleetwood would be executed as a rebel: his life was with difficulty saved, and he retired to Stoke Newington, where he was allowed to spend the remainder of his life in miserable obscurity. He died soon after the Revolution. In character he was cunning, but weak and irresolute, and of shallow capacity: he was neither generally distinguished for courage (his conduct in the battle of Worcester forms an exception), nor skilful in military operations: his influence in Cromwell's extraordinary army is attributable to the excess of his fanaticism. (Noble's *Memoirs of the Cromwell Family*, &c.

FLENSBURG or FIENSBORG, a Danish town, at the southern extremity of the Flensborg Wyck or Fiorde, an arm of the Baltic, and in the centre of the duchy of Schleswig. It lies in 54° 47′ N. lat. and 9° 27′ E. long., and is encircled by hills on the three sides facing the Fiorde. It is a pleasant well-built town, inclosed by an old wall and ditch, outside of which there are three suburbs; it contains about 1200 houses and about 16,500 inhabitants. The streets are well paved and lighted. Flensburg has three German churches and one Danish, three market-places, a town-hall, an orphan asylum, an hospital and midwifery school, public library, grammar and secondary school, several schools for the lower classes, an exchange, a theatre, a house of correction, and nine refuges for the indigent. It has several large manufactories, particularly of brandy, refined sugar, tobacco, sailcloth, soap and tallow, paper, &c. There are three shipbuilders' yards, and the people of the town are owners of between 200 and 300 vessels. There is a good harbour, deep enough for large ships, but the entrance is difficult. Fairs for grain, cattle, horses, &c. are held periodically. The trade is considerable, and the exports are brandy, corn, hides and skins, soap, tallow, fish, &c. Flensburg is the capital of the bailiwick of the same name, which has an area of about 336 square miles, divided into five herreders or hardes, with one town, one market-town (Glücksburg), 29 parishes, and about 39,000 inhabitants.

FLETA is a commentary in Latin on the entire body of the English law, as it stood at the time when the author wrote. It is supposed to have been written about the thirteenth year of the reign of Edward I., as the statutes passed towards the end of his reign are not noticed, while that of Westminster II. is often quoted. The author gives as the reason for the title of his book, that it was written during his confinement in the Fleet Prison: who he was is not known. The work is divided into six books: the first treats of the rights of persons and of pleas of the crown; the second of courts and offices; the third of methods of acquiring titles to things; the fourth and fifth of actions grounded upon a seisin, and of writs of entry; the sixth of a writ of right. The author has followed Bracton in the matter and manner of his work, having adopted his plan, and in many instances transcribed whole pages from him. He also followed Glanville in many instances; and various obscure passages of both those writers are illustrated by Fleta. It seems to have been the author's design to give a concise account of the law as it then stood, with the alterations which had taken place since Bracton wrote, supplying such parts as had been left untouched by him, and dilating upon others which had been passed over with too little attention. Thus Fleta serves as an appendix, and often as a commentary, to Bracton. Most of the subjects so minutely discussed by Bracton are passed over in Fleta in a very brief manner, so that with all its new matter this volume is not more than one-third the size of Bracton. (2 Reeve's *Eng. Law.*)

The work was originally published by Selden from an antient manuscript in the Cottonian Library, together with a small treatise in law French, entitled 'Fet Assavoir,' which is a collection of notes concerning proceedings in actions, and a learned dissertation by Selden himself. Two editions only have been published in England, one in 1647, the other in 1685, which last corrects many hundred errors which had been caused in the first edition by an unskilful copyist (Bridgman). It is also printed in Houard's collection. [BRITTON.] President Henault, in his 'Chronological Abridgment of the History of France,' tome i., p. 258, refers to Fleta as an historical authority.

FLETCHER, JOHN, was born in 1576, and was the son of the Rev. Dr. Fletcher, afterwards bishop of Bristol. He was educated at Cambridge with his friend Francis Beaumont, and is said to have distinguished himself as a good scholar. For an account of his works and his literary connexion with Beaumont, see that article. He was carried off by a plague which happened in 1625.

FLETCHER, GILES and PHINEAS, were the sons of Dr. Giles Fletcher, who was employed by Queen Elizabeth as ambassador in Russia, and cousins of John Fletcher the dramatist.

Giles, the elder, was born about 1580, was educated at Trinity College, Cambridge, and died at his living of Alderton, in Suffolk, in 1623. The single poem which he has left, 'Christ's Victory in Heaven, Christ's Triumph on Earth, Christ's Triumph over Death, Christ's Triumph after Death,' will, as Dr. Southey observes, 'preserve his name while there is any praise.' Its beauty is of a very peculiar cast, uniting many of Spenser's characteristics with a greater regard to antithesis. Lines like the following,

> 'The obsequies of him that could not die,'
> 'And death of life, end of eternity,'
> 'How worthily he died that died unworthily,' &c.,

occur perpetually, and give an air to his poetry which cannot be well mistaken. The 'Wooing Song,' in the second part of the poem, is as perfect a specimen of fanciful elegance as can be found: and is the more striking from being written in octo-syllabic couplets, while the rest of the poem is in a variation of the Spenserian stanza.

Phineas Fletcher, younger brother of Giles, was born about 1584, and admitted scholar of King's College, Cambridge, in 1600. In 1621 he was presented to the living of Hilgay, in Norfolk, where he died about 1660.

He wrote, in addition to his great work, some Eclogues; ' History of the Founders and Benefactors of Cambridge University,' in Latin hexameters, and a drama called Sicelides.' But the only work for which he is now known s 'The Purple Island, or the Isle of Man,' a description of he human soul and body, but especially the latter, much n the style of 'Christ's Triumph.'

The two Fletchers, with Browne, make up a kind of Spenserian school, possessing considerable common resemlances, with original qualities enough to procure for each very high reputation. They are the more remarkable as aving tended to form the style of Milton's poetry, as may e seen by any one well acquainted with both. (Southey's *British Poets*; Chalmers's *Biogr. Dict.*)

FLETCHER, ANDREW, was the son of Sir Robert letcher, of Saltoun, in East Lothian, where he was born n 1653. Sir Robert is said to have died when his son was child. He is, we suppose, the subject of a small duodeimo volume printed at Edinburgh in 1665, and entitled A Discourse on the Memory of that rare and truly virtuous erson, Sir Robert Fletcher, of Saltoun, who died the 3th of January last, in the 39th year of his age; written y a Gentleman of his acquaintance.' It is a warm tribute o the general worth and especially to the piety of his chaacter. Andrew Fletcher's early education was superinended by Gilbert Burnet afterwards the celebrated bishop of Salisbury, who was at this time parish minister of Saltoun. To him Fletcher was probably indebted for his first bias in favour of those political principles to which he adhered through his life. Under the care of Burnet he also laid the foundation of an excellent literary education. When he grew up he spent some time in travelling on the continent. On his return home he obtained a seat in the Scottish parliament as commissioner, or member, for his native county; and in that capacity he soon became distinguished as one of the foremost opponents of the government. After some time however he deemed it prudent to withdraw to Holland; on which he was summoned before the lords of the council, and, when he did not make his appearance, was outlawed, and his estate confiscated. He ventured to come home in 1683, but soon returned to the continent, and there he remained till 1685, when he thought proper to engage in the attempt of the duke of Monmouth. But he had scarcely landed in England when he shot a man dead in a private quarrel, and found himself obliged precipitately to leave the country. The person he killed was the mayor of Lyme. He then proceeded to Spain, and afterwards to Hungary, where he took part in some military operations against the Turks, and distinguished himself by his gallantry. When the scheme of the English Revolution began to be projected, he repaired to Holland to join the councils of his countrymen there; and he came over to England with the Prince of Orange and his old friend Burnet in 1688. He now recovered possession of his estate, and again sat as representative for his native county, first in the Scottish Convention and afterwards in parliament. After a short time however he became nearly as determined an opponent of the government of King William as he had formerly been of that of Charles II. His last exertions as a public man were directed against the scheme of the union of the two kingdoms. He died in London in 1716. He is the author of the following tracts, all of which, we believe, were originally published without his name:—1, 'A Discourse of Government with relation to Militias,' Edinburgh, 1698; 2, 'Two Discourses concerning the Affairs of Scotland, written in the year 1698,' Edinburgh, 1698; 3, 'Discorso delle Cose di Spagna, scritto nel mese di Luglio, 1698,' Napoli, 1698; 4, 'Speeches by a Member of the Parliament which began at Edinburgh the 6th of May, 1703,' Edinburgh, 1703; 5, 'An Account of a Conversation concerning a right Regulation of Governments for the Common Good of Mankind; in a Letter to the Marquis of Montrose, the Earls of Rothes, Roxburgh, and Haddington, from London, the 1st of December, 1703,' Edinburgh, 1704. The original editions of these publications are scarce, but they were all reprinted at London in an octavo volume in 1737, under the title of 'The Political Works of Andrew Fletcher, Esquire.'

Fletcher writes in a flowing and scholarlike style, occasionally rising to considerable warmth and energy; his compositions are interspersed with many sagacious and happily expressed remarks, and they have at all times the charm of earnestness and perfect conviction. But for deep or extensive views in the philosophy of politics they will be searched in vain. The author's prescriptive name of patriot best describes what he was. He was thoroughly honest, in the sense of being inaccessible to any seduction which appealed openly to his individual interests, and was always ready to make any sacrifice and to encounter any danger in the cause of what he deemed the public welfare and in the performance of his duty. But his politics, to say the truth, were made up rather more of passion than of philosophy. His two cardinal principles were an enthusiasm in behalf of the independence of his native country, and an extreme sensitiveness to the mischiefs or dangers of arbitrary power, which was however in great part an impulse of his physical organization, and which also, we are compelled to add, had not a little of the narrowness and blindness as well as the warmth and honesty of a passion—allowing him to employ the same eloquence in which he, in one place, denounces the oppression of kings, to urge in another the strange scheme of providing for the poor by the restoration of some such system of slavery as he conceives existed among the Greeks and Romans. This singular proposal is contained in his Two Discourses on the affairs of Scotland. Among the most curious of his works is his account of the Conversation on Governments, which appears to be a report of a real conversation, the parties being Fletcher himself, the earl of Cromarty, Sir Edward

Seymour, and Sir Charles Musgrave. The part of the dialogue given to Seymour in particular is highly characteristic. It is in this production that we find the remark so often quoted about the superior influence and importance of the national ballad-maker to the national law-giver: Fletcher gives it as the observation of a friend.

In a quotation prefixed to the collected edition of his works, from 'a MS. in the library of the late Thomas Rawlinson, Esq., entitled Short Political Characters of the chief of the Lords and Commons of England,' &c., Fletcher is described as 'a low thin man; of a brown complexion; full of fire; with a stern, sour look; and fifty years old.' Having mentioned his strong jealousy of the power of princes, the writer says, 'This made him oppose King Charles, invade King James, and oppose the giving so much power to King William, whom he never would serve; nor does he ever come into the administration of this queen, but stands up a stout pillar for the constitution of the parliament of Scotland.' It is added, 'His thoughts are large as to religion, and could never be brought within the bonds of any particular sett.' In the Memoirs of Lockhart of Carnwath (2nd edit. 8vo. Lon. 1714), Fletcher is described as 'so extremely wedded to his own opinions, that there were few he could endure to reason against him.' He therefore never could be brought to act with any party. 'He was, no doubt,' continues Lockhart, 'an enemy to all monarchical governments, at least thought they wanted to be much reformed; but I do very well believe his aversion to the English and the Union was so great, in revenge to them he would have sided with the royal family.' Notwithstanding his democratic opinions, 'he liked,' it is added, 'commended, and conversed with, highflying Tories, more than any other set of men, acknowledging them to be the best countrymen, and of most honour, integrity, and ingenuity (ingenuousness).' The truth is, his liberalism, or republicanism, was of a strongly aristocratic complexion. He was by temper, as well as by station, a patrician, and that too, on the whole, rather of the feudal than of the old Roman stamp. However, the general bearing of his writings, as well as of his public life, may be considered as placing him among the British democrats; and his talents, and the value of what he has left, make him a figure of considerable note among his contemporaries. The best qualities of his writings are their cordiality and straightforwardness; he has the advantages, and also the disadvantages, of the man who has never changed his opinions, and who has never doubted;—extreme confidence and a fervid zeal, but little largeness of view, and a tendency to intolerance, which even the most liberal principles cannot redeem from the charge of illiberality and bigotry. There is a very eulogistic account of Fletcher by the late earl of Buchan, in a publication entitled 'Essay on the Lives and Writings of Fletcher of Saltoun, and the Poet Thomson,' 8vo. 1792. A nephew of Fletcher's, of the same name, was an eminent judge of the Court of Session from 1726 to 1775, by the title of Lord Milton. He was also a native of Saltoun, which, besides its connexion with the Fletchers and Bishop Burnet, has likewise the honour of being the birth-place of the greatest of the old Scottish poets, Dunbar.

FLEUR-DE-LIS, a form of blazonry for the flower which resembles an iris, and which, previously to the French Revolution, was borne first semée, and then three, as representing semée, in the arms of France. In old English it was called the *flower-de-luce*. Its origin and history have been variously stated by the French antiquaries. Some have considered it as the flower which grew on the banks of the river Lys, which separated Artois and France from Flanders; others state that Louis VII., who began his reign in 1137, first adopted it in allusion to his name of *Loys*, and because he was called *Ludovicus Florus*, or the Young. The coins of Louis VII. are allowed to be the first on which the *fleur-de-lis* appears, as well as upon his smaller or counter seal. The *fleurs-de-lis* were originally borne semée, without regard to number: according to common belief Charles VI. was the first of the French monarchs who reduced them upon his shield to three. Le Blanc, however, remarks that three fleurs-de-lis only occur upon the seal of Philip de Valois, as well as upon an impression of a seal of John king of France appended to a charter of 1355. Much upon the history of the fleur-de-lis may be seen in Furetière's *Dictionnaire Universel*, tom. iii., fol. Haye, 1727, *v.* 'Lis;' and more especially in Rey's *Histoire du Drapeau, des Couleurs, et des Insignes de la Monarchie Française*, 8vo., Par. 1837, tom. ii. p. 59–414. Upon crowns and the tops of sceptres the *fleur-de-lis* was used by other nations as well as France from a very early period.

FLEURY', ANDRE' HERCULE DE, CARDINAL, was born in 1653 at Lodève, in Languedoc, studied at Paris in the college of the Jesuits, was afterwards made almoner to the queen-consort of Louis XIV., and in 1699 bishop of Fréjus, which see he resigned in 1715, on account of ill health. Louis XIV. appointed him also preceptor to his grandson, afterwards Louis XV., who became greatly attached to him. After the death of the regent in 1723, Fleury was made a member of the Council of State, and afterwards prime minister, in which office he continued for seventeen years, till the time of his death. The period of his administration was the happiest part of the reign of Louis XV. Fleury was honest, economical, disinterested, a friend to peace, and a patron of learning. He was obliged, against his inclinations, by the court party and Marshal Villars, to take a part in the war of the Polish succession in 1733, in which France engaged chiefly in order to support Stanislaus Leczinsky, father-in-law of Louis XV. Although that object was frustrated by the united forces of Austria and Russia, yet the war terminated in 1736 in a manner advantageous to France, which gained by it the important accession of Lorraine.

In 1741 Cardinal Fleury found himself driven by court influence into another war, that of the Austrian succession, of which he did not live to see the end. He died in 1743, at eighty-nine years of age; and from that time the government of Louis XV. fell deeper and deeper into corruption and decay. Fleury amassed no fortune, but he left the reputation of a wise, benevolent, and faithful minister of state. He completed the building for the royal (now national) library, which he enriched with a number of valuable MSS., especially in the oriental languages.

FLEURY, CLAUDE, ABBE', was born at Paris in 1640, and died in 1723, aged eighty-three years. All the contemporary writers coincide in the opinion that Fleury possessed all the virtues and qualities requisite to constitute a scholar, an honest man, and a Christian. Having completed in a brilliant manner his studies at the college of Clermont at Paris, he embraced in 1658 the profession of his father, who was a distinguished advocate, and he practised at the bar for nine years. To his legal occupations he united the study of literature and history, but the religious turn of his mind having induced him to enter the church, he thenceforward entirely devoted himself to the study of divinity, the Holy Scriptures, canon law, and the Fathers. In 1674 he was appointed tutor to the princes Conti, whom Louis XIV. educated with his son the Dauphin. After this the king intrusted him with the education of his natural son the prince of Vermandois. Upon the death of the young prince, Louis conferred on Fleury the abbey of Loc-Dieu, in the diocese of Rhodez, and five years after (1689) he was created sub-preceptor of the king's grandsons the dukes of Bourgogne, Anjou (afterwards Philip V., king of Spain), and Berri. Fleury thus became the associate of Fenelon. In 1696 he succeeded Labruyère as member of the French Academy, and when the education of the three above-mentioned princes was completed (1707), the king bestowed on him the priory of Argenteuil, in the diocese of Paris. This grant was very acceptable to Fleury, as it afforded him a comfortable retirement for the prosecution of his studies, without depriving him of those resources which are found only in a capital. Being however a strict observer of the canon law, which was the particular subject of his study and which prohibits a plurality of ecclesiastical benefices, he resigned the abbey of Loc-Dieu. In his retirement at Argenteuil, notwithstanding his advanced age (he was now sixty-six years old) he conceived the plan of his grand work the 'Ecclesiastical History,' and began the execution of it. After the death of Louis XIV. (1716), the Regent Duke d'Orleans nominated Fleury confessor to the young king Louis XV., a post which he held till 1722, when he resigned it on account of his great age, being then in his eighty-third year. He died a few months afterwards.

Fleury commenced his literary career with the 'Histoire du Droit François,' 1674. He afterwards published successively 'Institution au Droit Ecclésiastique,' 'Catechisme Historique,' translated into Latin by the author himself, a work which has become classical, and is con stantly reprinted; 'Les Mœurs des Israelites,' of which an English translation was made by Dr. Adam Clarke. Bishop Horne calls this work 'an excellent introduction to the reading of the Old Testament, which should be in the hands of every young person;' 'Les Mœurs des Chrétiens,' also translated into English. These two last works are considered, for elegance and precision of style, as among the best in the French language. He also wrote 'Traité du Choix et de la Méthode des Etudes.' But the most valuable of Fleury's works, and that which has established his reputation as a first-rate writer, is the 'Histoire Ecclésiastique.' It comprehends a space of fourteen centuries, beginning with the establishment of Christianity, and terminating at the opening of the council of Constance. It was objected to the author that he related too many miracles, but he excused himself on the ground that such was the belief of the church to which he belonged. Though an orthodox Roman Catholic priest, he strictly adheres to the truth in his account of the scandals which have thrown odium on the church, and the best proof of his sincerity is that his 'Ecclesiastical History' was put into the Roman Index Expurgatorius. Fleury was engaged on the 20th volume of his History at the time of his death. It was continued till the year 1698 by Fobre, of the Oratoire, in 16 vols. in 4to. Fleury's 'Ecclesiastical History' is translated into English. The university library of Cambray contains a manuscript of a 'History of France,' which Fleury drew up for the use of the French princes while he was engaged with their education, but it has never been printed. We must not omit to mention, that, notwithstanding his grave occupations, Fleury had leisure to compose a treatise on the duties of masters and servants. This little work, which has been much esteemed, is translated into English.

FLEXURE, CONTRARY. A point of contrary flexure in a curve is that at which the branch of the curve ceases to present convexity to a straight line without it, and begins to present concavity, or vice versâ. [CURVE.] But when a straight line passes *through* a point of contrary flexure, the curve presents either convexity on both sides or concavity on both sides.

The algebraical test of a point of contrary flexure is a change of sign in the second differential coefficient of either of the two, abscissa or ordinate, with respect to the other. It is frequently stated, in works on the differential calculus, that the sole test of such a point is $\frac{d^2y}{dx^2} = 0$, where x and y are the abscissa and ordinate. This is not correct; the above equation may be true when there is no contrary flexure, and there may be contrary flexures when the above is not true. It is necessary and sufficient for a point of contrary flexure that $\frac{d^2y}{dx^2}$ should change its sign, which cannot be except when it is nothing or infinite. Examine therefore all the roots of the two equations,

$$\frac{d^2y}{dx^2} = 0 \qquad \text{and} \qquad \frac{1}{\dfrac{d^2y}{dx^2}} = 0$$

and such of them as are accompanied by change of sign give points of contrary flexure.

For instance, let the equation of the curve be

$$y = 3x^5 - 20x^4 + 50x^3 - 60x^2$$

$$\frac{d^2y}{dx^2} = 60\,(x^3 - 4x^2 + 5x - 2) = 60\,(x - 1)^2\,(x - 2)$$

then $\frac{d^2y}{dx^2} = 0$ when $x = 1$ and when $x = 2$. but there is only a point of contrary flexure when $x = 2$, for when $x = 1$ there is no change of sign.

FLIBUSTIER. [BUCCANEERS.]

FLINDERS, MATTHEW, was a native of Donington, in Lincolnshire. He went early to sea in the merchant service. In 1795 he was a midshipman in the Royal Navy, and went to New Holland with the ship that conveyed Captain Hunter, the new governor, to Botany Bay. On board this ship he found a congenial mind in George Bass, the surgeon, who, like himself, was bold and adventurous, and had a passionate desire to explore new countries. Soon after their arrival at Port Jackson these enterprising young men launched a little boat, which was appropriately called 'Tom Thumb,' being only 8 feet long. In this boat Flinders and Bass, with no other companion than a boy, ran across Botany Bay, and explored George's River 20 miles beyond the point where Governor Hunter's survey had stopped. They made several discoveries and encountered many dangers. Their heroism was appreciated but by few persons in the colony. The English had been ten years in possession, and there was an imaginary line of more than 250 leagues (beginning in the vicinity of the colony) set down on the charts as 'unknown coast.' Flinders was anxious to remove this blot. The complete examination of Australia became what he called his 'darling object.' It was not yet known that Van Diemen's Land was a separate island; the existence of a strait dividing it from Australia was first mentioned as a probable fact by Bass, who ran down the coast in a whale-boat, and who suggested that the heavy swell which rolled in from the westward could be produced only from the great Southern Ocean. Flinders was sent with his old companion Bass to ascertain this fact. They embarked in the 'Norfolk,' a large decked boat built of the excellent fir of Norfolk Island; and they had only six men to assist them. They went through the straits, made a rapid survey, and returned to Port Jackson in little more than three months. The name of Bass was given to this strait. In the following year, 1799, Flinders, now a lieutenant in the Royal Navy, was sent in the same small vessel to explore the coast to the north of Port Jackson, where nothing had been done since the imperfect notices by Cook. He visited and examined all the creeks and bays as far north as 25°, paying particular attention to Harvey's Bay, and returned to Port Jackson with satisfactory accounts. On his return to England he was promoted*

In July, 1801, Captain Flinders sailed from England in the Investigator, a bark of 334 tons, carrying 88 men, including an astronomer, a naturalist, two painters, a botanic gardener, and a miner. England and France were at war at the time, the preliminaries of the treaty of Amiens not being signed until the 25th of October following; but a French pass, conceived in flattering terms, and speaking of the sacred rights of science, was granted to Flinders, who, whether in war or peace, was to be respected by all armed ships of France, and to be entertained as a friend in any French colony that he might make. Such conditions, though not expressly laid down, had been acted upon by the French in the time of Louis XVI.; and about a year before Captain Flinders's departure the English government had regularly established a precedent. M. Otto, in the name of Bonaparte, applied for a similar free pass in favour of Captain Baudin, who, it was said, was going with two ships on a voyage of discovery 'round the world;' and the Addington administration readily and courteously granted it, notwithstanding the fierce hostilities which were then raging between the two nations.

In the month of December Captain Flinders made Cape Leuwen, on the south-east coast of Australia; and commencing operations, he gradually surveyed and examined the coast to the eastern extremity of Bass's Straits, where, in 'Encounter Bay,' he met the French ships, which, instead of going round the world, had made straight for Australia, and devoted their whole care to the examination of Van Diemen's Land and New South Wales, evidently with a view to the formation of a French colony. Captain Baudin had had the start of Flinders by nine months; but he had been delayed in collecting shells and catching butterflies, and at the moment of their meeting he had done little in the way of discovery or survey; and Flinders says that by assiduity and favourable circumstances he had anticipated him in the most interesting parts of the southern coast. He says that he gave Baudin an account of his discoveries. Baudin afterwards said that he found Captain Flinders not very communicative, but that he *obtained intelligence of all that had been done on the southern coast from some of his people.* From Bass's Straits Flinders sailed to Port Jackson, where he arrived on the 9th of May, 1802. Having refitted, he set off again on the 22nd of July. He then steered northerly along the east coast, exploring Northumberland and Cumberland Islands, and surveying the great Barrier Reef of coral rocks—a long and dangerous tract, most necessary to lay down. In fourteen days he conducted the Investigator through these perilous mazes, where he had nothing to guide him but his own vigilance and skill; then bearing still north, he made Torres Straits and surveyed the vast gulf of Carpentaria, which had been very imperfectly examined by General Carpenter, its first discoverer. While engaged in this duty the Investigator was reported to be 'quite rotten,' and in such a state that she could not possibly last above six months *in fine weather*. Three of these months Flinders kept her in the gulf; he then stood away for the island of Timor, where he refreshed his sick and over-fatigued crew. From Timor he made his way with the leaky bark to Cape Leuwen. Sailing again along the southern coast, he anchored in the Archipelago of the Recherche; then passing Bass's Straits a second time, he made for Port Jackson, where he arrived on the 9th of June, 1803, having lost many of his best men, and among others Good, the botanical gardener. The Investigator was immediately condemned: she was in such a state that people could scarcely conceive how she had been kept afloat.

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* It appears that Bass met with no reward whatever. In 1802 he left Port Jackson as *mate* or master of a trading vessel, and was never more heard of. In 1820 there was a vague report that he was alive and settled somewhere in Peru; but the more probable story is that he was lost at sea.

Unable to continue the survey (there being no disposable vessel in the colony), Captain Flinders embarked as passenger in the Porpoise, a store-ship, in order, he says, 'to lay his charts and journals before the Lords Commissioners of the Admiralty, and obtain, if such should be their pleasure, another ship to complete the examination of the Terra Australia.' The Porpoise was accompanied by two trading vessels, the Bridgewater, Captain Palmer, and the Cato, of London. The route chosen was by Torres Straits. On the 17th of August, at night, the Porpoise suddenly found herself among breakers, and the very next instant 'striking upon a coral reef, she took a fearful heel over her larboard beam-ends.' A minute or two after, the Cato struck on the same reef, about two cable lengths off, and went over. The Bridgewater, which was close by, cleared the rocks, and was perfectly safe in smooth water; but Palmer basely 'bore away round all,' and then pursued his course without doing so much as sending a boat to ascertain the fate of the two crews*. As morning dawned Flinders, who acted with admirable self-possession, contrived to get the men safely landed on a sand-bank, which at all stages of the tide remained a little above water-mark. They removed some portion of the stores from the wrecks, and made themselves as comfortable as men could be in such a situation. There is scarcely a more interesting case of shipwreck upon record; and the methods adopted, and the admirable order preserved, show that there was a master-mind among them. On the 26th of August Flinders left the reef in a small open boat, to make a voyage of 750 miles. He however got safely to Port Jackson on the 6th September, and procured a small schooner, the Cumberland, which was only twenty-nine tons, and when she got to sea it was found that she was very leaky. She was accompanied as far as the wrecks by another schooner, and by a trading vessel which was bound for China. Flinders reached the reef on the 7th October, and was received with three cheers. In the mean while the poor sailors on Wreck Reef Bank had planted oats, maize, and pumpkins, and the young plants were up and flourishing. Captain Flinders regretted that he had no cocoa-nuts with him to plant on the bank. Some of the men went back to Port Jackson in the schooner, some embarked in the trading ship bound for China, the rest cheerfully remained with Flinders, to make, in the ill-conditioned Cumberland, which was not quite so large as a Gravesend sailing boat, the circumnavigation of half the globe; for Flinders intended to reach England with this miserable craft. He mentions that not a man refused to share the risk with him except his clerk. Having gone through Torres Straits, and touched again at Timor, Flinders stretched boldly across the Indian Ocean, and made the Isle of France, which was not yet taken by the English. Though the war had been renewed, he relied on his French pass, and indeed he could scarcely choose, for the little Cumberland was in a sinking state when he got her into the French port. To his astonishment the authorities of the Isle of France seized the vessel and all his papers, and declared him and his people to be prisoners of war. The governor even chose to consider Flinders as a spy, and treated him with a brutal severity which, united with his uneasiness of mind, certainly had the effect of shortening his valuable life. Flinders knew that Baudin was returning to France, and he saw with a prophetic eye that the Frenchman would claim the merit of all his discoveries on the southern coast of Australia. He thought the governor De Caen too illiterate to know or care much about the matter, otherwise, he says that he should have been induced to suspect that he was detained a prisoner in order that Baudin might have the start of him in publishing, and make the world believe that it was to the French nation alone they were indebted for the complete discovery and examination of those parts. Some English writers did not hesitate to take this view of the case, and what followed in France settled the question. A volume and an atlas were published: the whole of the southern coast, including not only all the discoveries of Flinders and Bass, but also those of Nuyts, Vancouver, Grant, and Dentrecasteaux, was laid down as new land, and called *Terre Napoleon*. Every point which had been named by Flinders and his precursors was rechristened, and there were all sorts of significant names given, from Cape Marengo and Cape Rivoli, to Talleyrand Bay. Baudin had made about 50 leagues of real discovery; he claimed or seemed to claim nearly 900 leagues.

After pining six years a prisoner in the Isle of France, Flinders was liberated, and he reached England at the end of the year 1810. His charts and plans were restored to him, but one of his log-books was kept or destroyed. His health was completely broken, but as long as there was work to do he kept up his energy, correcting his maps, and writing out his descriptions. After revising his last sheet for press he drooped; he died in the month of July, 1814, on the very day his book was published. (*A Voyage to Terra Australia, &c., in the years* 1801, 1802, *and* 1803, *in H.M. Ship Investigator, and subsequently in the armed vessel Porpoise and Cumberland schooner*, 2 vols., with Atlas, London, 1814; also *Quart. Rev.*, vol. xii.)

FLINT, a well-known silicious mineral, the true native place of which is the upper bed of the chalk formation, where it occurs in regular beds, consisting either of nodules or flat tabular masses, which may be seen extending two miles in length in the chalk east of Dover. It is often found in the form of sponges, alcyonia, echinites, &c.; it occurs also plentifully in alluvial deposits in the neighbourhood of chalk. Gravel consists principally of flints which have been rounded by attrition, and by exposure to air and moisture, have acquired a yellowish-red colour, owing to peroxidizement of the iron which they contain; in this state they are termed ferruginous flints.

Flint is usually of a grey colour of various shades; sometimes it is brown, black, yellow, or red; hardness 7·0, 7·25; it is rather harder than quartz, which it scratches; thin fragments of the black varieties are translucent, the fracture is perfect, and large conchoidal; it is fragile, and being rarely laminated, it is broken with equal facility in almost every direction, and the fragments are sharp. Specific gravity 2·594. It is infusible, but becomes opaque and white by the action of heat.

According to Klaproth, flint consists of—

Silica . . .	98
Lime . . .	·5
Alumina . . .	·25
Oxide of iron . .	·25
Water . . .	1
	100

The substances with which it is mixed are to be considered as mere accidental admixtures.

Flints are largely employed under the name of gun-flints, and in the manufacture of china and porcelain; formerly, also, as the name indicates, in making flint-glass: but for this purpose fine silicious sand is now generally substituted.

FLINT, a town in North Wales. [Flintshire.]

FLINT-GLASS. [Glass.]

FLINTS, LIQUOR OF, is a solution of flint or silica in the alkali potash; it is prepared by fusing together a mixture of four parts of hydrate of potash and one part of powdered flint or fine sand. When a part of the fluid compound is poured out of the crucible, crystals are formed in the residual portion, which, according to Berzelius, are composed of one equivalent of each of its constituents. This compound, sometimes called silicate of potash, silica being regarded as an acid, is soluble in water, and when sulphuric, nitric, or other powerful acids are added to it a hydrate of silica is precipitated.

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* It is worth while remarking, that the crews of the Porpoise and Cato got safely home, after all their dangers; and that Palmer and the whole crew of the Bridgewater perished at sea, on the homeward voyage.

FLINTSHIRE, a county in North Wales, in the north-eastern part of the principality. The main portion of the county extends along the æstuary of the Dee, and there are two outlying portions. 1. The main portion approximates in form to a parallelogram, having its greatest extent or length from north-west to south-east. The north-west side from the mouth of the Clwyd to the Point of Air (eight miles long) is washed by the Irish Sea; the north-east side from the Point of Air to Dodleston Common (twenty-two miles) is for the most part washed by the æstuary of the Dee, and partly bounded by the county of Chester; the south-east side (ten miles) is bounded by the county of Denbigh, from which it is partly separated by one of the branches of the Alen; the south-west side (twenty-three miles) is bounded by the county of Denbigh, the boundary line being partly along the hills which skirt on the east the valley of the Upper Alen, partly along those which skirt on the north-east the vale of Clwyd, and partly along the Clwyd itself to its outfal. 2. The principal outlying portion is also a parallelogram, having its greatest length from west-north-west to east-south-east. It is bounded on the north-north-east side (seven miles long) by the county of Chester, from which it is separated by the tributary waters of the Dee; on the east-south-east and south-south-west sides (seven miles and nine miles respectively) by the county of Salop; and on the west-north-west side (five miles) by Denbighshire, from which it is separated by the Dee. 3. The smaller outlying portion is situated between the main portion of the county and the larger outlying portion: it is bounded on every side by Denbighshire, and is very small. The area of the county is only 244 square miles; it is the smallest county in Wales: in population it is the eighth of the Welsh counties, the inhabitants in 1831 being 60,012, or 246 to a square mile. In density of population Flintshire far exceeds any other part of Wales, and is just equal to the English county of Somerset. Mold, the county town, is about 174 miles in a direct line north-west of St. Paul's, London.

Coast, Surface, and Hydrography.—The only promontory on the coast is the Point of Air. The coast is low, and is skirted in almost every part by sands, Hoyle sands and Bog sands, in some places near four miles wide, and dry at low water, except where they are traversed by the low water channel of the Dee, and of the various streams that flow into that river or into the open sea. On the north-west coast are several pools, called Trewyn pools, forming a line along the shore of about two miles.

There are no hills in Flintshire of great elevation: the south-west boundary lies along the hills which skirt the valleys of the Upper Alen and the Clwyd; and a range of hills connected with these extends through the county from north-west to south-east, separating the Alen and the lower part of the Clwyd from the æstuary of the Dee. Garreg Mountain, towards the north-west extremity of this range, is 835 feet high, and Gwaunysgaer Down, still farther to the north-west, is 732 feet high. From the slopes of this range of hills a number of small streams flow, on one side into the Dee, and on the other into the Clwyd and Alen. These rivers, though they have part of their course on or within the border of Flintshire, rather belong to other counties. [CLWYD; DEE; DENBIGHSHIRE.] The new channel of the Dee below Chester is indeed for the most part within the county, and constitutes the only inland navigation which it possesses. There is a small rail-road from the coal-pits near Mold to the Dee.

Geological Character.—The new red sandstone or red marl, the uppermost of the rocks of this county, occupies the two outlying portions; and is found on the north-west coast, in the lower part of the vale of Clwyd, and in that part of the county which is on the north-east side of the new channel of the Dee. The coal-measures occupy the coast of the æstuary of the Dee, and the coal-field forms a belt extending from the Point of Air to the south-east side of the county, gradually increasing in width inland. The seams of coal are of different thickness, from three quarters of a yard to five yards, and the dip varies from one yard in four to two in three. Common, cannel, and peacock coal are found. Pits are worked in the neighbourhood of Holywell, and at Mostyn, which is on the æstuary of the Dee, not far from that town; in the neighbourhood of Hawarden, and between that town and Flint; and also in the neighbourhood of Mold, and between Mold and Hawarden. Beds of shale and sandstone, answering in position and character to the shale and millstone grit of Derbyshire [DERBYSHIRE], underlie the coal-measures, and crop out from beneath them on the south-west side of the coal-field, forming a belt more inland than the coal-field, but parallel to it and to the shore of the Dee, and separating the coal-field from the district occupied by the carboniferous or mountain limestone. This last-named rock occupies all the remainder of the county, except a small tract occupied by the old red sandstone: extensive lead mines are worked in the limestone, especially in the neighbourhood of Holywell, and near the road from that town to Hawarden. Copper, iron, zinc, and calamine, are also found.

Divisions, Towns, &c.—The present division is into five hundreds. Prestatyn, in the north, along the coast; Rhuddlan, in the west, toward Denbighshire; Mold, in the east and south, toward Cheshire and Denbighshire; Coleshill, in the north-east, along the æstuary of the Dee; and Maylor, comprehending the larger detached portion of the county and one or two parishes in the south-east of the main part. The smaller outlying portion is in the hundred of Mold. Flintshire contains one city and contributory borough, St. Asaph on the Elwy (population, in 1831, 3144); one principal borough and ex-county town, Flint, on the æstuary of the Dee (population 2216); six other contributory boroughs, Holywell near the æstuary of the Dee (population 8969); Mold, the present county town (population 3153); Caergwrle or Caergwyle, with Hope, on the Alen (population 2747); Overton, in the large outlying portion of the county near the Dee (population 1746); Rhyddlan or Rhuddlan on the Clwyd (population 1506); and Caerwis, or Caerwys, not far from Holywell on the road to Denbigh (population 935). Of St. Asaph and Holywell an account is given elsewhere [ASAPH, ST.; HOLYWELL]. St. Asaph, Holywell, and Mold were added as contributory boroughs to Flint by the Reform Act: Caergwyle, Overton, Rhyddlan, and Caerwis were contributory boroughs before.

Flint, from which the county derives its name, is in Coleshill hundred, on the æstuary of the Dee, 200 miles from London, through Coventry, Birmingham, Shrewsbury, Ellesmere, Wrexham, and Mold. Flint was probably a Roman station; the site occupied by the town was a rectangle surrounded with a vast ditch and two great ramparts, and having four gates, with streets regularly laid out and crossing each other at right angles: many antiquities apparently Roman have been dug up in the neighbourhood (*Pennant's Tour in Wales*, 2 vols. 4to., 1784, vol. i. pp. 69. 74, where these antiquities are figured and described); and there is a tradition that in very old times there was a large town on this spot. There are traces of Roman establishments for the smelting of the lead-ore dug in the neighbourhood. The Roman name is unknown: the present name is of Saxon origin, but it does not appear in the Domesday Survey; in which the town, if noticed at all, is possibly comprehended in the designation of Coleselt, which under its modernized form, Coleshill, is applied to a township of Holywell parish immediately adjacent to Flint. The castle was built, most probably by Edward I., a short time before the year 1280; though some writers carry back its foundation to the time of Henry II. Soon after its erection it appears to have been taken by the Welsh in their revolt, A.D. 1282. In the civil war of Charles I. this castle was garrisoned for the king by Col. Sir Roger Mostyn, but taken after a gallant defence by the parliamentarians. It shortly after fell again into the hands of the royalists; but was finally taken by the opposite party under General Mytton, and was, with the other Welsh castles, dismantled in 1647, by order of the parliament.

The remains of the castle stand a little to the north-east of the town on the summit of a rock of freestone. The castle is a square building with a round tower at three of the corners and at the fourth a round tower of much larger dimensions than the other, separated by a deep moat from the rest of the building, with which it communicated by a drawbridge. This large tower constituted the keep, or donjon, of the castle, and from its situation and the great thickness of the walls was almost impregnable. It is supposed that the low-water channel of the Dee once ran close under the castle walls, and there are still in some parts the rings to which ships were moored.

The other public buildings of the town are the parochial chapel, a county gaol, a dilapidated guild-hall, a national school-house, an almshouse for twelve poor burgesses, and a dissenting place of worship. Two dissenting congregations meet in private houses. The county gaol was built in 1785. At the time of its erection it was considered a neat and commodious building; but it does not admit of a proper classification of prisoners. The appearance of the town of Flint is very unfavourable; the streets are so broken by dilapidated walls and the gaps caused by the removal of houses as to give the place an air of desertion and irregularity.

The population of the borough and parochial chapelry by the census of 1831 was 2216, about one-eighth agricultural. The trade of the port of Flint is rapidly increasing. The æstuary of the Dee is many miles wide, but the low water channel is narrow, and it was said some years ago to be of so little depth when the tide was out that it might be crossed, by those well acquainted with it, on foot. (*A Second Walk through Wales*, by the Rev. Richard Warner, in 1798.) The obstructions caused by the shifting sands in the channel of the Dee above Flint have caused this place to become in a considerable degree the port of Chester, and the approach to the quay had been so much improved that large vessels could come up to it at any time of the tide. The neighbouring lead and coal mines, and the works for smelting the lead, give employment to a great number of persons, and furnish the principal articles for export. Of the miners, a portion drawn from the inland part of Wales speak Welsh only, but the great majority of the inhabitants speak English. The market has fallen into disuse, but there are three yearly fairs. Flint is a place of some resort as a bathing place; there are hot-baths.

The borough of Flint was established by charter of Edward I., and regulated by subsequent charters. The borough limits comprehend, beside the chapelry of Flint, the township of Coleshill Fawr, in the parish of Holywell. By the Municipal Reform Act the corporation consists of four aldermen and twelve councillors. The borough of Flint with its contributories was empowered to send one member to parliament in the reign of Henry VIII.; the right of voting was in the inhabitants paying scot and lot. The number of electors registered under the Reform Act (A.D. 1832) was 361 as scot and lot voters, and only 14 as ten-pound householders, but many who really belonged to the latter class were included in the scot and lot voters. The living of Flint is a perpetual curacy of the yearly value of 225*l.*, in the gift of the bishop of St. Asaph, who is impropriator of the great tithes. Northop is the mother church to Flint.

There were at Flint, in 1833, a national school for 140 children of both sexes, partly supported by subscription; three other day-schools with 85 children of both sexes, and three Sunday-schools with 418 children. There are few children in the borough unable to read. (*Parliamentary Returns, Reports of Corporation Commissioners, &c.*)

Mold, the present county and assize town, is in the hundred of the same name, and on the right or west bank of the river Alen; it is 194 miles from London, on the road to Flint, described above. Mold is called in Welsh, 'Yr Wyddgrug,' 'a lofty hill,' which designation it owes to 'the Bailey hill,' an eminence partly natural and partly artificial, on which formerly stood an antient castle. There is no certain mention of the place until the time of William Rufus, when the castle was in possession of the English. In A.D. 1144 this castle was stormed by the Welsh, under their Prince Owen Gwynedd, and razed. It was afterwards rebuilt, and repeatedly taken in the contests between the English and the Welsh. Of the castle itself there is no part remaining; but the ditches which defended it, or separated its parts from each other, may still be traced. 'The Bailey hill,' so called from the Ballia or courts of the castle, is even now of difficult access: its summit, which was levelled by art in order to the construction of the antient fortress, commands a view of the country round of no great extent but of considerable beauty. The site of the castle is completely covered with thriving plantations of larches and other trees. The town consists of one main street, with one or two smaller ones intersecting it at right angles; the houses are indifferent, nor are there any public buildings except the church, two or three dissenting meeting-houses, and a school-house. The church, a rich and beautiful specimen of the perpendicular English style, consists of a nave, two aisles, and chancel, and a square embattled tower enriched with sculpture and crowned with pinnacles: this tower, though of later date than the body of the church, is of similar architecture. The interior of the church is handsome: the piers and arches are very light and elegant; there are some portions of antient stained glass and several monuments The assizes are held in a private house hired for the occasion; but it is in contemplation to erect a county hall and prison.

The population of the township of Mold was, in 1831, 3153, of which about one-fourth was agricultural. The entire parish, which contains ten townships, beside that of Mold and the two chapelries of Nerquis and Treddyn, had an aggregate population of 9385 persons, of which more than a third was agricultural: the extensive coal-pits and lead and iron mines in the parish gave employment to 629 labourers. In the town of Mold 230 persons were engaged in the manufacture chiefly of cotton twist; earthenware and fire-bricks are made in the parish. There are two weekly markets (held on Wednesday and Saturday), and four annual fairs.

The living of Mold is a vicarage, in the gift of the bishop of St. Asaph, of the yearly value of 355*l.* The perpetual curacies of Nerquis, yearly value 92*l.*, and Treddyn or Tryddyn, yearly value 78*l.*, with a glebe-house, are in the gift, the first of the vicar of Mold, and the second of the bishop of St. Asaph.

By the Reform Act, Mold was made a parliamentary borough contributory to Flint: the borough comprehends the township of Mold, which contained, according to the Report of the Boundary Commissioners, about one hundred and fifty houses, worth 10*l.* a year or upwards: of these a hundred and forty were in the town.

There were in the whole parish, in 1833, two national schools, with 122 children, partly supported by an endowment; two other partially endowed schools with 122 children; thirteen unendowed day-schools with 331 children; and ten Sunday-schools with 1887 scholars, some of whom were probably adult and even aged persons.

Caergwrle, or Caergwyle, is also on the right or west bank of the Alen, below Mold, 187 miles from London, about 7 from Mold, and 13 from Flint. It is in the parish of Hope, or Queen Hope, and in the hundred of Maylor, or Maelor. The name Caergwrle is with considerable probability derived from Caer Gawr Lle, 'the camp of the giant legion,' from the 20th Roman legion, which was named 'Victrix,' and had its head-quarters at Deva (Chester). It is conjectured that this legion had an outpost here, and the conjecture is confirmed by the circumstance of a Roman sudatory, or vapour bath, hollowed out in the rock, roofed with polished tiles, on some of which was an inscription 'Legio XX.,' having been found here. Some vestiges of Roman roads and other works were formerly visible in the neighbourhood. The Roman outpost is supposed to have been on the spot now occupied by the ruins of the castle.

The oblong form of the castle, its comparative deficiency of towers, and its general agreement in structure with other castles whose origin is known, lead to the conclusion that it was of Welsh rather than Saxon origin. Previous to the final subjugation of Wales, it changed masters more than once, and appears to have been known by the English under the name of Hope Castle, and gave name to the district of Hopedale, while, with the Welsh, it bore its native designation, Caergwrle. Eleanor, queen of Edward I., lodged here on her way to Caernarvon, at which time, or soon after, the castle was burned. In Leland's time it was in a state of decay, and is now a mere ruin. The importance of this castle was derived from its strong position, and its command of the entrance into the vale of Alen: the hill on which it stood is precipitous on one side and of steep ascent on the other: on the accessible parts it was protected by deep ditches cut in the rock. This rock, which is a breccia of small pebbles lodged in grit, was formerly quarried for millstones. The neighbouring hill, called 'Caergwrle Hill,' affords limestone, of which a great quantity is burned into lime.

The parish of Hope is extensive, and had in 1831 a population of 2747, more than half agricultural: it is divided into eight townships, of which the parliamentary borough of Caergwrle, contributory to Flint, comprehends the township of Caergwrle, in which is the village of the same name, at the foot of the Castle Hill; the township of Estyn, in which is the village of Hope, with the church, a small edifice dedicated to St. Cynvarch, and containing some good monuments; and part of the township of Rhnbarfadd or Rhanbervedd. The right of voting was, before the

Reform Act, in the inhabitants paying scot and lot: the constituency was left untouched by that Act. The number of voters is about 120; the number of houses worth 10*l.* a year or upwards is about 20. The living is a vicarage, in the gift of the bishop of St. Asaph. The borough had once a charter and a municipal government; but the privileges of the burgesses had fallen into disuse and become matter of tradition even in Leland's time.

In the parish are part of the antient Wat's Dyke, and an antient British post, called Caer Estyn, a wide area enclosed by a single rampart and ditch, on a hill on the opposite side of the vale of Alen to the Castle Hill. Caergwrle and Hope are nearly a mile distant one from the other, and the river Alen flows between them.

The parish of Hope contained in 1833 two day-schools (one partly supported by donations) with 80 to 90 scholars, and ten Sunday-schools with nearly 800 scholars.

Overton is near the right bank of the Dee, in that part of the hundred of Maylor which is detached from the rest of the county; 174½ miles from London on the road to Caergwrle, Mold, and Flint.

Overton is mentioned in Domesday. There was antiently a castle here, said to have been the residence of a Welsh prince, Madoc, of Powys, lord of Overton: of this castle there are no remains. Edward I. was a great benefactor to Overton; he granted it a weekly market, and bestowed other privileges on the inhabitants. That monarch had at Overton a fishery, estimated to be worth 20*l.* a year. The market has been for some time discontinued. The village is pleasantly situated on a high bank overlooking a rich meadowy flat watered by the Dee. The church is a handsome building, and the churchyard is remarkable for some fine yew-trees. There are a Wesleyan chapel, a national school, and a house of correction for the hundred. Over the Dee, near the village, is a stone bridge of two arches.

The population of the parish in 1831 was 1746, nearly half agricultural: it does not appear that any particular branch of trade is carried on. There are four fairs in the year. The parliamentary borough, contributory to Flint, is co-extensive with the parish; and the right of suffrage, which has not been affected by the Reform Act, is in all the inhabitants rated to the relief of the poor: the number of voters is about 300: the number of houses worth 10*l.* a year and upwards is about 100. There does not appear to have been ever any municipal corporation. The parish is a chapelry, held with the rectory of Bangor Monachorum, which is in the gift of the Marquis of Westminster, and is worth 1200*l.* a year, with a glebe-house.

The parish of Overton had in 1833 six infant or dame schools, with nearly 100 children; five other day-schools (two supported by voluntary contributions), with nearly 200 scholars; and three Sunday-schools, with 150 scholars.

Rhyddlan or Rhuddlan is partly in Rhuddlan hundred, partly in that of Prestatyn, and on the right or east bank of the Clwyd, rather more than two miles above its mouth. Rhuddlan appears as a place of importance in the early part of the eleventh century when Llewelyn ap Sitsylt, prince of Wales, built a castle here in which he resided. In the time of Gryffydd ap Llewelyn, A.D. 1063, this castle or palace was surprised and burnt by the Saxons under Harold. It was soon restored, but shortly afterwards reconquered by Robert, nephew of Hugh Lupus earl of Chester. Robert fortified the castle with new works; at subsequent periods it was repeatedly attacked and taken by the Welsh and re-fortified by the English. Baldwin, archbishop of Canterbury, in his progress through Wales, was nobly entertained here. In the invasion of Wales by Edward I., that monarch made Rhuddlan his place d'armes and magazine of provisions. In 1281 it was attacked by Llewelyn, the last prince of Wales, and his brother David, but without success. David was confined here previous to his removal to Shrewsbury, where he was executed as a traitor. Edward, sensible of the importance of the place, built a new castle a little to the northward of the former one; the finishing of this work took a considerable time. He made the town a free borough and bestowed upon the inhabitants many immunities. He also assembled here, in A.D. 1283, a parliament or council, in which Wales was divided into counties, antient laws and customs which appeared detrimental were abolished, and new and more advantageous ones introduced, and many important regulations established by what was called the Statute of Rhuddlan. Here also he promised the Welsh to give them for their prince a native of the principality who never spoke a word of English and whose life and conversation no man could impugn. He fulfilled the letter of his promise by presenting to them his infant son, afterwards Edward II., then just born at Caernarvon. An old building called the Parliament House was probably the place where the king held this council. Rhuddlan Castle was in the great civil war garrisoned for the king, but was taken by General Mytton, A.D. 1646, and in the same or the following year ordered by the parliament to be dismantled.

The village of Rhuddlan consists of one principal street running down to the Clwyd and some smaller streets. There are not much more than twenty houses of the yearly value of 10*l.* or more. The principal buildings or other objects of interest are the castle, the church, the antient priory, the dissenting places of worship (one each for Wesleyan and Calvinistic Methodists, Independents, and Baptists), and a lock-up house, built at the expense of the county eleven or twelve years since. There is a bridge over the Clwyd of two arches, rebuilt or repaired about A.D. 1595. The castle of Edward I. is on the bank of the Clwyd, a little way above the bridge. It was built of red sandstone from the neighbouring rocks and formed a square externally (as we gather from Pennant's description), having at two opposite angles double round towers, and single ones at the other angles; the court-yard was an irregular octagon. The ditch was large, and faced on both sides with stone. The castle on the side of the steep slope toward the river was defended by high walls and square towers. Three of the round towers at the angles and one of the square towers are tolerably entire, and there are vestiges of others. To the south of this castle, about a furlong distance, is a large artificial mound called Tut-hill or Toot-hill, on which the castle of Llewelyn ap Sitsylt and Robert of Chester seems to have stood. About half a mile south of the castle stood the priory of Black Friars, founded some time before A.D. 1268, and which continued till the dissolution. 'There is a fragment of this priory remaining which bears the marks of antiquity: the rest is disguised in the form of a farm-house and barn.' The Toot-hill and the ruins of the priory are comprehended in an extensive area surrounded by a fosse which communicates with the castle ditch. The church is of tolerable size; but the architecture is nowise remarkable. There was in very antient times an hospital at Rhuddlan.

The population of the parish in 1831 was 1506, nearly half agricultural. The river Clwyd is navigable up to the bridge at spring tides for vessels of 70 or 80 tons. From seven to nine vessels ordinarily come in at spring tides. The lead mines to the east of the town are still worked, and give employment to about 300 men. There is a large export of corn; formerly considerable trade was carried on in timber and bark, but this has recently declined. A steam-packet plies between Rhuddlan and Liverpool. Rhyl, a township in the parish, has become a place of some resort as a bathing place. There are four fairs in the year; the weekly market has been discontinued for several years.

The parliamentary borough of Rhuddlan (contributory to Flint) comprises the whole of Rhuddlan parish, a great part of St. Asaph parish, and parts of the parishes of Cwm and Diserth or Dyserth; it contains about 170 or perhaps 190 scot and lot voters. It was by charter a municipal borough, but the municipal privileges have fallen into disuse, except the annual appointment of two bailiffs, whose duties are very unimportant. The living is a vicarage of the annual value of 266*l.* with a glebe-house, in the gift of the dean and chapter of St. Asaph.

There were in Rhuddlan, in 1833, two national schools with 140 scholars, one other day-school with 64 scholars, and five Sunday-schools with 350 scholars.

Caerwys is in Rhuddlan hundred, near a small stream which runs into the Clwyd, 204 miles from London, through Overton, Wrexham, Caergwrle, and Mold. Its name is derived from 'Caer,' a fortress, and 'Gwys,' a summons; the latter part of its designation is derived from its having been a seat of judicature, first under the native princes and again after Wales had been united to England. The assizes for Flintshire were held here till the year 1672, when they were removed to Flint, and subsequently to Mold. The prefix Caer, the form of the place, consisting of two streets crossing at right angles, and numerous copper Roman coins found here, have been considered as sufficient indications that this was a Roman station. In the middle ages Caerwys was the place of holding the Eisteddfod, or general meeting of the Welsh bards.

This place, now a mere village, is seated on a wild and naked hill, surrounded by a bleak and barren district. It is very ill supplied with water, which is brought from a well a quarter of a mile distant from the village. The conveyance of water from this well forms a regular branch of traffic. Caerwys has a neat church, and meeting-houses for Wesleyan and Calvinistic Methodists, and a national school-house. The former town-hall is now used as a barn, and the former county gaol is now occupied as a dwelling-house: the judges' lodgings are now a mean hovel. The population of the parish, which is large, and comprehends four townships, was, in 1831, 985, about half agricultural. A little woollen cloth is made, and there is a small wire-mill.

The parliamentary borough, contributory to Flint, contains part of two of the four townships, Caerwys and Trefedwyn, or Trêv-Edwyn. The right of suffrage, which the Reform Act has not altered, is in the inhabitants paying church and poor-rates and not receiving parish relief. The number of voters is about 130. There are some of the forms of a municipal corporation. There are two bailiffs, a recorder, a crier, and two constables. The recorder and crier are appointed by the lord of the manor; the crier annually nominates the bailiffs, and the constables are appointed by the jury at the court-leet. The functions of these officers are but trivial.

The living is a rectory and vicarage of the yearly value of 285*l.* with a glebe-house, in the gift of the bishop of St. Asaph.

There were in the parish in 1833 one national school with 154 scholars, and four Sunday-schools with 455 scholars.

Hawarden is in the hundred of Mold, a mile and a half or two miles from the south bank of the Dee, on the road from Chester to Holywell, seven miles from Chester, and 195½ from London. The name Hawarden is Saxon, and the town was probably, at the time of the Conquest, one of the residences of Edwin, earl of Mercia. There was a castle here at a very early date: it was the residence of the barons of Mont-Alto or Mold, stewards to the powerful earls of Chester. This castle was destroyed, probably by Llewelyn, last prince of North Wales, but rebuilt before 1280. On the night of Palm Sunday, 1282, during a tempest which favoured the design, it was stormed by David, brother of Llewelyn, in their last struggle with the English. In the civil war of Charles I. it changed masters more than once, and was at the close of that contest dismantled. The remains of it are a fine circular tower or keep on the summit of a mound: this is the only part that is tolerably entire: there are no other remains except a few walls and the foundations of some rooms. The different parts of the fortress seem to have been built at different times. The town is large and well built, and consists principally of one street nearly a mile long. The church is a plain but handsome building. The population of the whole parish in 1831 was 5414, of which less than one-half was agricultural: but the population of the township of Hawarden, in which the town stands, was only 895, of which less than one-seventh was agricultural. The township of Ewloe (Eulo) and Ewloe Wood is more populous than that of Hawarden. There are several coal-pits, brick and tile works, and potteries in the parish, and there are two rail-roads for conveying the produce of these to the river. Upwards of 250 men are employed in the coal-pits. There are iron works and a laboratory for making Glauber's salts in the town. The market is on Saturday, and there are two yearly fairs.

The living is a rectory, exempt from episcopal jurisdiction, of the yearly value of 2844*l.* with a glebe-house. There are places of worship for Wesleyan and Calvinistic Methodists.

There were in the parish in 1833 an infant or dame school with 70 children; an endowed grammar-school, and five other day schools with 783 scholars; and five Sunday-schools with 158 children.

Divisions for Ecclesiastical and Legal purposes.—The county of Flint is in the diocese and archdeaconry of St. Asaph, and in the ecclesiastical province of Canterbury, with the exception of the places mentioned below. It contains, as nearly as we can gather from a comparison of our authorities, thirty-three parishes or parochial chapelries, of which six, viz. St. Asaph, Bangor, Bodfari, Erbistock, Iscoyd chapelry, and Nannerch, extend into Denbighshire. Wrexham and Gresford parishes, although extending into Flintshire, are not taken into the account, as they belong almost entirely to Denbighshire. Iscoyd (or Iscoed) chapelry is a dependency of the rectory of Malpas in Cheshire, in the diocese and archdeaconry of Chester, province of York, with which it is, as to the benefice, united. Penley chapelry is a dependency of the vicarage of Ellesmere in Shropshire, in the diocese of Litchfield and Coventry, and in the archdeaconry of Salop; and Flint chapelry is a dependency of the vicarage of Northop; but these two (Penley and Flint) form distinct benefices. The chapelry of Overton is united with the rectory of Bangor; and the chapelries of Buckley and Broughton with the rectory of Hawarden: these are all in the diocese and archdeaconry of Chester; as are Doddlestone, Hanmer, and Worthenbury.

The number of benefices, deducting from the thirty-three parishes the chapelries of Iscoyd, Overton, Buckley, and Broughton, and adding the sinecure rectories of Cwm or Combe, Cilcon or Kilken, and Whitford, is thirty-two. Of these, one, Caerwys, is a rectory and vicarage united; twelve are rectories (including the three sinecures); twelve vicarages; and seven are perpetual curacies. The richest benefice is the rectory of Hawarden, the annual value of which is 2844*l.* with a glebe-house; the next, the rectory of Bangor, the yearly value of which is 1200*l.*, also with a glebe-house; there are no other livings of so much as 1000*l.* a year; there are one between 700*l.* and 800*l.*; one between 600*l.* and 700*l.*; one between 500*l.* and 600*l.*; three between 400*l.* and 500*l.*; four between 300*l.* and 400*l.*; eleven between 200*l.* and 300*l.*; four between 100*l.* and 200*l.*; and four under 100*l.* Of one living (Hope) we have no return. The bishop of St. Asaph has twenty of the livings in his gift.

The county is included in the Chester circuit; the assizes and quarter sessions are held at Mold; but the county prison is still at Flint, the former county town.

Two members are returned from Flintshire, one for the county, and one for Flint, and the contributory boroughs. The principal place of county election is Flint; and the polling stations are Flint, Rhuddlan, and Overton. The election of the member for the boroughs is held also at Flint.

History and Antiquities.—Flintshire, with the rest of North Wales, was comprehended in the territory of the Ordovices, except those parts eastward of the Dee, which may be considered as having belonged to the Cornavii, who occupied the present county of Chester and much of the midland part of England. Pennant supposes that the part of the county west of the Dee was occupied in the summer by the Cangi, Ceangi, or herdsmen of the Cornavii, who passed the winter in the peninsula of Wiral in Cheshire, between the æstuaries of the Dee and the Mersey. From these herdsmen Pennant supposes that the district of Tegangle, which comprehended the three modern hundreds of Coleshill, Prestatyn, and Rhuddlan, took its name; being derived from *Teg*, fair, *Cang*, the name of the people, and Lle, a place. In the Roman division of Britain the Ordovices were comprehended in the district of *Britannia Secunda*; the Cornavii in that of *Flavià Cæsariensis*. Two Roman stations are by antiquaries fixed in or closely upon the borders of this county, Varæ or Varis, at or near Bodfari (in the latter part of which name the Roman designation may be traced), and Bovium, at or near Bangor on the Dee. There seems reason to suppose that the Romans had posts at or near Flint, Mold, Caergwrle and Caerwys. It is probable that they worked the lead mines of the neighbourhood, and that the posts were established with the view of protecting or carrying on that branch of industry.

In the Saxon invasion Flintshire suffered. At Banchor or Bangor (the Roman Bovium) was a vast monastery. [BANGOR.]

The great dyke which Offa, king of Mercia, carried along the frontier of his own dominion and that of the Welsh, may yet be traced to the hills which skirt the valley of the Clwyd, running across the south-western part of Flintshire. The greater part of the county was on the Mercian side of the dyke. Wat's Dyke, another antient rampart, is also to be traced running through a considerable part of the county. The territory between the two is said to have been neutral.

About a year after Offa's death (A.D. 795) a fierce battle was fought within the border of the county in the marshes between Rhuddlan and the sea, between the Britons or Welsh and the Saxons: the former were defeated with dreadful slaughter and lost their king Caradoc; a plaintive

Welsh air, Morfa Rhuddlan, preserves the memory of this disastrous day. Immediately after the capture of Chester by Egbert of Wessex, Flintshire, destitute of the mountains and fastnesses which protected the other parts of North Wales was easily overrun by the Saxons, who gave new names to the towns, villages, and hamlets; and many Saxons settled in the county in which they held lands under the governors or earls of Mercia. It appears however to have come again under the power of the Welsh princes, and was cruelly ravaged in the reign of Edward the Confessor by the Saxons under Harold: it was reconquered from the Welsh by Robert de Rotheland, (Rhuddlan) nephew of Hugh Lupus, earl of Chester, who refortified Rhuddlan Castle. In Domesday Book a great part of the county of Flint appears as a part of that of Chester, under the name of Atis cross hundred. It had been previously called by the Saxons Englefield. In the time of the Domesday Survey there were only seven churches in the hundred, and the division into parishes had not yet been made. Atis Cross, from which the hundred took its name, was near the town of Flint. The pedestal was remaining in the earlier days of Mr. Pennant.

In the time of Henry II. the county appears to have fallen again into the hands of the Welsh, and was the scene of fierce contest when the English monarch attacked the principality of North Wales. He advanced from Cheshire into Flintshire. In the woody district of Coed Eulo, near Hawarden, a detachment of his forces fell into an ambuscade formed by the sons of Owen Gwynedd, prince of North Wales, who was encamped with his principal force near Basingwerk. The English were defeated with great slaughter, and pursued even to Henry's camp. The king himself was afterwards surprised in the defile of Coleselt (Coleshill, near Flint), and with difficulty saved himself from defeat. He succeeded however in repelling the Welsh, and afterwards obliged Owen to retreat westward over the Clwyd into Denbighshire. In subsequent periods antecedent to the final reduction of the Welsh, Flintshire continued to be debateable ground, and was the frequent scene of petty hostilities. In 1277 Edward I., who had determined on the final subjugation of Wales, built, or else rebuilt Flint Castle, and strengthened that of Rhuddlan, and prepared, by making good roads, for the advance of his troops. In 1282 the Welsh princes, Llewelyn and his brother David, rose in arms. David stormed Hawarden Castle, and in conjunction with his brother, invested Flint and Rhuddlan, the only places left to the English in the county: the former surrendered and the latter was hard pressed. The advance of the English under Edward changed the face of affairs; Caergwrle was taken by them and the siege of Rhuddlan raised, and the war carried westward into Caernarvonshire.

Flintshire appears to have been constituted a county in the time of Edward I.; it was part of the earldom of Chester, and long continued to be under the jurisdiction of the chief justice of Chester. The county and the borough of Flint, with its contributaries, received the privilege of sending representatives to parliament in the reign of Henry VIII.

In the civil war of Charles I. this county was the scene of contest. Hawarden Castle was held for the parliament, but was in 1643 taken by capitulation by the royalists. In the same year Flint Castle, which had been garrisoned for the king, was obliged to surrender to a parliamentary force under Sir William Brereton and Sir Thomas Middleton It fell however again into the hands of the royalists. In 1645 Hawarden was retaken by the parliamentarians; and in the following year both Flint and Rhuddlan Castles fell into their hands. All these castles were ordered by the parliament to be dismantled.

Among the remains of past ages the castles are the principal: those of Flint, Mold, Caergwrle, Rhuddlan, and Hawarden have been already noticed; the others are Ewloe and Basingwerk. The ruins of Ewloe are on the edge of a wooded dingle. It consists of two parts, an oblong tower, rounded at the side and guarded on the accessible places by a strong wall at some distance from it; and an oblong yard with the remains of a circular tower at the other end of it. The towers are overgrown with ivy, and command a view of three deep and gloomy wooded glens. The only vestiges of Basingwerk castle appear to be the foundation of a wall on the verge of Offa's Dyke, in the parish of Holywell.

Of the antient religious edifices the principal are the cathedral of St. Asaph [ST. ASAPH]; the churches of Mold (described above), and Northop, near Flint; the abbey of Basingwerk, and the chapel over the celebrated spring at Holywell. [HOLYWELL.] Northop church is in the perpendicular English style, and has a lofty, handsome, and well-proportioned tower. Basingwerk Abbey is of antient but uncertain foundation. Bishop Tanner ascribes it to Randal, second earl of Chester; bishop Fleetwood to Henry II.; Mr. Pennant thinks that its foundation was of yet older date, and probably due to one of the Welsh princes. The monks were of the Cistertian order, and their yearly revenues at the dissolution were 157*l.* 15*s.* 2*d.* gross, or 150*l.* 7*s.* 3*d.* clear. Henry II. established here a house of Knights Templars. The remains consist of the refectory, the chapel of the Knights Templars, and some remains of offices. The refectory is pretty entire; the Templars' chapel is spacious, with long narrow and pointed windows, and slender and elegant pilasters between them on the inside. The architecture is generally in the early English style, but some part of the remains have the short columns and round arches of the Norman style.

(Arrowsmith's *Map of England and Wales;* Walker's *Map of Wales;* Conybeare and Phillips, *Outlines of the Geol. of England and Wales;* Pennant's *Tour in Wales Beauties of England and Wales; Parliamentary Papers.*)

STATISTICS.

Population.—Flintshire is, except in one or two localities, principally an agricultural county. Of 14,234 males twenty years of age and upwards, inhabitants of Flintshire in 1831, there were 6048 engaged in agricultural pursuits; 630 in manufactures, or in making manufacturing machinery; and 3597 labourers employed in labour not agricultural. Of the 930 employed in manufactures, 256 were inhabitants of the town of Holywell, and were engaged there in the manufacture of silk and cotton goods, in making paper and manufacturing iron, copper, brass, and lead; about 230 were employed principally in the cotton manufacture; and about 40 weavers were scattered throughout the county.

HUNDREDS, &c.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families	Building.	Uninhabited.	Families chiefly employed in agriculture.	Families chiefly employed in trade, manufactures, and handicraft.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.	Males twenty years of age.
Coleshill	2,230	2,313	6	114	859	338	1,116	5,747	5,555	11,302	2,882
Mayler	2,054	2,218	3	52	1,245	593	380	5,489	5,492	10,981	2,527
Mold	2,849	2,896	22	148	980	742	1,174	7,326	7,473	14,799	3,523
Prestatyn	930	947	19	19	385	161	401	2,423	2,262	4,685	1,227
Rhuddlan	1,863	1,889	9	101	923	398	568	4,609	4,667	9,276	2,283
Holywell (town) . . .	1,790	1,875	5	107	268	869	738	4,330	4,639	8,969	1,792
Totals . . .	11,716	12,138	64	541	4,660	3,101	4,377	29,924	30,088	60,012	14,234

The population of Flintshire each time the census was taken in the present century was—

	Males.	Females.	Total.	Increase per cent.
1801	. .	. .	39,622	. .
1811	. .	. .	46,518	17·40
1821	26,733	27,051	53,784	15·62
1831	29,924	30,088	60,012	11·58

Showing an increase between the first and last periods of 20,390, or nearly 51½ per cent., which is 4½ per cent. below the general rate of increase throughout England.

County Expenses, Crime, &c.—The sums expended for the relief of the poor were—

		£.		s.	d.	
1811	„	19,454,	which was	8	4	for each inhabitant.
1821	„	19,470	„	7	2	„
1831	„	20,559	„	6	10	„

The sum expended for the same purpose in the year ending March, 1836, was 16,080*l.* 3*s.*; and assuming the same rate of increase in the population since 1831 as in the ten years preceding that period, the above sum gives an average of rather more than 5*s.* for each inhabitant. All these averages are below those for the whole of England and Wales.

The sum raised in Flintshire for poor-rate, county-rate, and other local purposes, in the year ending the 25th of March, 1833, was 29,191*l.* 1*s.*, and was levied upon the various descriptions of property as follows:—

	£.	s.
On land . . .	25,250	1
Dwelling-houses . .	2,176	0
Mills, factories, &c. .	941	15
Manorial profits, navigation, &c.	823	5

The amount expended was—

	£.	s.
For the relief of the poor . .	22,357	19
In suits of law, removals of paupers, &c.	1,150	19
For other purposes . . .	4,978	15
	28,487	13

In the returns made up for subsequent years, the descriptions of property assessed for local purposes are not distinguished. The sums raised in the years 1834, 1835, and 1836 were 26,963*l.* 14*s.*, 24,215*l.* 12*s.*, and 21,935*l.* 13*s.*, respectively, and the expenditure was as follows:—

	1834.		1835.		1836.	
For the relief of the poor .	£19,565	16	£17,477	4	£16,080	3
In suits of law, removals, &c.	1,852	17	1,169	10	807	13
Payment towards the county-rate . . .	5,220	3	3,276	16	3,125	13
For all other purposes			2,441	19	2,312	15
Total money expended	£26,638	16	24,365	9	22,326	4

The whole saving effected in 1836 as compared with 1834 was therefore 4312*l.* 12*s.*, or not quite 16½ per cent.; and the saving in the expenses for the relief of the poor was 3485*l.* 13*s.*, or rather more than 17½ per cent.

The county expenditure in 1834, exclusive of the relief for the poor, was 3120*l.* 14*s.* 9*d.*, disbursed as follows:—

	£.	s.	d.
Bridges, building, and repairs . .	694	16	1
Gaols, houses of correction, &c., and maintaining prisoners, &c. .	751	5	4
	£.	s.	d.
Shire-halls and courts of justice, building, repairing, &c.	509	17	2
Prosecutions	525	15	11
Clerk of the peace . . .	144	3	10
Conveyance of prisoners before trial .	32	10	11
„ of transports . .	34	12	4
Vagrants—apprehending and conveying	5	19	9
Coroner	130	10	9
Miscellaneous . . .	291	2	8

The number of persons charged with criminal offences, in the three septennial periods ending with 1820, 1827, and 1834, were 84 87, and 171 respectively; making an average of 12 annually in the first period, of 12½ in the second period, and of 24 in the third period. The number of persons tried at quarter-sessions, in respect to which any costs were paid out of the county-rates in the years 1831, 1832, and 1833, were 14, 6, and 13 respectively.

Of this number there were committed for—

	1831.	1832.	1833
Felonies . . .	13	6	12
Misdemeanors . .	1	—	1

The total number of committals in each of the same years were 14, 6, and 13 respectively; of whom

	1831.	1832.	1833.
The number convicted was .	14	5	12
„ acquitted .	—	1	1
Discharged by proclamation	—	—	—

At the assizes and sessions in 1836 there were 31 persons charged with crimes in this county. Of this number 10 were charged with offences against the person, 4 of which were for common assaults; 1 for an offence against property, committed with violence; 15 with offences against property committed without violence; and 5 for poaching. Of the whole number of offenders 21 were convicted and 10 acquitted, or no bill found against them. Of the number convicted 1 was transported for life and 3 for 14 years; 6 were imprisoned for one year and 10 for six months and under.

Of the total number of offenders, 28 were males and 3 females. Among the whole not one had received superior instruction; 3 could read and write well; 18 could read and write imperfectly; and 10 could neither read nor write. The proportion of the offenders to the population was, in 1836, as 1 in 2048, assuming that the population has increased since 1831 in the same proportion as it had done during the ten preceding years.

The number of persons in confinement in the county gaol at Michaelmas, 1836, exclusive of 2 debtors, was 9, viz.:—

	Males.	Females.
For Misdemeanors .	2	—
„ Felonies . . .	5	2

the whole of whom were above 17 years of age; 2 of them were awaiting their trials. The total number of persons committed to the gaol in the course of the year from Michaelmas, 1835, was 67; and the greatest number in custody at any one time was 18. Of the 9 prisoners above mentioned 2 had been committed once and 1 twice before; and 3 prisoners, probably three former offenders, were set to hard labour, 'wheeling and bruising copper dross for road materials.' The average cost per week of each prisoner for food and fuel was 2*s.* 2*d.*

The number of turnpike trusts in Flintshire, as ascertained in 1834, was 14; the number of miles of road under their charge was 85; the annual income arising from the tolls and parish composition was 13,918*l.* 13*s.* 3*d.*, and the annual expenditure 16,211*l.* 8*s.*

The number of persons qualified to vote for the county members of Flintshire was 2151, being 1 in 29 of the whole population, and 1 in 7 of the male population above twenty years of age. The expenses of the last election of county members to parliament were to the inhabitants of the county 74*l.* 9*s.* 8½*d.*, and were paid out of the general county-rate.

There are four savings' banks in this county. The number of depositors and deposits in each of the following years ending 20th of November were:—

	1833.	1834.	1835.	1836.
Number of depositors .	1941	2116	2226	2445
Amount of deposits	£60,945	£65,067	£67,701	£75,188

The various sums placed in the savings' banks in 1835 and 1836 were distributed as under:—

	1835.		1836.	
	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	1188	£8,213	1259	£9,061
„ 50	621	18,908	745	22,777
„ 100	266	17,907	283	19,380
„ 150	92	10,895	86	9,909
„ 200	36	6,108	48	8,093
Above 200	23	5,670	24	5,968
	2226	67,701	2445	75,188

Education.—The following summary is taken from the parliamentary inquiry on education, made in 1835:—

	Schools.	Scholars.	Total.
Infant schools	8		
Number of infants at such schools; ages from 2 to 7 years:—			
Males . . .		62	
Females . . .		62	
Sex not specified		55	
		—	179

	Schools.	Scholars.	Total.
Brought forward			179
Daily schools	119		
Number of children at such schools; ages from 4 to 14 years:—			
Males . . .		2,562	
Females . . .		2,102	
Sex not specified		1,257	
	——	——	5,921
Schools . .	127		——
Total of children under daily instruction			6,100
Sunday schools	108		
Number of children and others at such schools; ages from 5 to 80 years:—			
Males . . .		3,851	
Females . . .		3,366	
Sex not specified		5,701	
		——	12,918

Assuming that the population between the ages 2 and 15 has increased in the same proportion as the whole population since 1821, we may by approximation suppose that the number of children between those ages in Flintshire, in 1834, were 21,162. A large number of scholars attend both daily and Sunday-schools, but how far duplicate entry has been thus made is uncertain. Eight schools, containing 560 children, are both daily and Sunday-schools, therefore so far duplicate entry is known to have been created. Most of the Sunday-schools consist of adult and aged persons as well as children; some are said to remain in them up to the time of their death. Making allowances therefore for these two causes of uncertainty, we may conclude that perhaps not more than three-quarters of the children between 2 and 15 years of age were receiving instruction in 1834.

Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars		Subscrip. and payment from scholars	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	..	..	..	..	8	179	..	..
Daily Schools	16	784	19	1,684	80	3,080	4	373
Sunday Schools	1	55	104	12,613	3	250	..	..
Total.....	17	839	123	14,297	91	3,509	4	373

The schools established by Dissenters included in the bove statement are:—

	Schools.	Scholars.
Infant schools .	. ..	..
Daily schools .	. 5	159
Sunday-schools .	. 77	9931

The schools established since 1818 are:—

	Scholars.
Infant and other daily schools	55, containing 1,952
Sunday-schools . .	88, containing 11,691.

Two boarding-schools are included in the number of daily chools as given above. No school in the county appears o be confined to the members of the Established Church, r of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools stablished by Dissenters, with whom are here included Vesleyan Methodists.

A lending library of books is attached to one school n Flintshire.

FLINTY-SLATE, or SILICIOUS SCHISTUS, is a ubstance which is found chiefly in beds in transition ountains, and it occurs in Saxony, the Harz, Bohemia, tc. It occurs also in Scotland, in the Pentland and Muirut Hills, and in the Isle of Skye, &c.

This substance is of various colours, grey, bluish-grey, nd red; its structure is rather slaty; on the edges it is ranslucent; it is dull, or only glimmering; hard, and roken with difficulty.

It contains about 75 per cent. of silica, the remainder eing lime, magnesia, and oxide of iron.

The basanite, or Lydian stone, is considered to be a ariety of flinty-slate; it has not however a slaty structure, nd is not so hard as flinty-slate. It occurs in Bohemia nd Hungary, but was first brought from Lydia in Asia inor, whence its name.

It is employed, when polished, for trying gold by a comarison of colours and has thence obtained the name of uenstone.

FLODDEN FIELD. [James IV.]

FLOOK. [Anchor.]

FLO'RA, in the Roman mythology, was the goddess of spring and of flowers, and the wife of Zephyr. Flora was also the assumed name of a Roman courtesan, who instituted certain games or festivals called Floralia, which were celebrated at the end of April, and in which women of loose character performed dances and mimic fights, throwing beans and chick-pease among the crowd. Instead of the fights of wild beasts, hares and rabbits were exhibited and chased about on those occasions. The Ædiles presided at these games. (Cicero *in Verrem*, v. 14.) The ground on which the games were performed is still called Campo di Fiora, and forms one of the squares of modern Rome, and serves as a market-place. Some pretend that the Flora who bequeathed this ground to the Roman people was a mistress of Pompey, the remains of whose theatre are close by. But the floral games were instituted long before Pompey, at the beginning of the sixth century of Rome.

Floral games, 'jeux floraux,' was the name given to the poetical assemblies and competition for prizes held at Toulouse. [Clemence Isaure.]

FLORENCE, Province of (Compartimento di Firenze), one of the five provinces into which Tuscany is divided, is bounded on the north by the province of Bologna in the Papal State, on the north-east by the province of Ravenna in the same state, east by the Tuscan province of Arezzo, south by that of Siena, west by that of Pisa and by the duchy of Lucca, and north-west by the duchy of Modena. Its greatest length from east to west is about 70 miles, and its breadth about 60: its area is reckoned at 2241 Italian square miles of 60 to one degree of latitude; and its population is 681,000. (Repetti, *Dizionario geografico della Toscana*, 1837.) The surface of the country is in great measure mountainous, being intersected from northwest to south-east by the central Apennine range. That part of the province which lies on the north slope of the Apennines is called Romagna Granducale, and consists of high lands and narrow valleys, which form the beds of numerous rivers that flow towards the Adriatic. The greater and by far the finest part of the province of Florence lies south or rather south-west of the Apennine chain, and consists of the great valley of the Arno, which crosses it from east to west, and of numerous lateral valleys which follow the course of the rivers that flow into the Arno. The principal of these valleys on the left bank of the Arno are: 1, the Val di Greve, below Florence; 2, Val di Pesa; 3, Val d'Elsa; 4, Val d'Era, on the borders of the province of Pisa: on the right bank of the Arno are—5, the Val di Sieve, called also Mugello, north of Florence; 6, Val di Bisenzio or of Prato; 7, Val d'Ombrone or of Pistoja; 8, Val di Nievole. To the north-west, near the borders of Lucca, the Florentine territory includes part of the Val di Lima, which is a tributary of the Serchio, and at its southern extremity it extends over part of the valley of the Cecina, a river that flows into the Mediterranean through the Maremma of Pisa. The valleys produce corn, wine, oil, silk, and abundance of fruit. The mountains are planted with chestnut and timber trees, and afford abundant pasture. The farms are generally very small, and are mostly let to tenants-at-will on the metayer system. A great resource of the country people is the manufacture of straw hats, the straw for which is that of a peculiar description of wheat cultivated for the purpose, and very thickly sown and cut down before it is ripe. The country girls and men employ themselves in platting this straw, and the profit they derive from it forms a considerable addition to their means of support. The appearance of the peasantry, especially in the Val d'Arno, is pleasing; there is an air of health, comfort, and cheerfulness, a smartness of dress and a cleanliness of the person, superior to what is seen in most other parts of Italy. Many of the women wear round beaver hats like the men. The other manufactures in the country are pottery and china ware, cloth, paper, leather, &c., mostly for internal consumption. The silk manufacture, once very flourishing at Florence, has greatly declined during the present century. The manners of the country people are simple, sober, and decent. The church festivals, which recur at various epochs of the year, are days of mixed devotion and rejoicing, to which the people are much attached. Heinous crimes, such as murders or robberies, are of very rare occurrence. There are elementary schools in every commune, but without any obligatory law to enforce the attendance of children, as in Austrian Lombardy. There are besides grammar schools in the towns, kept by the Scolopj, the Brothers of S. Filippo Neri, and other religious congregations. Lancasterian schools, holiday schools, and infant schools have been established of late years, through the exertions of benevolent individuals, among whom the Abate Lambruschini stands foremost. Upon the whole, although there are still many illiterate persons in the country, a general refinement of manners and address, and a quickness of perception and justness of reasoning, are prevalent, to which the kind and friendly intercourse which exists between landlords and tenants greatly contributes, as well as the universally established use of the same oral and written language which is spoken with nearly equal purity by all classes of persons.

For administrative purposes the province of Florence is divided into 28 districts called cancellerie, which contain altogether 90 communes, having each a gonfaloniere and a communal council. The districts have each a political governor, called cancelliere, and they are named from their chief towns as follows:—1. Bagno in the valley of the Savio, near the borders of Papal Romagna, contains two communes and 7515 inhabitants; 2. Galeata in the valley of the Bidente or Ronco, two communes and 4533 inhabitants; 3. Rocca S. Casciano in the valley of the Rabbi and Montone, five communes and 11,528 inhabitants; 4. Terra del Sole in the valley of the Montone, one commune and 3309 inhabitants; 5. Modigliana in the valley of the Marzena near the borders of Faenza, one commune and 4810 inhabitants; 6 Marradi in the valley of the Lamone, two communes and 1050 inhabitants; 7. Firenzuola in the valley of the Santerno, one commune and 8316 inhabitants: the old road from Florence to Bologna passed through it. All the above districts are north of the Apennine chain. On the south side of the mountains are: 8. Scarperia in the valley of the Upper Sieve or Mugello, containing five communes and 22,870 inhabitants; 9. Borgo San Lorenzo in the Middle Sieve, with four communes and 26,344 inhabitants; 10. Pontassieve at the confluence of the Sieve with the Arno, three communes and 18,575 inhabitants; 11. Figline in the Valdarno above Florence, three communes and 33,239 inhabitants; 12. FLORENCE one commune with 95,927 inhabitants; 13. Fiesole eight communes and 52,282 inhabitants. The town of Fiesole is much decayed, and hardly contains 3000 inhabitants. It is a bishop's see, and has a remarkable cathedral and several other churches. 14. Galluzzo in the valley of the Arno south of Florence contains six communes and 52,177 inhabitants; 15. San Casciano in the Val di Greve, three communes and 25,900 inhabitants; 16. Castel Fiorentino in the Val d'Elsa, three communes and 20,114 inhabitants; 17. Empoli in the valley of the Lower Arno, five communes and 29,664 inhabitants. Empoli is a thriving well-built town on the left bank of the Arno, in a very fertile country; it has several manufactories of cotton, leather, glass, and 5500 inhabitants. 18. San Miniato, below Empoli, one commune and 13,960 inhabitants; 19. Castel Franco di Sotto, four communes and 11,235 inhabitants; 20. Volterra, between the Era and the Cecina, two communes and 43,009 inhabitants [VOLTERRA]; 21. Fucecchio on the north bank of the Lower Arno, with two communes and 16,390 inhabitants; 22. Pescia in the Val di Nievole, four communes and 18,173 inhabitants; 23. Monte Catini in the same valley, two communes and 10,549 inhabitants; 24. Buggiano also in the Val di Nievole, two communes and 11,904 inhabitants; 25. San Marcello in the valley of the Lima, among the Apennines of Modena and Lucca, contains three communes and 10,140 inhabitants; 26. Pistoja has five communes and 43,433 inhabitants; 27. Potesterie di Pistoja, which include seven communes formerly subject to that town, and 36,326 inhabitants [PISTOJA]; 28. Prato in the valley of the Bisenzio, has two communes and 38,885 inhabitants. The town of Prato, 12 miles north-west of Florence, at the foot of the Apennines, is a bishop's see, has a handsome cathedral, a college, besides a seminary for ecclesiastical students, a public library, a printing-press, an hospital, a monte di pieta, several manufactories of coarse woollens, and about 10,000 inhabitants. The road from Florence to Prato crosses a fine level country, highly cultivated, and thick set with gardens and villas.

Further particulars concerning the government, industry, commerce, and other statistics of this country are given under the head TUSCANY. The climate of the province of Florence is generally healthy, and the winters are much colder than in the plains of Pisa near the sea: the highlands of the Apennines are bleak and barren; the lowlands are pleasant and fertile, but in many parts are subject to inundations of the Arno and its affluents

FLORENCE, FIRE'NZE, or FIORE'NZA, the capital of the Grand Duchy of Tuscany, and an archbishop's see, is situated in the valley of the Arno, which river divides it into two unequal parts, the larger or original city being on the right or northern bank. Its shape is a pentagon about six miles in circuit; it is enclosed by walls and has eight gates, six of which open to high roads leading to Arezzo, Siena, Pisa, Pistoja, Bologna, and to the Vallombrosa and the Casentino. On the north and north-west a fine plain a few miles in breadth is interposed between the town and the Apennines, which rise to the height of more than 3000 feet above the plain, and the upper ridge of which has a naked and barren appearance. To the north-east the hill of Fiesole, covered with gardens and country-houses, almost touches the city walls. That part of the town which is south of the Arno runs up the declivity of a rather steep hill, which is partly enclosed within the walls; the gardens of Boboli and the fort of Belvedere crown the higher grounds within the enclosure. Four bridges over the Arno connect the two parts of the city; the handsomest of the four is the Ponte Santa Trinita which is adorned with marble statues, and the middle arch of which is 90 feet in span. In the central or most antient part of Florence (for the town has been repeatedly enlarged, the actual line of walls dating from the 14th century,) which lies chiefly between the cathedral the old market, the town palace, and the river, the streets are mostly narrow and irregular, and many of the houses have a mean or dilapidated appearance, though here and there are fine churches and massive square stone palaces which look like fortresses, and were partly intended as such during the civil contentions of the commonwealth. But the streets which lead from this central part to the present gates and which from their more recent date are still called Borghi, or suburbs, are laid out on a regular plan: the outer part of the town also is handsomely built, the houses being interspersed with gardens, especially in the neighbourhood of the city walls. The most remarkable structures in Florence are,—1. The Duomo or Cathedral, which was begun at the end of the 13th century by Arnolfo di Lapo, was continued by Giotto and other successive architects, until Brunelleschi completed it in the 15th century by raising the noble cupola which excited the admiration of Michel Angelo. This magnificent building is surrounded by an open place; on one side of it rises a detached square tower or belfry 250 feet high, and before it the baptistery of St. John, an octagon chapel rich with sculptures and mosaics. The whole group of buildings is cased in marble party-coloured black and white. A full account of the cathedral and baptistery is given by Sgrilli, *Descrizione dell' insigne Fabbrica di S. Maria del Fiore, Metropolitana Fiorentina*, 2nd edition, 1756; and there are splendid engravings of it in the work recently published in parts at Milan, entitled *Chiese principali d' Europa*. 2. Il Palazzo Vecchio, or town-house, which was the seat of the government of the Florentine republic, a square massive-looking structure surmounted by a tower 260 feet high, from which the great bell used to toll to assemble the citizens or call them to arms. The square in front is adorned with a noble fountain and with marble and bronze statues. A description of this palace is given by Rastrelli, *Illustrazione Storica del Palazzo della Signoria detto Palazzo Vecchio*, Florence, 1792. 3. Between the Palazzo Vecchio and the Arno is the handsome building, called Gli Ufficii, with arcades forming three sides of an oblong court 400 feet in length, raised by the Grand Duke Cosmo I. the first story is occupied by the archives, the treasury, other public offices, and the Magliabecchi library, which contains 150,000 printed volumes and 12,000 MSS. The second story contains the celebrated galleria, or museum, formed by the Medici, which is one of the richest existing collections in sculptures, medals, cameos, bronzes, paintings, and other works of art. Full descriptions of it with plates have been repeatedly published. 4. The Church of San Lorenzo, built by Brunelleschi, the numerous altars of which are adorned with the paintings of Florentine masters. In the body of the church is the modest tomb of the elder Cosmo, called Pater Patriæ; in the old sacristy is that of his father, Giovanni, the princely merchant, the head of his family and the founder of this church; and in the new sacristy are the celebrated monuments of Giuliano de' Medici and of Lorenzo Duke of Urbino, by Michel Angelo. Behind the choir of the church is the sepulchral chapel of the grand dukes of the house of Medici, rich in marble, jasper, agates, lapis lazuli, and other valuable stones, on which account it has received the name of 'Cappella delle Pietre dure;' but it is much inferior in the taste and workmanship of its mausolea to the plain marble monuments of Michel Angelo in the neighbouring sacristy. Annexed to the church is the building begun by Michel Angelo and finished by Vasari, containing the valuable library of MSS. called Laurentiana, collected in great part by Cosmo, Lorenzo, and the other members of the first house of Medici, but considerably increased since. Bandini has published the catalogue of the Greek, Latin, and Italian MSS.; and Biscioni and Assemani those of the Hebrew and Oriental ones. 5. The Church of Santa Croce is remarkable chiefly for the sepulchral monuments of Machiavelli, Michel Angelo, Galileo, and Alfieri. 6. The palace Pitti, the residence of the grand duke, begun by Brunelleschi and finished by the Grand Duke Cosmo I., has a splendid gallery of paintings and a library of 70,000 printed volumes and 1500 MSS. chiefly Italian, among others the correspondence of Machiavelli and that of Galileo. The adjoining gardens of Boboli are extensive, and afford a pleasant promenade to the public, but they are laid out and the trees are cut in the old formal style; the fountains are remarkably fine.

Besides the above, which are the most remarkable edifices in Florence, there are numerous other structures which would be considered as an ornament to any city; such as the palace Riccardi, with its valuable library, now the property of the community; the palace Strozzi, one of the most remarkable specimens of the old massive and stern Florentine architecture; the modern palaces Corsini, Borghese, and many others; the churches of San Marco, Santa Maria Novella, l'Annunziata, Ognissanti, &c.; the two principal theatres; the Academy of the Fine Arts; the hospitals; and the public walks outside the gates, all of which have been described in separate publications. For a general description of the remarkable objects in Florence, see *Guida della Città di Firenze*, 1822; and *Scelta di 24 Vedute delle principali Contrade, Piazze, Chiese e Palazzi di Firenze, disegnate da* Zocchi, in fol.

Florence contains many charitable and other useful institutions. There are nine elementary schools for boys, besides the schools kept by several religious congregations; four schools for girls; the Instituto della SS. Annunziatasin which 800 girls are boarded and instructed, and provided for when they leave the house; besides asylums for the orphan, the blind, the deaf and dumb, and other unfortunate persons; and 'confraternite,' or associations of charitable persons, for attending the infirm and burying the poor dead. The medical and surgical college attached to the hospital of Santa Maria Nuova is one of the best medical schools in Italy. The principal academies are that of La Crusca; that of the fine arts, which reckons several distinguished contemporary artists, such as the painter Benvenuti, and the engraver Morghen; and the Academy dei Georgofili, which encourages agriculture, and publishes a quarterly journal, called 'Giornale Agrario Toscano.'

The state of education among the Florentines is noticed under the head of FLORENCE, PROVINCE OF; the reader may also consult on this subject a very full article, *State of Education in Tuscany in the year* 1830, in No. III. of the *Journal of Education*. The people of Florence are civil, industrious, sober, steady, economical even to parsimony, loquacious and satirical, but docile and quietly disposed. Among the wealthy and fashionable class morals are pretty much on the same standard as in most other Italian cities, only there is perhaps greater outward decorum maintained. Fortunes are moderate, and mostly derived from landed property. Among the Tuscan nobility are many individuals distinguished for their learning, and for the liberality with which they exert themselves in promoting useful and charitable institutions, such as schools, savings' banks, and works of public utility.

Florence is upon the whole the most pleasant place of residence in all Italy. Strangers have also the advantage of the best reading-rooms in the whole peninsula, which are supplied with foreign journals and literary novelties.

The price of provisions is moderate, the country very fine, and the climate generally healthy, though at times foggy in the autumn and cold in the winter. The whole neighbourhood of Florence is studded with villas, country-houses, and gardens, which made Ariosto say, that if they could be all collected within the enclosure of a wall and joined to the actual city, Florence would be more than equal to two Romes. Florence is 43 miles east of Pisa, 51 south by west of Bologna, and 145 north-north-west of Rome.

History of Florence.—This town owes its origin to a colony of Roman soldiers, sent by Octavianus after the victory of Perusia, to whom he allotted part of the territory of the colony of Fæsulæ, established about forty years before by Sulla. In the reign of Tiberius we find the Florentines mentioned by Tacitus (*Annal.* i. 79) as having sent a deputation to Rome to deprecate the intended diversion of the course of the Clanis into the Arno, by which their fields would have been exposed to inundation. About A.D. 119 Hadrian, who had been prætor of Etruria under Trajan restored, in the second year of his reign, the Via Cassia from Clusium to Florentia. Little else is known of Florence under the empire, and hardly any remains exist of that period, except some relics of an amphitheatre, and a few inscriptions. Christianity seems to have been established at Florence in the third century, and several martyrs are recorded there under Decius. In the year 313 Felix bishop of Florence attended a council at Rome. About 405 the town was threatened by the Goths under Radagaisus, but was saved by Stilichon, who defeated the barbarians in its neighbourhood. In 542, being again attacked by the Goths under Totila, it was successfully defended by the garrison which Belisarius had left in it. In 553 the Florentines sent a deputation to Narses to propitiate that commander in their favour. The Longobards afterwards occupied Florence, apparently without violence, and Tuscany became one of the duchies of their kingdom. Upon the whole, Florence seems to have escaped comparatively unhurt the ravages of the northern invaders, owing probably to its situation. Charlemagne having conquered the Longobards, organized the various provinces of their kingdom: he appointed at Florence a political chief called duke, and afterwards count, under whom were various officers called scabini, vicarii, vicedomini, advocati, and centenarii, who by the Capitularies of the year 809, ch. xxi., were to be chosen by the count and the people together. Thus a municipal government was early given to Florence. In the eleventh century, when Italy began to be involved in the long quarrel between the church and the empire, Florence with the greater part of Tuscany was under the jurisdiction of the Countess Matilda, who dying about 1115 left her inheritance to the Roman see. From that time the towns of Tuscany began to govern themselves as independent commonwealths, and the popes favoured this state of things. Florence had then a very limited contado, or territory, extending only a few miles round its walls; but the industry and speculative spirit of its citizens wonderfully enriched them. They had commercial establishments in the Levant, in France, and in other parts; they were money-changers, money-lenders, jewellers, and goldsmiths. In 1078 they first enlarged the circuit of their town. In 1113, while the Countess Matilda was still living, the citizens of Florence took up arms to repel a new delegate or vicar sent by the emperor and accompanied by a troop of armed men furnished by the neighbouring feudatories. They met him at Monte Cascioli, then an estate of the counts Cadolingi, about six miles west of Florence: Robert the imperial vicar was killed in the conflict, and his men were routed. This was the first military exploit of the Florentine community, and from that time Florence was numbered among the towns attached to the popes and opposed to the emperors, or as they were afterwards called in the following century, the Guelph party, although many of the neighbouring feudatories were of the opposite or imperial party; and as several of them at various epochs became citizens of Florence, or became connected by marriage or otherwise with Florentine families, the seeds of internal discord were thus sown within its walls.

In 1177 the first internal disturbance is recorded as raised by the Uberti, a powerful family, supported by their dependants and friends, against the consuls, or municipal magistrates, who were elected by the various trades. The town became divided into factions, each headed by some turbulent family: they fought in the streets, from palace to palace, and tower against tower: of these towers there were many within the town more than 100 braccia high (about 150 feet). (Malispini, *Cronica Fiorentina*, cap. 80.)

In 1215 the whole town was divided into two factions, in consequence of a young man of the family of Buondelmonti, who was betrothed to a young lady, a relative of the Uberti, having broken his faith to her and married another of the family of Donati. The Uberti and their relatives stabbed the promise-breaker in the street. The citizens took part, some with the Uberti, and others with the Buondelmonti and Donati. As the Uberti were partisans of the emperor Frederic II., the two parties assumed the respective names of Guelphs and Guibelines, and the private feud was mixed up with the great quarrel which then divided all Italy. In the course of this struggle, sometimes one, sometimes the other of the two parties prevailed, when the leaders of the losing faction generally left the town to return at the first opportunity. The majority of the citizens however were Guelphs, and their party predominated in the town when the emperor Frederic II. died in 1250. Emboldened by this event, the Guelphs of Florence, not content with ruling over their community, sent forces against Pistoja, Pisa, and Siena, which belonged to the Guibeline party, defeated the Pisans, made an incursion into the valley of Mugello against the Ubaldini, who, as well as the Guidi, were great Guibeline feudatories in the Apennines, and sent another force into the Valdarno against the Florentine emigrants who had gathered there. All this occurred in 1252, which was thenceforth remembered by the Florentines as 'the year of victories.' In 1254 they took Volterra. This was to Florence a period of great success, and it was then that they first coined their golden florins, of twenty-four carats, and of the weight of a drachm, bearing the impression of John the Baptist, the patron of Florence, and a lily, the device of the city. This was considered the finest coin in all Europe. It was also about this time that the government was reformed. Instead of the consuls of the trades, a council of twelve anziani, or elders, was appointed, two for each district of the town, who were civil magistrates, and a podesta was chosen from some other town to administer justice, whose decisions were without appeal. Another stranger was chosen as captain of the people, or commander of the militia, composed of the citizens formed into companies under their respective gonfalonieri, or standard-bearers. These two last officers were renewed every two years, and sometimes yearly. It was at that time a prevailing custom of the Italian cities to choose their podesta from among strangers, to avoid the risk of partiality arising from connexion and friendship; but the temptation of bribery or seduction still remained.

Meantime the Guibeline emigrants had gathered at Siena, and being supported by Manfred, king of Naples, they took the field under Farinata degli Uberti, an able leader, who surprised the Florentines and other Guelphs of Tuscany at Monteaparto, on the banks of the Arbia, a few miles from Siena, on the 4th September, 1260, and completely defeated them, with the loss of 10,000 killed and a number of prisoners. The Guibelines entered Florence in triumph, the principal Guelphs who survived fled to Lucca, their property was confiscated, their houses were razed, and a new magistracy was formed from among the Guibeline party, who took the oath of allegiance to Manfred. At a general diet of the Guibeline cities, held soon after at Empoli, it was proposed to raze Florence to the ground, and distribute the inhabitants among other towns, as the bulk of the population was too much Guelph to be trusted; but Farinata indignantly resisted the proposal, saying he would sooner join the Guelphs than see his native town destroyed: this threat had its effect, and Florence was saved. Dante has justly praised Farinata for this patriotic act, in which the feelings of the citizen rose above the passions of the partisan.

In 1265 the defeat and death of Manfred, at Benevento, turned the scale against the Guibelines. The Florentines in the following year drove away the garrison left by Manfred, and offered their allegiance for ten years to Charles of Anjou, king of Naples, who sent them 800 French horsemen under Gui de Montfort as his vicar. A new organization of the government took place, which was divided among several councils. There was a council of twelve Buonomini, who were to give their opinion first on every new measure, law, or tax proposed, after which the measure, if approved by them, was laid before the council of credenza, or 'trust,' a sort of senate composed of the gonfalonieri of the higher trades and other notables, who deliberated in secret, and from them the motion came before the council of 300, consisting of deputies from all classes of citizens, presided over by the podesta, which gave its final sanction. The mode of electing these various councillors is not very clearly ascertained. There was also much confusion between the legislative and judicial powers in all the Italian cities, and the laws and customs were generally so barbarous and absurd, that there was no security for person or property. (Sismondi's *Italian Republics;* Hallam's *Middle Ages;* also an article in the *Foreign Quarterly Review*, xxiv., October, 1833, on the *History of Modern Italian Freedom.*)

In 1268 the expedition of Conradin gave a momentary preponderance to the Guibelines, but they were soon expelled again from Florence. In 1273, by the mediation of the pope, peace was made between the two parties, and the Guibelines were recalled, but this harmony did not last long. In 1280 Cardinal Latino Orsini, legate of Pope Nicholas III., made a new peace: the more violent Guibelines were banished for a time, but their property was restored to them, and the rest of their party were allowed to return, and to participate in the offices of the state. But the Guelphs being stronger, did not keep their promises towards them. From this epoch and for the next thirty years we have a faithful guide among the intricacy of the internal feuds of Florence in the chronicler Dino Compagni, from whom a brief account of those transactions in which both he himself and the poet Dante acted a part, is given under the head DANTE. The institution of the Priori, or supreme executive magistrates, who were chosen from among the higher trades, one for each district or ward of the city, and renewed every two months, dates from this epoch, and lasted till the end of the republic. All those families who had titles of nobility conferred upon them, whether Guelphs or Guibelines, were declared to be excluded for ever from the higher offices of state. They formed the class called Dei Grandi, and were 33 families, mostly Guelph, as the Guibelines had been previously exiled. Machiavelli remarks on this occasion that 'the plebeians of Rome aimed at sharing in the offices and honours of the state in common with the patricians, an aim just and reasonable, and in which they succeeded, while those of Florence fought in order to monopolize the government, to the exclusion of the nobles, which made the latter more desperate, and led to a perpetual recurrence of slaughter, banishment, and confiscation.' (*Istorie Fiorentine, proemio*, lib. iii.) But Machiavelli seems to have overlooked the difference in the constitution of society in the two cities: at Rome the patricians were the original inhabitants, while at Florence the nobles were most of them originally strangers who had asked for and obtained the freedom of the city, or citizen families who had obtained titles of nobility from the emperors or other foreign rulers.

After the feuds of the Bianchi and the Neri, and the banishment of the former, the Florentines besieged and took Pistoja by famine in the year 1306. The siege was attended with circumstances of the greatest atrocity, like most of the wars of the Italian cities in the middle ages, and which are indignantly related by honest Dino. In August, 1315, Uguccione della Faggiuola, at the head of the Guibelines of Pisa, completely defeated the Florentines, joined by the other Guelphs of Tuscany, at Monte Catini, in the Val di Nievole. But Uguccione himself being driven away from Pisa for his tyranny towards the citizens, Florence had time to recover from its loss. Uguccione was succeeded in the command of the Guibelines of Tuscany by Castruccio Castracani, lord of Lucca, who took Pistoja, and defeated the Florentines in a pitched battle at Altopascio, near the marshes of Bientina, in September, 1325. Castruccio advanced to within a mile of Florence, and had the bishop of Arezzo joined him with his forces, he would have taken the town. But the Florentines received timely assistance from the Anjou king of Naples, while the Emperor Ludovic V. came into Italy to support Castruccio and the Guibelines, whose cause however met soon after with an irreparable loss by the death of Castruccio in September, 1328. [CASTRUCCIO CASTRACANI.] Charles duke of Calabria, on whom the Florentines in their distress had conferred the signoria, or lordship, of their city, and who had already given proofs of a tyrannical disposition, died about the same time. Death, Machiavelli observes, was the best ally of the Florentines in their most urgent distresses. While they were threatened by Castruccio, one of their principal merchant houses failed for the sum of 400,000 golden florins, which added greatly to their distress. In 1333 a great flood of the Arno carried away three bridges, part of the walls, laid most of the streets of Florence under water, and caused heavy damage. Some years afterwards two more commercial companies, Peruzzi and Bardi, failed in consequence of the loss of 1,365,000 golden florins, being capital and interest of sums which they had advanced to Edward III. of England, and which he was unable to repay.

These facts give an insight into the sources of the extraordinary wealth and resources of the Florentines. These sources were twofold, the numerous manufactures at home and the trade and banking speculations carried on by Florentine merchants abroad. Among the manufactures the most important were those of woollens, silks, and jewellery. The citizens of Florence were classed from 1266 into 12 arti, or companies of trades or professions, seven of which were called arti maggiori, namely—1, lawyers and attorneys; 2, dealers in foreign stuffs; 3, bankers and money-changers; 4, woollen manufacturers and drapers; 5, physicians and apothecaries; 6, silk manufacturers and mercers; 7, furriers. The arti minori, or lower trades, were originally five—retailers of cloth, smiths, shoemakers, butchers, carpenters, and masons; but they were afterwards increased to 14. Every citizen who wished to be eligible to office was required to inscribe his name on the rolls of one of the trades. Dante had his inscribed on the roll of the apothecaries, although he never exercised that profession. Of the importance of their foreign trade, and the influence which the Florentine merchants or bankers had attained in foreign countries, we have a proof in the fact, that when Pope Boniface VIII. after his election, received the congratulatory addresses of foreign states, it was observed that no less than 12 envoys accredited to him on the occasion were citizens of Florence, on which Boniface exclaimed, that 'the Florentines constituted the fifth element of the creation.'

Their armies, especially when upon a long expedition, were chiefly composed of mercenaries and auxiliaries, and mostly commanded by a foreign captain, or condottiere, by whom they were often badly served or betrayed. The towns and districts subject to Florence retained their local statutes, and elected their own magistrates, like the municipia subject to antient Rome, but they had no share in the central government of the republic.

Fresh dissensions among themselves and an unfortunate campaign against Pisa made the Florentines look out again for a foreign protector. King Robert of Naples sent them one of his officers, Gaultier de Brienne, of French extraction, but born in Greece, who bore the title of Duke of Athens, and who had already some years before come to the assistance of Florence against Castruccio. Many of the citizens, weary of civil feuds, contrived to have him elected by acclamation lord of Florence for life, in 1342, thus superseding the ordinary government of the Priori and Gonfaloniere. He began by putting to death or sending into exile a number of citizens of the wealthier popular families who had till now kept the government in their own hands, and who were obnoxious both to the nobles who were excluded from office and to the inferior orders who attributed to them all their troubles. Having a foreign force of Frenchmen and Neapolitans at his disposal, his sentences were summarily executed. In the course of ten months he contrived to draw 400,000 golden florins, which he transmitted to Naples. He soon incurred the hatred of all parties, and having convoked for the 26th July, 1343, a number of distinguished citizens to consult with them on the affairs of state, but really for the purpose of putting them to death the people, who were already prepared, rushed to the palace at the cry of 'popolo, popolo,' dispersed the duke's cavalry, and obliged him to capitulate on the 3rd of August, when the bishop of Florence had him conveyed safely with his men outside of the territory of the republic. Thus Florence recovered its independence, and the memory of that deliverance, called 'la Cacciata del Duca d'Atene,' is still solemnized at Florence by the display of the flags of the various trades on the 26th of July.

It was now agreed that the grandi, or antient nobles, should have a share of the offices of the state, but as they soon assumed too much, they were driven away again from the town-hall. Upon this they took up arms, and a battle ensued in the streets of Florence, in which the grandi were defeated and their houses plundered and burnt. This was the last struggle of the nobles at Florence. (Machiavelli, lib. 11.) But a few years after a new quarrel broke out between two wealthy citizen families, the Albizzi and the Ricci, which divided the city into two parties again. The Albizzi at length preponderated, and after exiling a number of citizens of the opposite party, they formed a government composed entirely of popolani grassi, or wealthy citizens. The way in which the Albizzi, and the Medici after them, contrived to monopolize the power of the state, was by calling together the general assembly of the people in the great square, which, not being able to deliberate, voted by acclamation a Balìa, or dictatorial commission. This commission appointed a permanent council, a sort of senate which chose the citizens whom it thought qualified to fill the principal offices of state. These general assemblies, called 'parlamenti,' were resorted to in factious times, and were swayed by the strongest or boldest faction. (Machiavelli, *Istorie Fiorentine.*) The lower trades, instigated by the Ricci and the Medici, who began at that time to court notice and popularity, broke out into insurrection in 1378, forced the town-hall, burnt the archives, and after three days of anarchy, elected a woolcomber, Michele Lando, as chief magistrate. Lando, who was a man of natural good sense, succeeded in re-establishing order and checking the rioters After several years of troubles, the popolani grassi, with the Albizzi at their head resumed the power in 1382, and formed a new aristocracy, which succeeded in retaining the reins of the government for 52 years, not however without occasional tumults, conspiracies, and insurrections, until the year 1400. From that year, Machiavelli says, the city remained internally quiet till 1433, the longest period of tranquillity which Florence had ever known. The state was fortunate in its external politics; its two most formidable enemies Gian Galeazzo Visconti, duke of Milan, and Ladislaus, king of Naples, being carried off, the former by the plague and the other by another contagion, just as they were threatening Florence with destruction. The Florentines acquired possession, partly by force and partly by purchase, of Cortona, Arezzo, Livorno (Leghorn), part of the Romagna, and lastly of Pisa, which they took through famine and treachery in September, 1406. The Florentines behaved with great humanity and even generosity in order to reconcile the Pisans to their yoke; but all the antient and most opulent families of that city emigrated to Lucca, Sardinia, and Sicily, the young men engaged in the free companies of the various Condottieri; and Pisa, in losing its independence, lost its commerce, its population, and its prosperity.

The administration of the Albizzi was overthrown by Cosmo de' Medici, a popular citizen and a princely merchant, in 1434. From that moment the history of Florence became closely connected with that of his house, and the sequel is given under the head MEDICI.

The first house of Medici respected the republican forms, and were contented with exercising the chief influence in the state without emerging from the class of citizens. But the foreign wars which desolated Italy in the 16th century effected the fall of that republic, when a member of a lateral branch of the Medici, the line of Cosmo having become extinct, was placed by Charles V. as duke of Florence. [COSMO I.] The ducal dynasty of Medici continued to rule till the year 1737, when, becoming extinct, they were succeeded by Francis of Lorraine, afterwards emperor of Germany, and husband of Maria Theresa of Austria. [TUSCANY.]

FLORES, an island 30 miles long, with a mean breadth of 9 miles, is one of the Azores, and situated in 39° 34 N. lat., and 31° W. long. It derived its name from the multitude of flowers with which it abounds. There are two small towns on the east coast, called Santa Cruz and Lagena. There is little trade, but the island produces abundance of wheat and pulse; and a great number of horned cattle of small size are bred. The number of inhabitants is said to be about 1400.

FLORES, sometimes called Endé, an island in the Indian archipelago lying between 8° and 9° S. lat., and between 120° and 123° E. long. Its length is about 200 miles from east to west, and its average breadth about 35 miles. The surface of the island is hilly, particularly on the south side, where there are several high volcanic mountains, from one of which there was an eruption in 1810. The principal port, Endé, is on the south side of the island it has an excellent harbour. Larantuka, a town on the east side, on the straits of Larantuka, in 8° 45′ S. lat. and 123° E. long., is in the possession of the Portuguese, who have succeeded in bringing many of the natives to the profession of the Catholic faith. This is the only part of the island in possession of Europeans. Endé was formerly subordinate to the Dutch residency at Coopang in the island of Timor out in 1812 the Bugis inhabitants succeeded in expelling all Europeans, and have since refused to hold any intercourse with them. The coast is mostly colonized by Bugis and Malays, but the interior is inhabited by aborigines, about whom and about their customs and institutions little or nothing is known. They more resemble in their persons the Papuas of New Guinea than any other inhabitants of the Eastern Archipelago.

FLORIAN, JEAN PIERRE CLARIS DE, was born of a noble family in the Château-Florian, in the Cevennes, in 1755. His education was superintended by his grandfather; but, on his dying deeply in debt, Florian was obliged to look around him for some means of support. The Marquis de Florian, his uncle, who had married a niece of Voltaire's, took young Florian to Ferney, where the philosopher spoke encouragingly of his talents. He became in 1768 page of the Duc de Penthièvre, and finding that he had a passion for the army, that nobleman gave him a company of the dragoons de Penthièvre. He shortly afterwards retired from active service, and accepted the place of gentleman in ordinary to the duke, who treated him as a friend. Having now an opportunity to devote himself to literature, he produced in 1783 the romance of 'Galatea,' in imitation of the novels of Cervantes. His mother being a Castilian, he was perfectly familiar with the Spanish language. 'Galatée' was followed by the well-known 'Numa Pompilius,' published in 1786. The pastoral romance of 'Estelle,' which was produced two years afterwards, and was reckoned by critics his best production, caused but small sensation at the time. He also brought out a collection of fables and a number of little comedies, in the Italian style, with Arlechino for their hero, which were very successful. In 1791 he published his romance 'Gonzalve de Cordoue,' which was preceded by an historical notice of the Moors, which has been greatly esteemed. In 1793 he was banished from Paris by the decree published against the nobility, and retired to Sceaux, the inhabitants of which received him with cordiality, as he had always been, in conjunction with the Duc de Penthièvre, their benefactor. He was afterwards arrested, and confined in the prison called Port Libre, but he was soon liberated. His health was so affected by anxiety, that he died in 1794, having, during his incarceration, written the romance of 'Guillaume Tell.'

Florian seems to have been a writer who did little else than imitate, in an inferior manner, the authors who had preceded him. 'Galatée' is an imitation of Cervantes; 'Numa' of Fenelon's 'Telemaque;' and the fables, of those of La Fontaine. His fables, which are well spoken of by La Harpe, contain some very neat and accurate descriptions; indeed, as a fabulist, La Fontaine is alone his superior. 'Numa' retains its place as a school-book. The translation of 'Don Quixote,' which is a posthumous work, is censured for its want of humour. An honourable trait of Florian deserves to be recorded—he devoted much of the profits of his works to paying the debts of his family.

FLO'RIDA was the name given by Juan Ponce de Lion to the continent of North America, from having discovered it on Palm Sunday (called, in Spanish, Pasqua Florida) in 1512. During a great part of the sixteenth century the southern part of the eastern coast of North America continued to bear this name, which was gradually restricted to that portion of this coast now called Florida. This country at present forms a territory of the United States, and comprehends a peninsula, lying between 25° and 30° 45′ N. lat. and 80° and 83° W. long., besides a tract of land extending along the northern shores of the Gulf of Mexico, between 29° 40′ and 31° N. lat. and 83° and 87° 20′ W. long. The peninsula and adjacent country are called East Florida, and the remainder West Florida; the river Appalachicola being considered as the boundary between them. The length of the peninsula from Cape Sable, its most southern point, to the mouth of St. Mary's River, which divides Florida from Georgia, is 380 miles. Its width between Vacasansa Bay and St. Augustine is about 90 miles, and the breadth is about the same towards its southern extremity; but the central part between Amasura River and Cape Romano is 120 miles wide. The tract along the Gulf of Mexico is nearly 300 miles long from east to west: its width varies between 30 and 70 miles. The whole territory is calculated to be about 55,000 square miles, or somewhat more than that of England.

Opposite the southern extremity of the peninsula there is a series of keys (as they are called, a corruption of *cayos*) and islands, mostly covered with wood. They begin on the west with the Tortugas, and continue for some distance eastward, but afterwards turn to the north-east and north, and terminate at Cape Florida. These islands, which are called the Florida Keys, are skirted towards the south and east by narrow reefs, called the Florida Reefs, and both the Florida Keys and the Florida Reefs may be considered as constituting in this place the left bank of the Gulf Stream, the beginning of which may be fixed between the Tortugas and the coast of Cuba, near the Havanna. The Gulf Stream rapidly increases in velocity, and between Cape Florida and the Bemini Islands sometimes runs five miles per hour. It continues with nearly the same velocity along the eastern shores of Florida up to the mouth of St. Mary's River. The whole of this coast is flat, and skirted by low narrow islands of sand, which lie parallel to the main land, and are separated from it by narrow and shallow lagunes, which cannot be navigated even by vessels of small burden. This coast has no harbours, except at the northern extremity, where that of St. Augustine has 10 feet, St. John 15 feet, and St. Mary's 20 feet water at high tides. The western coast of the peninsula and that of West Florida are also enclosed by elongated narrow sandy islands, though they do not form such a continuous barrier as along the eastern coast, some parts of the west coast being free from them. But this coast also has few harbours. Charlotte Harbour (between 26° and 27° N. lat.) has no great depth of water. Tampa Bay is spacious, and, it is said, admits vessels of considerable burden; but the best harbour is Pensacola, which has 21 feet water on the bar, and from 23 to 36 feet in the interior, which is spacious and convenient. It admits vessels drawing 20 feet, and is the deepest port on the northern coast of the Gulf of Mexico.

The southern districts of the peninsula, as far north as 29° N. lat., are low and flat, being mostly covered with swamps, and containing only moderate tracts of dry land intermixed with the marshy ground. It is in great part devoid of timber, and has only brackish water. The part north of 29° N. lat. has a more uneven surface, but the higher grounds in the interior rarely rise to the elevation of hills. This division contains better water, and is better drained; the swamps are not numerous, and are only of moderate extent. It is besides better wooded, and its soil, though generally sandy, is more fertile; yet in all Florida the proportion of good soil to bad is very small, and cultivation is confined to a few spots of moderate extent. In the northern part limestone is the prevailing rock, and some of the rivers run in different places for some distance under ground.

The climate of Florida is very mild, and in the southern districts hot. South of 28° N. lat. snow is unknown, and frost, though occasional, is rare. The temperature of this tract approaches that of the West Indies. In summer the thermometer generally rises to between 84° and 88°, and in July and August even to 94°. The east side of the peninsula is warmer than the west, which is probably to be attributed to the high temperature of the Gulf Stream. At the equinoxes, especially in autumn, rain falls abundantly every day from eleven to four o'clock for several weeks. At this period strong gales are frequent.

The peninsula is drained by several small rivers, and by the St. John River, whose main branch, the Ocklawaha, rises nearly midway between both seas, and runs north for about 80 miles, when it turns east, and joins the other branch, or proper St. John. Both rivers in their upper course form several shallow lakes, and, after their union, the channel of the river is more like an inlet of the sea than that of a river, being very wide and nearly without current for the remainder of its course, which rather exceeds 80 miles, and is directed to the north. It is on an average 15 feet deep, and may be navigated some distance above the place where both branches unite.

The St. Mary's River, which, for the greatest part of its course, forms the boundary-line between Florida and Georgia, rises in the latter state near 31° N. lat., and flowing first southward about 40 miles, then turns with a bold sweep northward, in which direction it continues about 30 miles. The remainder of its course lies to the east: where it falls into the Atlantic it forms St. Mary's Harbour, the deepest port in the United States south of the Chesapeake Bay, on the Atlantic coast. The whole course of the river is about 110 miles.

The rivers which fall into the Gulf of Mexico rise either in Georgia or in Alabama. The most eastern is the Suwanee River, which rises in Georgia with two branches, the Alapaha and Suwanee, which unite in Florida and fall into the Gulf of Mexico at the northern extremity of the peninsula of Florida, after a course of upwards of 200 miles. Farther west is the Ocklockonnee, which also rises in Georgia: it runs about 125 miles. The next is the Appalachicola, the largest river of Florida. Its principal branch, the Chatahoochee, rises near 35° N. lat., on the southern declivity of the high table-land of the Appalachian system, and runs first south-west and then south, in which direction it enters Florida, receiving on its boundary the Flint River, which rises between 33° and 34° N. lat., and flows 210 miles before it joins the Chatahoochee. The united river is called Appalachicola, which flows nearly due south more than 70 miles, and is navigable for vessels of considerable burden in all its extent. The united course of the Chatahoochee and Appalachicola is more than 350 miles. The Perdido is a small river, and only remarkable as a political boundary between Florida and Alabama.

Florida has a considerable number of lakes, the largest of which are in the swampy districts of the peninsula. The Lake of Macaco (between 26° and 27° N. lat.) seems to be the most extensive; but its dimensions have not been ascertained. Lake George, which is an expansion of the St. John's River, is 18 miles long and 12 wide; the depth of its water is, on an average, 12 feet. In those districts where the limestone formation prevails there are also numerous lakes; but they are generally of small extent.

The climate of Florida is favourable to the cultivation of most of the productions of the West Indies, where the soil is suitable. The sugar-cane may be cultivated successfully in all the maritime parts, where the orange also, the lime, and the shaddock succeed. Cotton, rice, indigo, tobacco, Indian corn, and a great variety of fruits compose the most important cultivated vegetables of Florida. The pines cover a great part of the northern districts, but the forests contain many other valuable trees.

Wild quadrupeds of the larger description are not numerous, except deer. Alligators, turtles, and snakes are very common. Fish is extremely abundant, and of great variety. Coal and iron ore are said to abound in some places.

According to the census of 1830, the population of Florida consisted of 19,210 free people and 15,510 slaves. This scanty population of so extensive a country is explained by the circumstance of the inferior quality of its soil. But it must also be observed, that a large portion of the peninsula, along its western coast, is still in possession of an Indian tribe, the Seminoles, a branch of the once great and numerous nation of the Creeks. The number of individuals composing this tribe is said to exceed 12,000. Two or three years ago they destroyed several plantations of the whites; and when an armed force was sent against them it was impossible to discover their lurking-places. This war is still going on, but is not maintained with vigour; and it is probable that the Seminoles will keep possession of their territory, as it does not contain any extensive tract fit for cultivation.

Florida not having been received into the Union as a state, is only a territory, and in that capacity sends a delegate to Congress. Its capital, Talahassee, a few miles from the river Ocklackonnee, contains about 1200 inhabitants. The most important town is Pensacola, built on the bay of the same name: yet its population does not much exceed 2000 souls. St. Augustine, on the shores of the Atlantic, has about 2000 inhabitants. In its neighbourhood two settlements of Greek emigrants were established by the English, called Anastasia and New Smyrna; but they no longer exist. Farther north is the fertile island of Amelia, on which is a small town called Fernandina.

Florida was discovered by the Spaniards in 1512; the first Spanish settlement was formed in 1565 at St. Augustine, which town, therefore, may be considered as the oldest European settlement on the North American continent, except those on the Mexican isthmus. The Spaniards kept possession of Florida till 1763, when it was ceded to England. It was retaken by the Spaniards in 1781, and remained in their hands at the peace of 1783. In 1819, the United States, being desirous of possessing a country which, by its vicinity to the Gulf Stream, seems to give its possessors a great command over the navigation between Europe and the countries lying about the Gulf of Mexico, entered into a negotiation with Spain for the cession of Florida and a treaty to that effect was ratified by Spain in 1821 The Spanish government, however, was not inclined to cede the country; but the feebleness to which it was then reduced rendered it incapable of any resistance, and in 1821 it was taken possession of by General Jackson, by order of the government of the United States. During the administration of Mr. Jefferson two millions of dollars were appropriated for the purchase of Florida; but the negotiation at that time was not completed.

FLORIN. [MONEY.]

FLORUS, LUCIUS ANNÆUS, a native of Spain, or, according to others, of Gaul, lived under Trajan and Hadrian. Some have supposed him to be the same as Lucius Julius Florus, who lived under Augustus, and to whom Horace has addressed two of his Epistles; but as, in the proemium to his history, Florus speaks of Trajan, he cannot be the same person as Lucius Julius, unless we suppose the passage to be interpolated. This question has been discussed by Titze, *De Epitome Rerum Romanorum*, 1804. Others have supposed Florus the historian to be the same as Julius Florus or Floridus, who lived under Hadrian, and wrote the 'Pervigilium Veneris,' a pretty poem in imitation of Horace's 'Carmen Seculare;' but the identity of the two writers is very doubtful. Lucius Annæus Florus wrote a small work entitled 'Epitome de Gestis Romanorum,' in 4 books, from the foundation of the city to the closing of the Temple of Janus by Augustus. The author compiled his epitome from Livy and from other historian whose works are lost. It is meagre and declamatory, and is less a history than a panegyric of the Roman people. Florus is also incorrect in his chronology and geography. It must be observed, however, that the text, as we have it, is corrupt and interpolated. The work is of some use as a kind of substitute, however poor, for those books of Livy which are lost. Some MSS. attribute to Florus also the Epitomæ, or heads of contents, of the books of Livy.

FLOS FERRI. [ARRAGONITE.]

FLOTSAM, or FLOATSAM, is such portion of the wreck of a ship and the cargo as continues floating on the surface of the water. Jetsam is where goods are cast into the sea, and there sink and remain under water; and ligan is where they are sunk in the sea, but are tied to a cork or buoy, in order that they may be found again.

These barbarous and uncouth appellations are used to distinguish goods in these circumstances from legal wreck, in order to constitute which they must come to land.

Flotsam, jetsam, and ligan belong to the king, or his grantee, if no owner appears to claim within a year after they are taken possession of by the persons otherwise entitled. They are accounted so far distinct from legal wreck, that by the king's grant of wreck, flotsam, jetsam and ligan will not pass.

Wreck is frequently granted by the king to lords of manors as a royal franchise; but if the king's goods are wrecked, he can claim them at any time even after a year and a day. (Bl. *Com.*) The same distinction, it is presumed, would prevail with respect to flotsam, jetsam, and ligan.

FLOUNDER. [PLEURONECTIDÆ.]

FLOUR. [WHEAT.]

FLOUR, ST., a town in France, in the department of Cantal, the capital of an arrondissement and the seat of a bishopric. It is on the right bank of the river Lende, a feeder of the Trueyre, which falls into the Lot, one of the principal streams of the system of the Garonne, 289 miles from Paris, on the high road by Moulins and Clermont to Narbonne and Perpignan. This town is said to derive its name and its origin from a bishop of Lodeve, who came into Auvergne to preach, and died there near the end of the fourteenth century, and whose sanctity attracted so great a crowd as to form a town. St. Flour is on the summit of an eminence of basalt about 300 feet high, and enjoys, from its elevated situation, a pure though keen air. The streets are narrow and sombre in their appearance; the houses, which are built of lava and covered with tiles, have a black and dismal look. The cathedral is small, and the promenade (which forms the entrance from Toulouse and Rodez) though tolerable in itself, is not advantageously situated. The population of the town in 1832 was 5813; of the commune 6464. The inhabitants trade in corn and mules; they manufacture linen cloth, ordinary woollens, and glue. In the neighbourhood, but not in the town, metal pots and pans are made. Many of the tinkers, hawkers, and other industrious itinerants who traverse France, come from the district round St. Flour. There are nine yearly fairs, at two of which a number of mules are sold. The town has a seminary for the priesthood, a high school, and an agricultural society, a small public library, and a philosophical apparatus. The assize court of the department is held here; and there are one or two subordinate courts of justice.

The diocese of St. Flour was established at or near the time of the origin of the town, and comprehended Haute (or Upper) Auvergne; it now comprehends the department of Cantal. The bishop is and always has been a suffragan of the archbishop of Bourges. The arrondissement comprehends 6 cantons and 82 communes, and had in 1832 a population of 64,943.

FLOWER, that part of a plant in which the organs of reproduction are placed. It usually consists of a calyx, a corolla, stamens, and a pistil; but sometimes of only one of the two latter parts; as in the willow and other plants with naked unisexual flowers. In the absence of the stamens and pistil no collection of leaves, whether coloured or not, constitutes a flower. What are termed compound, or more properly composite, flowers, are collections of flowers in a close head, as in the dahlia, and are consequently a peculiar form of inflorescence. [INFLORESCENCE.]

FLOWERS. Lord Bacon (*Essay* 46) calls a garden 'the purest of human pleasures.' Admitting and valuing fully the truth of this assertion, it must be added, that it is also a pleasure which is easily procured, and which lasts throughout a very large portion of the year. In saying that a garden is easily procured, we must be understood to mean a garden in which the objects desired by the cultivator are show, gaiety, and neatness. Where rarity and refinement are wished for, the case is wholly altered; the first can be obtained at a small cost, but there is no limit to the expense of the second. It is of the method of cultivating and displaying flowers in a garden of the less refined sort that we shall now chiefly treat, and we do so because of the great increase of these gardens that is visible: the smallest villa and parsonage, or the larger farm-house, are now rarely without their beds of flowers; and a few hints may be useful to their proprietors. It is obviously desirable, where the varieties of flowers cultivated are few in number, that they should be chosen with regard to the following qualities: the size, the brilliancy, and the smell of their blossoms, the variety of their colours, and more especially the length of time which they continue to blow. This last point is very material, because, if it is disregarded, a large stock of plants will be requisite to keep up a succession, and the labour of planting and replanting, moving and removing, will multiply trouble and expense. As a very large majority of annuals are deficient in this quality, it must be to biennials and perennials that the gardener must chiefly trust. Many of these plants not being sufficiently hardy to stand exposure to an English winter, some shelter must be provided for them during that season. Room for a considerable number may commonly be found in the house of the owner of the garden: they can be placed in windows and in passages, where they will remain in health, if in cold weather the house is continually inhabited. If this cannot be done, shrubby plants may be well, though not so well preserved, by taking them up at the beginning of winter, cutting back the branches, and stowing the roots in a dry cellar, whence they must be taken early in the spring, and potted and watered in a shed-room or very sheltered place to forward them for the summer. The best method of keeping them in the winter (and in this method with care there is no risk whatsoever of loss,) is in a brick pit with two or three glass lights, warmed by a small stove and flue: the cost of building such a pit will usually be about 10*l.* Some breakage of glass must of course be considered as an annual cost. The quantity of fuel used will be too small to take into consideration; a few cinders are all that is requisite. Thousands of plants may be kept in one such pit.

Plants may be multiplied in many ways, by budding, grafting, innarching, by layers, pipings, and cuttings, by suckers, the division of roots and tubers, and by seed; and there are very few species from which by some of these methods an increase cannot be obtained. So easy indeed is the multiplication of plants, and so large a number of new plants can with proper management be raised from one original stock in the course of a year, that the nursery gardeners find it impossible (excepting in rare instances) to maintain a high price for a new flower beyond two or three years: the first year the price of a new flower may be 5*l.*, the second it will be about 30*s.*, the third year not more than 2*s.* 6*d.* The method applicable to the greatest number of plants, and which is successful with ordinary management, is that of cuttings: from the parent plant small slips or cuttings are taken where the wood is not very tender, and if practicable at a joint. The cuttings should be planted about two inches apart, in large pots or boxes, and the pots placed in a moderately warm hot-bed, shaded from the sun. In about a fortnight they will strike root, and begin to grow. They should then be gradually hardened, be put as far as practicable, into separate pots, and removed into the flue-pit, where plenty of air must be given them in the day-time to prevent their damping off, and a fire be lit before frosty nights: the additional security of mats thrown over the frames must be used when the weather is unusually severe. The time of removing the plants from their winter quarters must depend upon their nature and the climate in which they are to grow. The last week in May or the first in June is the earliest time at which the tenderest will bear a thorough exposure; for one or two previous weeks they should be hardened by gradual exposure to the wind and cold nights, care being taken to protect them with mats if either should be in excess. The cultivation of dahlias is commenced in the second or third week in February, when the roots which have been taken up in the autumn should be put into a hot-bed, kept, as far as practicable, at a uniform heat of 62° to 65°; a little of the earth in the bed should be spread over them, and water liberally given them once a day. The roots will then push out suckers, one from each eye: these should be separated from the bulb: a few fibres of the old root being torn off with them, and being treated after the manner of cuttings, will strike and be ready to plant out at the end of May. It is a fault with gardeners generally that their dahlias flower too late. The first flowers are seldom perfect, and it often happens that the plants have not long reached their prime before they are either pinched by cold nights or perhaps altogether destroyed by frost. It is therefore desirable that the plants should never be checked in the early stages by want of heat or otherwise. Perennial herbaceous plants may be easily multiplied by dividing the roots either in the autumn or in spring. Annuals are principally raised from seed sown in April and May, either upon a hot-bed, from which they must be transplanted, or in the situation in which they are to grow. Sweet-peas and mignonette, nemophylla insignis, poppies, &c., are very shy of being transplanted unless from pots. Mallows, choriopsis, China and German asters, French and African marigolds, eutoca viscida, nolana prostrata, &c., will be better raised on a hot-bed. New annuals are continually produced: we do not however consider them generally as a desirable class of flowers.

There are two methods of arranging flowers with a view to their display—1st, putting each species in a separate bed; 2nd, mixing two or more species in one bed. Each has its merits, and in every garden both should be practised. When flower-beds situated close to each other are to be filled with one species only, it will be requisite to consider the height and colour of the flowers to be planted, that both symmetry and harmony may be preserved. Yellow flowers, especially among those that grow from six inches to two feet in height, are more numerous than flowers of any one other colour, and care must be taken not to plant them in undue proportion. When several species are to be planted in the same bed, the largest bed must be chosen, the tallest species be placed in the middle, and various colours mixed together; sufficient space should be left for each plant to grow freely without interfering with or confusing its branches with those that are next to it. Flowers for the most part like a rich, light, new soil. The spot chosen for a flower-garden should be dry, open to the sun, and sheltered from wind and cold.

Beckman (*Hist. Inventions*) says that it may be asserted with great probability, 'that the modern taste for flowers came from Persia to Constantinople, and thence was imported to Europe for the first time in the sixteenth century. At any rate we find that the greater part of the productions of our flower-gardens were conveyed to us by that channel.' The first public botanic garden in Europe was established at Pisa by Cosmo de' Medici in 1543. The example of Pisa was soon imitated at Padua, Bologna, Florence, Rome, and other cities and universities of

Italy and Germany. The Dutch at this time began to exchange the bulbs for which their gardens were celebrated for the orange-trees of Genoa and Leghorn; Spanish flowers also found their way into Italy, and among them the double night-smelling jasmine, which was so highly prized by the governor of Pisa that he placed a centinel to keep guard over the plant.

The taste for gardens among the French was likewise derived from the Italians. Thus far the taste for flower-gardening had not passed the limits of favourable climates, but it continued to spread into colder countries. Germany and England followed the example of their neighbours. James I. of Scotland wrote of a garden at Windsor Castle, where he was a prisoner in the beginning of the fifteenth century; but gardens at that time were certainly very rare, and seem to have been rather formal shrubberies with clipped yew and other hedges, arbours, and avenues, than gardens containing herbaceous and other flowering plants. The gardens at Nonsuch and Hampton Court were planted in Henry VIII's reign; at Hatfield, in Queen Elizabeth's time. Evelyn mentions in his *Diary* the most celebrated gardens of his day: from his account of them it will be seen that flowers were then generally cultivated, and that gardens had become a luxury on which large sums of money were expended. The prices which have been given for flowers at certain periods form a very curious portion of their history. The most curious instance of a mania (it can be called no less) for different species is given by Beckman. (*Hist. Inven.*, vol. i.) In the middle of the seventeenth century tulip roots of particular kinds were greatly sought after, and as their value consequently greatly increased, they became matter of speculation; roots were sold by a weight less than a grain; as much as three, four, and five thousand florins were given for some species; and when once it happened that there were only two roots of a kind called Semper Augustus to be had, the one at Amsterdam, the other at Haarlem, 4600 florins (about *402l. 10s.*), together with a new carriage, two grey horses, and complete harness, were given for one root. Twelve acres of land were offered for a single root, and those who had not ready money promised their movable and immovable goods, lands, cattle, and clothes. The purchaser perhaps did not even receive the root he had bought; he certainly had no intention of cultivating it, and the transactions were purely speculative. This extraordinary system of gambling can only be accounted for by the want of employment for capital. At the present time (1837), though gardens are maintained at a great cost, we do not hear of very large sums being given for individual specimens of whatever species; *60l.* or *70l.* is considered a great price for any plant, and is very rarely given. The principal nursery gardeners, and we believe one nobleman distinguished for his love of flowers, employ botanical agents in distant countries; and the varieties of flowers imported from the Cape of Good Hope and South America, and the East and West Indies, have been extremely numerous. (Loudon's *Cyclop. of Gardening.*)

FLUCERINE, the name given to the native deutofluate of cerium which occurs at Finbo and Broddbo, near Falun, in Sweden. It occurs both massive and crystallized. The crystals are either six-sided plates or prisms; they have a yellow or reddish colour; fracture uneven; dull; translucent, in very thin fragments: when heated by the blow-pipe on charcoal it becomes slightly brown, but does not fuse; in the reducing flame it becomes colourless, and in the oxidating flame, with borax and a phosphate, it yields an orange-coloured globule: when heated in a tube with an acid, the glass is corroded.

FLUE. [House.]

FLUELLITE, a compound of fluoric acid and alumina, which occurs at Stenna-gwyn, in Cornwall, in octahedral crystals, the primary form being a rhombic prism: the crystals are colourless and transparent, with a vitreous lustre. It is extremely rare.

FLUENTS. [Fluxions.]

FLUID. This term is applied to substances of which the parts possess perfect mobility amongst themselves, but more rigorously depends on the relative intensities of the forces which act on the component particles of masses. In bodies of permanent form, denominated solids, these forces not only preserve the particles in a state of rest when undisturbed, but also, on the communication of a slight disturbance relative to their mean positions, reduce them, after the lapse of a very short time, to the places they possessed before; hence arises the permanence of figure and arrangement characteristic of solid bodies. On the other hand, the gases have an elastic or expansive power, which is usually attributed to caloric, because the gaseous state is induced in all substances by the communication of a high degree of heat; the particles of gases have therefore a tendency, when external forces are removed, to fly from their places in obedience to the repulsion exercised by the parts in their vicinity: they are therefore freely movable amongst each other. But the conditions of the motion of any one particle are nevertheless limited by the condensations of the particles on which they impinge and the rarefactions of those they abandon, and therefore, even in a gas, the disturbance of a particle only makes it describe a curve round its mean position, and the condensations and rarefactions thence generated produce inequalities of pressure which propagate like motions in the particles in the vicinity. These motions, gradually conveyed throughout the entire mass, produce vibrations, the phenomena of sound, and, it is thought, those also of light.

This yielding to the internal forces called into play by the motion of the particles of a gas is by no means opposed to but rather implies their perfect mobility. If we diminish or increase their specific weight by an alteration of temperature, they will accordingly rise or sink amongst the myriads of particles by which they are surrounded. Yet they will not rise or sink as if in vacuo, for they still will be encumbered by the influences of the adjacent particles, and therefore their motions must suffer resistance.

But in liquids, which also come under the denomination of fluids, this alteration of density and elasticity is imperceptible in ordinary motions, from whence, in physico-mathematics, they have been generally treated as incompressible bodies; still a small alteration of specific gravity is sufficient to produce a distinct motion on the particles subject to such change. By the application of a blow-pipe to the lower part of a glass vessel containing any liquid a current, due to the alteration of density of the particles in contact with the heated part of the glass, is generated, and there is much reason to believe that many of the permanent currents of the ocean originate from a similar cause, namely, the unequal temperature of different parts of the bottom of the sea, either from the difference of their depths, or of the conductibility of the solid strata with which the fluid is in contact.

The particles of a fluid being thus surrounded by others which are subject to external forces, such as that of gravity, undergo a pressure which is estimated by considering how great it would be if continued uniform over any surface taken as a unit. The direction of such a surface is immaterial, for the particle can only be in repose when the pressures from all quarters are equal. When fluids are inelastic this pressure is entirely due to extraneous forces, such as the weight of the superincumbent mass; but in elastic fluids, as in air, the pressure is necessarily proportional to the elacticity of the particle which supports it; and this elasticity is known to increase with the diminution of the volume compressed; such fluids therefore, under the influence of external forces, acquire variable densities in their different parts.

We reserve for the articles Hydrostatics and Hydrodynamics the principles from whence the equilibrium and motion of fluids are deduced when subject to known forces; and for the article Tides the case when those forces are the attractions of the sun and moon upon the ocean.

The equilibrium of a body floating on a fluid depends on two simple conditions; namely, that the centre of gravity of the whole body and of the displaced fluid must be in the same vertical line, and the weight of this displaced fluid must be equal to that of the body: but for the conditions of the stability of the equilibrium we refer to Metacentre.

When a body moves in a fluid it suffers a resistance depending on its velocity; and when the body is small compared with the mass in which it moves the law of resistance is nearly expressed by the square of the velocity. This hypothesis was originally formed by considering that the number of particles on which the moving body impinges in a given time is nearly proportional to its velocity: we say nearly, because the particles which have been struck form returning currents which interfere with this simple law; and, secondly, that the force with which it impinges is also as its velocity, which must be modified from the same consideration. The nature of these currents has not been yet investigated, and therefore the law of the square of the velocity is adopted generally as a first approximation, but the discovery of the true law would appear to be within the limits of calculation without aid from experiment, and is a subject worthy the attention of physical mathematicians.

The resistance of bodies only partly immersed in fluids, and having a depth bearing a sensible ratio to that of the fluids, as in barges towed along canals, is subject to laws far different from those which we have considered, for the quantity immersed is itself a function of the velocity, diminishing considerably with great velocities: thus, notwithstanding the increase of resistance due to velocity, this diminution due to less immersion permits the possibility of a minimum resistance. This important subject will be further considered in the article HYDRAULICS.

The term fluid has been extended to the supposed media through which the forces of electricity, galvanism, and magnetism act, but little that can be relied upon has been deduced from by their supposed analogy with material fluids. A surer source of calculation is found in detecting the laws of their elementary actions by experiment; and indeed this process seems to point out the most feasible methods for discovering the molecular laws even of material fluids, manifested both in their tenacity and their capillary phenomena.

Fluidity cannot be easily defined in the explicit terms of its exact causes until more is known of the true laws of the forces which govern the internal arrangement of bodies; but taking the effect, we may with Laplace say, that 'mobility is the characteristic property of fluids.' Hence fluidity may be rendered imperfect by the admixture of solids with fluids, as in mud, &c. The effects of fluidity become still more concealed in masses consisting of heterogeneous solids holding fluids in their pores, as in moist clays, dough, &c.; nor are they fully developed in solids which, through the action of heat, are tending to a fluid state, as in melting tallow, wax, glass, &c. In none of these cases can the laws of perfect fluids be applied; but as they belong only to states of transition, their peculiar laws do not deserve, or at least have not obtained, much consideration.

FLUIDITY. All ponderable matter exists either in the gaseous, fluid, or solid state; and most solids, when heat is applied to them, may be rendered fluid, or converted into liquids, under which circumstances mutual repulsion of particles takes the place of cohesion. The degree of heat required to produce this effect is different in different solids, but, *cæteris paribus*, it is always the same in the same solid: in many cases the transition from the solid to the fluid form is sudden, while in other instances solids pass through various degrees of liquidity before they become perfectly fluid. Of the first mode of becoming fluid ice and the metals are examples, and wax or tallow of the second.

As most solid bodies may be rendered fluid by heat, so many gaseous and fluid bodies are converted into solids by diminishing their temperature. Solid bodies in becoming fluid render latent a large quantity of heat; and on the other hand, fluid bodies in becoming solid evolve much sensible heat. The heat which is requisite to the fluid existence of a body is termed the *heat of fluidity*. These facts are proved by two simple experiments. Mix a pound of water at 32° Fahr. with a pound of water at 172°, and the resulting temperature will be the mean, or 102°. If a pound of ice at 32° be dissolved in a pound of water at 172°, the solution will not have the mean temperature of 102°, but only 32°. As, then, the pound of ice, by being rendered merely fluid, absorbs 140° of heat, so the quantity of heat which becomes sensible when a pound of water at 32° is converted into ice at 32° amounts also to 140°. The actual quantity of heat rendered latent by different fluids as they liquefy depends upon the nature of the substance; thus, according to Dr. Irvine, the under-mentioned bodies contain the annexed quantities of heat when rendered fluid:—

Sulphur	143·68° Fahr.
Spermaceti	145
Lead .	162
Bees' wax	175
Zinc . .	493
Tin . .	500
Bismuth	550

The nature of fluidity will be further considered when HEAT is treated of.

FLUOBORIC ACID GAS, or FLUORIDE OF BORON, was obtained by Gay-Lussac and Thenard by heating a mixture of fluor-spar, or fluoride of calcium, and vitrified boracic acid. In this operation the oxygen of the boracic acid probably combines with the calcium of the fluoride of calcium and converts it into oxide of calcium or lime, and the fluorine and boron then uniting form the gas in question. The properties of this gas are, that it is colourless, has a pungent odour, is deleterious to animals, and extinguishes flame. It reddens litmus paper strongly; and when bubbles escape into the air, they combine with its moisture and produce a very white dense fume. The specific gravity of this gas is stated differently, from 2·31 to 2·371. It consists, according to Dr. Thomson, of—

One equivalent of fluorine	18
Two equivalents of boron	16
Equivalent	34

Water dissolves about 700 times its volume of this gas. The solution is caustic, and emits fumes, and was found by Berzelius to contain boracic and hydrofluoric acids, probably derived from the decomposition of water, which supplied oxygen to the boron and hydrogen to the fluorine. This solution does not act upon glass, nor does the gas itself; but they readily decompose animal and vegetable substances. Thus, a piece of paper put into the jar of the gas over mercury is decomposed and charred as if burnt, by the abstraction of the elements of water from it, for which the gas has so powerful an affinity. When potassium is put into this gas it burns, and a brown compound of boron and fluoride of potassium is obtained.

This compound acid combines with certain bases, as ammonia, to form salts, which are termed *fluoborates*; but they are quite unimportant.

FLUOR SPAR, *Fluor, Fluate of Lime*, is a well-known mineral, which occurs in many parts of the earth, but especially and in great plenty in Cornwall, Derbyshire, and Durham. It occurs both crystallized and massive. The primary form of the crystal is a cube, the cleavage is parallel to the planes of the regular octahedron, distinct, but seldom with perfect surfaces: it assumes a vast number of secondary forms, as the octahedron, rhombic dodecahedron. The late W. Phillips mentions his possessing at least 70 beautiful varieties of form, and he has figured a fragment of a crystal from Devonshire which if it were perfect, would exhibit 322 planes. It occurs colourless, and of almost every colour, as grey, purple, black, brown, red, yellow, green, and blue in Derbyshire the last is the prevailing tint, and the massive fluor of that county is termed by the miners *Blue John*. It is frequently transparent, but more commonly only translucent; its lustre is vitreous; specific gravity 3·14; hardness 4·0; streak white, or slightly coloured; fracture conchoidal: when powdered and thrown on a hot coal, fluor spar exhibits a phosphorescent light, which is blue, green, purple, or yellow; when thrown in mass into the fire, it decrepitates. The massive varieties are nodular or amorphous: the structure of the former is large fibrous, or columnar, with divergent fibres: the structure of the amorphous variety is crystalline, granular, earthy, compact, and occasionally straight or curved laminar: the crystallized varieties are more common in Cornwall and the west of England, the massive in Derbyshire and the north of England. It occurs in many places on the Continent also.

Fluor spar is, strictly speaking, to be considered as a fluoride of calcium, composed of

One equivalent of fluorine . . .	18
One equivalent of calcium . . .	20
Equivalent . .	38

The blue and variegated fluor spar of Derbyshire is turned into various ornamental forms, candlesticks, &c.; that of Cornwall is used as a flux in the reduction of copper ore.

FLUORIC ACID. [HYDROFLUORIC ACID.]

FLUORINE, a substance which, though long known in combination with other bodies, has been only lately procured in an insulated state, if indeed as much as this can be said and its properties in a separate state are consequently very imperfectly known. It was first obtained, or at any rate supposed to be obtained, in a separate form by Baudrimont, by passing fluorboric acid over deutoxide of lead heated to redness: the gas was received in a dry vessel

He has since employed a mixture of sulphuric acid, peroxide of manganese, and fluoride of calcium; and although the product is mixed with hydrofluoric and fluosilicic acid gases, their presence did not prevent some of the properties of fluorine from being observed. The rationale of this operation is evidently similar to that of obtaining chlorine from chloride of sodium; the calcium of the fluoride takes oxygen from the peroxide of manganese, and the fluorine is set free in the elastic state. It appears to be a gas of a yellowish-brown colour; its odour resembles that of a mixture of chlorine and burnt sugar, and, like chlorine, it has the power of destroying colour: it does not act upon glass. These experiments have been confirmed by the more recent results of Messrs. Knox. Like chlorine and oxygen, it appears to have a powerful affinity for metallic bodies and for hydrogen: with this latter it forms hydrofluoric acid.

The compounds which contain fluorine, when they do not possess acid properties, are termed *fluorides;* thus, as already mentioned, the fluor spar, so well known in Derbyshire, is termed chemically *fluoride of calcium*. The equivalent or combining weight of fluorine is a subject on which chemists differ, Dr. Thomson making it 18, while Berzelius considers it as only 9·37.

FLUOSILICIC ACID is prepared by mixing equal quantities of fluoride of calcium and silica with three times their weight of sulphuric acid in a retort; on the application of a moderate degree of heat action takes place; and it appears that the oxygen of the silica is transferred to the calcium of the fluoride and converts it into lime, which combining with the sulphuric acid forms sulphate of lime, while the fluorine and silicium set free combine to form fluosilicic acid, which rises in the gaseous state, and is to be received in very dry air-jars filled with and inverted in mercury.

The gas thus obtained is colourless, its odour is peculiar, suffocating, and acid, and it fumes on coming into contact with the moisture of the air, but much less so than fluoboric acid gas. Its specific gravity, according to Dr. Davy, is 3·600, while Dumas makes 3·574. It suffers no change by exposure to a high temperature, and it has not been liquefied by condensation. It is absorbed and decomposed by water, of which it also decomposes a portion, and the results are hydrofluoric acid and silica, from the union of fluorine with the hydrogen of the water, and the silicium with the oxygen.

When potassium is put into this gas, it inflames and burns at a certain temperature. When the gas is passed over iron heated to whiteness, there is formed an extremely thin coating of fluoride of iron and silicium, and the gas then passes without further alteration.

It does not decompose the alkaline carbonates when dry at common temperatures, nor is it absorbed by them, however long they may remain in contact; most hydrated oxides however absorb it without the assistance of heat.

Fluosilicic acid condenses double its volume of ammoniacal gas, and forms with it a volatile fluosilicate, which is a salt of no importance; when it acts upon metallic oxides both are decomposed, the results being silica and metallic fluorides.

It has been mentioned that this gas is decomposed by and decomposes water; the hydrofluoric acid remains in solution with a portion of the silica, while another part of it is precipitated in the state of hydrate; the solution is very sour to the taste, and reddens litmus paper strongly, and decomposes alkaline carbonates with effervescence. This solution has been called hydrofluosilicic acid.

Fluosilicic acid is probably composed of

One equivalent of fluorine	18
One equivalent of silicium	8
Equivalent .	26

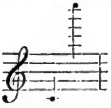
FLUSHING, or VLISSINGEN, a town and fortified port on the south coast of the Island of Walcheren, in the province of Zealand. It is situated at the north side of the Schelde, the passage of which it defends, and lies in 51° 25′ N. lat. and 3° 30′ E. long., 8 miles south of Middelburg, and 17 miles north-east from Sluis. The port is formed by two moles, which break the force of the sea, and beyond these are two canals which enter the town, in the interior of which they form two perfectly-secure basins; one of them is of considerable size, and has sufficient depth of water to receive the largest ships of war. Flushing came into possession of the French in 1795, and was much used by them as a place or rendezvous for their fleets. The batteries by which the port is defended command to a great extent the south entrance to the Schelde. The town is well built, and the population is above 6000. It was besieged in 1809 by the English expedition under Lord Chatham, well known as the Walcheren expedition, and was taken, but evacuated very shortly after, the port and town having been much damaged by the English. Flushing has always had much notoriety as the place of resort of English smugglers.

FLUSTRA. [CELLARIÆA, vol. vi., p. 401.]

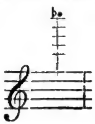
FLUTE, a well-known musical instrument, the use of which, under different forms and names, may be traced to the remotest periods of antiquity. Most of the antient poets ascribe its invention to no less personages than gods and goddesses. Even the grave Plutarch, in his dialogue Περὶ Μουσικῆς, attributes it to Apollo. Lucretius, however, contents himself by deriving its origin from the breathing of western winds over certain reeds, and thus, he tells us, was suggested to man the rural pipe, a simple tube, which the ingenuity of later ages has improved into one of the most elegant and fascinating instruments that art can boast The word is said to be derived from the Latin *Fluta* (lamprey), a kind of eel which has seven holes lengthways in its side, and when extended resembles a very narrow flute.

The antient flute had some sort of mouth-piece; it was double as well as single—that is, was often composed of two tubes, both played together, and hence it has not unreasonably been inferred that the enlightened nations of antiquity possessed some knowledge of harmony. There is a figure of an antient flute-player, or of Pan, in the Townley Gallery of the British Museum (Lib. of Entertaining Knowledge, *Townley Gallery*, vol. i., p. 189). The flute was almost universally employed by the Greeks, Romans, &c., not only in their temples, theatres, social entertainments, and armies, but also in their funeral ceremonies. It even may be said to have accompanied their public orations, having frequently been employed for the purpose of keeping the voice up to a proper pitch. From the custom of introducing it in the last offices for the dead arose the saying, *Jam licet ad tibicines mittas* (you may now send for the flute-players), when any one was *in articulo mortis*—in the last agonies.

Of the old English flute—for the invention whereof Mersenne erroneously gives this country the credit—we will say a few words. It was not unfrequently called the *Flute à bec*, from the resemblance of the mouth-piece to the beak of a bird. This mouth-piece was at the upper and wider end, and the instrument was held in the manner of the oboe and clarinet. It had seven finger-holes, no keys, and was commonly adapted either to the scale of C or F. The *Flute à bec* was gradually superseded by that now in use, which long was known as the German Flute—the *Flute Traversière*, or horizontal. This, at first simple in construction, limited in means, in length about a foot and a half, and having only one key, has by degrees been extended to twenty-seven inches, occasionally more, and has sometimes as many as a dozen keys, seldom less than six; so that every kind of music, however chromatic, within its compass, and adapted to the nature of a tube, may now be executed on this instrument. It is formed of any kind of hard wood, of ivory, and even of glass, and is divided into four joints. The scale of the concert flute is from C below the treble staff to C in the altissimo:—



Some flutes are made to go four notes lower· and an adroit player can reach the E♭ in altissimo:—



The high notes of the flute are very effective in the orchestra, but its best, its expressive tones, are those between the low C and G in alt, comprising twelve diatonic degrees, and all the intermediate semitones. Performers on the flute, however, like those on most other instruments, now strive to astonish rather than please their auditors. Tasteless, senseless execution is all-prevailing, a fact which the great majority of hearers most willingly admit, and much deplore, while they nevertheless encourage the debasement of one of the most delightful of arts by patiently listening to, and often applauding, that which at best only excites some little wonder, never affords heart-felt pleasure, and most commonly is the source of dissatisfaction, if not of a feeling nearly allied to disgust.

The OCTAVE FLUTE (called also the *Flauto Piccolo*, *Ottavino*, and *Flautino*, in orchestral scores) is a small instrument an octave higher than the common flute; it is shrill and piercing, and only desirable in the fullest instrumental music, and in military bands. The best of these are provided with four keys.

FLUTE-STOP, on the organ, is a range of wooden pipes, tuned in unison with the diapason, and generally proves a most successful imitation of the instrument whence its name is derived.

FLUTE, FLUTINGS. [COLUMN.]

FLUX, in chemistry and metallurgy, is any substance employed to assist the reduction of ores or metallic compounds to their metallic state. In smelting the argillaceous iron ore of this country, which is a mixture of carbonate of iron, alumina, and silica, the flux employed is limestone, in such proportions as will form a slag that melts easily, so as to allow the fused iron to sink through it. When the proportion of limestone has been properly adjusted, the slag has the appearance of green bottle-glass; when, on the other hand, the slag is opaque and blue, it is a sign that a good mixture has not been made.

When copper ores are difficult to melt, fluor spar is added as a flux, which appears to promote the operation.

The fluxes made use of in assays and in chemical operations vary greatly according to the nature of the metal to be reduced and that of the substances combined with it. [ASSAYING.]

We shall mention a few of the more important fluxes employed.

Black flux is made by mixing one part of powdered nitre with two parts of powdered argol, which is the commercial name for impure cream of tartar, or bitartrate of potash; this mixture is to be gradually thrown into a red-hot earthen crucible so as to deflagrate it, taking care not to make the heat so high as to fuse the mixture.

In this case the nitric acid of the nitre is decomposed, its oxygen acts upon the carbon of the tartaric acid, carbonic acid is formed, and this uniting with the potash both of the nitre and bitartrate is converted into carbonate of potash; the whole of the carbon of the tartaric acid is not however so acted upon, and the excess remains mixed with the carbonate of potash in the state of finely-divided charcoal. This flux should be immediately reduced to powder and kept in a well-stopped bottle, otherwise it will become damp by the absorption of moisture, to which the carbonate of potash is subject.

This flux is doubly useful; the carbonate of potash combines with the earthy parts of the ore, such as silica and alumina, while the charcoal unites with the oxygen of the metallic oxides, and carbonic acid being formed and expelled, the metal is reduced and melts. This flux is especially useful in the process of detecting arsenious acid and reducing it to the metallic state.

White flux is a carbonate of potash made by deflagrating equal weights of nitre and bitartrate of potash; the quantity of this last salt being smaller than that in black flux, there is no excess of charcoal furnished by tartaric acid. It appears to possess therefore no advantage over common carbonate of potash, and either of them may be employed in reducing metallic chlorides, such as that of silver, to the metallic state. White flux, or carbonate of potash, disintegrates stony matter, as alumina and silica, separates acids and sulphur from metals, and dissolves many metallic oxides; having however no charcoal in its composition, it does not reduce metallic oxides as the *black flux* does.

Argol, already described as an impure bitartrate of potash, powdered and mixed with the pulverized substance to be reduced, is sometimes advantageously used as a flux; owing to the intimate mixture of the charcoal and potash in this flux a good deal of potassium is evolved, and upon the reducing property of this metal the reduction of the oxides of other metals frequently depends to a considerable extent.

Charcoal alone is, in the case of pure oxides, sometimes employed as a flux; thus a crucible lined with charcoal is useful for the reduction of oxide of iron, or the oxide may be mixed with charcoal.

There are some bodies which are even more efficient than charcoal in certain cases, such as wax, fat, oil, tar, and pitch, and gum, sugar, or starch; these may be intimately mixed with the substance to be reduced, and they not only contain carbon in a form which is readily developed, but also hydrogen, which is likely to assist in the separation of the oxygen from metallic oxides.

Flint glass is sometimes, but improperly, used as a flux, for it contains much lead that may greatly interfere with the results produced.

Green bottle-glass has also been used for this purpose, but it is objectionable on account of its containing iron, and it even yields traces of silicium and aluminum to iron which was pure before being heated with it.

FLUXIONS, FLUENTS, METHOD, NOTATION, AND EARLY HISTORY. The method of fluxions assumes a distinct conception of velocity, both in the case of a uniform and variable motion. It further extends this notion of velocity or rate of increase, derived from the consideration of a moving point, to all species of magnitudes, and even to expressions which are purely numerical, as the formulæ of algebra. If one magnitude depend on another for its value, so that a change in the first produces a change in the second, and if the first be imagined to increase at a uniform and given rate, then the second will also increase or decrease, but not at a uniform rate, unless the second magnitude y be determined from the first x by an equation of the first degree, $ax \pm by \pm c = 0$. But the rate at which y increases, though varying with the values of x, can in all cases be determined; and, supposing $\dot{x}$ to be the velocity with which x increases, and $\dot{y}$ that of y, an equation can always be produced of the form

$$\dot{y} = \left\{ \begin{matrix} \text{a function of } x \text{ and } y\text{, depending on} \\ \text{the equation which connects them} \end{matrix} \right\} \times \dot{x}.$$

In this case y and x were called by Newton *flowing* quantities, and $\dot{x}$ and $\dot{y}$ were called their fluxions: conversely y and x were called the *fluents* of $\dot{y}$ and $\dot{x}$. Thus when $y = x^3$ it may be shown that $\dot{y} = 3x^2\dot{x}$, and if $x = 10$ $\dot{y} = 300\,\dot{x}$, or if the number be increasing continuously, then the increasing number being 10, its cube is increasing 300 times as fast as itself. Thus while a number changes from 10 to 10·01, its cube changes from 1000 to 1003·003001, and 3·003001 is 300·3001 times as great as ·01. That this is not exactly 300 arises from the rate of increase of x^3 not being uniform when that of x is uniform. [VELOCITY.] The velocity of y being variable, may itself be considered as having a rate of change. Thus, if the velocity of a body increase uniformly, the whole velocity gained in a second may be called the velocity of the velocity, or the fluxion of the fluxion. Thus if x increase uniformly, the velocity of $\dot{x}$ is nothing, or $(\dot{x})^{\cdot} = 0$, but if $y = x^3$ then $(\dot{y})^{\cdot} = 6x\dot{x}^2$. Newton denoted these second fluxions by $\ddot{y}$ and $\ddot{x}$. In a similar way might be determined the velocity of $\ddot{y}$, denoted by $\dddot{y}$, and so on. We cannot find that Newton proposed any symbol for the fluent of a fluxion except the enclosure of its expression; thus,

$$\boxed{3x^2\dot{x}} \text{ is the fluent of } 3x^2\dot{x}\text{, or } x^3.$$

He also, in his treatise 'De Quadratura Curvarum,' used z' to stand for the fluent of z.

We now come to the history of this discovery, and of the dispute relative to the right of invention. We have already given a brief outline of the circumstances which led to the publication of the COMMERCIUM EPISTOLICUM, and we shall now add the previous and subsequent occurrences, with some quotations from authorities.

The biographers of Newton state, that about the year 1663 he began to turn his attention to the writings of Descartes and Wallis, and Newton himself testifies that he invented the method of series and fluxions in the year 1665; and that in a tract written in 1666 he had begun to use the notation of fluxions. In 1669 Barrow communicated to Collins the tract of Newton, afterwards published under the title of *De Analysi per Equationes numero terminorum infinitas;* of which he afterwards says, 'I am glad my friend's paper gives you so much satisfaction: his name is Mr. Newton, a fellow of our college, and very young (being but the second year Master of Arts), but of an extraordinary genius and proficiency in these things.' This tract contains a method of series, and many problems solved by application of limits to differences obtained by expansion; but no direct method of fluxions. It was first published in the Commercium Epistolicum. Various letters of Newton, Collins, and others, up to the beginning of 1676, state that the first-named had invented a method by which tangents could be drawn, &c., without the necessity of freeing their equations from irrational terms. Among them is a letter of Newton to Collins, dated December 10, 1672, in which he states the fact of his discovery, with one example. This letter the committee [COMMERCIUM EPISTOLICUM] assert to have been sent to Leibnitz, but without proof. Leibnitz desired to have this method communicated to him; and Newton, at the request of Oldenburg and Collins, wrote to the former the celebrated letters of June 13 and October 24, 1676. In the first he states the binomial theorem, and various consequences of it in combination with his method, but without giving any information as to that method. Leibnitz in a reply, also addressed to Oldenburg, speaks in the highest terms of what Newton had sent, and requests further explanation. Newton, in the second letter just mentioned, then explained how he arrived at the binomial theorem [BINOMIAL THEOREM], and gives various results of his method. He also communicated his method of fluxions and fluents *in cipher* (as was often practised at the time), if cipher it could be called, which had no method by which it could be deciphered. It consisted in placing in alphabetical order all the letters in the sentence communicated. Thus Newton gravely tells Oldenburg that his method of drawing tangents was

6accdæ 13eff 7i 3l 9n 4o 4qrr 4s 9t 12vx;

or, that if any one could arrange six *a*s, two *c*s, one *d*, &c., into a certain sentence, he would see the method. That sentence was, Data Æquatione quotcunque fluentes quantitates involvente fluxiones invenire, et vice versa. If Leibnitz could have taken a hint either from the preceding letters in alphabetical order, or (had he known it) in their significant arrangement, he would have deserved as much credit for his sagacity as if he made the invention independently. We cannot find anything in the rest of the letter which could give any such hint; and certainly Newton, who showed himself desirous to conceal the method, and knew that his letter was to come under the acute eye of Leibnitz, did not imagine that he had in any part of it betrayed his secret. This letter, of October 24, 1676, had not been sent to Leibnitz, March 5, 1677, as Collins informs Newton by letter of that date. So early as June 21, of the same year, however, Leibnitz had received that letter and written an answer to Collins, in which, without any desire of concealment, he explains the principle, notation, and use of his differential calculus: this letter was published in the 'Commercium Epistolicum.' It is of this correspondence that Newton wrote the celebrated scholium; of which, as we shall see, he was afterwards weak enough, first, to deny the plain and obvious meaning, and secondly, to omit it entirely from the third edition of the 'Principia.' This scholium[*], very literally translated, is as follows (book ii. prop. 7, scholium).

A.D. 1687. 'In letters which went between me and that most excellent geometer, G. G. Leibnitz, ten years ago, when I signified that I was in the knowledge of a method of determining maxima and minima, of drawing tangents, and the like, and when I concealed it in transposed letters involving this sentence (Data æquatione, &c., above cited), that most distinguished man wrote back that he had also fallen upon a method of the same kind, and communicated his method, which hardly differed from mine, except in his forms of words and symbols.'

It will be convenient here to give Newton's subsequent explanation, given in the year 1716, taken from his remarks on Leibnitz's letter to Conti of April 9, 1716, published in 1716 in the appendix to Raphson's 'History of Fluxions.'

'He pretends that in my book of principles I allowed him the invention of the calculus differentialis, independently of my own; and that to attribute this invention to myself is contrary to my knowledge there avowed. But in the paragraph there referred unto I do not find one word to this purpose. On the contrary, I there represent that I sent notice of my method to Mr. Leibnitz before he sent notice of his method to me: and left him to make it appear that he had found his method before the date of my letter; that is, eight months[*] at the least before the date of his own. And, by referring to the letters which passed between Mr. Leibnitz and me ten years before, I left the reader to consult these letters[†] and interpret the paragraph thereby. For by those letters he would see that I wrote a tract on that method and the method of series together, five years before the writing of these letters; that is, in the year 1671. And these hints were as much as was proper in that short paragraph, it being besides the design of that book to enter into disputes about these matters.'

Nothing material passed till 1684, in which year Leibnitz gave his first paper on the Differential Calculus in the Leipzig Acts. In 1687 the Principia was published by Newton; and Leibnitz continued to give papers on the subject of his new Calculus. The Bernoullis began to cultivate the subject about the year 1691, and as they were on terms of correspondence with Leibnitz, he was the source from whence they drew, and to which they returned, additional ideas on the subject. The Marquis De L'Hôpital was employed in writing his elementary treatise (the first written), which was published in 1696. All these considered Leibnitz as their chief and the consequence was that Dr. Wallis informs Newton, by letter of April 10, 1695, that 'he had heard that his notions of fluxions passed in Holland with great applause by the name of Leibnitz's Calculus Differentialis.' Accordingly Wallis, who had just completed printing the first volume of his works (the third, which contains Newton's letters to Oldenburg, having been previously printed) inserted in the preface, as a reason for not mentioning the Differential Calculus, that it was Newton's method of fluxions which had been communicated to Leibnitz in the Oldenburg Letters. A review of Wallis's works, in the 'Acta Eruditorum, or Leipzig Acts,' for 1696, reminds the reader of Newton's own admission above cited. On this Newton (Raphson, supplement above cited) remarks, 'Whether Mr. Leibnitz invented it after me, or had it from me, is a question of no consequence, for second inventors have no right.'

In 1699 Fatio de Duillier, a Genevese, settled in England, stated in a mathematical work his conviction that Newton was the first inventor, adding that he left it to those who had seen the manuscripts and letters to say whether Leibnitz borrowed from Newton. This was the first distinct suspicion of plagiarism; and Leibnitz, who had never contested the priority of Newton's discovery, and who appeared to be quite satisfied by Newton's admission, now appears, for the first time, in the controversy. In a reply to Duillier (Leipzig Acts, 1700) after calling attention to Newton's scholium, he declares that when he published his method, in 1684, he knew nothing more of any method of Newton, except that the latter had written to him that he could dispense with the removal of irrational terms; and that, though on the publication of the Principia he became aware how much further its author had pushed his discoveries, he did not know that Newton possessed a *Calculus* (or organized method) like the Differential, till the publication of Wallis's preface.

The 'Quadrature of Curves' was published by Newton in 1704 at the end of his Optics. It contains a formal exposition (the first published) of the method and notation of fluxions. Since so great a stress was laid by the parties to the quarrel on the introduction of specific notation, we may remark that Newton himself did not very soon adopt such a course. He says that in 1666 he 'sometimes used a letter with one prick for quantities involving first fluxions; and the same quantity with two pricks for quantities involving second fluxions.' Even so late as 1687 he does not (in the Principia) give any notation for the *momenta* to which he had given a name, and (though not laying any stress on it) we doubt whether Newton would ever have systematized his

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[*] In the article COMMERCIUM EPISTOLICUM we have supposed that the committee took no notice of this correspondence. The truth is, that from Newton's expressions we always imagined he referred to some *direct* correspondence which passed between him and Leibnitz, and not to these letters which were *written to Oldenburg.*

notation if he had not seen the letter of Leibnitz referred to in the scholium.

A review of the above work appeared in the 'Leipzig Acts,' January, 1705, in which, after stating that the Differential Calculus had been explained in that work by Leibnitz, its inventor, and further by the Bernoullis and De L'Hôpital, the author proceeds as follows: 'Instead of the Leibnitian differences Newton applies and always has applied (adhibet semperque adhibuit) fluxions, which are *quam proximè* as the increments of flowing quantities generated in infinitely small times, and has used them with elegance both in his Principia and in subsequent writings, just as (quemadmodum et) Fabri in his synopsis has substituted (substituit) motion for the method of Cavalieri.' This was considered by Newton's friends as an imputation of plagiarism on their chief; but such a construction was always strenuously resisted by Leibnitz. On the one hand it was declared that Newton was represented in the same light with regard to Leibnitz as Fabri to Cavalieri, by the force of 'quemadmodum et:' on the other it was replied that the distinction between separate invention and borrowing was preserved in *adhibuit* and *substituit*. We are inclined to suspect that the meaning of the writer was not very fair. Be this as it may, the preceding sentence called forth the assertion of Keill (*Phil. Trans.*, 1708), that Leibnitz had inserted Newton's method, changing its name and notation, in the Leipzig Acts. The article COMMERCIUM EPISTOLICUM takes up the history at this point.

The 'Commercium Epistolicum' (which was not published for sale, the few copies printed being distributed as presents) did not reach Leibnitz, who was at Vienna, for a considerable time. In the mean while he wrote to John Bernoulli (who had received his copy) for his opinion of the work. This the latter gave, first in a letter to Leibnitz, and afterwards (as Leibnitz asserts) in an anonymous tract published in July, 1713. But, as in this tract the author speaks in complimentary terms of John Bernoulli, it has been supposed that at least it was edited by some one else. This letter is decidedly as unfair towards Newton as the friends of the latter had been towards Leibnitz; it asserts the method of fluxions to be a plagiarism from the Differential Calculus. Keill printed a reply, and Newton and Leibnitz then appear as mutual accusers, in letters to Mr. Chamberlayne. Nothing remarkable arose out of this correspondence, which terminated in the announcement of Leibnitz that he also would prepare a Commercium Epistolicum. About December, 1715, Leibnitz re-opened the matter in a letter to the Abbé Antonio Conti of Venice, then on a visit to England. He there complains of the treatment he had received, and attacks the Newtonian philosophy in general. Newton wrote a reply, February 26, 1715–16, in which he very much dwells on previous admissions made by Leibnitz. The latter, in a third letter to Conti, April 9, 1716, avows that he always believed Newton upon his word, but that, seeing him connive at accusations which he must have known to be false, it was natural that he (Leibnitz) should begin to doubt. Newton is also reminded that he had made some admissions in favour of Leibnitz (in the scholium) which he was now desirous of disavowing. This letter was not sent directly to Conti, but first to Paris, that it might be there seen and copied by a friend: on which Newton refused to send any answer, considering it as an insult that Leibnitz, though he complained of suppressions in the Commercium Epistolicum, should take means to preserve evidence to the whole of his letters. But Newton circulated some remarks among his friends, which he published immediately on hearing of the death of Leibnitz, November 14, 1716. It is in this last paper that the remarkable sentence occurs which we have quoted above in connexion with the scholium which it disavows. Raphson's 'History of Fluxions' being then ready for publication (its title-page bears 1715), or perhaps published, the Conti correspondence was annexed as a supplement.

The history of the controversy ends with the death of Leibnitz, and we shall conclude this article with a few additional quotations and facts which bear upon the subject.

1. The second letter of Keill (May 24, 1711), [COMMERCIUM EPISTOLICUM] on which the whole of the subsequent dispute arose, was in substance the statement of Newton himself. In the minutes of the Royal Society, April 5, 1711, it is stated that 'the president gave a short account of the matter, with the particular time of his first mentioning or discovering his invention, referring to some letters published by Dr. Wallis: upon which Mr. Keill was desired to draw up an account of the matter in dispute, and set it in a just light.' The letter in question was the consequence, which was read at the meeting of the 24th o May (its date).

2. The committee consisted of Dr. Arbuthnot, Mr. Hill Dr. Halley, Mr. Jones, Mr. Machin, and Mr. Burnet. This is what Newton calls 'a numerous committee of gentlemen of several nations.' The names of the committee were not published with the Commercium Epistolicum.

3. So far from the committee considering themselves as in any judicial capacity, it appears, from a letter of Burnet above-named to John Bernoulli (which the latter sent to Leibnitz, and the extract is in the published correspondence of the two), that the Royal Society was busy proving by original letters that Leibnitz might have seen the method of fluxions in the correspondence of Oldenburg, &c.

There was throughout the whole dispute a confusion between the knowledge of fluxions or differentials and that of a *calculus* of fluxions or differentials, that is, a digested method with general rules. If the dispute could be revived at the present time, it would be on entirely different grounds: but of course, in describing the controversy as it existed, we need only consider those points which were put in issue by the parties themselves.

FLY, a name applied almost indiscriminately to all insects possessing wings; by many however restricted to the various species of Dipterous insects, an account of which is given under the head DIPTERA.

FLY-TRAP. [DIONÆA.]

FLY-WHEEL. [WHEELS.]

FLYING-FISH. Under the head DACTYLOPTERUS there is an account of certain flying fishes belonging to the order Acanthopterygii: there are however others, of a different tribe, which have the same appellation, being equally gifted with the power of sustaining themselves in the air for a certain length of time—we allude to the species of the genus Exocetus.

The genus *Exocetus* belongs to the Abdominal Malacopterygii, and forms part of the family Esocidæ. The distinguishing characters are:—pectoral fins nearly equal to the body in length; head flattened above and on the sides; the lower part of the body furnished with a longitudinal series of carinated scales on each side; dorsal fin placed above the anal; eyes large; jaws furnished with small pointed teeth.

The flying fishes when in their own element are constantly harassed by various fishes of prey, and it is supposed that their flights are performed for the purpose of escaping from these enemies: when in the air however they are subject to the attacks of various species of gulls.

Whether these fishes possess the power of flying, in the true sense of the term—that is, by beating the air with their members, or whether their large fins merely serve as parachutes to sustain them in the air for a short time, after a leap from the water, is not yet fully ascertained; observers having given different accounts. The latter is perhaps the prevailing opinion of naturalists, and is that of the more recent observers. 'I have never,' observes Mr. George Bennett, the author of 'Wanderings in New South Wales, 'been able to see any percussion of the pectoral fins during flight, and the greatest length of time that I have seen the *volatile* fish on the *fin* has been thirty seconds by the watch, and their longest flight mentioned by Captain Hall has been 200 yards, but he thinks that subsequent observation has extended the space. The most usual height of flight, as seen above the surface of the water, is from two to three feet; but I have known them come on board at a height of 14 feet and upwards; and they have been well ascertained to come into channels of a line-of-battle ship, which is considered as high as 20 feet and upwards.' 'But it must not be supposed they have the power of elevating themselves in the air after having left their native element; for, on watching them, I have often seen them fall much below the elevation at which they first rose from the water, but never in any one instance could I observe them rise from the height at which they first sprang; for I regard the elevation they take to depend on the power of the first spring or leap they make on leaving their native element.'

Judging from the foregoing quotation, and several other accounts which we have perused, it would appear that something beyond the mere leap of the fish would be required to account for the great heights (of 14 or 20 feet) at which these fishes have been seen. If they cannot fly (which one would judge to be the case upon examining the structure and position of the fins) it seems probable that they take advantage of the wind at times, and so adjust their fins that they are carried upwards by it.

Several instances are on record of the appearance of flying fishes off the British coast, but we are not aware what particular species they were. It is probable that both the *Exocetus exiliens* and the *E. volitans* may have made their appearance in our seas; these two species being very abundant, the former in the Mediterranean sea (where many fishes similar to those of our own coast occur) and the latter in the Atlantic ocean.

The *Exocetus exiliens* has the ventral fins placed behind the middle of the body, and the *E. volitans* has the ventrals (which are much smaller than in *E. exiliens*) placed anterior to the middle part of the body: these two species therefore are easily distinguished; of the latter there is a figure in Yarrell's *British Fishes*.

The American seas afford us examples of other species of this genus.

FO, pronounced by the Chinese Fŭh, is the name by which Buddha is worshipped in China. According to the Chinese authorities quoted in Dr. Morrison's Chinese Dictionary (vol. i. part i. pp. 92, 93), the religion of Fo was introduced into China in the seventh year of the reign of the Emperor Ming, about A.D. 50. Though the Chinese government has usually discountenanced, and at some periods persecuted, the followers of Fo, they have always been very numerous; yet Mr. Davis remarks, in his work on the Chinese (vol. ii. p. 94), that 'the present condition in China of the religion of Fŏ is very far from flourishing; and the extensive and magnificent establishments which have been founded in former times are evidently in a state of dilapidation and decay. It is rarely that one meets with any of their nine or seven-storied pagodas in tolerable repair, though one or two of these striking and elegant objects occur in almost every landscape. Between Macao and Canton there are no less than four or five nine-storied pagodas on elevated points by the river-side, and every one of them is in a state of ruin.' Many interesting particulars respecting the Buddhist religion in China are contained in *The Catechism of the Shamans; or, the Laws and Regulations of the Priesthood of Buddha in China. Translated from the Chinese Original, with Notes and Illustrations, by* Charles Fried. Neumann, London, 8vo., 1831. [Buddha.]

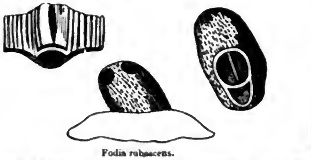
FO-HI, the name of the first emperor of China, is said to have been born in the province of Shensy, and to have reigned B.C. 2952. According to the Chinese historians, Fo-hi reclaimed the inhabitants of China from barbarism, established social order, instituted marriage, and taught them the use of writing. Fo-hi and his two successors Shin-noong and Hoang-ti, who are usually termed the 'Three Emperors,' must be considered as belonging to the fabulous part of Chinese history. He is said to have been the author of one of the canonical books of the Chinese, called 'Yĕ-king.' (Du Halde's *Description de l'Empire de la Chine*, vol. i. p. 266-269; vol. ii. p. 344-353.)

FOCKSHAN or FOCZANY. [Moldavia.]

FOCUS (Geometry). [Ellipse, Hyperbola, Parabola.]

FOCUS (Optics), the point at or near which rays are collected by a lens or mirror. Its distance from the lens or mirror is called the focal length. [Lens; Mirror.]

FO'DIA, a genus of mollusks established by Bosc, and generally arranged by zoologists at the end of the *Simple Ascidians*, and next to *Bipapillaria;* nor is it better known than the last-named genus.



Fodia rubescens.

Generic Character.—Animal oval, mammillated, divided throughout its length by a vertical partition which contains the stomach, into two unequal tubes, opening at each extremity by an orifice, the upper one being a little sunk, and irregularly dentated, and the lower edged by a circular border forming a kind of sucker (ventouse), and serving to fix the animal.

Bosc founded the genus from a mollusk found on the coasts of North America.

FOEHR or FOEHRDE, a Danish island off the northern coast of the western part of Schleswig, about 25 miles in area and 98 miles in circuit, has 5 parishes and about 5000 inhabitants. It is divided into Osterlandföhr, which forms part of Schleswig, and contains the port of Wyk, 54° 43′ N. lat., and 8° 40′ E. long., 500 feet long, 112 feet broad, and 10 feet deep, which has a bathing establishment; and Westerlandföhr, which forms part of North Jütland. The islanders are engaged in navigation, fishery, and woollen stocking manufactures.

FOELDVA'R. [Tolna.]

FŒNI'CULUM, the genus to which the common potherb called fennel belongs. It was formerly considered a species of Anethum, but, since the remodelling of the natural order Apiaceæ by Koch, it has been universally looked upon as a distinct genus. Anethum in fact belongs to the subdivision *Peucedaneæ*, with thin flat fruit, while Fœniculum forms part of *Seselineæ*, the fruit of which is tapering or very little compressed, and by no means flat.

In this country we are acquainted with but one sort of fennel, the *Fœniculum vulgare*, a biennial plant with leaves cut into hair-like segments, yellow flowers, and glaucous stems, common on chalky cliffs in the southern parts of England, and everywhere cultivated for the sake of the agreeable aromatic quality of its leaves. There are several others that deserve to be noticed.

Fœniculum dulce, the *Finocchio dolce* of the Italians, is an annual sort which is cultivated in Italy as celery with us; and its blanched stems are said to be an excellent vegetable, resembling celery, but more tender and delicate, with a slight flavour of common fennel. The summers of England are not warm enough to render it possible to cultivate this successfully.

Fœniculum piperitum is a wild fennel, occurring on dry elevated hills in Sicily, where it is called *Finocchio d'asino* it is known from common fennel by its long slender stem, short rigid leaves, and very hot biting fruit.

Fœniculum Panmorium is cultivated in various parts of Bengal, under the name of *Panmuhuree*, or *Mudhoorika* in Sanscrit. Its fruit has a warmish, very sweet taste, and aromatic smell, and is much used by the natives with their betel and in their curries.

Finally, *Fœniculum capense* is a species little known, with a thick esculent aromatic root, found in the interior of the Cape of Good Hope, but about which little is known.

FŒTUS, a Latin word applied to the immature young of any animals. This term is used in physiology to designate the embryo of mammiferous animals, and particularly of man. There has been considerable confusion in the application of the names fœtus and embryo: the newly developed germ has been called the embryo during the first six weeks of utero-gestation, or pregnancy, and then during the rest of its uterine life has been denominated the fœtus: but this distinction is entirely arbitrary. The word embryo is applied to the immature being, developed in the ovum of any animal after impregnation, and before it is capable of supporting an independent existence, and therefore is equally applicable to oviparous and viviparous animals. it has a much more extensive signification than fœtus, which is restricted to the embryo of viviparous animals only, in which the ovum after impregnation descends from the ovary into a peculiar cavity denominated the uterus, where it becomes attached to the mother, and derives its nourishment from her till it is sufficiently perfect to exist separately. In oviparous animals, on the contrary, the germ when detached from the ovary is conveyed through a tube called the oviduct, and excluded from the body of the mother, without being again connected with her, or deriving any nourishment from her. The egg requires to be subjected to a certain degree of temperature without the body, for a certain time, before the embryo arrives at a sufficient degree of development to leave the case in which it has been enclosed: during this process, called incubation, the chick is nourished by the absorption of an organized and nutritive substance to which the embryo is connected, and which constitutes the yolk of the egg.

The ovulum of mammalia after impregnation bursts from the ovary, and is conveyed through the Fallopian tube to the uterus, but it has not been exactly determined how soon it arrives there. Sir E. Home detected an ovum within the uterus, when he supposed that only eight days had elapsed since impregnation; but other accurate investigations have failed in finding any ovum, though it was probable that nearly a month had intervened between impregnation and death.

The ovum at first contains no embryo visible to the naked eye; in fact it may be considered as now proved by the labours of Wolff and other physiologists, that the organs of the fœtus are successively formed in the ovum, and not evolved, according to antient hypothesis, from parts preexisting in the germ. The ovulum grows rapidly after reaching the uterus; it at first consists of two sacs, one enclosing the other, and the inner containing a liquid. When it is about half a line in diameter, a new element becomes visible in it; a round, opaque, granular disk is seen, with a dark spot in its centre, upon the surface of the internal globule or sac. This spot, which is seen either on or through the inner membrance of the ovum, corresponds with the cicatricula of the egg, and is the first rudiment of the fœtus.

In birds the cicatricula or germ spot lies upon the surface of the yolk: soon after the commencement of incubation it expands and separates into two layers; the outer is called by Pander the serous layer, and subsequently forms the osseous, nervous, muscular, and tegumentary systems of the body; the inner, which is in contact with the yolk, is called the mucous, which (together with a third developed between the two others, and named the vascular layer) appears to give rise, by the changes which it undergoes, to the intestinal, respiratory, vascular, and glandular systems. The mucous layer of the germinal membrane gradually expands over the yolk, till it nearly encloses it in a sac, which towards the body of the chick contracts into an oblong canal, which extends the whole length of the embryo, and becomes the future alimentary tube. The sac containing the yolk, and communicating with the intestines, is called the intestinal vesicle or yolk-bag, and towards the close of incubation is drawn into the belly of the chick, and its contents are used as nourishment. The lower end of the alimentary canal (the cloaca of birds) shoots out into a sac which is termed the allantoïs or allantoïd membrane. After a time arteries and veins are seen ramifying upon this sac, which protrudes more and more out of the body of the chick, till at length it forms a double bag, laid immediately under the membrane of the shell. On this sac the blood-vessels are so distributed that their contents are influenced by the atmosphere through the porous egg-shell and its membrane, and thus a true respiratory organ is established.

The original structure of the ovum, and the early development of the embryo, in mammalia, appear to be much the same as in the egg of a bird; though there are some characteristic differences. When a human ovum of any magnitude is examined, the embryo is seen suspended in a loose bag filled with fluid, called the amnios, which is a shut sac: this sac is the outermost product of the serous layer of the germinal membrane: for its formation a membrane is reflected from the sides and extremities of the embryo, (the reflection, according to Velpeau, not commencing before the twelfth day,) so as to enclose a space behind it. As the walls of the trunk close in front, the circle at which the amnios is attached to the body of the embryo gradually contracts, till at length it is limited to the edge of the umbilical opening; it then invests the umbilical cord, and spreads out from its placental extremity into an ample sac filled with fluid, in which the fœtus floats. The mucous layer of the germinal membrane in mammalia is supposed from analogy to form a sac, as in birds, containing a yolk, or substance subservient to the nourishment of the fœtus in its early stage. Whether this view of its formation and use be correct or not only rests on analogy; but in the early part of gestation a small sac or bladder, which from its being filled with a whitish fluid has been called the vesicula alba, may be found on the placenta, at or near the extremity of the umbilical cord, and exterior to the amnios; from this sac a fine tube may be traced along the cord to the navel, and in some animals it has been seen communicating with the intestinal canal. This tube becomes obliterated so early (Velpeau says in the sixth week of gestation) that its communication with the intestines was long undetected, though the sac was known to the older anatomists. The intestinal vesicle finally differs in mammalia and birds in this circumstance, that in the former it is not drawn into the body of the fœtus, but remains without between the membranes, and gradually wasting becomes obliterated by the third month. The duct of the umbilical vesicle is accompanied along the cord by an artery and vein, which are called the omphalo-mesenteric vessels; the artery communicates with the superior mesenteric, and the vein with the vena portæ. The allantoïs exists in all mammals as well as in birds, though its use in the former, which are furnished with a placenta, is not obvious. In some animals, as in man, it becomes obliterated at a very early period, as soon as the sixth week, but in others, as the carnivora, &c., it attains a large size, and continues during the whole period of fœtal existence. In mammalia it communicates with the fundus of the bladder, and the remains of the duct by which it is connected is denominated the urachus. The channel of communication between the allantoïs and the bladder, or cloaca (in birds), at first is short, so that the sac lies directly against the body of the embryo, but it afterwards becomes elongated, like the corresponding duct of the umbilical vesicle.

In man, after impregnation has taken place, a spongy membrane is formed on the inner surface of the uterus by an exudation of lymph. This membrane, called decidua, lines the whole of the uterus before the descent of the ovum; but when this passes down through the Fallopian tube it gradually pushes the deciduous membrane before it, inverting one portion of it which surrounds the ovum, and is called the 'decidua reflexa;' this grows with the ovum till it fills the cavity of the uterus, and comes in contact with the other portion called the 'decidua vera,' lining the walls of the uterus.

The point at which the decidua is reflected upon the ovum is where the placenta is fixed to the uterus. The ovum has two proper membranes, the amnios, which we have described, internally, and an outer membrane, which is called the chorion; this latter membrane in man, during the first two months of pregnancy, has a shaggy external surface, being covered with vascular villi, which become united with the membrana decidua, which is also thick and vascular. This thickening and vascularity of both these membranes gradually diminishes, and becomes concentrated on one part, usually towards the fundus of the uterus; this thickened part is called the placenta. In ruminating animals the thickening and vascularity of the chorion is confined to a number of circular and spongy elevations varying in number from thirty to one hundred, which are called cotyledons. These vascular processes dip in between corresponding processes attached to the uterus of the mother, which are called maternal cotyledons, the surface of which is supplied with numerous vessels derived from the uterine arteries and veins. The result of this arrangement is that a large vascular surface of the maternal system is applied to an equally extensive one of the fœtus, and though there is no direct communication between the arteries and veins, we must suppose that nourishment is imbibed from the vessels of the mother by those of the fœtus through the fine intervening membranes by which they are separated. In man the relation between the maternal and fœtal systems is not so clearly understood as in the preceding instance. In the human subject the placenta is a spongy vascular mass like a cake, from six to eight inches in diameter, about an inch thick in the middle, and two or three lines at the circumference. It adheres by one surface to the uterus, and by the other is connected with the fœtus by means of the umbilical cord. The uterine surface is lobulated, and is connected with the uterus by blood-vessels. The fœtal surface is covered by the chorion and amnios, and presents the ramifications of the umbilical vessels, which consist of two arteries and a vein. The radicles of these vessels communicate with each other, but no communication has ever been shown to exist between them and the utero-placentine vessels; for if we inject from the umbilical arteries we find that the placenta is rendered turgid, and that vessels are found filled in every part of it, but between their ramifications there will remain an uninjected substance, and the uterine surface will not be injected, for the fœtal vessels do not pass all the way to that surface. In like manner, if we inject from the uterine vessels, the placenta will be rendered turgid, but nothing passes into the fœtal vessels. From this circumstance it is concluded that the placenta consists uniformly of two portions: the one is furnished by the deciduous coat of the uterus, the other by the vessels o the chorion, and these two portions may, during the first three months, be separated from each other by maceration. The structure of the fœtal portion, so far as can be made out, appears to be similar to that of the pulmonary vessels, the artery terminating in the vein. But the maternal portion is somewhat different; there is not a direct communication, but the arteries, as Mr. Hunter thought, seem to terminate in irregular cells, and the veins appear to commence with open mouths from these cells, for by throwing wax into the uterine arteries we fill the cells, and frequently inject the uterine veins also.

It has always been considered doubtful whether the placental cells of Hunter were real or artificial, being, in the latter case, produced by extravasation of the injection; and the recent researches of Dr. Robert Lee have confirmed this doubt, but without throwing any satisfactory light on this very obscure subject. With regard to the use of the placenta we may infer that it is very similar in man to what it is in ruminating and other animals; it most probably serves to produce a change in the blood of the fœtus analogous to that which the blood of the adult undergoes in the lungs; and, from considering that the fœtus itself cannot create materials for its own growth and support, we may further infer that the placenta is the source of nutrition also.

The navel-string, or umbilical cord, which connects the child to the mother, is composed of the umbilical vein and two umbilical arteries twisted together, and surrounded by a gelatinous substance and the reflections of the chorion and amnios: it also contains the urachus, and the remains of the duct of the vesicula alba and omphalo-mesenteric vessels. It is visible in the human embryo in the sixth week as a short and straight cord; at birth the length of it is, on an average, about two feet. The outer tunic of the cord, the amnios, is continuous with the epidermis, or cuticle of the fœtus at the umbilicus; and in the same way the chorion, which is also reflected on the naval-string, is continued into the dermis, or true skin of the fœtus.

We have already described the early development of the embryo, and the first changes which take place in the ovum. When the human fœtus is first distinctly visible through the membranes it is not above a line in length, and of an oblong shape. At the end of about six weeks it is slightly curved, and somewhat resembles a split pea; at the conclusion of the second month it may be compared in size and shape to a kidney bean. To the naked eye the embryo at first seems formed by two oval bodies connected together by a slender neck; one of these represents the head, and the other the trunk; the former, which is at first merely a membranous bag, bears a large proportion to the trunk; the features soon appear, and are very perceptible by the end of the second month. The extremities begin to shoot out like the buds of a plant in the sixth week; the arms are at first large in proportion to the legs; in fact, the limbs are originally very much alike, and only distinguishable by their situation; they at first grow straight out from the trunk. The upper arm is then laid against the breast, and the fore arm drawn upward; the thigh is bent up to the belly, the leg drawn backwards towards the thigh, and the feet turned in

At an early period of fœtal existence there is no brain, but only the spinal marrow, so that the embryo of man then resembles one of the lowest orders of animals; the brain is perceptible about the second month, and is evidently formed by a prolongation of the spinal cord. Before the sixth month the brain is semifluid. Hair does not grow on the head before the sixth month, and even then it is very short, thin, and light coloured. The nails are at that period indistinct, the eye-lids closed, and the pupil is filled up by a membrane. In the seventh month the membrana pupillaris is removed, the eye-lids open, the nails become more distinct, and the hair longer and thicker. At the full time the nails are quite formed, the hair covers the head, and is of its proper colour, the cells of the skin are filled with fat, the lungs are large and red, the valve of the foramen ovale completely formed, the ductus arteriosus nearly an inch in length, and almost as large as the aorta itself.

The proportion between the weight of the embryo and its envelopes is reversed at the beginning and end of gestation. When the fœtus does not weigh more than a scruple, the membranes are nearly as large as an egg, and full of fluid; at the end of gestation the average weight of the fœtus is seven pounds, while the placenta and membranes together do not weigh a pound and a half; the proportion of liquor amnii is also much less. The most general height of a full-grown child is about twenty inches.

The fœtus has many peculiarities which distinguish it from the child after birth, most of which are peculiar to its mode of life, and are lost immediately after being separated from the mother, or are gradually removed during gestation. The most characteristic difference is that it lives in a medium of water, and not of air, and consequently does not breath by lungs, but has the blood which is deteriorated by circulating through the system purified in some manner in passing through the placenta. The umbilical vein carries the blood from the placenta to the fœtus: it enters the liver by the longitudinal fissure, and in the transverse fissure communicates with the vena portæ, sending the greater part of the blood to be circulated in the liver. This organ is of great size, and seems to perform some important office in the fœtal œconomy. It is conjectured by Dr. R. Lee to secrete albuminous matter, which nourishes the fœtus. The rest of the blood is transmitted directly to the vena cava inferior by the ductus venosus, which seems to be a continuation of the umbilical vein in man, though in most animals it is merely a branch arising from the sinus of the vena portæ. The blood conveyed by the vena cava inferior to the right auricle of the heart, does not all pass, as in the adult, into the right ventricle, but a great portion goes immediately into the left auricle through an opening in the septum of the auricles called the foramen ovale, which closes up immediately after birth. The blood that still goes into the right ventricle through the auriculo-ventricular orifice is propelled into the pulmonary artery, but, as there is no use for it at present in the lungs, it nearly all passes through a vessel named the ductus arteriosus into the aorta. This duct also becomes obliterated after birth, its functions having ceased when once the child has breathed.

By the aorta the blood is sent from the left side of the heart and ductus arteriosus to the different parts of the body, from which it is returned by the veins, but a great part of it passes out of the body of the fœtus by the umbilical arteries which are continued from the internal iliacs, and pass out at the navel to go to the placenta. The blood of the fœtus differs in its physical and chemical qualities from that of the adult. There is before birth no distinction between arterial and venous blood; it is of a dark colour in both systems of vessels. The purified blood is brought from the placenta by the umbilical vein, and is mixed before arriving at the heart with that which has been circulating through the fœtus: the mixed blood is then transmitted by the aorta to various parts of the body; some of it only going again to the placenta by the umbilical arteries to be again purified.

The position of the child in the uterus is that which takes up the least room; it lies with the head downwards, the chin being bent on the breast; the knees are doubled up close to the belly, and the arms are folded in the space between the head and legs. This is the most general position, and the child thus forms an oval figure, of which the head forms one end and the breech the other. The long axis of this ellipse measures in the ninth month fully ten inches, and the short one five or six. The quantity of fluid which surrounds the child at the full time is, on an average, about two pints.

The ordinary period of utero-gestation in man is forty weeks, though labour often takes place before this period, or is delayed a little beyond it. The embryo having now arrived at a sufficient degree of maturity to exist separately, the fibres of the uterus contract, accompanied by contraction of the abdominal muscles and diaphragm. In consequence of this pressure the membranes gradually dilate the mouth of the womb; they then burst and evacuate the liquor amnii, when the pressure acts upon the child itself, which is gradually forced into the world and commences a new existence. In man, and other mammalia, the young being for a considerable time depends upon its mother for the whole of its nourishment, and very generally requires a supply of warmth and a degree of protection till it is able to provide for itself.

FŒTUS (in Botany). The fœtus of plants is what botanists term the embryo; a firm, cellular, more or less cylindrical body, either divided into two or more lobes or cotyledons, or having but one cotyledon rolled upon itself, and usually with its margins so united that it appears extremely like a solid cylinder. The cotyledons are placed upon a small body, which may be compared to two cones with their bases applied to each other, and consequently with their apices pointing in opposite directions, and which separates them in a slight degree when there are two or more cotyledons. That cone which points towards the apex of the cotyledon is the *plumule*, and the other the *radicle*. Of these parts the cotyledons are rudimentary leaves, and the double cone a rudimentary axis of growth, the plumule giving birth to the stem and the radicle to the roots.

The embryo rarely, if ever, exhibits any distinct traces of either vascular or woody tissue until the commencement of germination, but as soon as that phenomenon takes place both are rapidly developed in abundance.

The embryo of a plant is developed in the nucleus of the ovule [Ovule], and always first appears in that part of the nucleus which is next the foramen. It is first seen as a whitish semi-opaque globule; after which it gradually organizes its radicle next the foramen and its cotyledon or cotyledons downwards into the mucilage which, at that time, fills the cavity of the ovule; eventually absorbing all the mucilage, when it occupies the whole interior of the seed, or only a portion of it, in which case it is associated with albumen. When it first appears it does not lie loose in this mucilage or water of development, but it adheres to a cellular cord which is attached by one end to the chalaza, and by the other to the summit of the nucleus where the embryo first appears. This cellular cord usually disappears by the time the embryo is matured, but in many plants, Nymphæa and Cycas for instance, it remains visible in the seed as a long twisted irregular thread, from which the embryo is found to hang when it is taken out of the seed. (Treviranus, *Symbolæ Phytologicæ*, fasc. i.; and Mirbel *sur l'Ovule*, p. 37.)

FO'GGIA, the chief town of the province of Capitanata, in the kingdom of Naples, situated in the midst of a vast and perfectly level plain, which extends from the foot of the Apennines to the Adriatic, is the residence of the intendente and the seat of the criminal court of the province. For civil suits Capitanata is subject to the Gran Corte Civile of Naples. The Royal Lyceum of the province is at Lucera; but there is at Foggia a secondary or grammar-school as well as elementary schools, and also a school of agriculture and rural economy. The Tribunal of Commerce for the provinces of Apulia was established here in 1818. Foggia is a modern-looking, regularly-built town with wide streets, some fine buildings, and 21,000 inhabitants. It carries on a great trade in corn, wool, and cattle, the staple produce of the country, and has large granaries for storing corn. A great fair is held here in the month of May. Foggia is chiefly a place of trade, being the great inland market for the agricultural produce of Apulia, and is also the residence of the provincial nobility and landholders, who are wealthy and hospitable. The climate is not wholesome in the summer months, and the night air especially is considered unhealthy. Foggia is reckoned, for its importance and wealth, the second town in the kingdom of Naples. It stands on the high road from the capital to the eastern provinces, 75 miles north-east of Naples, 25 south-west of Manfredonia, and 77 miles west-by-north of Bari. The neighbourhood of Foggia being planted with olive, mulberry, vine, and other fruit-trees, looks like an oasis in the vast naked and solitary plain of the Tavoliere. [Capitanata.] A branch of industry at Foggia is the pickling of capers, which grow in great quantity in the neighbouring country.

FOIL, in Gilding. [Gilding.]

FOIX, the name of a town and former county of France.

The town of Foix is the capital of the department of Arriège, and is situated on the left bank of the river which gives name to the department. It is among the Pyrenees, but many miles from the line of the highest elevation, about 404 miles in a straight line south-by-west of Paris. It is in 42° 58′ N. lat., and 1° 36′ E. long.

An antient tradition ascribes the foundation of this place to the Phocæans of Massilia (Marseille), and attributes to it the name of Phocée; but this tradition does not seem to be supported by anything, unless it be the modern name of the town. Foix seems rather to have owed its original to an antient castle, the residence in the middle ages of the counts of Foix, and to an antient abbey, founded by the counts of Carcassonne, and endowed by the counts of Foix with additional possessions. The streets of the town are narrow; but there is a good though antique stone bridge over the Arriège; and the remains of the castle, consisting of three decayed Gothic towers, on a height commanding the town, are interesting from their historical recollections. The population of the town in 1832 was 3225, that of the commune 4857. The inhabitants are industrious, but the secluded situation of the place restricts its commerce: coarse cloth, serge, hats, and hosiery are manufactured; and trade is carried on in cattle, pulse, resin, turpentine, cork, iron, and woollen cloth. There are some coal-pits; and on the banks of the river are several forges. Foix has a subordinate court of justice and several government-offices, an exchange, a high-school, a library, a theatre, and a society of agriculture and the arts. The town has no communication by posting with the capital: the line of post ceases at Toulouse, about 50 miles from Foix; and, although there are in this part fourteen passes or defiles of the Pyrenees communicating with Spain, none of them are practicable for carriages.

The territory known as the county of Foix was formerly part of the territory of the Volcæ Tectosages, and perhaps of the Consoranni inhabitants of the Couserans. It was afterwards part of the territory of the counts of Carcassonne, who were in feudal subjection to the counts of Toulouse: but upon the death of Roger I. count of Carcassonne, who divided his estates between his family, it became, about the beginning of the eleventh century, a separate jurisdiction, which fell to Bernard, second surviving son of Roger. This separate jurisdiction was afterwards erected into the county of Foix. The counts made a conspicuous figure in the civil and religious dissensions of the middle ages: Raymond Roger (A.D. 1188-1223) and Roger Bernard le Grand (A.D. 1223-1241) supported the counts of Toulouse against the Crusaders under Simon de Montfort and the other supporters of the papal authority: the former distinguished himself by various exploits in the course of the crusade against the Albigenses and their protector the count of Toulouse. [Albigenses.] He acknowledged himself the vassal of Peter king of Aragon, whence it arose that the kings of Aragon pretended to the sovereignty of the county, till James of Aragon (A.D. 1258) renounced his claim in favour of St. Louis of France. Gaston IV. count of Foix came into possession (by inheritance from his father-in-law) of the kingdom of Navarre; and the county of Foix, thus united to the other possessions of the royal house of Navarre, fell to the crown of France upon the accession of Henri IV., A.D. 1582,

The county of Foix was small: its greatest extent was from north-by-west to south-by-east about 50 miles; its greatest breadth about 35. It was bounded on the east, north, and north-west by Languedoc, on the west by the district of Couserans, and on the south by the crests of the Pyrenees, by which it was separated from Cerdagne and Roussillon. The territory thus described is watered by the Arriège, which runs through it in the direction of its greatest length. It was subdivided into La Haute Partie (the upper district), La Basse Partie (the lower district), and Le Donnezan. The chief towns were Foix, Pamiers (population in 1832, 5150 for the town, or 6048 for the whole commune), La Bastide de Seron (pop. 1652 for the town, or 2911 for the whole commune), Mazères (pop. 2327 for the town, 3170 for the commune), Saurat (pop. 2563 for the town, 5014 for the commune), Saverdun (pop. 1897 for the town, 3327 for the commune), Ax or Aqs, Tarascon, and Les Cabanes.

The present arrondissement of Foix comprehends eight cantons, and 140 communes: it had, in 1832, 89,892 inhabitants.

FOIX (GASTON III. COUNT DE), Viscount de Béarn, was born in 1331. He was the son of Gaston II by Eleanor, daughter of Bernard V. Count de Cominges. From his personal beauty, or his fondness for the chase, he was called Phœbus, on which account, agreeably to the fashion of his day, he took the sun for a device. His father died when he was twelve years old, leaving him under the guardianship of his mother. In 1345 he made his first essay in arms against the English in Guienne, and served afterwards in Languedoc, where, and in Gascony, he subsequently became the king's lieutenant. In 1349 he married Agnes, daughter of Philip III. king of Navarre. In 1356, being suspected of holding criminal intelligence with his brother-in-law Charles the Bad, he was arrested by order of King John, and sent to the prison of the Châtelet, at Paris; but, being released soon afterwards, he went to Prussia to serve against the infidels. In 1358, during the revolt called the Jacquerie, he aided in the rescue of the Dauphin, whom the Parisians had shut up in the market-place of Meaux, and in the same year made war upon his relative the Count d'Armagnac, who had set up pretensions to the viscounty of Béarn, and whom he afterwards took prisoner, in 1372, at the battle of Launac. Gaston, who had become discontented with his wife, upon a dispute about her dower, parted from her in 1373. In 1380, the government of Languedoc becoming vacant by the recall of the duke of Anjou, it was bestowed by Charles V. on the Count de Foix. He held it however but a few months. Charles V. dying on Sept. 16th that year, Charles VI. revoked the appointment, and gave it to the duke of Berri. The Count de Foix appealed to arms, and finally yielded up the government only on negociation. By his marriage the Count de Foix had but one son. This youth, in 1382, paying a visit to his mother, who had retired to the court of her brother, Charles the Bad, received from that king (to whom crime was familiar) what he pretended was a bag of love-powder, which that king told him to conceal, at the same time informing him that the sprinkling of a small quantity of it upon any food his father might eat, would have the effect of reconciling the count to his wife. The powder turned out to be a strong poison, and Gaston ordered his son to be arrested. The young prince, deceived but not guilty, refused all nourishment, and died in his prison; the father, as Froissart relates, having hastened his death when going to remonstrate with him, by accidentally striking the point of a knife into his son's throat as he pushed aside the tapestry which covered the entrance to his dungeon.

In 1390 Gaston received Charles VI. and his whole court at his castle of Mazères, in the diocese of Mirepoix, where he not only entertained them with great magnificence, but made the king the heir to his domains. He died of apoplexy in the beginning of August, 1391, as his attendants were pouring water on his hands at his return from a bear-chase.

Historians, especially Froissart, have painted Gaston as an accomplished, brave, affable, and magnificent prince: they cannot however deny that he was violent to excess. His conduct toward his son, and to De Berne, the governor of the castle of Lourde, whom he wished to force to deliver the place to the French, and whom, on his refusal, he struck several times with his poniard, are incontestable proofs. His favourite passion was hunting. He carried it to such extreme, that if we may believe Saint-Yon, he did not keep fewer than sixteen hundred dogs. He also composed a work on what constituted the object of his affection, entitled *Phebus des deduitz de la Chasse des Bestes sauvaiges et des Oyseaulx de proye*, three or four editions of which are known; viz., fol. Par. by Verard, without date; another by J. Treperel; 4to. by Phil. le Noir, without date, and 1515 and 1520. The book of 'Phebus' is also included in several of the early editions of the Treatise on Hunting by Jacques de Fouilloux. (*L'Art de vérifier les Dates*, fol. Par. 1784, tom. ii. pp. 312, 313; *Biogr. Universelle*, tom. xv. p. 131; Goujet, *Bibliothèque Françoise*, tom. ix. p. 114.) It was in the castle of Orthes, Gaston's principal residence, that Froissart, who staid there a considerable time, heard many of the best stories with which his history is embellished. The portrait which he has drawn of Gaston is one of the completest pictures of what a chivalrous prince was in the time of our Edward the Third.

FOKIAN. [China, p. 80.]

FOKSHAM. [Wallachia.]

FOLA'RD, JEAN CHARLES DE, was born at Avignon, in 1669. He entered early into the army, and distinguished himself by the attention which he paid to the scientific part of his profession, to the movements and manœuvres of an army in the field: he drew plans and maps, and became a pretty good engineer. Having been made aide-de-camp to the duke of Vendome, he attended him in his Italian campaigns, and was wounded at the battle of Cassano. He afterwards served in Flanders under the duke of Bourgogne, and was wounded again at the battle of Malplaquet. His zeal, at times indiscreet, his want of tact, his restless activity, and his fondness of giving advice, which, although at times valuable, was not acceptable to his superiors, made him many enemies. The peace of 1712 having placed him on the reduced list, he repaired to Malta to offer his services to the order of St. John, which was then threatened by the Turks; but being offended at some real or supposed slight, he returned to the continent, and visited Sweden, where he was well received by Charles XII., who employed him on some missions, and whom he accompanied in his last expedition to Norway. After Charles's death in the trenches of Fredericshall, Folard returned to France, and made one short campaign more in the war against Spain of 1719, after which he withdrew into private life, and occupied himself in writing on military matters. He died at Avignon in 1752.

Folard's principal work is his 'Commentaries on Polybius,' in which he not only makes his observations on the events narrated by the Greek historian, but also draws parallels between antient and modern military practices, and reasons on the occurrences of the wars which he had witnessed, exposing with the greatest freedom the errors of the various commanders of his own age. His disquisitions, though often prolix, are valuable. He had some peculiar notions on tactics, which have been refuted as inapplicable to the modern system of warfare. Frederic II., a very good judge of these matters, says that 'Folard had scattered diamonds amongst dung, that his system of columns in deep order was worthless, but that the movements which he describes so well, and certain instances of ingenious defence which he explains, may be useful, as well as his strictures on the conduct of some French generals, and also certain projects of his which give rise to reflections more useful than the projects themselves.' Folard's 'Commentaries' were published in 6 vols. 4to., Paris, 1727-30, and again at Amsterdam, in 7 vols. 4to., the seventh volume containing some treatises and strictures on Folard's system of tactics, with his own replies.

FOLCLAND. [Bocland.]

FO'LIO, from the Latin *folium*, properly signifies a leaf; and in books of accounts means a leaf, or two pages, of a ledger-book. Folio *a* and *b*, or *recto* and *verso*, are antient and still continued distinctions for the first and second sides of the leaf or folio, in manuscripts and early printed books. Folio, with booksellers, means a book in folio, the pages of which consist of sheets folded only in two, each leaf making half a sheet. 'Folia chartarum' is an expression at least as old as the time of Pliny.

FOLKES, MARTIN, an eminent English antiquary, was the eldest son of Martin Folkes, Esq., and was born in Great Queen Street, Lincoln's-Inn-Fields, October 29th, 1690. He entered of Clare Hall, Cambridge, in 1707, where his progress in all branches of learning, and more especially in mathematics and philosophy, was such, that when he was scarcely more than twenty-three years of age he was admitted a fellow of the Royal Society, and two years after had so distinguished himself as to be chosen one of its council. His first communication to the Society was on the aurora borealis of March 30, 1717. This was followed at various times by other papers in considerable numbers, for which it may be sufficient to refer to the 'Philosophical Transactions.' He was chosen a second time of the council of the Royal Society in 1718, and continued to be re-chosen every year till 1727; Sir Isaac Newton, the president, having in 1723 appointed him one of his vice-presidents. In February, 1720, he was elected a fellow of the Society of Antiquaries.

At the first anniversary election of the Royal Society after the death of Sir Isaac Newton, in 1727, Mr. Folkes was competitor with Sir Hans Sloane for the office of president, and his interest was supported by a great number of members, though the choice was determined in favour of Sir Hans. He was, however, again chosen of the council in 1729, and continued in it till he was advanced to the president's chair twelve years after. In the mean time he was, in 1733, appointed one of the vice-presidents by Sir Hans Sloane. In this year he set out with his whole family on a tour to Italy, and, after residing a considerable time both at Rome and Florence, returned to England in September, 1735. The opportunities which he had of consulting the best-furnished cabinets of Italy enabled him to compose there an excellent 'Dissertation on the Weights and Values of antient Coins.' This was read in the Society of Antiquaries, who requested that a copy of it might be registered in their books, which he promised to give after he had revised and enlarged it; but, for some reason, this was never done. In the same year however, 1736, his 'Observations on the Trajan and Antonine Pillars at Rome' were read in this Society, and afterwards printed in the first volume of their 'Archæologia,' which contains another paper by him on the brass equestrian statue of Marcus Aurelius at Rome, occasioned by a small brass model of it being found near London. In April he also communicated to them 'A Table of English Gold Coins from the 18th year of King Edward III., when Gold was first coined in England, to the present time, with their Weights and intrinsic Values;' which at their desire he printed the same year in 4to.; and in 1745 reprinted it with additions, prefixing a larger and more considerable work, entitled 'A Table of English Silver Coins, from the Norman Conquest to the present time, with their Weights, intrinsic Values, and some Remarks upon the several Pieces.' Mr. Folkes, in order to illustrate this work, had set about engraving, and actually did engrave 42 copper-plates of English silver coins, which were left at the time of his death in an incomplete state. These, together with the copyright of the books or tables before mentioned, were purchased by the Society of Antiquaries, December 19th, 1754, for 120*l.*, and the whole published, with great additions, both as to letter-press and plates, under the care of Dr. Andrew Gifford, in 1763.

Sir Hans Sloane having, on account of his advanced age, resigned the office of president of the Royal Society, at the annual election in 1741, Mr. Folkes was unanimously chosen to fill that honourable post; and, in the following year, was chosen to succeed Dr. Halley, as a member of the Royal Academy of Sciences at Paris. In 1746 the University of Oxford conferred upon him the degree of LL.D., and he was afterwards admitted to the same degree at Cambridge.

On the death of Algernon, duke of Somerset, president of the Society of Antiquaries, in February, 1750, Mr. Folkes, then one of the vice-presidents, was immediately chosen to succeed his grace in that office, in which he was continued by the charter of incorporation of that Society, November 2, 1751. But he was soon disabled from presiding in person, either in that or the Royal Society, being seized on September 26th of the same year with a palsy, which deprived him of the use of his left side. In this unhappy situation he languished nearly three years, till a second stroke put an end to his life, June 28th, 1754. He was buried near his father and mother, at Hillington, near Lynn in Norfolk, under a black marble slab, with no inscription but his name and the date, pursuant to the express direction of his last will. By his wife, Lucretia Bradshaw, who had been an actress on the stage before he married her, he left two daughters. The sale of his library, prints, coins, &c., in 1756, lasted 56 days, and produced the sum of 3090*l.* 5*s.* A monument to his memory was erected in Westminster Abbey in 1792, in a window on the south side of the choir, opposite to the monument of Mr. Thynne. (Nichols's *Anecdotes of Bowyer*, 4to., London, 1782, pp. 562—566, from a memoir prepared for publication by Dr. Birch; Chalmers's *Biogr. Dict.*, vol. xiv. pp. 428—431.)

FOLKESTONE. [KENT.]

FOLK-MOTE, or FOLK-GEMOTE, literally a meeting of the people; an assembly under the Anglo-Saxon government, respecting the nature of which some of our antiquaries have differed. Somner, in his 'Anglo-Saxon Dictionary,' calls it a general assembly of the people for considering and ordering matters of the Commonwealth. So the laws of King Edward the Confessor, 'Folcmote, *i.e.* vocatio et congregatio populorum et gentium omnium, quia ibi omnes convenire debent, et universi qui sub protectione et pace Domini Regis degunt.' The continuation of this statute of Edward the Confessor expressly directs that the meeting of the Folcmote should be held once in the year upon the 1st of May. 'Statutum est enim quod ibi debent populi omnes, &c., semel in anno scilicet convenire, scilicet in capite Kal. Maii.' (Wilk., *Leg. Anglo-Sax.*, p. 204.)

Brady, in his 'Introduction to Old English History,' Gloss. p. 47, is entirely mistaken when he speaks of it as an inferior ordinary court, held once a month. The Folk-mote and Shire-mote (or general meeting of a county) were synonymous. (Wilk. *ut supr. Gloss.* p. 404.)

In later times a Folk-mote, according to Stow, among the citizens of London, meant a meeting of themselves. Fabyan, in his 'Chronicles' (edit. 1811, p. 344), mentions a court of folk-mote held at Paul's Cross in 1256; and another assembled by command of Henry III. (ibid. p. 345), 'where the king, according to the former ordinances made, axed licence of the commonalty of the city to pass the sea.'

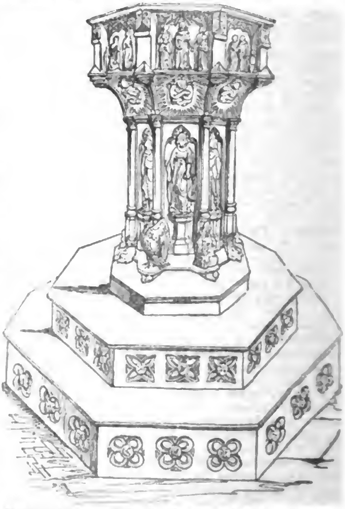
FOMALHAUT. [PISCIS AUSTRALIS.]

FOMENTATIONS are liquid applications, generally of a warm temperature, placed in contact with a limited portion of the body, to mitigate or remove disease of the part, or of the neighbouring organs. They differ from partial or local baths, chiefly in the greater length of time which they are kept applied. Flannel cloths, or other substances fit to retain heat and moisture, are commonly employed. To enable these substances to retain the heat still longer, they are often covered externally with oiled silk. It is proper to renew the application before the cloths begin to give a feeling of coldness. The liquids used are of various kinds, sometimes pure water; at other times, medicated; they are termed emollient when charged with mucilaginous principles, such as mallows, and sedative or anodyne when they contain a narcotic principle, such as poppy heads.

FONDI. [LAVORO, TERRA DI.]

FONT, a vessel employed in Protestant churches to hold water for the purpose of baptism, and in Catholic churches used also for holy water. The form of the font is usually hexagonal, similar to the form of the baptistery, in which fonts were originally placed. There are a great many fonts in England curious both for their antiquity and their architectural design: they date from the Saxon period to the time when the florid style of Gothic architecture was in vogue, in the reign of Henry VII.

Although the hexagonal form is the most usual, yet fonts occur both of a circular and square form. They are usually shaped like a cup, with a solid stem, or supported on columns; the top is hollowed out for the water, and the sides and stem are often highly enriched with ornament, sculptured figures, and with colour and gilding. In many instances a flight of steps forms a base, and even the sides of these steps are carved with pannels, having quatrefoils and rosettes sunk within them. It was usual to cover the basin of the font with a wooden lid, and there are some of these remaining of a pyramidal or spire-like form, richly carved and designed, with a profusion of shafts, buttresses, and tracery piled up to the apex. There is such a cover in Castleacre church, Norfolk. Porchester church has a very antient font, of a circular form, like the antient Roman puteal or circular stone-mouth of the well in the atrium of a Roman house; it is decorated with intersecting arches on columns, with a frieze of foliage, and figures above. Lincoln cathedral, and the South Church in Hayling Island, Hampshire, are examples of the square form of font on five



Font in East Dereham Church, Norfolk, from an original drawing made by Mr. W. H. Clarke, architect, in 1834.

columns; one being placed in the centre, of much larger dimensions than the four columns which are at the angles. The font of Blythborough church in Suffolk still shows some traces of colouring and gilding; and that of Lowestoff church in Norfolk has some fine remains of sculptured figures representing kings and queens. The font at Loddon in Norfolk is remarkable for its elegance and richness of decoration. In Winchester cathedral there is one of the most antient and curious fonts in the kingdom. In the elaborately designed porch of East Dereham church, Norfolk, are two fonts, or stoups, as they are usually designated, originally intended for holy water.

The Gothic fonts in England exhibit every species of design and decoration belonging to the several periods or styles of Gothic architecture, and therefore merit the attention of the antiquarian and architect. There are numerous drawings of fonts in 'A Series of Antient Baptismal Fonts, chronologically arranged,' &c., published by Mr. Weale, High Holborn, London.

FONTAINEBLEAU, a town in France, the capital of an arrondissement in the department of Seine et Marne. It is on the high road from Paris to Montargis, Nevers, Moulins, and Lyon; 33 miles from Paris in a straight line, or 35 by the road. It is in 48° 24′ N. lat., and 2° 42′ E. long. There has been much dispute respecting the etymology of the name, but the most probable opinion is that which derives it from the name of a fountain, called, in antient title-deeds, Fons Bliaudi or Blaudi, and said to have obtained that name from Bliaud, one of the hounds of Louis VII. le Jeune, or more probably from the name of the original owner of the spot. There is no mention made of Fontainebleau until the time of Louis VII., who built here (A.D. 1169) a chapel, which was consecrated by the celebrated Thomas-à-Becket, in the midst of the surrounding forest, then called the Forest of Bièvre: a château, or royal residence, was in existence at that time, but by whom built is uncertain. The spot was a favourite one both with Philippe II. (Auguste) and with Louis IX. (St. Louis), who founded here an hospital and two chapels. Francois I. caused a magnificent château to be erected here by the architect and painter Primatice: and this structure has been further embellished by the taste or extravagance of succeeding princes. The kings, Philippe IV. le Bel, Henri III., and Louis XIII. were born here, and the first of the three died here. Christina, queen of Sweden, after her abdication, resided here, and has imparted to the place a sad celebrity by the death of her secretary, Monaldeschi, whom she ordered to be executed in a gallery of the château. Here the unhappy Pope Pius VII. lived for eighteen months during the reign of Napoléon, and here Napoléon himself signed his act of abdication of the throne of France in 1814, previous to his retirement to Elba.

The town is situated in the midst of the forest of Fontainebleau: it is well built, especially in the more modern parts: several of the streets are straight, and of tolerable breadth; the houses are of brick and stone united in the same building. The château is an irregular pile, resembling a group of distinct edifices rather than one united building. It has six court-yards, each nearly or quite surrounded with three or four buildings, and combined without any uniform plan. It is adorned with numerous statues and paintings: the works of the Italian artists, Primatice and others, whom Francois I. engaged for the decoration of his residence, have almost entirely disappeared, some from the ravages of time, and others from the rise of a more correct taste, with which their indelicacy was incompatible. The library of Fontainebleau is more numerous than any of those at the other royal residences, but the apartment which is appropriated to it is not sufficient to contain it. The park and gardens are in a style of magnificence corresponding to that of the château: they are adorned with a canal and cascade (nearly three quarters of a mile long, and above 120 feet wide), several smaller canals, and a variety of jets d'eau and statues in bronze and marble: there are some fine avenues in the park. There are two hospitals in the town, one founded in 1646 by Anne of Austria, for fourteen sick paupers, and the other in 1696, by Madame de Montespan, for the education of sixty poor girls, and the maintenance of forty old people: these hospitals have very inadequate endowments, and owe their existence now chiefly to public support. There are also fine barracks.

The population of Fontainebleau in 1832 was 8104 for the town, or 8122 for the whole commune there is very little trade; what there is is chiefly in the agricultural produce of the neighbourhood. Some porcelain, and other earthenware, leather, and calicoes, are manufactured. There are three fairs in the year for cattle, wine, &c.

The Forest of Fontainebleau occupies an extent of nearly 33,000 arpents, above 41,000 acres, or 64 square miles: it surrounds on nearly every side the plain in which the town stands: its surface is unequal, and its soil sandy, interspersed with rude blocks of sandstone, which are quarried for the pavement of Paris. The age of some of the trees, and the width of the avenues which pierce the forest in various directions, impart to it a considerable degree of picturesque beauty: the hermitage of Franchard, about two or three miles north-east of Fontainebleau, is one of its most remarkable sites. The Forest of Fontainebleau furnishes Paris with a small proportion of its fuel, but with a considerable portion of its pavement. There is a good quantity of game; wild boars are numerous.

The gardens of the town and the neighbourhood produce a grape which is known at Paris by the name of *Chasselas de Fontainebleau*. The arrondissement of Fontainebleau comprehends seven cantons, and 104 communes; it had in 1832 a population of 69,953.

FONTAINE, JEAN DE LA, was born in 1621 at Château-Thierry, where his father was Maître des Eaux et des Forêts. No great attention was paid to his education, and he did not display the glimmering of any sort of talent till he had attained the age of twenty-two. His genius is said to have been first called forth on his hearing read an ode by Malherbe, when he is reported to have exclaimed, 'I also am a poet!' At first he took Malherbe for his model, but afterwards turned his attention to the works of Rabelais, Voiture, and Clement Marot. His father, delighted with his imitations of his favourite authors, thought him a prodigy of poetic genius, and a relation advised him to study the classics. A translation of Terence's 'Eunuch,' published by La Fontaine in 1654, was the fruit of this advice. He was much delighted with the Italian authors, especially Machiavelli, whom he chiefly admired for his little novels. On the death of his father, he succeeded to his office, which he filled inefficiently, and took a wife, with whom he lived unhappily, and from whom he finally separated. In fact, he was of too indolent and improvident a disposition for any of the common avocations of life; he does not seem to have had any absolute vice, but to have gone on in his own lounging way without taking any interest in what was passing around him. In an epitaph on himself he describes his life as having been occupied with sleeping and doing nothing; in the latter category he evidently includes the writing of his poems, which he probably threw off when in a happy vein without giving himself any great exertion. Some verses of La Fontaine happening to fall in the way of the exiled duchess de Bouillon, who was residing at Château-Thierry, she caused the author to be introduced to her, and took him with her to Paris when she returned. Here the superintendent Fouquet became his Mæcenas, and placed his name on a list of pensions which he allowed to various persons of merit. On the exile of this minister La Fontaine wrote a pathetic elegy. Though many distinguished persons honoured him with their patronage, his ignorance of the world and his habitual carelessness would have plunged him into difficulties had not a liberal lady, Madame Sablière, taken him into her house, where he resided for twenty years in perfect tranquillity. A well-known story gives a good idea of La Fontaine's quiet lazy disposition. Madame Sablière having had occasion to part with her servants, said to a friend, 'I have now got rid of all my animals but three—my dog, my cat, and La Fontaine.'

In 1684 he was received into the Académie as successor to Colbert, not without opposition from the graver sort, on account of the licentiousness of some of his works. However he triumphed over Boileau, who was the rival candidate. The king, indignant at this, delayed giving assent to his admission, but on the death of M. Bezons, and the election of Boileau to fill his place, the king expressed his approbation of the choice of La Fontaine. On the death of his benefactress, La Fontaine was again reduced to difficulties, and would have been forced to accept an offer of St. Evremond to take him to England, had not the duke of Burgundy assisted him. In 1692, when he became seriously ill, the Abbé Pougit paid him a visit to attend to his spiritual welfare. La Fontaine submitted to the dictates of the abbé, though he was somewhat restive on two points. In the first place, the abbé demanded a public apology for his licentious tales; in the second, a solemn promise not to give to the actors a comedy which he had written. He made the required apology, but he applied to the Sorbonne before he yielded to the second demand; however, receiving an unfavourable answer, he committed the comedy to the flames. This demand on a poor man to relinquish his only chance of accumulating a small sum, by an act which in itself involved no moral wrong, but merely happened to be at variance with the prejudices of the clergy, is a striking instance of the bigotry of the times. In 1693 La Fontaine became worse, and was even reported dead; but he recovered, and devoted himself to a translation of the hymns of the church and other religious works. He would now have been almost alone in the world, if a friend, M. d'Hervart, had not kindly offered him an asylum in his own house. He died in 1695.

The works by which La Fontaine is known are his Tales and his Fables. The former have a very equivocal set of readers, and are seldom mentioned in society; the latter belong to that small class of works the reputation of which never fades, and which are just as well known at present as they were in the seventeenth century. Innumerable are the editions of these fables, and great is the field they have offered for the ingenuity of artists in furnishing illustrations. To say nothing of the various unornamented editions, they appear in every variety of shape, from an 18mo with vignettes to a huge folio with large and elaborate plates; and even now an edition is publishing adorned with fine wood-cuts, representing all the animals mentioned in the fables in human dresses. It is remarkable that La Fontaine never (or rarely) invented his subjects: his tales are taken from Boccaccio, Machiavelli, Ariosto, and others; his fables are chiefly selected from Æsop. It is not the matter of his compositions, but the manner in which he tells a tale, that constitutes his merit. His narrative is marked by that ease and grace which, as La Harpe says, 'are to be perceived, not described; for if after a profound philosophical investigation,' he continues, 'we arrived at the ultimate causes of excellence, and referred the point to La Fontaine himself, the "bon homme" (as he is called) would say, "I know nothing about this; I wrote them as my humour dictated, and that was all."'

Curiosity will cause a reader to wade through a new story even when indifferently written; but a man who, by his mere manner of narrating, can make a vast number of readers peruse a series of narratives, with every incident of which they are perfectly acquainted—must have talents great indeed.

FONTAINE-L'EVEQUE. [Hainault.]

FONTA'NA, DOMENI'CO, a distinguished Italian architect, younger brother of Giovanni, who followed the same art, was born at Mili, on the borders of the lake of Como, in 1543. Having a decided taste for mathematical studies, at the age of twenty he went to join his brother at Rome, nor was it long before he attracted the notice and obtained the favour of Cardinal Montalto, who confided to him the erection of the Cappella del Presepio or Sistina in Santa Maria Maggiore, a work that stamped his reputation as a design of great nobleness and grandeur, although, according to modern taste, it is too overcharged in its ornaments, and too much cut up by the injudicious arrangement of the gilding and coloured marbles. By the same ecclesiastic he was employed to build for him, in the vicinity of the above-mentioned church, the palace now known by the name of the Villa Negroni. This edifice which, partly on account of its gardens, was for a long while one of the most celebrated mansions in Rome, is, like most of the architect's other designs of the same class, exceedingly simple in its composition, and has little decoration beyond what it derives from the dressings and pediments of the windows, which latter are alternately angular and curved. Yet favourable as these undertakings were in themselves, they were not productive of much immediate profit to the architect, and were even injurious to his patron, as they afforded the pope (Gregory XIII.) a pretext for suppressing the pensions of the cardinal, since he was wealthy enough to indulge in such magnificence. On this, out of his attachment to the cardinal and his eagerness to complete the Cappella del Presepio, Fontana generously contributed a thousand scudi of his own, rather than see the scheme abandoned. To his disinterestedness on this occasion he was, in all probability, not a little indebted for his subsequent good fortune, as the cardinal was shortly afterwards elected to the pontifical throne, under the well-known name of Sisto Quinto. The new pope had now the means of indulging his taste for architecture and embellishment; and one of his projects was to re-erect the various Egyptian obelisks which lay scattered and neglected among the ruined fabrics of the antient city. The first to which the pope directed his attention was that which still remained standing in the Vatican circus. This he was anxious to have removed to the area in front of St. Peter's; but the practicability of transporting such an enormous mass (83 feet 2 inches high), and elevating it upon a pedestal, was long doubtful, although the ablest mathematicians and engineers were summoned to suggest the means. Upwards of five hundred different projects and models were submitted to him, nor did Fontana fail to come forward among the competitors, for he produced the model of a machine that acted upon a leaden figure of the obelisk; besides which he gave satisfactory proof of his contrivance by applying it to a small obelisk in the Mausoleum of Augustus. Still, although his plan was approved and adopted, it was not until after urgent representations on his part that the carrying it into execution was intrusted to Fontana, it having been in the first instance determined that Giacomo della Porta and Ammanati should take charge of the operations. A circumstantial account of all the proceedings attending this very arduous enterprise was published by the architect himself, under the title of *Del modo tenuto nel trasportare l'Obelisco Vaticano*. The operations commenced April 30th, 1586, and the obelisk was removed, and placed on the new pedestal prepared for it, on the 13th of the following June, when was successfully accomplished the most stupendous trial of mechanical skill that age had then witnessed, although afterwards rivalled on more than one occasion, and in our own times by the erection of the Alexander column at St. Petersburg, a monolithic granite shaft of eighty-four feet in height and twelve and a half in diameter, which had been previously transported from the quarries in Finland. The complete success of this task gained the architect not only honours and distinction, but a pension of two thousand scudi, and also gave him assurance of an equally favourable result in all similar undertakings. To these belong the three obelisks he afterwards erected in the Piazza del Popolo, before St. Giovanni Laterano, and in front of Santa Maria Maggiore. The second of these is still larger than the first-mentioned, being 105 feet 7 inches high, independently of the pedestal, and its weight calculated at about 440 tons. (*Egyptian Antiquities; Lib. Ent. Knowledge*, vol. i., chap. 15.)

In addition to tasks of this nature Sixtus afforded him the opportunity of displaying his talents as an architect, giving him charge of the various works at the Lateran church, to which he attached, on one of its sides, a kind of portico consisting of an upper and lower gallery, in five open arcades, the piers of the former ornamented with a Doric and those of the other with a Corinthian order. Immediately adjoining this portico he also erected the palace of the Lateran, a uniform square pile of building, with two series of windows above the lower floor, all of which have pediments alternately angular and curved, and the whole is surmounted by a massive and rich cornice. By the same pontiff he was likewise charged to construct the Vatican library, and thus destroy the noble court formed by Bramante. [Bramante.] Nor was this the only addition he made to that pile, for he also erected the lofty mass of building on the side towards the piazza of St. Peter's, which, impressive as it is in itself, does not bespeak much fertility of invention, it being little more than a repetition of his palace of the Lateran. Another papal residence, which was partly erected by him, was that of the Quirinal, or Monte Cavallo, so called from the two colossal figures before it, which he removed thither from the Baths of Constantine. Among his other works may be mentioned the restoration of the columns of Trajan and Antoninus, and the fountain of Termini. He was preparing to erect a vast edifice for a cloth manufactory within the Coliseum, the plan of which was to have been elliptical, like that of the amphitheatre, when Sixtus, with whom the idea originated, died, and thus was frustrated a scheme that would irreparably have injured the sublime and majestic character of that monument of antiquity.

The death of that pope brought a change of circumstances to Fontana, who was dismissed by Clement VIII from his situation as papal architect. Still his prosperous fortune did not desert him, for he was immediately invited to Naples, by the viceroy, the Count de Miranda. In that capital, to which he repaired in 1592, he was employed on a variety of works; and among others he executed the fountain Medina; but the most important of them all was the royal palace, a grand and imposing, although not particularly elegant edifice. He died in that city in 1607, possessed of considerable wealth, and of a distinguished reputation.

FONTARABIA, or FUENTE RABIA. [GUIPUZCOA.]

FONTENAY, a town in France, capital of an arrondissement in the department of Vendée, and on the left or north-west bank of the river Vendée, which unites with the Sêvre of Niort: it is 281 miles south-west of Paris by the road through Orléans, Blois, Tours, Poitiers, and Niort.

The town owes its origin to a castle which the counts of Poitiers caused to be built here, and of which there are some remains. Fontenay was twice besieged by the Huguenots in the religious troubles of the 16th century (A.D. 1568 and 1570). In the first siege, which was successful, the conquerors, in violation of the terms of the surrender, put the garrison to the sword, and afterwards slew the commandant, whom they had taken to Rochelle. In 1574 Fontenay was the scene of still greater atrocities perpetrated by the Catholics.

The town stands partly in a valley on the bank of the river, partly on a hill. The streets are narrow, crooked, and ill paved. The spire of the church of Notre Dame is remarkable for the lightness of its architecture and its extraordinary height, which is above 300 feet. The covered market-places are of unusual size for a small provincial town. The population in 1832 was 6388 for the town, or 7504 for the whole commune. The chief manufactures are linen and coarse woollen cloths for the consumption of the country; there are several tan-yards and some breweries; trade is carried on in corn, cattle, horses, mules, wood, charcoal, and wine, of which last the neighbourhood produces some white of ordinary quality. There are four yearly fairs and a large corn market. Mill-stones of coarse texture are quarried in the neighbourhood. There are a subordinate court of justice, a high-school, and an agricultural society. The navigation of the river Vendée commences here. Fontenay is sometimes distinguished by the epithet 'Le Comte,' from the antient counts of Poitiers: during the Revolution, when such anxiety prevailed to obliterate all names that could recall the feudal or monarchical period, the designation was changed for that of 'Le Peuple.'

The arrondissement of Fontenay comprehends 9 cantons and 124 communes, and had in 1832 a population of 119,664.

FONTENELLE, BERNARD LE BOVIER DE, born at Rouen 11th February, 1657, was, by his mother's side, nephew of the great Corneille, and, by a long life of nearly a century, contemporary with most of the greatest writers of France, among whom he held a conspicuous station, distinguished as well by the variety of his acquirements as the brilliancy and versatility of his powers. Educated at the College of the Jesuits in his native city, he displayed, at a very early period, the quickness and aptitude of his talents, which he cultivated with the greatest diligence and application. At the age of thirteen Fontenelle successfully contended for the prize offered for the best composition in Latin verse; and in general literature had deserved honourable mention on the records of his college. From this time to his sixteenth year the law was the study to which his attention was nominally directed. But his heart was not with the science: poetry, philosophy, and history engrossed the time which should have been devoted to the Corpus Juris. During this period principally Fontenelle acquired those vast stores of varied and accurate knowledge which, giving an appearance of catholic learning to his works, are constantly recurring in the shape of apposite and almost unconscious allusions. Having completed the term of his legal studies, he lost the first cause in which he was retained, and thereupon abandoning for ever the distasteful profession of the law, devoted himself to the more attractive and congenial pursuits of literature.

In his private fortunes there is little to interest the curiosity so commonly felt respecting the doings of men of genius; the biographer has consequently little to do but to follow him in his literary career, which was neither without honour nor profit. For the last years of his life he was in the enjoyment of a yearly income of nearly 900*l.*, and left behind him at his death a very considerable sum. From 1699 to 1741 he held the distinguished and responsible office of secretary to the Academy of Sciences at Paris, and was an honorary member of that of Berlin and of the Royal Society of London. Fontenelle died at Paris on the 9th January, 1757, having completed his hundredth year within a few weeks, and expired exclaiming 'Je ne souffrée pas, mes amis; mais je sens une certaine difficulté d'être.' The calmness with which he met his death was in keeping with the serenity of his whole life.

In his personal character Fontenelle presents a rare instance of self-command and moderation, neither confounding virtue with austerity nor pleasure with excess. To the measured reserve of his character there is a somewhat exaggerated allusion in his oft-repeated declaration, that in his whole life he had never laughed nor wept. As he held it to be the duty of the sage to cultivate all his senses, internal as well as external, and to combine with the enjoyment of all nature the exercise of all his faculties, the tone of his mind exhibited a happy harmony with his personal character. The universality of his pursuits, which embraced nearly the whole domain of literature, offered on the one hand an insuperable obstacle to unrivalled excellence in any single department, but contributed on the other, by enlarging his views and increasing his stores of knowledge, to render respectable his attainments in all.

As a poet, in which character he made his first appearance in the world of letters, he composed several tragedies and operas, most of which were unfavourably received; and if the 'Thetis and Pelée' met with some success and the praises of Voltaire, it has since fallen with the rest into neglect and oblivion. His Pastorals, which were recommended solely by their novelty, are full of extravagant conceits: on the other hand, there is much of nature and grace in the 'Ismène,' which, with the 'Apologie de l'Amour,' is alone worthy of being preserved. His poetic pieces occasionally display much delicacy of sentiment, and extreme polish and elegance both in the thought and diction; but in all of them the poetic feeling is weak, and there is little invention, and a decided want of originality and force.

The 'Dialogue des Morts,' published in 1683, first laid the foundation of his literary fame, which was firmly established by the appearance two years afterwards of the 'Entretiens sur la Pluralité des Mondes,' one of the ablest of his works, and exhibiting a rare combination of science and wit. The object of the latter was to familiarize his countrymen with the Cartesian astronomy; and in the preface he compares himself to Cicero presenting the philosophy of Greece in a form and language intelligible to the Romans. For the execution of such a task Fontenelle was eminently qualified, and rarely, if ever, has it been so ably accomplished. By the happiness and point of his illustrations, he interests while he instructs his reader: quick to discover in common things unimagined beauties, he adduces and presents new truths in so obvious a light, that even when most opposed to received opinion, they are at once adopted as old and firmly established. In the 'Eloges,' which, as secretary of the Academy, he pronounced upon its deceased members, and by which he is best known to posterity, his peculiar talents are most felicitously displayed. Of a mixed character, between memoirs and criticism, they combine history and encomium with such tact and delicacy, that the panegyric is almost imperceptible, and the commendation the highest when apparently least intended.

The 'Histoire des Oracles,' even if it has no claims to originality, being taken entirely from the learned work of Van Daale, is deservedly celebrated for clearness and precision in the style, which is an exact and distinct image of the thought, and for the regular march of the reasoning, which is so natural and so easy as to present no difficulty to the understanding, and to need no divining. It scarcely deserves however the high title of history. It comprises two essays, in one of which the object is to show that the oracles were not given by the supernatural agency of demons, the other, that they did not cease with the appearance of Christ. Lastly, the 'Géométrie de l'Infini,' the 'Apologie des Tourbillons,' and similar works, although they display a philosophical spirit, are neither vigorous nor profound.

Generally indeed we ought not perhaps to look to the works of Fontenelle to discover the secret of the great influence and reputation which he enjoyed in his lifetime. The solution lies rather in his possession of unequalled social qualities, and of the most brilliant acquirements, by which he was able to enact at once the man of fashion and the man of letters. By his wonderful skill in adapting himself to the capacity of others, he was able to improve and embellish the lightest conversation with scientific and moral allusions; and by applying the language of ordinary life to the most abstruse topics and ideas, he contributed greatly to transfer the tribunal of letters from the scholarly few to a large and miscellaneous class of readers, and, by this revolution, to favour and to advance a spirit of scientific research in the seventeenth century. Such services may be forgotten, for the names of those who have laboured not so much to discover new truth, as to preserve and transmit the old, are too often left unrecorded; but they have not laboured in vain, for to diffuse truth is as useful as to discover it. If the mission of the discoverer be more dazzling in its course, and its track more permanent, that of the disseminator is not less beneficial to mankind, and leaves, in a more extended civilization, a nameless but imperishable monument.

The works of Fontenelle were collected and published in 8 vols. 8vo., Paris, 1760.

FONTENOY. [HAINAULT.]

FOOD. All organized bodies are nourished by the introduction into their internal structures of materials from without. Such materials are called indifferently aliments or food, and are fitted to supply and maintain the fluid and solid matter of the body. For this purpose they must either be soluble naturally, or capable of being dissolved by the digestive principle of the stomach. However diversified the articles employed may be in external appearance or chemical composition, they are reduced by the action of the organs of digestion into a fluid (chyle) [DIGESTION] of homogeneous character, which is reconverted into solids and fluids of different natures by the influence of the powers of assimilation. Before undergoing this second change, they must be brought into the state of arterial blood, and so form a part of the circulating fluids of the body. Substances which are incapable of undergoing these successive changes cannot be considered as articles of food, or capable of imparting nourishment to the frame. There are however various articles which, although incapable by themselves of nourishing, appear, when taken in conjunction with other articles, to contribute essentially to nutrition. But even of a substance unquestionably nutritious, the whole mass is never completely nutritive, *i.e.* capable of being entirely assimilated; some portion of it merely giving it bulk, or being of a nature calculated to make certain impressions on the organs of digestion, and to stimulate them to those actions which conduce to the exercise of the function of digestion.

Those substances which have previously been endowed with life can alone be considered as affording nutriment to animals of a high degree of organization, such as man, of whose aliment we here mean to treat. For a practical view of the subject, it may be divided into two heads, viz. the substantials and the accessories; the first comprising the real materials or sources of nourishment; the second condiments, &c., which either render the food more grateful to the palate, or by a vital or chemical action on the organs of taste and the stomach promote its digestion.

It is customary to distinguish the articles of food into solid and fluid, or meats and drinks, and into animal and vegetable. But the former is merely a distinction of convenience, and does not extend to any ultimate difference in the nature of the material, but only to the manner in which they are respectively treated by the organs of digestion; while the latter is only important in a medical point of view, as relates to the amount of nutriment in a given quantity of food, and the impression which the two kinds of food make upon the system generally. 'Specific differences are distinguishable in the chyme at least, if not in the chyle, according as the food from which it is formed has consisted of vegetable or animal matter, and according as it has contained fatty or oily substances, or been destitute of them.' Nevertheless as those substances alone contribute to the nourishment of the body by being assimilated by it which can be resolved into *their organic molecules*, and as these are only found in the proximate principles of animals and vegetables, of which principles none perhaps are exclusively animal, it seems most advantageous to treat at the outset of the principles, without reference to the source whence derived. The molecules can only be liberated by being diffused through some fluid, and therefore it matters not whether they be brought into such a condition by external agency or by the apparatus with which the higher animals are furnished, viz. the teeth, stomach, &c. To a fluid state they must be brought before they can pass the fine strainers of the alimentary canal. The resolution of the materials of food into their organic molecules is the real office of the digestive organs, while exercising that function within healthy limits: the resolution of the proximate principles into their elementary or ultimate principles, when various gases are evolved, is a morbid or diseased action of these organs.

The proximate principles of alimentary substances consist sometimes of three, sometimes of four elementary or constituent principles. Those which consist of three are of most frequent occurrence in the vegetable kingdom; those which consist of four are of most frequent occurrence in the animal kingdom. Where the elements are three only they are generally oxygen, hydrogen, and carbon; where four, oxygen, hydrogen, carbon, and nitrogen, or azote. The predominance of carbon is the characteristic of vegetable matter; the predominance of nitrogen the characteristic of animal matter. Wherever nitrogen is absent in animal matters the substance approximates, or is analogous to, vegetable matter, such as animal fats, which closely resemble vegetable oils. Animals which are decidedly carnivorous do not prosper if kept long on food destitute of azote, but man, whose dwelling-place is under different climates, can dispense with an azotized diet better in some parts of the world than in others, for instance, better in tropical countries than near the poles. The pilgrims and attendants on the caravans in their journeys across the deserts of Africa can subsist for a length of time on gum, which does not contain azote. Majendie, who carefully investigated the subject, concludes from his experiments—1st, That animals derive the azote which enters into their composition entirely from their food, and hence, that no animal can live for a considerable time on food entirely destitute of azote. 2nd, That animals, even those naturally carnivorous, can live a certain time upon food entirely destitute of azote, in consequence of which the excretions of those naturally carnivorous become altered, throwing off less azote than when they are fed on animal food, and acquiring the properties which these excretions have in animals whose food contains a very small proportion of azote. 3rd, That vegetable and animal substances destitute of azote are highly nutritious provided at the same time azote can be supplied from some other aliment containing it, though in small proportion. It seems however that vegetable aliments acquire an accession of azote in the digestive organs, though probably at the expense of some part of the system. Admitting the general correctness of Majendie's views, alimentary substances may be divided into three classes.

I. Those which contain azote, carbon, oxygen, and hydrogen.

II. Those which contain carbon, hydrogen, and oxygen.

III. Those which contain neither azote nor carbon.

The first class naturally demands the greatest share of attention, because 'the aliments which contain azote correspond with animal substances in general, and are calculated to repair the waste of our solids and fluids without great alteration or effort in the digesting organs. All the immediate principles of this class are not however equally digestible, or possessed of the same properties.' It is necessary therefore to say a few words on the leading forms or states in which azotized principles occur.

I. *Fibrin.*—This is found in greatest abundance in the animal kingdom, constituting the principal part of the muscular fibre of animals, and no inconsiderable portion of the blood, when by rest that fluid is coagulated. It has been thought to exist in some of the constituents of the vegetable kingdom, particularly in the juice of the fruit of the Carica Papaya, or papaw-tree, and in certain other plants with a milky juice, such as the Palo de Vaca, Cow-tree (Galactodendron utile) of South America, and in some fungi or mushrooms. The identity of the principle found in these vegetables with animal fibrin has been questioned by some recent chemists. Dr. Thomson considers the principle of the cow-tree distinct, and terms it galactin, while Gmelin terms that of the others emulsin, which he considers analogous to gluten.

Fibrin constitutes the chief part of the solid matter of the muscles of animals, particularly of those which are old and have dark-coloured dry flesh: it is that portion which remains in the form of fibres after all the soluble matters have been removed from the flesh of animals by long boiling. It is insoluble in cold water, is corrugated by long boiling in water, is insoluble in alcohol, but strong acetic acid causes it to swell considerably, rendering it transparent like cartilage, in which state it may be dissolved, or, at least, diffused through water by long boiling.

The flesh of animals is divided into white and coloured, and indeed it differs in the same animal at different ages, having different accompanying constituent principles at different periods of life. Thus in the calf the muscles are white, or only pinkish; in the ox they are deep red; in the first state much gelatin and little of osmazome is present; hence the gravy of veal easily gelatinizes, while that of beef rarely does so.

Fibrin is in general more tender, that is, more easily digested, because the force of aggregation is more easily overcome by the powers of the stomach in middle-aged than in old animals, and in the flesh of the female than that of the male, unless the males have been castrated when young.

Albumen is another important constituent of animal bodies, but of more sparing occurrence in vegetable substances. In animal substances it occurs in two states, fluid and coagulated. The most perfect examples of it in the former state are the white of eggs, which is an alkaline solution of albumen, and the blood, which is likewise probably an alkaline solution of albumen. Coagulated albumen constitutes cartilage, horn, hair, and the nails or hoofs of animals. It forms the chief constituent part of oysters, muscles, snails, &c. Milk is an albuminous fluid.

At the temperature of 165° Fahr. albumen is coagulated, and it is likewise solidified by many acids, such as that of the gastric juice (in the form of rennet), and by some metallic salts. Milk, though coagulated by acids, is not so by boiling.

Albumen is likewise found in the green feculæ of plants in general, and in some vegetables in very considerable quantity, such as the fruit of the Hibiscus esculentus, or Ochro, and the bark of the Ulmus campestris, or elm. The former is used in Sicily to thicken soups, and both are used in the West Indies to clarify sugar.

Gelatin abounds in most animal substances, and is common in proportion to the youth of the individual. It exists in bones, ligaments, tendons, membranes, skin, muscles, as well as in a portion of the horns of animals. The skin of fish, much of their substance, and the swimming-bladder of the sturgeon are formed of gelatin. It is remarkably bland and nearly insipid, as may be remarked in any solution of isinglass. Gelatin is not of common occurrence in the vegetable kingdom, and it is distinct from vegetable jelly. It occurs however in the Protococcus nivalis.

Gelatin is the opposite of albumen in its qualities; in cold water it swells, is not transparent, is soft, and somewhat elastic. The gelatin of isinglass and of young animals is slowly but completely soluble in scarcely tepid water, while that of old animals, of skins, and of hoofs or feet, requires warm water for its solution. The solution, when of a certain strength, gelatinizes into a tremulous or solid jelly. It is a highly nutritious principle, but its digestibility is, in popular estimation, much overrated.

Mucus is a principle probably found only in animal structures, unless it exists in some plants of the tribe of Boraginaceæ. It differs from albumen principally in not being coagulable by heat, while it differs from gelatin in not being precipitated by vegetable astringents, though tannin coagulates the watery combinations of mucus: neither does a concentrated solution of it gelatinize on cooling. Mucus is a constituent of most of the secretions of animals, particularly of the membranes termed mucous. It is deemed both nutritious and of easy digestion.

Osmazome, animal extractive, or alcoholic extract of flesh, is deemed the principle to which meat owes its sapid taste and odour when dressed. Berzelius is disposed to refer these qualities to a watery extract of flesh, which he terms *zomoidin*. Osmazome is by no means a simple, but, on the contrary, a very compound substance, consisting of at least two different extractive materials, lactic acid, several salts, alkalies in combination with hydrochloric acid and lactic acid, &c.

It is probably limited to the animal kingdom, though a substance strongly analogous to it is found in many mushrooms, or fungi, viz. the common mushroom (Agaricus campestris) the A. muscarius. A. bulbosus, A. thejogalus, and in the sporidia of the Elaphomyces officinalis. This principle is not soluble in alcohol, and to distinguish it from ozmazome it is termed Pilzosmazom; to it different fungi owe, when dressed, their savoury odour, resembling that of animal food, and probably a portion of their nutritious property.

Osmazome exists sparingly in young and white meats which consequently are deficient in savour; it is more abundant in that of animals of which the flesh is red, such as beef and mutton; it exists chiefly in the fibrous organs, or combined with fibrin in the muscles, but the tendons and gelatinous organs are, in a great measure, destitute of it. Animals with dark-coloured flesh, such as the hare, and different kinds of game, possess most, and hence are much esteemed by the lovers of savoury viands.

Gluten is, of all vegetable principles which occur in considerable quantity, the one which contains most azote, having from 14 to 20 per cent. Cafeine, or the alkaloid of coffee, possesses a much larger proportion. Gluten is met with, associated with starch and other matters, in the seeds of the cereal grains, in several other seeds, in many fruits, and in all green and other sappy parts of plants which yield feculæ. When separated from the principles with which it is usually associated, it is, when moist, a white, soft, elastic, and highly glutinous substance (bird-lime); when dry, it is white or whitish grey, hard, of a dull shining and conchoidal fracture. It is without smell or taste, insoluble in and heavier than water. Under ordinary circumstances, about a fourth part of what is termed gluten consists of a principle called *gliadin*. What remains after the removal of this and other matters present with it, is, according to Taddei, pure gluten, which he names zymoian. In the fleshy seeds of pulse, such as beans and peas, exists a substance resembling gluten, called *legumin* and also *vegeto-animal substance*.

Gluten is found in many esculent plants, such as the leaves of cabbages and cresses, and other edible cruciferous vegetables. Of the nutritious powers of gluten, separate from the starch, fat, gliadin, &c., with which it is always associated, nothing certain is known. In a state of combination, such as that of wheat-flour, it is highly nutritious. Such also is the character of the seeds of peas, beans, and other edible pulse.

Fluids which contain at the same time any of the varieties of sugar and gluten, or gluten-like principles, are capable, under favourable circumstances, of undergoing the vinous fermentation. A kind of fermentation occurs, by the agency of the gluten, in the conversion of wheat-flour into bread.

Emulsin (vegetable albumen, vegetable casein, or amygdalin) occurs in most of the elaborated juices of plants, and in many dry parts of plants, viz. in all oily seeds which when triturated with water form an emulsion. The real nature of this principle is not clearly ascertained. Many chemists deem it identical with animal albumen; others consider it identical with the casein of the milk of animals; while others pronounce it to be gluten. To Gmelin it appears distinct; he has accordingly given it the above name.

II. Proximate principles which consist of oxygen, hydrogen, and carbon.

Gum is a principle of vegetables, in all of which, but mostly soft parts of them, it is found; in some, however, it abounds so much as to form their chief characteristic; they are thence called mucilaginous, or gummy, such as the carrot, parsnip, &c. Gum is colourless, but from admixture of other matters it is often of a yellow or brownish hue, transparent or translucid, of an insipid rather sweetish taste, and not crystallizable. When pure, it is entirely soluble in water, whether warm or cold, forming with it a tenacious fluid; it is insoluble in alcohol. In the state of solution in which it occurs in plants, of which it forms the chief material for their nutriment, it is termed *mucilage*. From some trees, either by spontaneous cracks or incisions, it exudes and concretes on the bark, as is seen in the various acacias, which yield the *gum arabic*, the plum, and cherry trees, &c. There is some difference in chemical character in the various sorts of gum, according to the plant which yields it, but these scarcely affect its nutritive properties The principle which is found in many fruits, such as the gooseberry, currant, orange, &c., which is *vegetable jelly*, is regarded as a kind of gum, though designated *pectin*. This is neither acid nor possessed of basic properties, and the reason why it so often seems sour is by being united with vegetable acids (malic, citric, &c.), which communicate to the juices of these fruits their taste, and also enable them to redden litmus paper. The grateful and cooling properties of such fruits is therefore chiefly due to the vegetable acids, while their nutritious qualities depend upon the pectin and other principles.

Mucilaginous vegetables are rarely fit for use when growing wild; but they are much ameliorated by the processes of horticulture, having their bulk increased and their qualities improved. Those which are bitter or narcotic, as endive, lettuce, sea-kale, &c., being by blanching rendered mild and safe, or by being served to table while young, as asparagus. The difference in flavour of such vegetables is due to the principles with which the gum is associated; but their nutritive properties are owing to the gum, which even when taken alone, though mawkish, and at last repudiated by the palate, is certainly adequate to the support of the human frame for many weeks or perhaps months. During the harvest of gum at Senegal the Africans live entirely upon it, eight ounces being the daily allowance for each man. In general they become plump on this fare, and indeed such should be the result, if the calculation be correct which assigns as great nutritive power to four ounces of gum as to one pound of bread.

Sugar is a principle much more abundant in vegetable than animal fluids; it exists however in small quantity as a constituent of the bile, and in the milk of many animals; and it is formed in large quantity as a product of perverted action of the digestive and assimilating organs, in the disease termed diabetes. [DIABETES.] In chemical composition sugar does not differ greatly from gum, except in having a greater proportion of carbon. This additional proportion however is sufficient to confer upon it considerable differences in character. Sugar is of different kinds, according to the plant which yields it, and according to the part of the plant from which it is obtained. Sugars are therefore divided into those which are crystallizable and those which are not, and likewise into those which are susceptible of fermentation and those which are not so. The sugar of the sugar-cane is the most perfect example of those kinds which are both crystallizable and capable of undergoing fermentation; sugar of milk and mannite are examples of the second class. A remarkable feature presents itself in sugars of the first class; for, while susceptible, when dissolved in sufficient water, of the vinous or acetous fermentation, they greatly assist, when concentrated, in preserving vegetable substances, either when naturally present in them, as in many fruits, grapes, raisins, prunes, &c., or when added artificially in making conserves, jellies, &c. Those fruits which grow in seasons favourable to the elaboration of much saccharine matter in their tissues not only keep better, but are more wholesome than when grown in less favourable years.

Honey contains a variety of sugar, which is both nourishing and capable by fermentation of yielding mead, which was long the favourite beverage of the antient Britons. Many fungi, or mushrooms, contain a peculiar kind of sugar, which contributes to render them nutritious.

Starch possesses a larger proportion of carbon than sugar and gum: by removal of this additional proportion of carbon it is reduced to the state of one or other of those principles. This process of reduction occurs spontaneously in the course of flowering in plants, and in the stomach during digestion. When combined with gluten, it is susceptible of fermentation, and by undergoing the *panary* fermentation forms bread, one of the most important articles of food in civilized life. As this is ordinarily managed, some portion of the flour is made to yield up a certain amount of its carbon; but the precise nature of the change which the flour undergoes during this action is not clearly understood. The digestibility of the flour is however greatly increased by this process; and by various admixtures, chiefly of common salt, the taste is improved.

Starch exists largely in plants, but more abundantly in some parts than others; such as many seeds, particularly of the cereal grains, rice, barley, maize, and millet, in which it occurs in great purity; in wheat along with gluten; with saccharine matter in oats, and some leguminous seeds; with a viscid mucilage in potatoes, rye, and Windsor beans, and occasionally with an acrid principle, which can generally be dissipated by heat, as for example the Jatropha Manihot, which yields tapioca. Though seeds and roots yielding starch in abundance are all comprehended under the term *farinaceous*, there are essential differences between them according to the principles with which it is associated, which cause them to differ in their digestibility, and consequently in their eligibility and suitableness for different ages and individuals. Flour, starch, arrow-root, cassada-flour, or tapioca, salep, sago, and other similar preparations, are all merely varieties of the same principle. Starch is not only highly nutritive, but one of the blandest and most wholesome articles of diet, capable in due proportion, of being used for the food of tender infancy, and not improper at any subsequent period of life, though during youth and manhood it requires other principles to be taken along with it.

Oils and *fat*, however much unlike in some respects to the other principles arranged under this head, are formed out of precisely the same constituent elements; and during digestion the stomach brings even the most apparently dissimilar into a degree of relationship more intimate than might have been anticipated. The chief difference between them and the alimentary substances already mentioned is in their greater proportion of hydrogen. Sugar and starch are both susceptible of fermentation, during which a portion of carbon is removed from each by combining with oxygen and escaping in the form of carbonic acid gas. From starch, in the early stages of fermentation, one proportion of carbon is taken, which brings it to the state of sugar, from which again a proportion of carbon and of oxygen is taken, and alcohol produced, the hydrogen remaining undiminished in quantity: and as alcohol is merely an oleaginous body of a weak kind, the analogy is complete; for all farinaceous and saccharine aliments undergo changes in the digestive organs before they can be assimilated in the system, similar to what occurs in fermentation, viz. being converted into oil. [DIGESTION.]

Oils are insoluble in water, and therefore, though highly nutritive, they are not available for the support of the body till their immiscibility with water has been overcome. Hence they are apt to oppress the stomach during the early stages of digestion, if taken alone without being mingled with substances which facilitate their union with water. When this is accomplished they are very readily assimilated, as, according to Dr. Prout, 'albuminous and oleaginous principles may be considered already fitted for the purposes of the animal economy without undergoing any essential change in their composition.'

Oils are either fluid or concrete, and both forms occur in the animal and vegetable kingdoms, though in the latter they are most generally fluid.

Acids are present in many vegetable substances which affect the digestive organs in various ways, though they may not contribute directly to the nourishment of the system.

III. Alimentary principles which do not contain carbon.

Water is the only one of these which it is necessary to notice. This is essential to the existence of all organized beings in whatever way it is introduced into their tissues. Not only is it introduced by human beings in the state of common water, and many beverages of which the chief part is water, but our ordinary articles of animal food contain, on an average, seventy-five per cent. of water, and only twenty-five per cent. of nutritive matter; and many of our vegetables contain a still larger proportion.

Such are the chief principles employed by man in a state of civilization for his subsistence. But it is not enough that a sufficient quantity of one or more of these be swallowed. The function of digestion must be called into action to enable the crude materials to be assimilated. This is partly excited by the mere presence of a substance in the stomach, but more effectually when that substance is in itself of a stimulating quality, or is accompanied by certain accessories either added during the preparation of the food or at meal-times. Such accessories are termed condiments, which either make the food more grateful, or exercise a beneficial influence over the stomach during the process of digestion. The desire to eat is rarely so great when insipid food is offered to an individual as when savoury viands are presented. The very odour or aroma of these excites the salivary glands to more abundant secretion of saliva, which is a preparation for the digestion of the food about to be taken. Though the mere application of heat in the process of cooking develops an aroma from many substances which were previously devoid of it, either by altering the chemical composition of the material, or by volatilizing a principle latent in the substance, yet many adventitious articles are used to assist in increasing or modifying this odour, or to correct certain qualities in particular kinds of food which are either disagreeable or injurious. Respecting the most common of these a few words may be allowed. That condiment which is of most universal requirement and utility is salt, or chloride of sodium. It is the only one which is indispensable, for not only does it exist in the milk which forms the earliest nutriment of the infant, but at all subsequent periods of life it is needed. Independently of the part which this compound performs in the stomach during digestion, it is still further serviceable in the blood, and more so in the blood of man than of any other being, as Berzelius has remarked that the blood of man contains three times more hydrochlorates than that of the ox. Besides, the use of salt greatly benefits the alimentary canal and hinders the generation of worms. [ANTHELMINTICS.] It is one of the most ready means of rendering insipid food acceptable to the palate, as is noticed in one of the earliest compositions which have come down to us. 'Can that which is unsavoury be eaten without salt?' (Job. vi. 6.) Perhaps the next most important condiment is vinegar, which, like most vegetable acids, when taken in moderation, greatly assists in promoting the digestion of young meats of a gelatinous kind, such as veal.

Mustard and peppers of different kinds are also useful, and more so in warm than cold countries, as they rouse the languid stomach, and enable it to effect the digestion of the food. Hot pickles, from containing vinegar at the same time, are often advantageous when used in moderation, but the abuse of such articles produces many serious effects, particularly obstruction of the liver, with its long train of disorders. The use of spices and aromatic agents not only renders the food more pleasant, but enables the stomach to bear a larger quantity. Hence they are too often made the means of leading the gourmand to be guilty of excess; and that cook is often most prized who can most cunningly minister to the pampered appetite. This is perverting cookery, a highly proper and commendable art, from its legitimate end. 'In the hands of an expert cook, alimentary substances are made almost entirely to change their nature, their form, consistence, odour, savour, chemical composition, &c.; every thing is so modified that it is often impossible for the most exquisite sense of taste to recognise the substance which makes up the bases of certain dishes. The greatest utility of the kitchen consists in making the food agreeable to the senses, and rendering it easy of digestion. But its perfection seldom stops here: frequently among people advanced in civilization the object to which it aspires is to excite the appetite, to appease capricious palates, or to satisfy luxurious vanity. Then, far from cookery being a useful art, it becomes a real pestilence, carrying with it a train of diseases, and not unfrequently the premature death of many of its infatuated votaries.' (Majendie's *Physiology*.) [MILK; WATER; WINE.]

FOOD, PRESERVATION OF. [ANTISEPTICS.]

FOOD OF LABOURERS. It has been justly asserted by Dr. Paley that, inasmuch 'as the state of population is governed and limited by the quantity of provisions, perhaps there is no single cause that affects it so powerfully as the *kind and quantity* of food which chance or usage has introduced into the country.' (Paley's *Works*, 1819, vol. ii., p. 71.) The importance of the subject is here sufficiently proved. The inquiries that have been instituted for purposes connected with the alteration of the poor-laws have directed the attention of many persons to this subject. It is obvious that individuals differ in their capacities for food; that climate affects the desire and necessity for food as well as the nature of the employment. Nevertheless, says Mr. Mott (*Report of the Poor Law Commissioners*, 1836), 'I submit that, although, even for persons in full health, it would be difficult, perhaps impossible, to establish any given daily quantity of food to suit the capabilities of every stomach, it is possible so to classify them as to form a tolerably correct rule for the whole. I have been led to believe that the result shown in the following scale may be considered as a fair estimate of the proportions of food requisite to support human life in a sound and healthy state.'

'1st. For persons of moderate health and constitution, but using little exercise or exertion: daily allowance of food 12 to 18 ounces; in nutritive matter equal to an average daily of 10 ounces. 2nd. For persons of good health accustomed to moderate labour, as sailors and soldiers on ordinary peace duty, or agricultural labourers or mechanics at their usual work; daily allowance of food 18 to 24 ounces; in nutritive matter equal to an average daily of 16 ounces. 3rd. For persons subject to hard labour or other violent exertion, in good bodily health: 24 to 30 ounces of food; equal to 22 ounces of nutritive matter. The foregoing calculations have been taken indiscriminately, and I have reason to believe that they will bear the test of examination.' By a consideration of these data, and the price of provisions at such markets as the owners of a very small capital are enable to purchase at, a judgment may be formed of the condition of a labourer. So far regarding the *quantity* of food requisite; the *quality* varies according to the local position of the labourer Mr. Senior, in his 'Statement of the Provision for the Poor, and of the Condition of the Labouring Classes in a considerable portion of America and Europe' (Fellowes, 1835), gives the result of his inquiries into the food of foreign labourers. We extract the following information from his pages:—

Quality of food used by an agricultural labourer having a wife and four children.

AMERICA. *New York.*—Tea, coffee, meat twice a-day.

Massachusetts.—Poultry, meat, or fish, twice or thrice a day.

Mexico.—Maize prepared either in porridge or thin cakes, and beans, with chile, a hot pepper, of which they eat large quantities as seasoning.

Carthagena de Columbia.—Chiefly animal food.

Venezula.—Maize, vegetables, and fruit.

Uruguay.—Animal food.

Hayti.—Plantains, sweet potatoes, and other vegetables.

EUROPE. *Norway.*—Herrings, oatmeal porridge, potatoes, coarse oatmeal bread, bacon and salt beef perhaps twice a-week. Fish on the lakes and rivers. Brandy in general use.

Sweden.—In the south potatoes and salt fish; in the north porridge and rye bread.

Russia (general return).—Rye bread, buckwheat, and sour cabbage, soup seasoned with salt and lard.

DENMARK. *Copenhagen.*—Rye bread, inferior coffee, cheese, and butter.

Elsinore.—Rye bread, groats, potatoes, coffee, butter, cheese, and milk.

HANSEATIC TOWNS. *Lubeck.*—Rye bread, potatoes, bacon seldom, peas-porridge, groats, cheap fish.

Bremen.—Potatoes, beans, buckwheat, groats, rye bread, meat about twice a-week.

Mecklenburg.—Good sound food, occasionally meat.

Danzig.—Chiefly rye bread and potatoes, meat once or twice weekly.

Würtemberg.—Soup, potatoes, bread, meat once or twice a-week.

Frankfort.—Soup, potatoes, vegetables, bread, coffee, and beer daily, meat on one or two days.

Holland (general return).—Rye, cheese, potatoes, vegetables, beans and pork, buttermilk, buckwheat, meal, &c.

BELGIUM. *Boom.*—Bread, potatoes, and milk.

Ostend.—Potatoes and bread in the towns; in the country a little butter, vegetables, and sometimes a piece of pork.

Goesbek.—Rye bread, cheese, butter or fat, bacon, vegetables, coffee, and weak beer.

FRANCE. *Hâvre.*—Bread, vegetables, cider, very rarely animal food; coffee and treacle are also used.

Brittany.—Buckwheat, barley bread, potatoes, cabbages and about 6 lbs. of pork weekly.

La Loire Inférieure.—Bread and vegetables, bacon or other meat now and then.

Bordeaux.—Rye bread, millet soup, Indian corn, sometimes salt provisions, butchers' meat very rarely.

Marseilles.—Vegetables, bread, farinaceous substances made into soup, meat soup or bouillie probably once a-week.

Piedmont.—No meat, little wine, twice as much maize as wheat flour.

Portugal.—Salt fish, vegetable soup, with oil or lard, maize bread.

The Azores.—Maize bread, vegetables, potatoes, and fruit, meat seldom, fish when abundant

Greece; Patras.—Maize or wheaten bread, olives, pulse, vegetables, salt fish, meat occasionally.

European Turkey.—Bread, rice, greens, dried beans and peas, olives and onions, meat about once a-week.

Malta (from a communication).—Barley bread, cheese, carob, or other beans, and soup of maize or millet with herbs, when in employ; when out of employ a little bread and soup only.

Although these returns are general, and each statement comprehends a considerable surface, the information that they give is sufficient to enable the reader to form an idea of the condition of labourers in the different countries referred to. The food of English labourers consists principally of wheaten bread (which was unusual before the beginning of the eighteenth century), cheese, and potatoes, with bacon or butchers' meat once at least in the week. Cider or beer is frequently provided, according to agreement; and an increased quantity both of meat and drink is given during harvest. The following account was stated by Mr. Wallace in evidence before one of the Irish assistant poor law commissioners to be the weekly expenditure of a labourer whose wages were 9*s.* a-week, and whose family consisted of himself, his wife, and two children. The information had been derived from a labourer in that condition:—

	s.	*d.*
Two pecks of oatmeal, at 9*d.*	1	6
Five do. of potatoes, at 5*d.*	2	1
Milk	1	0
Loaf of bread . . .	0	6
¼ oz. of tea, and sugar ½ lb.	0	5
1 lb. of bacon . . .	0	6
Herrings or other fish .	0	6
Coal, oil, and soap . .	1	0½
Tobacco	0	3
Rent	1	0
	8	9½

Oatmeal and oaten and barley bread are in common use among the Scotch, and salt fish and salted meat are occasionally obtained. The food of the Irish labourers consists almost uniformly of potatoes, with which they are frequently unable to afford salt. A herring or a small portion of salt meat, milk, or buttermilk, are luxuries within the labourer's occasional reach; but, on the other hand, families are sometimes compelled to subsist upon the coarsest potatoes alone; and we have heard it stated, upon authority which cannot be doubted, that rents have been raised because the tenant has been seen to eat 'apple-taters'—potatoes of the best sort—the landlord considering that their quality was too good for the consumer, who should have sold them for his benefit and substituted coarser in their place.

The introduction of the potato as the general food of labourers necessarily works a great change in the country where it is adopted. As long as it is only an auxiliary to food it will not be mischievous; but when it becomes the staple evil will arise in the following manner.—The produce of an acre of potatoes will maintain at least twice as many persons as a similar surface of wheat. The population consequently will be increased; but neither will potatoes keep from year to year, nor can they be carried great distances. They therefore vary greatly in price; for the surplus crop of one year or place cannot supply the deficiency of another. It has been stated in evidence before the House of Commons that the price at some periods has been sixfold what it has been at others. Let a famine arise, and there is no cheaper food, no resource whatever to be resorted to. (See M'Culloch, *Notes to Adam Smith*, p. 163.) The British and Irish labourers certainly prefer a large quantity to an improved quality of food, and will make no alteration in its quality until they have a large superfluity in quantity. Their chief meal is a supper after the day's work is over. The inducements that are offered to the labourer by the low price of spirits and the increased number of cider and beer-houses to spend the small surplus of his income in drinking are proved to be successful by the large amount of spirituous and fermented liquors now consumed. The miseries of this indulgence on the part of the head of the family are not confined to the husbands and wives of the lowest labourers, but the families of artisans are often equal sufferers. An examination of the causes of destitution in the parish of Spitalfields, where the number of general charities is unusually large, elicited the following fact. While weavers earning wages of 20*s.* and more than 20*s.* a-week were consuming their wages in intoxication, their wives and families could only afford themselves the following subsistence. An itinerant dealer was their commissary. This man, called by the appropriate name of 'Jacky All Sorts,' received into his wash-tub the refuse meat and fat with the scrapings of dishes and plates from neighbouring cook-shops, and afterwards found customers for this filth among the families of the silk-weavers.

In the 'Report of the Commissioners for Inquiring into the Administration and Operation of the Poor Laws' (1834), Mr. Chadwick states that an independent labourer was then unable to get in the shape of solid food more than an average allowance of 122 oz. per week.

A soldier . . .	168	oz. per week.
An able-bodied pauper, together with other luxuries, about .	151	,,
The suspected thief (see Gaol Returns from Lancaster) .	181	,,
The convicted thief . .	239	,,
The transported thief .	330	,,

It is obvious that it was desirable that this table should be reversed. The independent should be better off than the dependent labourer, the dependent labourer than the suspected thief, the suspected than the convicted thief. With a view to this result, the dietaries of many gaols have been amended, and the poor law commissioners have provided that a sufficient but not an excessive quantity of food should be distributed in the union workhouses. In their Report for 1836 six dietaries have been printed (p. 64). The quantities contained in the first are as follows:—

	Bread.		Gruel.	Cooked meat.	Potatoes.	Suet or rice pudding.	Cheese.	Broth.
	lbs.	oz.	Pints.	oz.	lbs.	oz.	oz.	Pints.
For each Man per week . .	5	4	10½	15	1½	14	8	9
For each Woman per week .	4	6	Do.	Do.	Do.	12	Do.	Do.

Wheaten bread is used in all workhouses. It would be difficult, for want of accurate, precise data, to estimate the comparative welfare of labourers now and at earlier periods; we are, however, inclined to think that the condition of agricultural labourers has seldom been better than in the years 1834-5-6.

(*Reports of the Poor Law Commissioners;* Senior's *Foreign Poor Laws;* Sir F. Eden's *State of the Poor,* &c.)

FOOLS, FEAST OF. This was a festival antiently celebrated in different churches and monasteries of France upon New Year's day, from a very early period, when every kind of absurdity, and even indecency, was committed. It is supposed to have had its origin in the saturnalia of the Romans. The council of Basle in 1435 expressed its detestation of this and several other festivals which were then celebrated, and its abolition, at least in one district, was ordered by an arrêt of the parliament of Dijon in 1552. The reader who would know more of this festival may consult Du Cange's 'Glossary, *v.* KALENDÆ,' and Du Tilliot's 'Mémoires pour servir à l'Histoire de la Fête des Foux, qui se faisoit autrefois dans plusieurs Eglises,' 4to., Lausanne et à Genève, 1741.

FOOLS' PARSLEY. [*Æthusa.*]

FOOT. [MEASURES.]

FOOT-BALL, a ball made of a blown bladder cased with leather to be kicked by the foot; used by metonymy for the diversion of driving the ball itself. This was an early and favourite sport with the English. Fitzstephen mentions it among the games of the Londoners in the time of Henry II. Pepys, in his 'Memoirs,' vol. i. p. 324, A.D. 1664-5, says, 'January 2, to my Lord Brouncker's by appointment in the Piazza, Covent Garden: the street full of foot-balls, it being a great frost.' Brand (*Popular Antiq.*, vol. ii. p. 79) says, in the north of England, among the colliers, it is customary to watch the bridegroom's coming out of church after the ceremony, in order to demand money for a foot-ball.

FOOTE, SAMUEL, was born at Truro, in the county of Cornwall, but the date of his birth is not exactly known. His father was member for Tiverton, and he was educated at Worcester College, Oxford. On quitting the university, he commenced the study of the law, which his volatile disposition prevented him from pursuing. About the same time he married a lady of good fortune; but the marriage turned out unhappily, and he plunged into all the vices of the town, particularly gaming. His fortune being speedily exhausted, he turned player from necessity, and made his first appearance in the character of Othello, in which he produced no great sensation. Though he was more successful in comedy, he did not much distinguish himself as an actor till he began to perform parts of his own writing. His difficulties increasing, he was only extricated from them by Sir Francis Delaval, who allowed him an annuity for a not very honourable piece of service. Sir Francis was himself of ruined fortune, and had looked forward to a marriage with a rich lady as the means of repairing it. Foote, discovering a wealthy dame who was prepossessed with fortune-tellers, got a friend to personate a conjuror and recommend Sir Francis as a husband. The scheme succeeded, and Foote was rewarded as above mentioned.

In 1747 he opened the little theatre in the Haymarket, and here commenced his career as an author, by writing for his own house the succession of short pieces by which he is so well known. He did not, however, obtain a patent till 1766, when, riding out with the duke of York, he broke his leg by a fall from his horse, and was forced to have it amputated; the patent was procured by the duke as a sort of compensation for this accident. Foote did not retire from the stage on account of the loss of his limb, but acted with a cork leg. His death is said to have been accelerated by the shock he received on a servant preferring against him a charge of the worst nature; he was tried and honourably acquitted, but seems never to have recovered his spirits. Feeling his health decline, he let his house to Mr. Colman, still occasionally appearing as an actor. While performing one of his characters he was seized with paralysis on the stage. He went to Brighton for his health; and on his return to London he set out for Paris, but died on his way, at Dover, in 1777.

Complete editions of Foote's works are easily procured; but scarcely a single piece is now produced on the stage. In fact, notwithstanding their great merit, they refer so much to the humours and often the persons of his own times, that they now possess rather an historical than a dramatic interest, and will be read by few except those who are desirous of having a view of the striking characters in the latter part of the last century. The Methodists are lashed in 'The Minor;' the passion for travelling in 'The Englishman returned from Paris;' the newspapers in 'The Bankrupt;' the debating societies in 'The Orators;' the bar in 'The Lame Lover;' and in general every piece has its peculiar object of satire. In making his characters stand prominently forth, Foote is not excelled; but, like most depictors of humours, he occasionally falls into the error of giving abstractions rather than probable persons. The pieces which kept the stage longest are 'The Mayor of Garratt' and 'The Liar,' the humour of which is not so exclusively adapted to a particular time.

FORAMINI'FERA. An order established by M. D'Orbigny for certain foraminated polythalamous internal shells which have no chamber beyond their last partition. They nave no siphuncle; but their chambers are supposed to communicate with each other by means of many small foramina. This order is placed by M. D'Orbigny as the third of the *Cephalopoda;* but M. Dujardin has made observations on the living animals of some of the species, which induce him to assign these testaceous forms to a new class of animals inferior in their organization to the *Radiata*, and endowed with locomotive power by the instrumentality of minute tentacular filaments. For this class he proposes the name *Rahizopoda*, and under that title it is intended to give the reader the results of his researches when fully carried out At present we shall merely draw the reader's attention to M. D'Orbigny's arrangement of these curious minute shells which exist in myriads on the sea-coasts. The species found in the European ocean are comparatively few, and their size is very small; but the Adriatic abounds both in genera and species which are larger. The greater number are microscopic. The fossil species are most abundant in the tertiary formations, especially in Italy. The chalk of Meudon, in the Jura limestone of the Charente Inférieure, and the oolite of Calne, contain them. Count Munster reckons forty species from the cretaceous freestone of Maestricht. Mr. Lonsdale enumerates sixteen species from the English chalk, and the marquis of Northampton found them in chalk flints from the neighbourhood of Brighton. Some idea of the myriads which now occur together in particular localities in a fossil state, and once swarmed in life throughout the antient seas, may be gained from the following passage in Dr. Buckland's *Bridgewater Treatise*, descriptive of one genus only:—'Nummulites are so called from their resemblance to a piece of money they vary in size from that of a crown-piece to microscopic littleness, and occupy an important place in the history of fossil shells, on account of the prodigious extent to which they are accumulated in the later members of the secondary and in many of the tertiary strata. They are often piled on each other nearly in as close contact as the grains in a heap of corn. In this state they form a considerable portion of the entire bulk of many extensive mountains, *e.g.* in the tertiary limestones of Verona and Monte Bolca, and in secondary strata of the cretaceous formation in the Alps, Carpathians, and Pyrenees. Some of the pyramids and the sphinx of Egypt are composed of limestone loaded with nummulites. It is impossible to see such mountain masses of the remains of a single family of shells thus added to the solid materials of the globe without recollecting that each individual shell once held an important place within the body of a living animal; and thus recalling our imagination to those distant epochs when the waters of the ocean which then covered Europe were filled with floating swarms of these extinct mollusks, thick as the countless myriads of *Beröe* and *Clio Borealis* that now crowd the waters of the polar seas. Lamarck, in his observations on *Miliola*, remarks that these very minute animals have had much more influence on the masses which compose the surface or exterior crust of our globe than the remains of elephants, hippopotami, and whales.'

M. D'Orbigny has divided his *Foraminifera* into five families and has prepared magnified models, which are to be found in most collections, illustrating 100 species and all the 52 genera. Our limits will only allow us to give a mere sketch of his arrangement, as adopted by M. Rang.

FORAMINIFERA. (Asiphonoides of De Haan).

Family I. Les Stichostègues.

*

A single central opening.

Genus Nodosaria (Lamarck); Orthocera, Lamarck; Reophax; De Montfort.

us is sub-divided into many sub-genera.

1. Glandulina.
2. Nodosaria (properly so called).

Nodosaria contains numerous species both living and fossil, and is separated into two groups.

α

Shell not stirated longitudinally.

Example, *Nodosaria radicula.*

β

Shell stirated longitudinally

Example, *Nodosaria æqualis.*

3. Dentalina.

This sub-genus is also numerous and comprehends two groups.

α

Shell without longitudinal striæ.

Example, *Nodosaria communis.*

β

Shell longitudinally striated.

Example, *Nodosaria depressa.*

4. Orthocerina.
5. Mucronina.

Genus Frondicularia (Defrance) Renulina De Blainville).

Genus Lingulina.

*

Aperture Marginal.

Genus Rimulina.
Genus Vaginulina.
Genus Marginulina (Orthocera, Lamarck).
Genus Planularia (Defrance) Astacola? (De Montfort).
Genus Pavonia.

Family II. Les E'nallostègues.

Shell always composed of a porous tissue. Exterior rugose and covered with asperities.

*

Alternation of the chambers total or partial, regular
Genus Bigenerina.

This genus is divided into two sub-genera.

1. Bigenerina (properly so called).

Aperture central.

2. Gemmulina.

Aperture marginal.

Genus Textularia.
Genus Vulvulina.

* *

Alternation of the chambers total or partial, but irregular.

Texture vitreous, very translucid.

Genus Dimorphina.
Genus Polymorphina.

Polymorphina is divided into the following sub-genera:—

1. Polymorphina (properly so called).
2. Guttulina.
3. Globulina.
4. Pyrulina.

Genus Virgulina.
Genus Sphæroidina.

Family III. Les Hélicostègues.

Section 1. Turbinoides.

*

Spire elevated: shell free.

Genus Clavulina.
Genus Uvigerina.
Genus Bulimina.
Genus Valvulina.

* *

Spire surbaisée.

Genus Rosalina (Cidarollus? De Montfort).
Genus Rotalia.

Rotalia, which is abundant in living and fossil species, is divided into the following sub-genera:—

1. Rotalia (properly so called).
2. Discorbis (Lamarck).
3. Trochulina.
4. Turbinulina.

Genus Calcarina (Siderolites, Lamarck porus? and Cortalus? De Montfort).
Genus Globigerina.
Genus Gyroidina.
Genus Truncatulina. (Hammonia, Soldani; Polyxenes and Cibicides, De Montfort).

Section 2. Ammonoïdes.

Genus Planulina.
Genus Planorbulina.
Genus Operculina.
Genus Soldania.

Section 3. Nautiloïdes.

*

Chambers assembled on alternating axes; aperture towards the middle of the chamber.

Genus Cassidulina.

* *

Chambers not alternating or threaded (enfilées) on a single axis.

α

Sides unequal: one protuberant, the other flat.

Genus Anomalina.
Genus Vertebralina.

β

Sides unequal.

† Many apertures.

Genus Polystomella (Lamarck); Andromedes, Cellulia, Sporilus, Themeon, Pelorus, Geophonus, and Elphidium, (De Montfort).
Genus Dendritina.
Genus Peneroplis (De Montfort); Renulina, Placentula (De Blainville).
Genus Spirolina (Lamarck) including Lituites of the same author.

† †

A single aperture.

Genus Robulina. (Phonemus, Pharamum, Herion, Clisiphontes, Patrocles, Lampas, Antenor, Robulus, Rhinocurus, Spincterules; De Montfort.)
Genus Cristellaria (Lamarck); Linthuris and Oreas (De Blainville); Oreas and Scortimus (De Montfort); Saracenaire (Defrance).

Cristellaria is divided into two sub-genera.

1. Cristellaria (properly so called) Shell depressed.
2. The Saracenaires of Defrance. Shell convex.

Genus Nonionina. (Macrodites? Melonis, Cancris, Florilus, and Chrysolus; De Montfort.)
Genus Nummulina (Nummulites and Lenticulina; Lamarck. Helicites; De Blainville. Numulithes, Lycophris, Rotalites, Egeon; De Montfort).

Nummulina is separated into two sub-genera.

1. Nummulina (properly so called).
2. Assilina.

Genus Siderolina (Lamarck). Siderolithes (De Montfort).

Family IV. Les Agathistègues (Les Milioles; De Férussac.)

Genus Biloculina.
Genus Spiroloculina.
Genus Triloculina.
Genus Articulina.
Genus Quinqueloculina (Pollontes? De Montfort).
Genus Adelosina.

Family V. Les Entomostègues.

*

Sides unequal.

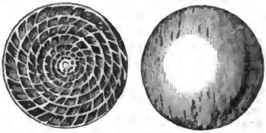
Genus Amphistegina.
Genus Heterostegina.

* *

Sides equal.

Genus Orbiculina (Lamarck); Helenis, Archaias, and Ilotes, (De Montfort).
Genus Alveolina (Alveolite); Bosc. Orizaire; Defrance. Borelis, Clausulus, and Milliolites; De Montfort. Fasciolite; Parkinson.
Genus Fabularia (Defrance).

The following example will serve as a general illustration of the family.



Nummulites lenticularis.

FORBES, DUNCAN, was the second son of Duncan Forbes of Culloden, near Inverness, where, or at another seat of the family, called Bunchrew, in the same neighbourhood, he was born 10th November, 1685. After studying law for some years at Leyden, he returned to Scotland in 1707, and was admitted an advocate 26th July, 1709. At the bar he rapidly gained employment and distinction. For his first public appointment, however, that of sheriff of Mid-Lothian, he was chiefly indebted to the friendship of the Argyll family. The rebellion of 1715 gave him an opportunity of displaying his zeal and activity in support of government; and to his influence and exertions, and those of his elder brother, who had now succeeded to the family estate, the maintenance of the public tranquillity throughout a great part of the north of Scotland at this crisis is considered to have been mainly owing. His services were rewarded the following year by his appointment to what was then called the office of deputy lord-advocate, which was similar to that of the present solicitor-general. In this office he did himself as much honour by the high-minded delicacy which he showed in conducting the trials of the persons charged with participation in the recent treason, as by the talent, activity, and courage he had displayed during the insurrection. The cry indeed that he was himself a disguised Jacobite was raised by the zealots of the government. In 1722 he was returned to parliament for the Inverness burghs, for which his elder brother had previously sat. In the House of Commons, of which he continued a member for the next fifteen years, he of course generally supported the minister, Sir Robert Walpole, as his official situation implied. In 1725 he was appointed lord-advocate, the place of secretary of state for Scotland being at the same time abolished, and its duties devolved upon him. In 1737 he was placed in a still more conspicuous position by his elevation to the dignity of lord president of the court of session, or head of the civil judicature of his native country. A few years before this time the death of his brother had made him proprietor of the family estate. For the last twenty years of his life, Forbes was regarded as a sort of lieutenant-governor of Scotland; but besides the power which he exercised through his official connexion, he secured to himself a still wider influence by his public spirit, and his unwearied exertions in promoting the welfare of the country in its trade, its manufactures, its agriculture, its fisheries, its roads, and every other department in which any project of improvement suggested itself to his active and patriotic mind. 'Thee, Forbes, too,' Thomson, in his 'Autumn,' addresses him (pronouncing the name, it may be observed, in two syllables, as it is usuallv heard in Scotland),—

'Thee, Forbes, too, whom every worth attends,
As truth sincere, as weeping friendship kind,
Thee, truly generous, and in silence great,
Thy country feels through her reviving arts.
Planned by thy wisdom, by thy soul informed;
And seldom has she known a friend like thee.'

The most memorable public exertions of President Forbes, however, were called forth by the rebellion of 1745. In this emergency he certainly contributed more than any other man to keep the rebels in check until the government was enabled to meet them in the field with an adequate military force. To the discredit of the ministry and the country, not only were his services never rewarded, but he was even refused any compensation for his actual losses and the expenditure of his private resources in the public cause. He had been attacked in his castle of Culloden by the rebels, who probably would have taken his life if he had fallen into their hands. It is said that his indignant sense of the ungrateful usage he met with broke his heart, and brought him to the grave. His death took place on the 10th December, 1747. He left an only son, by a lady whom he married soon after his admission to the bar, but whom he lost after a few years. President Forbes was a man both of extensive scholarship and of elegant accomplishments. Among other branches of learning he had cultivated an acquaintance with the Oriental tongues, and is said to have perused the Old Testament eight times in the original Hebrew. He is the author of the following pieces, which were published at Edinburgh in two volumes 8vo., soon after his death:—1. 'Thoughts on Religion, Natural and Revealed;' 2. 'Reflections on the Sources of Incredulity in regard to Religion;' of this Warburton, in a letter to Hurd, writes, 'It is a little jewel; I knew and venerated the man; one of the greatest that ever Scotland bred, both as a judge, a patriot, and a Christian;' 3. 'A Letter to a Bishop concerning some important discoveries in Philosophy and Religion.' To President Forbes are also attributed the elegant and well-known verses beginning—

'Ah! Chloris, could I now but sit
As unconcerned as when
Your infant beauty could beget
Nor happiness nor pain,' &c.

His correspondence in relation to Scottish affairs, and especially to the Rebellions of 1715 and 1745, was published in a 4to. volume at London in 1815, under the title of 'Culloden Papers, &c., from the originals in the possession of Duncan George Forbes of Culloden, Esq.' The above facts are stated on the authority of a 'Memoir' of considerable length which is prefixed to this publication.

FORBES, JAMES, a civil servant of the East India Company, creditably known as the author of 'Oriental Memoirs, selected and abridged from a series of familiar letters, written during seventeen years' residence in India,' &c., 4 vols. 4to. 1813. This work includes observations on those parts of Africa and America at which the author touched in his several voyages. The beauty of its decorations, more especially the coloured plates of animals and plants, from drawings made by the author, which have rarely been surpassed in spirit and beauty, obtained for it uncommon popularity. The text also, though bulky, was calculated to interest the public at large, as containing, intermixed with personal anecdote, an amusing mass of miscellaneous information concerning the Company's service, the history, manners, zoology, and antiquities of Hindustan, especially Guzerat, and other provinces on the western coast. The letters and drawings from which these memoirs were taken, are stated to occupy 52,000 folio pages, in 150 volumes. They appear to have been the production of a mind prone to the marvellous, but active, intelligent, and benevolent.

Mr. Forbes was born in London in 1749 It is erroneously said in the French 'Biog. des Contemporains' that he left England to gratify his love of travel, a statement contradicted by almost every chapter of his book. He went out in 1765, with a writer's appointment, to Bombay; accompanied, in a civil capacity, the troops sent to assist Ragonath Row, peshwa of the Mahrattas, in 1775; and, after a short visit to England for his health, received an appointment at Baroche, in Guzerat, from which he was promoted in 1780 to be collector and chief resident of the town and district of Dhuboy in the same province, then newly occupied by the Company. On the cession of that province to the Mahrattas, in 1783, he returned to England, honoured by the affection and sincere regret of the natives who had been placed under his charge. Being in France in 1803, he was among the numerous *détenus* confined at Verdun, but was released, with his family, in 1804, as a man of science, by the mediation of the French Institute, at the instance of our Royal Society. In 1806 Mr. Forbes published two volumes of letters, descriptive of his tour in Holland, Belgium, and France, with a more particular account of Verdun, and the treatment of the British detained there. He died August 1, 1819. He was a fellow of the Royal and Antiquarian Societies, and the Arcadian Society of Rome. (*Oriental Memoirs.*)

FORBIN, CLAUDE, one of the most distinguished naval officers that France has ever produced, was born in Provence in 1656, and died in 1734. It is unnecessary to enumerate his various exploits against the English, Dutch, Venetians, and the Barbary powers, but we cannot omit a remarkable circumstance in his life, of which he has left an account in his memoirs. We allude to the attempt which was made in the 17th century to introduce European civilization into the kingdom of Siam. It originated with an adventurer, a native of the Ionian Islands, called Constance Faulcon, who came at an early age to England, and entered the service of the East India Company. After many vicissitudes he reached Siam, and entering the service of the king of that country, he succeeded in gaining the favour not only of the prime minister but even of the king himself, who on the death of the minister wished to appoint Constance in his place. He had the good sense however to decline the title, in order to avoid exciting the jealousy of the natives, and contented himself with the exercise of the power. The beginning of Constance's administration was successful, and notwithstanding many difficulties, the country began to improve under the administration of this able foreigner. He now conceived the plan of introducing, with the assistance of the Jesuits, the Christian religion, not only into Siam, but also into the adjacent countries, and with that view he persuaded the king of Siam to send three deputies to Louis XIV. The three deputies died on their way, but Louis having heard of the circumstance sent the chevalier Chaumont, accompanied by Forbin, to the Siamese monarch. The embassy was accompanied by some troops. It concluded a treaty of commerce, secured protection to the Catholic religion in Siam, and returned to France with an embassy from the king. Constance having prevailed on his master to take some French officers and troops into his service, Forbin was appointed grand-admiral of the fleet, general-in-chief of the army of Siam, and governor of Bang-kok. The French troops were stationed in several parts of the kingdom; they occupied the fortresses of Mergui and Bang-kok, and the king requested Louis XIV., by the Jesuit Tachard, to increase their number. Everything seemed now favourable to the progress of European civilization in Siam, and there were great hopes of converting the monarch to the Christian religion, when jealousy between Constance and the commander of the French troops destroyed all these brilliant prospects. A Siamese grandee called Pitracha, taking advantage of the quarrels which divided the Europeans, united all their enemies and revolted against the king, took him prisoner and declared himself regent of the kingdom. He compelled the French to quit the country, and put Constance as well as many other Christians to death. Forbin returned to Europe after a two years' residence in Siam, of which he seems to have been heartily tired. Forbin's memoirs were published, during his lifetime, in 1730, at Amsterdam, 2 vols. in 12mo. They are written with great ease, and his lively descriptions as well as the variety of events related make them exceedingly interesting. Forbin was distinguished for his disinterested conduct, and for the zeal which he showed on many occasions in procuring merit its just reward. The last years of his life were spent in retirement and devoted to religious exercises and works of charity.

FORCE, a mechanical term, which, though it be sufficiently understood in its common and popular meaning, requires some consideration before its strict and philosophical sense can be understood.

The term force always implies the existence of some cause which produces a visible mechanical effect. Thus the cause of motion and the cause of pressure are both forces: again, difference of effects must be attributed to difference in the producing causes: thus, greater or less velocity, and greater or less pressure, are both attributed to differences in the causes of velocity or pressure. But on the other hand, effects which are the same in one point of view may differ in another; thus, bodies of different weights, let fall from the same heights above the ground, will strike the ground with the same velocities, but with different degrees of effect upon the substance which they strike. Again, if a ball be thrown upwards with a velocity a, which carries it to a height b, it will, when thrown upwards with twice the velocity, ascend through four times the height b. Here, then, considered with respect to one effect, the second force should seem twice the first: considered with respect to another, the second seems four times the first. Such difference of appearance in the numerical quantities of different effects led at one time to long and warm disputes on the *proper* method of measuring force, all of which a clearer knowledge of mechanics has shown to be of very little use. One distinct meaning, with care not to assume the consequences of any other meaning as necessarily deducible from the first, will enable the mechanical reasoner to establish the whole doctrine of statics, or equilibrium: another, the whole doctrine of dynamics, or motion.

It should seem that these two (so called) *forces* should have different names; but custom has settled otherwise. We proceed to the definitions of force.

In the theory of equilibrium, force is a synonyme of pressure, and weight is its measure. The notion of force is here derived, most probably, from the sensation which accompanies muscular effort. Wherever pressure is produced we can find a weight which will supply the place of the pressure: thus, if a string of Indian rubber, hanging from a fixed point, be extended by the hand placed at its lower extremity until its length is doubled, we can, by suspending a weight at the lower end, find what the weight must be in order to produce the same effect. And we then say that the force which the hand exerts is the same as that of the weight. The immediate causes of the effect are very different: our own power of volition, and the connexion between the earth and the weight which it draws towards it are (we may safely say, with all our ignorance of causes) extremely different things; but where they produce the same effect, we cease to think of the difference, and say that they both create the same *force* or *pressure*.

In the preceding definition of force, time is not one of the elements. But we very soon observe that wherever pressure is produced motion is prevented. Let the elastic string be suddenly cut in two, and the hand or the weight immediately descends. It is also proved that matter is incapable of producing either rest or motion in itself: if a certain rate of motion be communicated to it, it will preserve that motion unaltered till some external cause interferes. On this axiom the notion of force, as causing motion, depends for precision: the *alteration of velocity* is the evidence of the existence of force.

When force, in the sense of pressure, is considered as the cause of motion, or rather of change of motion, we must take into account both the necessity of introducing the element *time*, and also the quantity of matter which is moved. No change of velocity can be instantaneously produced. if a billiard-ball, moving ten feet per second, be struck so as to accelerate its motion to twenty feet per second, the accession of velocity is made gradually though rapidly. A stone which has fallen for one second in a vacuum is, at the end of the second, moving at the rate of 32 feet per second: let x be any number or fraction less than 32, and there must be a moment, during the course of the second, at which the stone's velocity is x feet per second. Again, when pressure produces motion the velocity generated in a given time is less, the greater the quantity of matter to be moved. Let different weights, the first double that of the second, be placed on a table (friction not being supposed to exist) and let given equal weights (say each one ounce) be attached to them by strings and hang over the side of the table: then, supposing the two first weights to be 16 and 8 ounces, the pressures are in both cases the same, namely, the weight of one ounce; but the masses of matter moved are 17 and 9 ounces (for in both cases the moving ounce is part of the whole quantity moved) The velocities at the end of any given time are found to be *inversely* as 17 and 9: so that by the time a velocity of 9 feet per second is created in the mass of 17 ounces, 17 feet per second is created in that of 9 ounces. The connexion of pressure, velocity created by pressure, and time which pressure takes to create velocity, as deduced from experiment, is contained in the following results:—

1. The same pressure continually acting upon a given mass for different times produces velocities which are proportional to the times, and augments velocity by equal portions in equal times.

2. The same pressure applied to different masses of matter (that is, to different weights of matter) during the same time, produces velocities which are inversely proportional to those masses.

3. The velocity of falling bodies is accelerated by 32·19 feet in every second: and in that proportion for all other times.

If then a pressure which is the same as that of a weight V produces motion in a mass of matter whose weight is W, during t seconds, then because the weight of V acting upon the mass of V for that time would produce $32{\cdot}19 \times t$ feet of velocity, we have

Velocity produced by V acting on V (or $32{\cdot}19 \times t$),
is to velocity produced by V acting on W (which is to be found),
inversely as V to W, or as W to V· whence

$$\text{velocity acquired is } \frac{V}{W} \times 32{\cdot}19\,t \text{ feet per second.}$$

If it were required to reduce the weight W, having a velocity v, to a state of rest in a given time, say t seconds, and if P were the pressure requisite to be applied to W during the t seconds to produce this effect, we must remember that the velocity destroyed by a pressure in any direction is the same as would have been created in the same time in the opposite direction, if the mass in question had been already at rest. Thus

$$\frac{P}{W} \times 32{\cdot}19 \times t \text{ must be} = v \text{ or } P = \frac{Wv}{32{\cdot}19\,t}$$

Hence, in different masses, the pressures necessary to destroy the motions in the same given time are as the products of the masses and velocities. Thus,

The pressure which will in one-hundredth of a second reduce to rest a mass of 10 ounces moving 100 feet per second, is to the pressure which will (also in one-hundredth of a second) reduce to rest 20 ounces moving 85 feet per second, as 10 × 100 to 20 × 85, or as 1000 to 1700. It is customary to call this product of mass and velocity the *momentum* or *moving force* of the body. [MOMENTUM.]

When bodies are in motion, and with a continually varying velocity, it becomes desirable to consider their motion, not at all with reference to the masses which are moved, and solely with reference to the alterations of velocity which are produced. Thus if a feather and a cannon-ball move together in the same way, the force that is exerted upon the feather is the same in motive effect (upon the feather) as that which acts on the ball (upon the ball). It is customary to ascertain the amount of velocity which would be produced in one second if the acceleration, such as it is at the point in question, continued uniformly. [ACCELERATION.] And this result is called the *accelerating force:* for which the simple term *acceleration* might be advantageously substituted. It is found by the rules of the Differential Calculus in the following manner (for the demonstration, see VELOCITY). If a point move in a line in such a manner that x feet is its distance from a given point in the line at the end of the time t seconds, and if x be a function of t then the velocity of the body (v) at the end of the time t is

$\frac{dx}{dt}$ feet per second, and the acceleration which that velocity is then undergoing is such as, if allowed to continue uniformly for one second would increase the velocity by $\frac{dv}{dt}$ or $\frac{d^2x}{dt^2}$ feet. Thus, if $x = t^2 + t^3$, or if a point move through $t^2 + t^3$ feet in t seconds, the velocity at the end of that time is $2t + 3t^2$ feet per second, and its acceleration s $2 + 6t$; or (for instance) at the end of 10 seconds the velocity (320 feet per second) is undergoing acceleration at a rate which would, if continued undisturbed for one second, add 62 feet in that second: or at the end of the *eleventh* second, the velocity would be 382 feet per second.

If f be this accelerating force, we have then

$$v = \frac{dx}{dt}; \quad f = \frac{dv}{dt} = \frac{d^2x}{dt^2}; \quad vdv = fdx.$$

These are called the *equations of motion*.

Any unit of time might be chosen instead of one second, but not without the following caution. Let g be the velocity generated by a force acting uniformly for one second: then 60 g is the velocity produced in 60 seconds or in one minute. If then we measure the acceleration by g, when the unit is one second, it might seem that we should use 60 g instead of g, when the unit is one minute. But it must be remembered that when we use the minute as a unit of time, we must measure velocities by the spaces which would be described in one minute. Now, in the preceding, 60 g means that the body, at the end of one minute, is moving at the rate of 60 g *per second;* that is, at the rate of 60 × 60 × g per minute. Hence 3600 g is the measure of the acceleration, when both velocity and acceleration are referred to the minute instead of the second.

Referring to what precedes, we see that accelerating forces (or accelerations) are proportional inversely to the masses in which they are produced, and directly to the pressures which produce them. Thus the pressure V acting on the weight W, produces $\frac{V}{W} \times 32{\cdot}19$ feet of velocity in every second.

The greatest difficulty in the way of the beginner is his inability to confound an increase of velocity with an increase of length described. He should carefully attend to the article Acceleration, by which he will see that a *velocity uniformly increasing* causes unequal spaces to be described in equal successive portions of time; while a *uniformly increasing length described* means a uniform velocity, or a velocity which does not change at all.

FORCES, IMPRESSED AND EFFECTIVE. When various pressures act at different points of a system the forces which act upon any one point are not those which would by themselves produce the motion which that point really has, in consequence of the motion of the system. Thus, suppose a pendulum with two balls, one above and the other (which suppose much heavier) below the point of suspension. The forces which act on the upper ball would, if it were free of the larger one, cause it to descend; while, in consequence of the connexion of the two balls, the smaller actually does vibrate like a pendulum turned upside down, or as if its gravitating tendency were upwards instead of downwards. Here is an instance in which the impressed force acts downwards and the *effective* force upwards: that is, the motion which actually ensues is such as would require a force acting upwards to cause it.

One of the most important principles in dynamics is that known by the name of D'Alembert, and is enunciated thus: the impressed forces are altogether equivalent to the effective forces, or if the directions of the latter were all changed, the former would equilibrate them. Suppose an infinitely small portion of time to elapse, during which the different small masses into which the system may be divided receive certain infinitely small accelerations or retardations. From these the effective forces may be deduced, for they are the forces which would severally produce the actual changes of velocity which take place. If then, forces equal and contrary to the effective forces thus deduced were applied at each point, all the motion created by the impressed forces would be destroyed; that is, the effective forces are such as would (applied in contrary directions) prevent the impressed forces from producing any motion. This proof might be put into more accurate language, but it is in substance the one which is usually given. [Virtual Velocities.]

FORCES, PARALLELOGRAM OF. Any two forces acting at the same point, and represented in magnitude and direction by two straight lines, are equivalent to a third force which is represented in magnitude and direction by the diagonal of the parallelogram constructed with the two lines as its sides. [Composition.] This theorem is frequently called that of the *parallelogram of forces*.

FORCING, in horticulture, is the art of hastening the growth and maturity of flowers, fruits, and vegetables by artificial means.

Many of our finest exotic fruits are indigenous to warmer countries, and would scarcely ripen even in our warmest seasons; but by this art they are brought to great perfection in cold climates, and by advancing or retarding artificially the growing season of hardy kinds they also can be had in regular succession throughout the greater part of the year.

Although forcing to any extent is but of recent date in this country, yet it appears to have been practised in other countries at a very early period of time. Sir Joseph Banks, in the 'Hort. Trans.,' cites some epigrams from Martial, to show that hothouses were not unknown to the Romans, and arrives at the conclusion that in all probability they had both vineries and peach-houses, formed of *talc* instead of glass, which is now commonly used. Pliny tells us that Tiberius, who was fond of cucumbers, had them in his garden throughout the year by means of (*specularia*) stoves, where they were grown in boxes, wheeled out in fine weather, and replaced in the night or in cold weather (Plin. *Hist. Nat.*, xix. 23); whence it may be inferred that forcing houses were not unknown to the Romans, though they do not appear to have been in general use. This branch of horticulture was almost unknown in Britain until the end of the 17th or beginning of the 18th century, and Lady Mary Wortley Montagu, on her journey to Constantinople in the year 1716, remarks the circumstance of pineapples being served up in the dessert at the electoral table at Hanover, as a thing she had never before seen or heard of. Sir Joseph Banks justly remarks, had pines been then grown in England, her ladyship, who moved in the highest circles, could not have been ignorant of the fact. It is said that the discovery of peach-forcing in Holland arose from an old Dutch gardener having, in a bad season when his peaches would not ripen, accidentally placed the sashes of a hotbed over them, which had the effect of ripening them. Even after forcing was practised to a considerable extent, its principles were so little understood, that fruit procured in this way was nearly destitute of that natural flavour which it acquires when exposed to the genial influence of the sun's rays in their most powerful state.

The fruits of warmer climates, growing in a wild state, enjoy a greater degree of light than it is possible to give them in this country at any season of the year, and this is one of the most important circumstances to attend to in the art of forcing. Nature is in all respects the best guide in these matters, and care should be taken to imitate her as far as possible; first, by taking care that forced plants are exposed to all the light that can be collected; and, secondly, by preserving a due proportion between the quantity of heat and light to which forced plants are exposed, in other words, by not forcing too hard at a season when the sun's rays are least powerful, thus acting in direct opposition to the laws of nature. Attention to this is the corner-stone of the whole process. When early crops are more desirable than high-flavoured fruit, gardeners are obliged to apply heat without reference to the intensity of light; but if this is not the object, forcing should never be commenced before the spring, in order that the fruit may have the greatest degree of light when ripening. These principles are now generally understood and appreciated, and consequently our peaches, grapes, and other forced fruits are even superior to those grown under the clear skies of the south of Europe.

Mr. Knight, the president of the London Horticultural Society, recommends the temperature to be kept much lower during night than is generally done, and remarks, 'A gardener in forcing generally treats his plants as he would wish to be treated himself, and, consequently, although the aggregate temperature of his house be nearly what it ought to be, its temperature during the night relatively to that of the day is almost always too high.' In one of his vineries he always wishes the temperature in the middle of a bright day in summer to rise to 90°, and when the leaves of his plants are quite dry, he does not object to ten or fifteen degrees higher. But he most justly adds, that if this is accompanied by a high temperature at night, 'it exhausts the excitability of the tree much more rapidly than it promotes its growth or accelerates the maturity of the fruit, which is in consequence ill supplied with nutriment at the period of its ripening, when most nutriment is probably wanted.'

The same experienced author recommends the plants for forcing to be rendered, by previous treatment, as excitable as possible, which may be done by ripening the wood early in autumn, and putting the tree into a state of repose, ready to be roused into action by the application of heat.

It appears to be a general rule that plants from warm countries endure with impunity a very high degree of temperature, while those of more temperate regions are impatient of artificial heat, and hence the difficulty of forcing the plants of northern climates; for example, the same degree of heat in which vines flourish would be much too high for cherries, which throw off their blossoms after expansion without setting their fruit. The reason of this seems to be the following: each plant is adapted to the peculiar circumstances in which it is naturally placed; the natives of warm climates are formed to endure heat, and those of higher latitudes to suffer cold; and when these circumstances are reversed, those of cold countries being placed in excessive heat, and those of warm regions in unusual cold, the former are excited by far too much and too rapidly, so that flowers and fruit are developed before the leaves have had time to organize matter to support them; and the latter, if they endure the cold, are not excited, and remain in a languishing unhealthy state. These reasons will at once show the extreme caution which is necessary in forcing the fruits of northern climates, and will at the same time suggest the treatment that plants of such a description require, and which both reason and experience agree in recommending to those who would be at all successful in the art. Firstly, the increase of temperature must be slow and gradual, and never at its highest point exceed 60° or 65° of Fahrenheit with artificial heat; air must be freely introduced, particularly in fine bright weather, and the house so constructed as to admit of the greatest possible quantity of light, as, for instance, having moveable lights which can be taken off and put on at pleasure.

The Dutch have long been celebrated as excellent forcing gardeners, and as their manner of performing the operation is peculiar, a description of it may be interesting. The principal feature in their system is conducting the operation chiefly in frames and pits heated with fermenting dung. The trees employed in forcing are generally taken from a wall in the open air, planted in a rich border of leaf mould, and trained to a trellis a few inches below the glass; here they remain until they have ripened their fruit, after which they are moved back to the wall until wanted for the same purpose in some succeeding year; they never force from the same plant two years in succession. Their system of employing dung instead of fire heat gives them an excellent opportunity of forcing vegetables, such as French beans, endive, lettuce, &c., which are either placed on, or plunged in, the bed in the inside of the frame.

Although pit and frame forcing is a principal feature in the horticulture of Holland, yet they have now, as well as in this country, more elevated structures.

The Dutch plan of forcing is now practised to a considerable extent in a number of gardens in Britain, particularly in that of P. C. Labouchere, Esq., Hylands, near Chelmsford, of which a full account is given in the first vol. of the *Gardener's Magazine*, and another interesting paper upon the same subject, communicated to the Horticultural Society by M. Lindegaard, is published in their Transactions, Series I. vol. v. The best information regarding the scientific principles of forcing is contained in the numerous papers scattered through the Transactions of the London Horticultural Society, and communicated by Mr. Knight and other scientific individuals. The best practical works upon the subject are those from the pens of Speechly, M'Phail, and Abercromby, the contents of which are chiefly given in Loudon's *Encyclopædia of Gardening*.

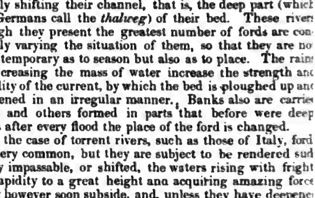
FORD. A name applied to that part of a river where the water is sufficiently shallow to admit of wading through it, and thus crossing over without having recourse to bridge, a ferry, or other similar means of passage.

Some rivers are never fordable, others are always so; i some the fords are temporary as to season though permanent as to place, and in others they frequently change thei situation. Rivers whose banks are steep and course straigh are rarely fordable, for in such the water is generally to deep or too rapid to admit of fording. Small and regula streams issuing from springs in flat countries are generall fordable at all times and in all parts. The most commo cases however are those of temporary and changeable fords Of the first of these it is observable that when a river ha once formed its bed in a soil of a certain degree of tenacity it seldom changes its channel, so that its shallows and dee parts remain constant, and, if the former permit of bein forded, nothing but a rise of the waters renders the for impracticable. This rise depends entirely on the rain which fall into the basin of which the river is the drain an the size of the basin itself, to which two circumstances th river is generally proportionate. If the basin be large an subject to frequent rain the fords will frequently be rendere impassable; if the rains are of long duration, the passage o the ford will be interrupted for a time proportionably long The channel however remaining permanent the ford ma again be passed as soon as the excess of water has flowe off. Such fords have generally been used long befor bridges were constructed, and as travellers from a distanc sometimes found the ford impassable on arriving, hostelrie for their temporary reception were constructed on the banks Such has been the beginning of many towns whose name still commemorate their origin, as Chelmsford, Bedford, Oxford, Stratford, &c.

Such rivers as flow through a loose soil, as sand o gravel, have generally a very winding course and are constantly shifting their channel, that is, the deep part (which the Germans call the *thalweg*) of their bed. These rivers though they present the greatest number of fords are constantly varying the situation of them, so that they are no only temporary as to season but also as to place. The rains by increasing the mass of water increase the strength an rapidity of the current, by which the bed is ploughed up an deepened in an irregular manner. Banks also are carrie away and others formed in parts that before were deep Thus after every flood the place of the ford is changed.

In the case of torrent rivers, such as those of Italy, ford are very common, but they are subject to be rendered suddenly impassable, or shifted, the waters rising with frightful rapidity to a great height ana acquiring amazing force They however soon subside, and, unless they have deepene the channel, cause no other inconvenience than a very temporary delay.

In military operations fords are of the greatest importance. The inhabitants on the borders of a river generall know where they are, but as their indications cannot alway be relied upon, particularly in an enemy's country, the ford must be looked for. They are generally found either in th widest part of the river, or in the direction of the diagona line that joins the salient angle of one side to the salien angle of the other side, as A B or C D.



In the first case the waters spread out in the wider par of the bed of the river, and are therefore less deep; and i the second, there is always a deposit in front of the salien angles (as indicated by the dotted lines) and consequen the water is more shallow in those parts.

Fords for infantry should not exceed the depths three feet, and for cavalry that of four feet. These are th extreme depths, and if the current be somewhat rapid it dangerous to risk fording through more than two feet wate for infantry and three for cavalry. The bottom must als be firm and even. Mud, weeds, or blocks of stone ar great obstacles—loose sand is also bad as a ford for caval for, being stirred up from the bottom by the horses it carried away by the stream, and the ford thus becomes deep that the last horses, in such case, are frequently force to swim. The opposite bank must also be easily accessi and clear, for it is useless to cross a river when, on gain the opposite side, your further progress is impeded by roc or impassable forests, thick brushwood, or swampy ground. Having discovered a ford, it is indispensable to mark its situation, and if some time should have elapsed previous to conducting the troops to it, the ford should be again examined in order to be sure that the waters have not risen, or that the enemy may not since have rendered it impassable, which may be effected in different ways. Other considerations are necessary when the ford is to be passed in presence of an enemy, but these belong to a different subject.

FORD, JOHN, the dramatist, descended from a highly-respectable family in the north-west of Devonshire, was the second son of Thomas Ford of Ilsington in that county. The exact date of his birth is not known, but Malone's industry has fixed his baptism at April 17, 1586, as appears from the parish register of Ilsington.

Having some connexion with Popham, the chief justice, Ford was designed for the bar, and entered at the Middle Temple, November 16, 1602; four years after which time he produced his first poem, 'Fame's Memorial,' an elegy on the death of the earl of Devonshire, dedicated to his countess, the beautiful sister of the favourite earl of Essex. This poem adds nothing to the author's present reputation, and all we gather from it are some hints of a disappointment in love, for the cure of which he had recourse to writing.

In addition to this mode of mental relief, he applied himself to a practice then common, that of assisting in the composition of plays, but he did not appear as an independent writer till 1629, when he published 'The Lover's Melancholy,' which was followed four years afterwards by ''Tis Pity She's a Whore,' 'The Broken Heart,' and 'Love's Sacrifice.' The next year produced 'Perkin Warbeck;' and in 1638-39 he published two serious comedies, called 'The Fancies chaste and noble,' and 'The Lady's Trial.' Besides these, he wrote in conjunction with Decker 'The Sun's Darling,' a moral mask, which was not printed till 1657 according to Langbaine, or 1658 according to Gifford.

Nothing more is known of Ford; but from some obscure traditions it has been supposed that soon after 1638 he retired to his native place of Ilsington, and there spent the remainder of his days.

Ford's plays contain many fine thoughts, and numerous specimens of harmonious versification, apparently the result of considerable labour. One fault into which he has fallen in common with others his contemporaries, that namely of killing off all his *dramatis personæ* at the end of the fifth act, appears to arise from an overstrained desire of completing and perfecting the action of the play. Forgetting that the end of every drama is to represent a certain crisis in the affairs of one or more of the principal agents, he endeavours to make the fortunes of almost all the inferiors converge to the same point, and accordingly involves them in a similar ruin. This is very much the case in ''Tis Pity She's a Whore' and 'The Broken Heart;' in the latter, as much from the intricacy of the plot as from any other reason.

His best work is, we think, 'Perkin Warbeck.' It has an air of repose throughout which we do not see in Ford's other plays. The device too of making Perkin believe in the justice of his own claims is highly ingenious; besides which the characters of Huntly, Katharine, and Dalyell are so excellent, that the whole effect of the play is very much like what is called Shakspeare's second manner. Here however, as in all Ford's dramas, we want Shakspeare's clowns and fools. There is nothing of nature, or even of genial humour in Ford's comic characters: the best is perhaps the tailor in 'Perkin Warbeck,' but he is, to speak in the most favourable terms of him, very much overstrained. It is in melancholy passages and love scenes that we must look for Ford's peculiar excellence; and if the characters of Annabella and Giovanni had been more fully sustained throughout, ''Tis Pity She's a Whore' would probably have been Ford's most perfect tragedy.

(Langbaine's *Dramatic Poets*, p. 219; Winstanley's *Engl. Poets*, p. 114; Gifford's edition of Ford.)

FORDUN, JOHN DE, the father of Scottish history, is believed to have been a canon of Aberdeen, and to have been born in the parish of Fordun, in the Mearns, in the early part of the fourteenth century. He probably died in the year 1386, or very soon after. His history, as far as completed by himself, is in five books, and comes down to the end of the reign of David I. (A.D. 1153); it begins at the creation, the first chapter being entitled 'De Mundo sensibili, terra scilicet et suis quatuor punctis principalibus, orientali, occidentali, australi, et boreali,' and a great deal that immediately follows, being rather a treatise on cosmogony than a chronicle or history. But, in addition to the five books, he left materials for bringing down the narrative to A.D. 1385, which were put in order by Walter Bower, abbot of Inchcolm, who, as he tells us himself, was born in that year. Bower also continued the history to the death of James I. (A.D. 1437), the whole work being thus extended to 16 books. Fordun states that he spent much time in collecting the materials for his history, both by inquiry and by travel; and he appears to have made a diligent use of all the sources of information that were accessible to him. He has undoubtedly preserved many facts which otherwise would have perished. Although by no means free from the credulity which belonged to the spirit of his age, he deserves to be considered as, by comparison, both an honest and a sensible writer; the mythology of the Scottish history appears in a much simpler shape in his account than it assumes in the hands of his successors. The five first books of Fordun's work were first printed under the title of 'Joannis Fordun Scoti Chronicon, sive Scotorum Historia,' in Gale's 'Historiæ Britannicæ, Saxonicæ, &c. Scriptores xv.' (commonly referred to as the first volume of Gale's collection) fol., Oxon., 1691, pp. 563-701. The first complete edition of the work was published by Hearne, at Oxford, in 5 vols. 8vo., in 1722, under the title of 'Joannis de Fordun, Scotichronicon.' A more complete and accurate edition appeared at Edinburgh in 1759, in 2 vols. fol., entitled 'Joannis Fordun Scotichronicon, cum supplementis et continuatione Walteri Boweri, Insulæ Sancti Columbæ Abbatis, &c., cura Gualteri Goodall.' Some copies of this publication are said to have a different title page, with the date 1775. Of Goodall's performance Pinkerton (*Introduction* to *Inquiry into History of Scotland*) says: 'A laudable work; but his introduction is another violent piece, fraught with contemptible scurrility, low prejudice, small reading, and gross error. He talks like a master where he is not even a scholar, and dreams he knows everything where he knows nothing.' Many manuscripts of Fordun are extant. In all of these, we believe, the 'Scoti' of the title is joined in one word with the 'Chronicon,' and not placed separately as an annexation to the author's name, in the manner in which it is printed by Gale.

FORDWICH. [Kent.]

FORECLOSURE. [Mortgage.]

FORELAND, N. and S. [Kent.]

FOREMAN. [Jury.]

FORESHORTENING (in Italian *scorciare, scorcio*) is a term chiefly applied to anatomical drawing when one or more limbs of a figure, or its entire body, are shown so as to be *shortened* by being viewed directly in front or nearly so, and the spectator seeing little more than its *fore* end, or that which is towards him. Thus, supposing an extended arm and hand to be nearly opposite the eye, and perpendicular to or forming a right angle with the picture, little more than the tips of the fingers and thickness of the arm would be visible. Hence, as perspective has been defined to be the art of foreshortening objects, foreshortening may be explained as linear perspective applied to the human figure, this being the principal case which admits of striking perspective effect in such subjects; because when, as for the most part happens, the limbs are beheld in their full or nearly their full extent, let the attitude be what it may, the outline is little affected by mere perspective; consequently, except in ceiling-pieces, where the figures are supposed to be above the spectator, and seen from below the plane on which they stand, foreshortening—at least any considerable degree of it—is rarely required in delineating the human figure; while, on the other hand, it occurs more or less in almost all those of animals, their forms being more compounded and their bodies placed horizontally. An example of *foreshortening* may therefore at any time be obtained by standing either in front of or behind a horse, when the hind or fore-legs, as the case may be, will be nearly concealed by those towards the eye, and the back of the animal or its length be no longer visible. In sculpture, unless it be in reliefs, the foreshortening of the limbs depends entirely upon the station chosen by the spectator himself; whereas in painting it depends upon that chosen by the painter for him; and several fine examples of it occur in the works of Michael Angelo, Correggio, and Rubens.

FOREST, an extensive tract of ground overgrown with trees alone, of one or several species, or with trees and underwood.

Forests are not only highly interesting in themselves, but are of most extensive importance, whether as regards their influence in the general economy of the globe or on local climate; as supplying to man those necessary articles timber and fuel, besides a variety of nutritious, medicinal, and tinctorial plants; or finally, as affording shelter to wild animals, which finding in them both food and security, leave man unmolested.

In taking a view of the forests which cover such immense tracts of the earth's surface, the first thing which strikes us is their variety. In one place they are composed of palms, in another of oaks, and elsewhere of pines and birch trees, &c. We are next surprised at the apparent dissimilarity of situation in which we find collected together trees of the same kind; palms in America, in Africa, and in Asia; oaks and pines in Russia and in Mexico, in plains and on mountain tops. A little consideration however will satisfactorily account for this. Trees, like other vegetables, require, according to their several natures, and independent of suitable soils, different modifications of heat, light, moisture, and atmospheric pressure; circumstances which, so far from being influenced by latitude alone, are much more dependent upon height above the level of the sea, its vicinity and other circumstances, than upon proximity to or distance from the equator. Hence, not only do we find particular kinds of trees associated in those regions which are most conducive to their perfect development, but as we find regions of similar climate in different parts of the world, so do we find them producing vegetation of similar character, and thus, though the torrid zone has forests peculiar to itself, we there find also, but at different heights above the sea, the forests of what are termed the temperate and frigid zones. It is however remarkable and not easily accounted for, that, although the same trees seem to require similar climates, these climates do not always give birth to the same kind of plants. The climate of many parts of the mountainous region of the torrid zone is similar to that of the temperate zone, and yet Humboldt did not find a single indigenous rose-tree in all South America, and this shrub is entirely wanting in the southern hemisphere. Heath is peculiar to the old world, for out of 137 known species, not one is found in the new continent from Pennsylvania and Labrador to Nootka and Alashka; and the greater part of our European forest-trees, even the hardiest, disappear towards the Tobol and the Irtish. They do not grow in Siberia though the climate is the same. The oak, the hazle, and the wild-apple are not found from the Tobol to Da-uria, although the two first appear again suddenly on the borders of the Argoun and the Amur, and the last is again found in the Aleütian islands.

According to Humboldt, whether we ascend from the plain of Oratavia to the top of the Peak of Teneriffe, or from the shores of the Pacific to the summit of the Mexican Andes, we find different zones of vegetation, in which the succession of forest-trees follows, generally, the same order that is observed in passing over the surface of the earth from the equator towards the poles. Raymond, also, in the Pyrenees, and Tournefort, on Mount Ararat, found in ascending these mountains, the same succession of trees as exists in passing from their particular latitudes towards the frozen regions. From this fact it has been rather rashly concluded, that certain heights correspond in the nature of their vegetation with certain latitudes: this however is not strictly the case, nor is the succession we have mentioned absolutely that observed in proceeding from the equator northward. The extreme heights at which certain forest-trees vegetate in the Andes are different from those at which the same trees are found in the Pyrenees, and while the birch is nearest the snow in Lapland it is succeeded in the Alps by the pine. These anomalies are explained by a difference in some of the elements of local climate, and by the probable fact of particular primitive distribution. It is also remarkable that in some cases forests are composed solely of some particular tree. Thus, in Lapland there are extensive forests of birch without a single tree of any other kind, and without underwood. In Mazovia also are extensive forests of nothing but birch. In Norway, Sweden, and Finland many forests consist exclusively of pine. Asia has whole woods of nothing but cocoa-nut, &c.

Our European forests, generally considered, are composed chiefly of oak, elm, ash, beech, alder, poplar, willow, plane, birch, and lime, together with interspersed wild-apple, pear, and cherry-trees, dogwood, hawthorn, and service-tree; the underwood being hazle, elder, buckthorn, viburnum, dog-rose, &c. Yew and holly are the evergreens of our woods, and of coniferous trees we have the larch, different species of the pine and fir, the cypress, and the juniper.

Forests of Great Britain and Ireland.—The British isles, like other countries of Europe, were in former times much more abundantly covered with timber than they are at present. The increase of population tends to the destruction of forests by causing a demand for the productions of arable land; and this, together with the prodigal expenditure of wood, when it is abundant, and the general and long-continued neglect of any measures tending to ensure a constant supply, have been the chief causes of the great diminution of wood. But though we have now hardly any forests of considerable extent, there are perhaps few countries over which timber is more equably distributed, that is, in those counties where the soil and aspect are favourable to its growth. Woods of small extent, coppices, clumps, and clusters of trees are very generally distributed over the face of the country, which, together with the timber scattered in the hedge-rows, constitute a mass of wood of no inconsiderable importance.

In Herefordshire, Warwickshire, Northamptonshire, and Staffordshire is abundance of fine oak and elm woods. In Buckinghamshire there is a quantity of birch and oak, and also fine beech. Sussex, once celebrated for the extent and quality of its oak forests, has yet some good timber: at present its woodlands, including coppice-wood, occupy 175,000 acres. Essex, with 50,000 acres of woodland, has some elms and oaks. Surrey, Hertfordshire, and Derbyshire abound in coppice-woods. In Worcestershire is abundance of oak and elm. In Oxfordshire there are the forests of Whichwood and Stokenchurch, chiefly of beech, with some oak, ash, birch, and aspen. Berkshire contains a part of Windsor forest; and Gloucestershire, the Forest of Dean; so that these three last counties are extensively wooded and with noble trees. Cheshire has few woods of any extent, but the hedge-row timber and coppices are in such abundance as to give the whole country, especially when seen from an elevation, the appearance of a vast forest. Of the remaining counties some have very little wood, and a few are altogether without; but the want and value of timber have given rise to a great many flourishing plantations. In Wales particularly, there is a rage for planting. In South Wales alone six millions of trees, it is said, are annually planted: if that is the case, nine-tenths of the number must come to nothing, or the whole country would be one entire forest.

Scotland has few forests of large timber, if we except the woods of Inverness-shire and Aberdeenshire. In the former of these counties the natural pine-woods exceed the quantity of this wood growing naturally in all the rest of Britain. In Strathspey alone there are 15,000 acres of natural firs; and in other parts the woods are reckoned by miles, not by acres; there are also oak woods and extensive tracts of birch. In Aberdeenshire, in the higher divisions of Mar, there are 100 square miles of wood and plantations. The pines of Braemar are magnificent in size, and are of the finest quality. Argyleshire, Dumbartonshire, and Stirlingshire have many thousands of acres of coppice-wood, and, with a very few exceptions, the remaining counties have many, and some very extensive plantations.

Ireland has every appearance of having been once covered with wood, but at the present day timber is exceedingly scarce in that country, there being no woods, if we except a portion along the sea-coast of Wicklow, the borders of the lake Gilly, in Sligo, some remains of an antient forest in Galway, and some small woods round Lough Lene, in the county of Kerry. The lakes of Westmeath have also some wooded islands. There are extensive plantations in Waterford, and a few natural woods, of small extent, in Cavan and Down; but Fermanagh is the best wooded part of Ireland. The want of wood however in this country, as far as it is employed for fuel, is little felt, in consequence of its extensive bogs, which furnish an almost inexhaustible quantity of peat.

Upon the whole then, though Great Britain and Ireland do not now possess any extensive forests, still there is a considerable quantity of timber, and the extent of new plantations seems to promise that we shall never be wholly destitute of so essential an article as wood. According to M'Culloch, there is annually cut down in Great Britain and Ireland timber to the amount of 2,000,000*l.*

If from our own country we pass over to the continent of Europe, we shall find forests of much greater extent, particularly in the north-east.

Norway.—In the southern part of this country the mountains are covered with wood; birch, maple, pine, and fir, forming immense forests; the fir, sometimes attaining a height of 160 feet, is in great estimation for masts and building timber: in the regions of moderate elevation are aspens. The good lands have some fine forests of oak, which extend as far as Drontheim, in 63° north latitude. The forests of *Sweden* are similar to those of Norway. In the damp places there grows in abundance the almond-leaved willow (*Salix amygdalina*).

Denmark.—Of this country it may be remarked that Jutland, once covered with thick forests, has now only a few long slips on its eastern side. Holstein has very little wood. The island of Funen has some small woods, as also Sealand, in that part of it which borders on the Sound. Falster is well wooded, and Bornholm has a good deal of birch. In all, Denmark possesses about 130 square leagues of wood, chiefly birch; there is also ash, alder, and oak, but pine and fir are scarce.

Holland possesses timber, though not in very great quantity generally speaking; what there is, consists of beech, fir, poplar, and ash; willow grows along the canals, and the coppices are of maple, ash, hornbeam, birch, and beech, with a slight portion of oak-bushes. In Guelderland there are plantations of many miles in extent of fir and Weymouth pines, and many hundred acres have been sown with acorns. At Rhenen there are thick woods, as also at Arnhem; and many plantations have been formed on the upper Yssel of fir, pine, oak, beech, and birch.

Germany is so well wooded that the forests are estimated to cover about one-third of the whole surface, though some consider this estimate too large. In *Hanover* are some fine groves, and a quantity of limes and willows planted in rows. This kingdom also includes about three-fifths of the Harz forest. In *Westphalia* there are very extensive forests, one in particular, in the neighbourhood of Osnabrück, is about thirty-two miles long and twenty broad. These woods, in which there is abundance of the finest oak timber, are stocked with swine, and furnish the hams so generally esteemed over all Europe. In *Brunswick* the woods and plantations cover a surface of near 300,000 acres. *Saxony* is also abundantly supplied with forests and plantations. *Hesse Cassel* has about a million of acres of wood, and the Rhenish provinces are amply furnished with it. *Prussia* possesses about 18 millions of acres of woodland. Near Kunnersdorff is a wood 20 miles in length. The banks of the Oder are well furnished with fine oaks, as also pines, birches, and willows, of extraordinary dimensions; elms do not thrive. In several places the roads for miles are bordered with poplars, and there is abundance of flourishing plantations. *Bohemia* possesses forests of all the trees common in Germany; they are regularly cut, and furnish upwards of 270 millions of cubical feet of wood, of which, as it greatly exceeds the consumption of the country, a considerable part is exported. *Bavaria* grows a quantity of fine oak and beech timber: the principal forests are those of Spessart, the Rhön-Gebirge, Zwieslar, Mitten, Kulwald, Retzler, Lorentz, &c.: they cover together a surface of upwards of seven millions of acres, being about 29 hundredths of the whole superficies of the country, or nine acres to each family. In *Würtemberg* the forests occupy about one-third of the whole surface. *Baden* counts about two millions of acres of forests, consisting of oak and pine. In the *Archduchy of Austria*, though there are many forests, they have been so long neglected, that wood is comparatively scarce and dear. The *Hungarian states* have, towards the north and west, as also in Transylvania, some very extensive forests; that of Bakony, the most considerable in the country, is full of the finest oaks. The plains are in general bare of wood, but the Carpathians are covered with the dwarf pine (*Pinus pumilio*). The whole country contains about 12 millions of acres of forest. The *Tyrol* abounds in timber, of which a quantity is exported to Venice.

Switzerland is abundantly wooded, particularly with the cone-bearing trees. Oaks are found occupying a region which rises to the height of 2800 feet above the sea, beyond which, and to the height of 4000 feet, there are beech woods; the firs are found at the height of 5500 feet.

France has many fine forests, though hardly sufficient for the consumption of a country where wood is the chief combustible, and where the state of the arts and general civilization create a constant demand for large timber and wood of every kind. The variety of climate and position in that country are however favourable to the growth of all kinds of European and many exotic trees; the oak, the birch, the elm, the ash, and the beech, are abundant; the alder grows in the damp places, and the mountains are clothed with pines and fir. The woods are pretty generally distributed over the country; and of the 86 departments into which the country is divided, there are 24, in each of which there are from one to two hundred thousand acres of wood, a dozen more containing each from two to three hundred thousand acres, six having from three to four hundred thousand acres, and three which reckon each above four hundred thousand acres. The department of Dordogne alone contains upwards of a million acres of wood. In all France there is reckoned about 21 millions of acres of woods and forests; of which about one-seventh, consisting of 1473 different forests, belong to the state.

Italy, the geographical position and local peculiarities of which are favourable in a high degree to vegetation of every kind, is not particularly rich in forest trees. There is at Ravena an extensive forest of the stone pine (*Pinus pinea*). The Apennines also have their portion of coniferous trees, and are in some places covered to the top with luxuriant forests of chestnut-trees. The fertile basin of the Po abounds in plantations of olive, mulberry, fig, and almond-trees, while the pyramidal poplar forms a contrast by its tapering form with the flattened and branchy head of the stone pine, and the same may be said of other parts of Italy. In *Sicily* the forests have long since been exhausted, and wood is extremely rare in that island. But in *Sardinia* one-fifth of the surface is covered with antient forests of oak, among which is the cork oak (*Quercus suber*), the common oak (*Q. robur*), and the evergreen oak (*Q ilex*).

Spain and Portugal are deficient in wood, both as regards quantity and quality. The peninsula however is not unfavourable to the growth of timber; in the time of the Moors, the southern provinces in particular possessed some noble forests, but they have long since been devastated; and although since the time of Philip II. there exists an excellent code of forest laws, they are altogether disregarded or evaded. Nevertheless there are still some forests in Spain; thus between the two Bagnères, in the Spanish valley of Aran, and on both sides of the western Pyrenees, there are forests of the silver fir; and on the south side of those mountains, east of Benasque, as also near Mont Perdu, and on the hills surrounding the republic of Andorra, are woods of the *Pinus uncinata;* and in the neighbourhood of Campo, in Upper Aragon, are forests of the *Pinus pyrenaica*, or, according to some, the *P. Larichio*, or Corsican pine. On the Sierra de Cuença, the Sierra de Segura, the Sierra Nevada, and the Serrania de Ronda, are some tracts of different kinds of pine, as the *P. Hispanica*, or Spanish pine, and the Aleppo pine (*P. halepensis*). The Aleppo pine grows in considerable quantities in Catalonia, and in the western part of Andalusia is a forest of the stone pine. The principal forest of Spain however is that of St. Ildefonso, which is chiefly of the Scotch pine (*P. sylvestris*). In the maritime part of the Basque provinces there is nothing but the miserable *pin des landes*. In Biscay beech only is cultivated; but in Galicia and in Catalonia there are both oak and beech. In Estremadura there are forests of the evergreen oak, which produce the sweet or edible acorn; Catalonia, Valencia, and the environs of Seville, produce the cork tree (*Q. suber*). This tree, which was formerly abundant in Andalusia, is proceeding rapidly to extinction. Many parts however of the Castiles, Aragon, Andalusia, and Estremadura, are without wood; and although the common oak is found in small quantity in the northern provinces, upon the whole there is a great deficiency of useful wood: all the middle and southern regions hardly produce one good kind of timber.

European Turkey.—Of this country it is observable that, on the northern side of the Balkan, in the basin of the Danube, there are fine forests of oak, elm, and pine, and in Wallachia there are whole forests of fruit trees, particularly plum, apple, pear, cherry, and apricot. On the southern side of the chain the forests are particularly varied. Different kinds of pine and fir, oak, maple, sycamore, walnut, chestnut, and beech, are found in succession on the several terraces, while on the mountains themselves forests of oak, elm, and lime, abound. The Morea produces the cork tree, the Kermes oak, the Vallona oak, of which the acorns are eaten, the plane, the wild olive, the sweet chestnut, the manna ash, pine, firs, and the larch, the barren date tree, the silk tree, &c., and a variety of plants used in the arts, and in pharmacy.

Russia.—Of all the countries of Europe, Russia is the most abundantly provided with timber; and her forests would be an almost inexhaustible source of wealth, if it were possible for the government effectually to protect them from destruction. In 1802 regulations for the preservation of the forests were established, but such is their extent and that of the country, that it is next to impossible wholly to prevent the waste of wood.

Hermann's Statistical Notice of the Agriculture of Russia, published in the 8th vol. of the 'Memoirs of the Academy of Sciences of St. Petersburg,' and quoted in Mr. Schnitzler's late work, states, 'there are still 200,000,000 of acres exclusively covered with pine and other cone-bearing trees, without counting oaks, maples, beech, poplar, and hornbeam, (none of which are scarce below the latitude of 52°) and birch, which grows further north.' In the year 1804 it was estimated that there existed 8,192,295 pine trees fit for masts, being 30 inches in diameter; and 374,804 oak trees, of 24 inches and upwards in diameter; about 87,000,000 more pines were proper for building timber. Enormous as this may appear, the statement, so far from being exaggerated, would seem to be considerably below the truth, it being certain that in the three northern governments alone of Wologda, Archangel, and Olonetz, there are 216,000,000 of acres of forest trees, chiefly pine and fir. Birch, pines, fir, and limes, are the common forest trees of European Russia. The first is the most abundant as far as the 55th parallel, beyond which there are still found vast forests of pine and fir. The governments of Novgorod and Twer are covered with wood; the Volkonsky forest is the largest in Europe. In the government of Perm, of a surface of 50,000,000 of acres, 47,000,000 are covered with forests. Many of these immense tracts of wood are impenetrable, and harbour great quantities of bears, wolves, and other savage beasts, while others abound in deer and game of all kinds. In Esthonia, Livonia, and Courland, there are fine forests of pine, fir, and birch, the latter predominating in the moist places; alder, ash, elm, and plane, are found in the good soils, but oak is in general scarce. In Courland lime is abundant, but beech is rare; there are willows of several varieties. In general it may be observed that, in Russia, the pine, fir, and other coniferous trees, are found as far north as 57°; birch, aspen, and extensive forests of lime, as far as 54° or 55°; oak, rare in the central plateau, prospers towards 51° or 52°, but in the valley of the Volga they are fine and abundant at 55°. In the same region where the oak succeeds the Russian maple (*Acer tartaricum*) is in abundance, as also white poplar and hornbeam. In the central provinces beech hardly reaches Smolensk, and does not pass beyond Little Russia. In some parts of the Ukraine are fine oak forests. In Lithuania the timber is generally fir, intermixed with pine and birch, and occasionally oak. The woods of the latter province harbour bears, elks, &c., and in the celebrated forest of Bielovieje is found the bison, a species of *Urus*.

Poland, generally speaking, is covered with magnificent forests; in Mazovia particularly there are some very fine woods. The different varieties of the pine are found in the sandy places, and on the mountains are fir and beech. Oak succeeds well in good soil. In addition to these trees Poland also possesses larch, lime, elm, and ash. In the Buckowine are forests of beech, intermixed with fir and birch woods.

It appears then, that although the progress of civilization and increase of population have greatly diminished the forests which at one time covered great part of Europe, there is still an immense quantity of wood, and the necessity of keeping up a constant supply being now very generally acknowledged, there is reason to hope that the forests will no longer be abandoned to wanton destruction, but that, on the contrary, the felling of timber and cutting of copse woods will be properly regulated, and fresh plantations made to replace the wood consumed.

We will now take a hasty glance over other parts of the world.

Asia.—In the Caucasus we find that on the western, eastern, and southern slopes of this chain, there are forests of cedar, cypress, juniper, beech, and oak, and on the edges of these, quinces, wild apple, and pear trees, while the warm and sheltered valleys produce the almond, the peach, and the fig. On the borders of the Caspian there are woods of olive, plane, and laurel.

In *Asia Minor*, Mount Taurus is covered with forests of cypress, juniper, and savines. The gall-nut oak grows from the Bosporus to Syria, and the Persian frontier: oaks and fir abound in the forests along the Black Sea. There are also in different parts woods composed exclusively of fruit trees. Syria, to a vegetation greatly similar, adds the sycamore and palm trees.

Arabia has no forests, properly speaking. The Oases, however, contain groves of date palms, tamarinds, and different fruit trees. In Hejaz the date palm is abundant.

Persia.—In Mekran there are forests of the Indian palm intermixed with the odoriferous shrubs of Arabia Felix. In the valley of Shiraz we find only clumps of plane trees, weeping willows, and poplars; but the mountains which border the Caspian are covered with oak, lime, acacia, and chestnut, and higher up cedar, cypress, and other pines, with the sumach and the mountain-ash. Ghilan abounds in boxwood, and on the south-east of the Caspian there is great abundance of oak, but no pine.

Siberia is too cold for the oak, the hazle, the alder, the plane, and the wild apple; even the ash ceases towards the Irtish; and the fir, which in Norway grows as far as 70°, stops in Siberia at 60°, while the silver fir goes no further than 58°. The great steppes of this country are nevertheless bounded by thick forests of birch, willow, elm, Tartarian maple, black and white poplar, aspen, and a great variety of firs, among others the Siberian cedar, which sometimes attains a height of 120 feet, and is particularly fine on the banks of the Yenesei. The country between this river and the Baikal is well wooded. At Tobolsk are fine woods of birch, and of the pitch pine. Berezoff has also forests of birch and fir, with stunted Siberian cedar. In the government of Tomsk there are forests of elm, larch, willow, and birch; and between the Obi and the Tom, the land is covered with birch. To the west of Irkutsk the country is nothing but one vast dense and swampy forest. At Nertchinsk, in Russian Da-uria, forests abound formed of larch, black and white fir, Siberian cedar, and black birch, which latter is found only here. There are also whole forests of wild apricot and rhododendrons. At Ockhotsk there are immense tracts of swampy forests, and Kamtchatka, the eastern limit of the Old World, abounds in larch, white poplar, and birch. The willow and the alder are employed only for fuel. On the whole, Siberia, notwithstanding its immense steppes and marshy plains, still reckons upwards of 2,000,000 of acres of forest in the two neighbourhoods alone of Ekaterinbourg and Tobolsk.

Central Asia is too little known for us to speak with any certainty regarding the forests it may contain. The greater part of the vast plateau of Tartary is a sandy and desert region, except at the immediate borders of the water courses; what forests do exist are on the slopes of the mountains by which the plains and valleys are surrounded. In the province of Leao Tong, in Mandshuria, there are some extensive forests of fir, cypress, acacia, willow, apricot, peach, and mulberry, and on the east coast the mountains are covered with oak and pine, while towards the lower lands the willow, the maple, and the azalea are abundant.

Corea has immense forests in the mountains of its northern parts. The islands of *Sagaleen Jesso*, and *the Kuriles* have large forests of the finest timber.

The *Empire of Japan* has a vigorous vegetation, partaking of the European and South Asiatic; larch, cypress, and weeping-willow, which, by the way, is found in all the temperate countries between the Mediterranean and this empire, are here blended with the cocoa-nut, the fanpalm, and arborescent mimosas.

China.—On the mountains of the western district of this great and populous empire there are forests of immense extent, abounding in almost every species of tree known in Europe, and many others unknown. These forests, besides timber and fuel, supply many valuable productions, such as barks, gums, oils, and resins used in the arts; rose-wood, ebony, sandal-wood, and the valuable Chinese aloe;

the camphor-tree, which furnishes the best and most beautiful timber, the paper and other mulberries, the tallow-tree, the bamboo, &c. The provinces of Kiang-si and Quang-si have also their mountains covered with forests, and in the latter province there is cinnamon superior to that of Ceylon.

The islands of *Formosa* and *Hainan* are abundantly wooded, producing, besides timber, several woods remarkable for their perfume, and others of great value for carving, as eagle-wood, violet-wood, and a yellow wood of remarkable beauty, said to be incorruptible. Returning to the continent of Asia, we find

Tibet, having the bases of its mountains girded with forests of bamboo, aspen, birch, cypress, and yew, and ash of remarkable beauty; pine and fir are low and stunted.

Cashmere has abundance of oak.

India, both within and beyond the Ganges, is rich in wood. There are whole forests of the bamboo, which sometimes attain a height of 60 feet. Cocoa-nut and palms of all kinds cover large tracts. Here are woods of oak, fir, cypress, and poplar; there of mangoes, banian-trees, uvarias, robinias, sandal-wood, &c. Guzerat, Oudepour, the kingdom of Asam, Bengal, along the coast particularly, the mountains of Tipra, and Malabar abound in wood: the latter produces teak. In the Birman empire there are magnificent forests of the last-named valuable tree, together with white sandal-wood, eagle-wood, iron-wood, ebony, sycamore, Indian fig, fanpalms, bignonias, cocoas, and sago-palms; as also fine groves of orange, lime, &c.

The kingdom of Laos, Tonquin, Cambodia, Siam, and the peninsula of Malacca, have a nearly similar vegetation.

Ceylon is also well wooded with Asiatic trees and shrubs: among the former are the ebony and satin-wood, and of the latter the cinnamon is the most remarkable.

Of *Oceanica* it is sufficient to say, that all the islands are more or less abundantly covered with timber; many produce trees of immense size, and of the finest wood, while others furnish the most valuable gums, drugs, and spices.

Australia, as far as known, is not thickly wooded; it produces mahogany, but the forest-timber of this island is said to be brittle, and generally of bad quality.

Borneo is remarkable for the growth and quality of its timber, and the great perfection to which the camphor-tree attains.

Africa. With the exception of the wide-spread deserts and sandy tracts of this part of the world, and in spite of the burning heat of a vertical sun, there are spots which, by reason of their elevation or their proximity to the sea, enjoy a more temperate climate and abundance of moisture: in these places vegetation is rich beyond description. Thus Senegambia, Guinea, and Congo are covered with forests, which consist of the baobab (of which there are different kinds, though only one seems to have been described), of palms, robinias, sycamores, sandal-wood, red and grey, and tamarinds, intermixed with bananas, oranges, limes, and pomegranates; there are also cocoa-nut trees in great abundance. The tamarind and cedar, which grow in the greatest profusion on the borders of the Congo, furnish timber of the finest quality. *Abyssinia* has abundant woods, in which grow the smooth-leaved coral-tree (*Erythrina corallodendron*), the tamarind, the date, some mimosas, and a large timber tree, which Bruce calls *ruk;* but the botany of this country is little known. On the coast of Adel there are odoriferous forests, producing the balm of Judæa, myrrh, &c. *Egypt*, though abounding in plantations of fruit-trees and dates, has no forests. The Atlas mountains, on the contrary, are covered with magnificent forests, equal to the finest in Italy, and producing a variety of oaks, the mastic tree, the cypress, &c. In the interior of the Atlas, the environs of Borgou are said to be covered with trees, among which are several kinds of sycamore, palms, and the *mimosa nilotica*. The kingdom of Bornou has immense forests, and the date-palm abounds here. *The Cape*, celebrated for the beauty of its vegetation, was generally thought to be deficient in forest-timber, but it has been discovered that, to the eastward, there are forests of the finest oak of the Albanian kind, celebrated for its quality and durability. These forests also produce iron-wood, the sago-palm, &c.; as yet however they have been but imperfectly examined. Of the African islands, *Madagascar* is rich in timber, and a variety of woods useful in the arts; the same may be said of the islands on the west coast, they are generally well wooded.

America is, of all parts of the world, the most thickly covered with wood. Beginning with the north, we find the Russian territory on the north-west coast abundantly stocked with fine timber: pines 300 feet high and 45 feet in circumference, Canadian poplar, alders 40 feet high below the branches, birch, yew, black and common oak, American ash, sycamore, sugar maple, cypresses 24 feet in circumference, and willows. The islands on this coast have also magnificent forests of pine and other lofty trees.

In *New Britain* the forests are extensive, but they present little variety, and in some parts, to the northward particularly, the larches and birches are stunted in their growth. The environs of Lake Winnipeg are covered with the trees common to Canada.

In *Greenland* there are only a few stunted willows and birches; and

Labrador has merely some pines and pinasters in the valleys.

Canada contains immense forests, though the trees are neither so large nor of such vigorous growth as in the United States. Pines and evergreens are the most abundant, after which come the red and the sugar maple, the birch, the lime, the American elm, and iron-wood, the yew, the common and the mountain-ash; also a great variety of oaks, different from the European species, which does not thrive here.

New Brunswick has large forests of fine timber, particularly pine, which it exports.

Nova Scotia produces good oak, but the principal wood is pine, fir, and birch.

The island of *Cape Breton* furnishes immense oaks and magnificent masts. *Newfoundland*, and the other islands at the mouth of the St. Lawrence, also produce timber fit for naval and other constructions.

The *United States* are abundantly wooded, the cleared land even in some of the Atlantic states being inconsiderable when compared with that still covered with the primitive forests, which contain an immense variety of trees. There are about forty different kinds of oak, fourteen of pine, besides cedar, cypress, and larch; several maples, among which is that from which sugar is obtained, birch, ash, beech, iron-wood, hornbeam, hickory, wild-cherry, and apple, mulberry, poplar, willow, magnolias, elm, chestnut, &c. Of all the states, Ohio perhaps contains the finest forest trees. The woods of Florida present a mixed vegetation, exhibiting the productions of both the north and the south. Thus there is red and white pine, evergreen oaks, chestnut, mahogany, walnut, cherry, maple, logwood, Brazil-wood, and sassafras. There are also in Florida whole forests of red and white mulberry, the finest in America. All European fruits also grow here, and the oranges are finer than in Portugal.

In *Mexico* or *New Spain* there are abundant forests, differing in character according to their position on the heights or in the plains. In the Texas there are great plains covered with palms, while the heights are clothed with the timber-trees of Louisiana. The mountains in the neighbourhood of Guanaxuata and Valladolid are covered with forests, and the Intendance of Mexico abounds in cedar and other large trees.

Yucatan is famous for its logwood and mahogany; the latter is also produced in great abundance round the Bay of Honduras.

Nicaragua has groves of palms which attain an immense magnitude; and in Costa Rica and Varaguay there is fine forest timber.

The *West India Islands* generally abound in wood, though there are exceptions.

In *South America* the Caracas possesses inexhaustible forests, which, besides the finest timber, produce also a great variety of beautiful woods for cabinet-work, dye-woods, drugs used in the arts, and medicinal plants, as the sarsaparilla, bark, &c.

In *New Grenada* the plateau of Bogota, Popayan, and Pasto have fine forests. The neighbourhood of Guayaquil, besides the common timber of the country, possesses a wood remarkable for strength and solidity, which is said to be incorruptible, and to resist worms better than any other; qualities which render it invaluable for the keels and ribs of vessels

Peru is rich in forests, which furnish timber, gums, resins, dye and cabinet-woods, all of the finest quality.

Chile possesses forests of gigantic trees, many of incorruptible wood, and others useful for their gums, resins, &c.

Pines and cedars are abundant. The whole chain of the Andes abounds in wood, varying in kind according to height, latitude, and aspect. The vigour of the vegetation in some parts is inconceivable: thus in Chile trees have been found so large, that an entire church, 60 feet long, with all its wooden appurtenances of doors, windows, &c., has been built of a single tree. The same country produces apples as large as the head, and peaches weighing 16 ounces.

The *Magellanic lands*, on the west or mountainous part, contain forests.

Paraguay is rich in wood, on the borders of the upper Uruguay; and, among other trees, produces in abundance that from which the resin termed dragon's-blood is obtained.

Brazil contains extensive forests, which cover immense tracts, and are composed of palms, Brazilian cocoa, loftier than the Indian, together with an endless variety of other trees peculiar to the country: some of these are of extraordinary size. The Brazilian pine furnishes very fine masts: this country exports a large quantity of timber, and supplies all the Portuguese shipping. At Bahia ship-building is carried on to a great extent. Brazil also produces the dye-wood which bears its name.

Guiana has extensive forests in its higher parts, but the wood of many of the trees is so soft as to be only good to burn, and that of others is too hard to be worked. It produces many dye-woods.

The forest region of the river Amazon and of the upper Orinoco, according to Humboldt, covers an area of about 719,000 square miles.

From the above rapid sketch of the forest lands of the globe it appears that they still cover a great portion of its surface, nor can it be doubted that the immense tracts of wood we have enumerated exercise a very powerful influence on the physical economy of the earth. This influence is both direct and indirect. The direct influence of forests is the diminution of temperature, effected, according to Humboldt:—'1. By screening the soil from the heat of the sun's direct rays; 2. By the powerful evaporation of moisture from the leaves; and 3. By the immense surface which these same leaves offer to the cooling process of radiation.' This however seems only a partial view of the subject, and it is considered more fully under another head.

The indirect influence is the preservation of that due circulation of moisture by which the fertilizing rivers of the earth's surface are furnished with a perennial supply of water. Such indeed is the importance of forests in this respect, that if it were possible to annihilate at once all the forests that now exist, the earth would no longer be habitable. The rains which fell in the mountains, no longer arrested by the trunks and roots of the trees, would not have time to percolate through the soil and fissures of the rocks to supply the reservoirs of springs, but would pour down in devastating torrents, leaving the water-courses dry as soon as the rain had ceased. This, in a limited degree, has been already experienced in places where the heights have been partially denuded of their forests; and its effect on the rivers in some parts of the United States where the portion of cleared land is considerable, is distinctly observed. Nor would this be all: lakes, for want of supply, would soon be dried up, and as no waters but those of the ocean would then exist, the atmosphere would be deficient in moisture; no vegetation could exist, and the animal world would perish of thirst, hunger, and heat. Forests then, are of primary importance in the economy of the globe, independent of their utility in a thousand arts which are necessary now to our comfort. This consideration has at length awakened governments to the necessity of protecting forests from wanton spoliation by codes enacted for the purpose, and of forming schools in which all that is necessary to be known for the management of forests, so as to maintain a constant supply of timber and fuel, shall be regularly taught. [FOREST SCIENCE.]

FOREST LAWS. In this country even in the time of the Saxons the crown lands consisted in part of forests, or tracts more or less covered with wood, and tenanted by animals of chase, in which the king was accustomed to take the diversion of hunting, and from hunting in which all other persons were prohibited. This distinctly appears from the laws of Canute. But the prohibition against hunting in the royal forests was merely a protection thrown around the property of the crown of the same kind with that afforded to all other landed estates, in regard to which, universall the law was, that every proprietor might hunt in his own woods or fields, but that no other person might do so without his leave. On the establishment, however, of the Norman government it has generally been supposed that the property of all the animals of chase throughout the kingdom was held to be vested in the crown, and no person without the express licence of the crown was allowed to hunt even upon his own estate. But this after all is rather a conjecture deduced from the supposed principles of feudalism, than a well-established fact. There are no laws respecting the forests among the laws attributed to the Conqueror; and perhaps all that we are absolutely entitled to affirm from the evidence we possess on the subject is, that after the Norman conquest the royal forests were guarded with much greater strictness than before; that their number was extended and possibly in some cases their bounds enlarged; that trespasses upon them were punished with much greater severity; and, finally, that there was established a new system of laws and of courts for their administration, by and according to which not only all offences touching the royal forests were tried, but also all persons living upon these properties were generally governed. This is the system or code that is properly called the forest laws. Yet even of this in its original integrity we have no complete or authoritative record: all our knowledge of it is derived from some incidental notices of the chroniclers; the vague though energetic language of complaint and condemnation in which it is repeatedly spoken of; the various legislative enactments for its reform which have been preserved; and the remnants of it which survived to a comparatively recent period.

The Conqueror is said to have possessed in different parts of England 68 forests, 13 chases, and 781 parks. In the language of the law, forests and chases differ from parks in not being inclosed by walls or palings, but only encompassed by metes and bounds; and a chase differs from a forest, both in being of much smaller extent (so that there are some chases within forests) and in being capable of being held by a subject, whereas a forest can only be in the hands of the crown. But the material distinction is, or rather was, that forests alone were subject to the forest laws so long as they subsisted. Every forest however was also a chase. A forest is defined by Manwood, the great authority on the forest laws, as being 'a certain territory or circuit of woody grounds and pastures, known in its bounds, and privileged, for the peaceable being and abiding of wild beasts, and fowls of forest, chase, and warren, to be under the king's protection for his princely delight; replenished with beasts of venery or chase, and great coverts of vert for succour of the said beasts; for preservation whereof there are particular laws, privileges, and officers belonging thereunto.' The beasts of park or chase, according to Coke, are properly the buck, the doe, the fox, the marten, and the roe; but the term in a wider sense comprehends all the beasts of the forest. Beasts of warren are such as hares, conies, and roes; fowls of warren, such as the partridge, quail, rail, pheasant, woodcock, mallard, heron, &c. He afterwards however quotes a decision of the justices and the king's council that roes are not beasts of the forest, because they put to flight other wild beasts (eo quod fugant alias feras), which seems an odd reason; perhaps the word should be 'fugiunt' (because they fly from other wild beasts). And he adds, 'beasts of forests be properly hart, hind, buck, hare, boar, and wolf; but legally all wild beasts of venery.' (*Co. Litt.* sec. 387.)

For the antiquity of the royal forests in England, 'the best and surest argument,' says Coke, elsewhere (4 *Inst.*, 319), 'is, that the forests in England, being sixty-nine in number, except the New Forest, in Hampshire, erected by William the Conqueror, and Hampton Court Forest, by Henry VIII., and by authority of parliament, are so antient, as no record or history doth make any mention of their history or beginning.' Yet it appears, both from the great charter of John, and from a previous charter granted by Stephen, that some lands had been afforested (as the term was) after the time of the two first Norman kings. 'The forests,' says Stephen, 'which King William my grandfather, and William II. my uncle, made and held, I reserve to myself; all the others which King Henry superadded I render up and concede in quiet to the churches and the kingdom.' And one of the concessions demanded from John and granted in Magna Charta (§ 47) was, that all the lands which had been afforested in his time should be immediately deafforested. No additional forests appear to ave been made from the reign of John till that of Hampton Court was constituted by act of parliament in 1539 (31 Hen. VIII. c. 5). The name given to it in the statute is Hampton Court Chase; but it is enacted that all offenders n it shall incur such penalties as the like offenders do in ny other forest or chase. It was therefore made a forest s well as a chase.

Many historians tell us that King John granted a harter of forests at the same time with Magna Charta. This is indeed distinctly asserted by Matthew Paris, who ven professes to give the charter at full length. But the tatement is entirely unfounded; the concessions obtained from John in regard to the royal forests are, as mentioned bove, contained in the Great Charter: the Carta de Foresta, which M. Paris quotes, is a charter granted by Henry III. in the 9th year of his reign (A.D. 1224). This was the first separate charter of forests. It is commonly printed in the statutes from the Inspeximus, or confirmation of it, in the 28th of Edward I. (A.D. 1299). The subsequent legislation upon this subject is principally to be found in the following statutes:—The Customs and Assize of the Forest, or the Articles of Attachments of the Forests (of which the date is not known); the Ordinatio Forestæ of the 33 Edw. I. (1305); the Ordinatio Forestæ of the 34 Edw. I. (1306); the 1 Edw. III. c. 8 (1327); and the 7 Ric. II. c. 3 (1383).

One of the chief things insisted upon in the early national demand for the reform of the forest laws, was the mitigation of their severe code of punishments. The Conqueror, who, as the 'Saxon Chronicle' says, loved the red deer as if he had been their father, is affirmed to have visited the slaughter of one of these animals with a heavier penalty than the murder of a human being. And it would appear from the charter of Henry III. that the offence had previously been punishable not only with mutilation, but with death. 'No man from henceforth,' says the 10th clause or chapter of the charter, 'shall lose either life or member for killing of our deer; but if any man be taken and convict for taking of our venison, he shall make a grievous fine, if he have anything whereof; and if he have nothing to lose, he shall be imprisoned a year and a day: and after the year and day expired, if he can find sufficient sureties, he shall be delivered; and if not, he shall abjure the realm of England.' According to Matthew Paris (whose authority however, on such a matter, is not worth much), Richard I. had already repealed the penalties of mutilation for offences against the forest laws.

The forest laws, as already mentioned, were administered by their own officers and courts. The officers were the justices in eyre of the forest [EYRE]; the wardens or warders; the verderers, foresters, agisters, regarders, keepers, bailiffs, beadles, &c. The courts were —. The Court of Woodmote, or of Attachments, sometimes called the Forty Days' Court, held once in every forty days before the verderers; 2. The Court of Swainmote, held three times in the year before the verderers as judges, and with a jury composed of the *swains*, or freeholders within the forest; and 3. The Court of Justice-seat, which was the supreme court, held every third year before the chief justice in eyre of the forest. This was a court of record, and, at least in later times, it was held that a writ of error lay from it to the Court of King's Bench. With the exception however of one said by Roger North in his life of Lord Keeper North to have been held *pro forma* soon after the Restoration, no Court of Justice-seat has been held since 1632. A minute survey of the forest was also taken every third year by its twelve regarders; and it was upon this occasion, and under the inspection of the regarders, that the lawing or expeditation of all the mastifs in the forest took place, which consisted in cutting off the claws and ball (or pelote) of their forefeet, to prevent them from running after the deer.

The four principal forests in England were accounted to be, the New Forest, Sherwood, Dean, and Windsor. Among the others were Epping, in Essex; Dartmoor, in Devonshire; Wichwood, in Oxfordshire; Salcey, Whittlebury, and Rockingham, in Northamptonshire; Waltham, in Lincolnshire; Richmond, in Yorkshire, &c.

The vexatious and oppressive powers vested in the crown by the forest laws, after having to a great extent long ceased to be exercised, were revived by Charles I., and endeavoured to be turned to account in replenishing his empty exchequer. At the Court of Justice-seat, held in 1632, before the earl of Holland as chief justice in eyre south of the Trent, large sums of money were extorted from many persons, chiefly as compositions for alleged encroachments on the antient boundaries of the forests, although after a quiet possession of three or four centuries. This accordingly was one of the grievances to which the Long Parliament directed its earliest attention. One of the Acts which that assembly passed in its first session (the 16 Char. I. c. 16), was entitled 'An Act for the Certainty of Forests, and of the Meets, Meers, Limits, and Bounds of the Forests,' which set forth in the preamble, that not only judgments had of late been given by which the bounds of some of the forests had been variously extended, or pretended to extend, beyond the bounds commonly known, and formerly observed, to the great grievance and vexation of many persons having lands adjoining; but there had also been some endeavours or pretences 'to set on foot forests in some parts of this realm and the dominion of Wales, where, in truth, none have been or ought to be, or, at least, have not been used of long time.' It is therefore enacted that the bounds of every forest shall be those commonly known, reputed, used, or taken to be its bounds; and that all judgments, &c., to the contrary shall be void; that no place where no Justice-seat or other forest court had been held within sixty years should be accounted forest; and that commissions should be issued for ascertaining the bounds of forests as they stood in the 20th year of the preceding reign, and beyond which they should not thenceforth be extended. Since the passing of this Act, the old forest laws may be considered as having been practically abolished, and the offices connected with their administration and execution turned into little better than sinecures.

The 11th chapter of the Carta Forestæ of Henry III. contains the following curious provision:—'Whatsoever archbishop, bishop, earl, or baron, coming to us at our commandment, passeth by our forest, it shall be lawful for him to take and kill one or two of our deer, by view of our forester, if he be present; or else he shall cause one to blow an horn for him, that he seem not to steal our deer; and likewise they shall do returning from us as it is aforesaid.' As this law is still unrepealed, any bishop or nobleman may shoot one or two of the deer if he should pass through any of the royal forests in going to or returning from parliament. Hunting, it may be observed, was formerly so common or universal an episcopal amusement, that the crown is still entitled, at the death of every bishop, to have his kennel of hounds, or a composition in lieu thereof. Auckland Park, and certain other demesnes, formerly held of the bishop of Durham by forest services; 'particularly,' says Camden, 'upon his great huntings, the tenants in these parts were bound to set up for him a field-house, or tabernacle, with a chapel, and all manners of rooms and offices; as also to furnish him with dogs and horses, and to carry his provision, and to attend him during his stay for the supply of all conveniences. But now all services of this kind are either let fall by disuse, or changed into pecuniary payments.' [GAME LAWS; WOODS AND FORESTS.]

FOREST SCIENCE, constitutes a separate and distinct branch of education, which originated in Germany from the increased scarcity of wood. The first special instruction of this kind was given by Mr. Zanthier at Ilsenburg, near the Harz forest, and its importance being immediately appreciated, forest academies soon multiplied, particularly in the central parts of the country. Prussia directed particular attention to the subject, and the present king, on coming to the throne, ordered that, 'in future, situations in the forest department should be conferred with a view to the most perfect preservation of the forests; that the nominations should be founded on knowledge and experience, and no longer granted as a recompense for service.' In consequence a new organization took place, and competent instruction in all things appertaining to the management of forests became a necessary qualification for an appointment to any post in the forest department.

In the forest academies are taught botany generally, and particularly as regards the ordinary productions of the forest, including vegetable physiology, mineralogy, zoology chemistry, surveying, mensuration, mechanics, the method, of resisting the encroachments of sands, draining and embanking, together with the care and chase of game; as also the laws and regulations of forest administration. The examination which the candidates undergo is very strict, and the result of the system has been eminently beneficial.

France has also a particular administration of the forests, and a very detailed code of forest laws. Russia, from the immense extent of its forests, is under little apprehension of a scarcity of wood, nevertheless the consumption of this article is so enormous, all the houses of the peasantry being built of it, and no other fuel being used, that it has been deemed advisable to pay some attention to the subject, and a board has been formed under the particular sanction of the government for the better preservation of the forests and more general instruction in forest science.

Louis XIV., by an *ordonnance* of 1669, placed the forests under the direction of a separate branch of the government. Men of science then began to turn their attention to this subject. Du Hamel, du Monceau and Buffon were among the first naturalists who wrote on the management of forest trees.

The consideration of the various trees which may be cultivated to advantage, and the uses to which their woods may be put, with the mode of their propagation in various soils, forms a branch of forest science.

The following is a list of the principal forest trees:—

The oak (Quercus), and its varieties, the beech (Fagus sylvatica), the hornbeam (Carpinus betulus), the birch (Betula alba), the elm (Ulmus), the maple (Acer campestre), the alder (Betula alnus), the ash (Fraxinus excelsior), the lime (Tilia sylvestris), the chestnut (Fagus castanea), the walnut (Juglans regia), the crab (Pyrus malus), the wild cherry (Prunus avium), the mountain service (Sorbus aucuparia), the service (Sorbus domestica), the aspin (Populus tremula), the white poplar (Populus alba), the common poplar (Populus nigra), the Lombardy poplar (Populus fastigiata), the sycamore (Acer pseudo-platanus), the plane (Acer platanoides), the hasel (Corylus sylvestris), the sallow (Salix capræa), the osier (Salix viminalis), the pine (Pinus sylvestris), the silver fir (pinus picea), the larch (Larix Europea). The wood of all those trees is divided into three sorts: hard wood, white wood, resinous wood. The German writers admit only two sorts of trees, the deciduus and evergreen, but this is more a botanical division than one applicable to forest-trees.

The uses to which the wood is applied vary much, according to circumstances and situations. The most profitable is that of timber for buildings, and more particularly for naval architecture. The oak, beech, elm, and fir, are the chief woods employed for this purpose; but the chestnut was at one time considered as equal to the oak, as the roofs and beams of many old buildings testify; Windsor castle among the rest. For millwrights the ash, beech, service tree, walnut, and crab, are most useful. For various utensils for the dairy and domestic use, the sycamore, the lime, and the poplar, are used on account of the whiteness of their wood. Various soft woods are used for turning, as well as the hardest, when they have a close grain and are not apt to split.

When wood cannot be applied to building or domestic uses it is still very valuable as fuel, and in this point of view it is important in those countries where pit coal is not abundant. The best wood for fuel is oak, and next to this beech. The harder the wood, in general, the more heat it gives out in burning. The trunks of large trees, sawn into convenient lengths and then split into billets, make the best fuel; but where wood is scarce it is found most profitable to cut down the trees at the age of 30 or 40 years at most, when they have acquired a considerable height of stem but no great girth. In the woods which are planted for this purpose in France and Germany the trees are drawn up by being left close together, and the side branches are kept cut to the height of 30 or 40 feet, so that they only spread out at top, and the trunk never acquires the size which it would if the tree stood singly, and had room to spread out its branches.

In order to judge of the value of woods in different soils the following table may be useful. It is calculated on the supposition that the ground is covered with trees as much as it will bear.

The cord here alluded to is 5 feet 6 inches in height, 8 feet long and 3 feet 6 inches wide, French measure, that is very nearly 6 feet high, 8 feet 8 inches long, and 3 feet 10 inches wide, or 200 cubic feet English measure.

In the following table the tops made into charcoal and the faggots are reduced to cords in the proportion of four and a half cords of charcoal-wood and 550 faggots for one cord of fire-wood.

Produce of Fire-wood per acre, at different ages, in cords

Age of Trees. Years.	On Poor Soils.	Middling Soils.	Good Soils.
10	2	3½	4½
15	2¼	5¼	9
20	3¾	9¼	15
25	5¼	13¼	21
30	6¾	16¾	27
35	7	21	35
40	7	24½	42
50	6	31	56
60	5	37½	70
70	3	41⅓	80
80	2	46	90
90	1	48½	96
100	.	51	102
120	.	57	114
140	.	62	124
150	.	64	128
200	.	67	135
250	.	60	120
300	.	55	110

This table is the result of careful measurement of wood cut down at different ages; and it shows that the maximum in poor soils is attained in thirty-five years, in middling and good soils at 200. But it also shows that the increase o wood per cent. in ten years is greatest from twenty to thirty in poor soils, from forty to fifty in middling soils, and from seventy to eighty in good soils: so that it never can be profitable to allow any wood which is to be used for fuel t stand above eighty years.

In good soil at thirty-five years growth the wood in the tree has increased one cord per acre each year; and the rate of growth increases till the ninetieth year, after which it begins to diminish. But it must also be taken into the account that wood of the age of seventy, eighty, and ninety years is of far greater specific gravity than that of twenty-five or thirty; and consequently the increase in bulk in ten years from eighty to ninety, produces more fuel than the mere measure indicates. On good soils oaks and beech will continue to increase for 200 years; but in poor soils they do no thrive after thirty-five years, and then they begin to waste.

Preparatory to making a plantation of any extent it i necessary to establish a nursery to raise plants; for although trees which are raised from seed and have neve been moved become much larger and finer than those which are transplanted, it will be found on calculation that a quick return is much more profitable; and as a matter o economy trees which have been raised in a nursery an transplanted arrive sooner at a certain growth than those which are sown on the spot where they are to remain.

The ground chosen for a nursery should not have a bette soil than that in which the plants are finally to be placed because, in that case, they would most likely suffer, if no perish altogether. The surface may be enriched by som manure to make the seed vegetate. If it is small, it ma be sown in drills, and the acorns and larger seeds may b dibbled regularly as beans are in a garden. The groun being kept very free from weeds by hoeing, the plant will rise regularly, and they may be thinned out afte the first year; those which are taken out may be transplanted after cutting off the tap root, in another spot in th nursery. When the trees are three or four years old, an have clean and straight stems, the side branches havin been carefully pruned off, they may be transplanted wher they are to remain. The ground should be trenched an well drained if it is wet. It is useful in northern climates t plant hardy evergreens, such as the Scotch fir, amongst fores trees, to serve as shelter to them while they are tende These are called nurses, and are gradually cut out, as th oaks, ash, beech, and other more valuable trees grow up. I the ground is dry it is only necessary to dig a hole eightee inches deep and a yard in diameter, for each tree: thi is to be half filled up with the loose earth taken out the young tree is then to be placed on this surface and its roots spread out, the tap root being cut off. The best earth is then carefully spread over the roots and trod in with the feet, and the whole filled up to the level of the ground. In wet situations the trees are sometimes placed nearly on the surface of the ground, and a small mound of earth is raised round the stem; but it is much better to drain the land properly, without which the plantations will never thrive. The proper distance to plant oaks is ten feet apart each way, with a fir-tree between every two. In five years half of the firs may be cut out, and the oaks pruned where it is necessary. In fifteen years all the firs will be cut out and the oaks will be able to protect one another. In twenty-five years from transplanting, half of the trees may be cut down, and the remainder thinned out gradually as they spread and advance in growth.

In England, where crooked pieces of large oaks are of value in ship-building, the side branches are not taken off higher than fifteen or twenty feet from the ground; and where trees have plenty of room, as in hedge-rows or parks, this may be judicious, but in close plantations it is of advantage to have a long stem without branches; in France and Germany the branches are always cut off to the height of thirty or forty feet. This is done gradually as the tree grows. When the branch is very young it may be cut close to the tree, and the bark will soon cover the wood and obliterate the scar. When they are larger, it is best to shorten them to a few inches from the stem the first year, and cut them close the next: when a branch is cut close in a young tree no portion of it must project beyond the wood of the stem, and if a portion of the bark of the latter is cut to make all smooth it will be no detriment, and the wound will soon heal over provided it is done at the proper time. But if a large branch is cut so that the bark cannot grow over the wound in one year, there is great danger of causing a fault in the wood by the decay of the heart of the branch; in that case it is better to cut it at some distance from the trunk, and to shorten it repeatedly till the branch dies naturally and breaks off. In that case no flaw will be found in the wood. This is the operation of nature in a close wood, which we should endeavour to imitate.

FORESTALLING is an offence at common law against trade: it is described in the statute 5 and 6 Ed. VI. c. 14, to be the buying or contracting for any merchandize or victual coming in the way to market; or dissuading persons from bringing their goods or provisions there, or persuading them to enhance the price when there, any of which practices were supposed to make the market dearer to the fair trader. All the statutes concerning this offence were repealed by the 12 Geo. III. c. 71, and now the general penalty for this as well as other minute misdemeanours is, by the common law, discretionary fine and imprisonment. (4 Bl. *Com.*)

The true principles of trade being now better understood, prosecutions for the offence are unknown; and by stat. 7 and 8 Geo. IV. c. 38, it is enacted that no constable shall be required to make presentments of forestallers at any gaol delivery or quarter sessions. The prohibition seems to have been derived from the Roman law, which imposed a penalty of twenty pieces of gold in such cases. (*Dig.* 48, tit. 12. 2.) [REGRATING; INGROSSING; MONOPOLY.]

FOREZ, a district in France, the largest of the three subdivisions of the province of Lyonois. It was for the most part comprehended in the territory of the Segusiani, and Feur, or Feurs, one of its chief towns, was the Forum Segusianorum of the antients—a town of some importance, and probably a Roman colony. From this town the districts derived the designation of Pagus Forensis, from whence Forez. It was comprehended, in the division under Honorius, in the province of Lugdunensis Prima, and afterwards formed part of the kingdom of the Burgundians, from whose dominion it passed to that of the Franks. It was bounded on the north by Bourgogne, on the north-east by Beaujolois, on the east by Lyonnois Proper, on the south by Velay and Vivarais, on the west by Auvergne, and on the north-west by Bourbonnois. The territory thus defined consists for the most part of a portion of the valley of the Loire, and of the slope of the hills which separate that valley on the east from Lyonois and on the west from Auvergne. It comprehends the coal field (or part of it) of the best quality in France: produces iron and lead, and is the chief seat of the hardware manufacture: St. Etienne, the Birmingham of France, is within its limits. It produces also abundance of fir-timber and excellent turpentine; and corn, wine of good quality, and excellent hemp. It is watered by the Loire and several of its tributaries, and extends in one part across the hills which ordinarily bound it on the east down to the river Rhône.

The district of Forez was subdivided into Haut Forez, capital Feurs; Bas Forez, capital Montbrison (population in 1832, 5040 for the town, 5265 for the whole commune); and Roannois, capital Roanne (population 8890 for the town, 9260 for the whole commune). It is now comprehended almost entirely in the department of Loire a small portion is included in that of Haute Loire.

The other principal towns of the ci-devant Forez, with their population in 1832, are—St. Bonnet Le Château (2079 town, 2169 commune), Bourg Argental (1734 town, 2502 commune), Chazelles sur Lyon (3079 commune), St Etienne (33,004), Firmini (2438 town, 3779 commune), St Galmier (1800 town, 2659 commune), St. Genêt-Malifaux (3274 commune), St. Julien en Jarret (3231 commune), St. Just sur Loire (1525 town, 2500 commune), La Fouillouse (3471 commune), St. Rambert (3015 commune), Val Benoîte (4433 commune), and Bas-en-Basset (5524 commune).

Forez, Beaujolois, and Lyonois constituted in the middle ages a county which was rendered hereditary by Guillaume, one of the officers of Charles Le Chauve. He was about A.D. 890 succeeded in Lyonois and Forez by one of his sons, and by another in Beaujolois, which thenceforward constituted a separate lordship. At a subsequent period these counts seem to have lost first the jurisdiction of the city of Lyon and afterwards of Lyonois, through the increasing power of the archbishop of that city. The county of Forez afterwards came into the hands of the dukes of Bourbon, and was, together with their duchy, united to the crown.

FORFAR, the county-town of Forfarshire, is an antient royal burgh, situated 13 miles north of Dundee, in the great valley of Strathmore. The ruins of a royal palace are still to be seen on the top of a mount. A figure of this castle, cut in stone, forms the heraldic device of the borough. Here Malcolm Canmore held his first parliament in 1057, after recovering his kingdom from the usurpation of Macbeth. The town was burned and plundered by Cromwell's troops, when all its written documents were lost. It is recorded that nine poor women were burned for witches at the end of the seventeenth century, and that in the reign of James VI. the weekly market-day was on Sunday. An iron collar, called the witches' bridle, is still preserved in the town; it was fixed on the head by two iron spikes put into the mouth, and by a long iron chain attached to it the dreaded agent of Satan was led to the flames. The houses are neat and well built, though the streets are irregular, as in every antient town. The church is a very spacious and ornamental edifice. There is also an episcopalian chapel, and a new and elegant town-house serves at once for judicial and other public purposes and a prison. Three endowed public schools are well conducted in commodious rooms. The town being the seat of the county courts, is the residence of many members of the legal profession. The linen manufacture is very extensively carried on. Several hundred looms are employed, and the quantity annually produced of Osnaburghs and various other kinds of linens is about 2,500,000 yards, the value of which exceeds 100,000*l*. Shoes, called brogues, are made in large quantities for exportation. This town is also distinguished for its breweries of porter and beer. Of late years many improvements have been made in the general appearance of the place and its institutions. An excellent botanic garden, first laid out by the celebrated Mr. Don, who resided here, has been replenished with a great variety of indigenous and exotic plants. A nursery too has been formed, containing nine acres planted with all kinds of fruit and forest trees. The inland situation, 15 miles from the sea-coast, is disadvantageous for commercial business; but the active spirit and industry of the inhabitants secures to the town a satisfactory degree of prosperity. In 1831 the population was 7950.

FORFARSHIRE is a maritime county on the east side of Scotland. Though it usually takes the name of Forfar, the county town, it is also named Angus, probably from the high land, south of the town of Montrose, called the Hill of Angus, on which the Caledonians assembled to watch the landing of their Danish invaders; or rather, as stated by other authorities, because this county was disjoined from the contiguous county of Kincardine, or Mearns, by Kenneth II., who assigned it to his son, Æneas, or Angus, about A.D. 838. Its eastern boundary is formed by the German Ocean; on the south it has the Frith of Tay and Perthshire; on the west, Perthshire; on the north the county of Aberdeen, and on the north-east the county of Kincardine; it lies between 56° 27′ and 56° 59′ N. lat. and between 2° 25′ and 3° 23′ W. long. The extreme length of the county from south to north in a straight line is 38 miles, and from east to west 26 miles. Its area is said in Mr. Headrick's Agricultural Survey' to contain 532,243 English acres, or 435,144 Scotch acres. The latter measure, which is most commonly used in this county, is nearly a fourth larger than the former; four Scotch being nearly equal to five English acres. In the same work, published in 1813, the constituent portions of the whole surface are given as follow:—

	Acres.
Woods and plantations . .	20,764
Cultivable wastes	20,000
Hills and mountains unarable	150,836
Cultivated and improved . .	340,643

In Mr. MacCulloch's 'Statistical Account of the British Empire' the superficial contents are stated to be 570,880 English acres, of which 2560 are water. In other recent accounts, the extent of land in cultivation is stated at 370,000 acres, and the wooded land 35,000 acres, of which 5000 acres are natural wood and coppice.

General Appearance.—There are four natural divisions of the surface. The first is the Grampian district, which comprises somewhat less than the north-western half of the county, and exhibits a tract of irregular mountain ridges, which, for the most part, have a shallow moorish soil, and are covered with short heath, and large tracts of peat moss, but numerous valleys by which they are intersected are fertile and picturesque. The direction of the ridges is generally from north-west to south-east, and the numerous streams which rise in this mountainous district all flow in a south easterly course. The Grampian mountains within this county are called the Braes of Angus; they rise in several places to an elevation of 3400 feet above the level of the sea, and exhibit all the grand and various scenery of an alpine country. The principal valleys are Glen Isla, Glen Prosen, Glen Clova, Glen Lethrot, and Glen Esk. The second division is formed by the great valley of Strathmore, or How (hollow) of Angus, which extends across the centre of the county, from south-west to north-east, including the towns of Cupar, Forfar, and Brechin. Its length is thirty-three miles, and the width from four to six miles. Here the surface is gently undulating, and beautifully diversified with streams, well cultivated fields, plantations, villages, and gentlemen's seats. The third division consists of the Seedlay or Sidlaw Hills, which run parallel with the great chain of the Grampians, from the south-west extremity of the county, and terminate in the promontory on the coast called Red Head, which rises to about 1500 feet above the sea. Some of these hills are upwards of 1400 feet above the level of the sea, and command extensive views of the Grampians on the one hand, and of the Tay and ocean on the other. In many parts they are covered with short heath, in others they are cultivated up to their summits, and contain many fertile and beautiful valleys. The length of this district is about 30 miles, and its width from 3 to 6 miles. The fourth division is the maritime district, included between the Sidlaws and the shores of the Tay and the ocean. It extends from the boundary west of Dundee to the hills about seven miles south of Montrose, varying in width from three to eight miles, and sloping gently towards the shore to the east and the south. This tract is generally very fertile, under high cultivation, and adorned with numerous villages, plantations, farm offices, and elegant villas. Near the shore of the Tay there are mounds of loose sand, containing extensive beds of sea shells, at least 60 feet higher than the present level of the sea.

Although so great a portion of this county is covered with mountains, it contains, on the whole, a greater proportion of arable land than any other county of Scotland, and it is not inferior to any in opulence and prosperity.

Minerals and Fossils. *Grampian District.*—The great chain of primary rocks called the Grampian Hills, a section of which forms the north-west portion of this county, has been minutely described in a geological survey of these mountains by Colonel Imrie. They are composed chiefly of —1st. granite of various qualities, some of it beautiful, and very durable for building. It is formed of crystallized rhomboidal felspars, commonly intermixed with laminated talc or mica, and takes a brilliant polish. In the cavities and fissures are found yellow and smoke-coloured topazes: when they are white, they are named rock crystals. Their usual form is that of pentagonal prisms, sometimes 12 or 14 inches in length. 2nd. Next to the granite a very large proportion of the Grampians in this county is composed of fine-grained, hard, and greyish gneiss, and micaceous schistus or mica schist. It is always stratified; the beds lie at various angles and are often perpendicular. This rock is generally of a lead colour, but is found occasionally brilliant with the mica, which covers the surface of its plates. Among the schistose rocks are veins and detached masses of silicious spar or quartz, frequently of a red colour from the presence of iron. It is found also of a clear white, and is the purest form of natural flint, like that with which the Chinese manufacture their beautiful earthenware. Laminated talc or mica slate of a silvery hue occurs among the schistose rocks in large blotches or in irregular veins. It often contains silicious spar, and is thickly studded with small garnets, varying in colour from a faint to a deep crimson. Porcelain stone is abundant on some of the Grampian heights. This name was assigned to it by Dr. Walker, professor of natural history in the university of Edinburgh, because it contains the same proportions of silica and alumina which are required to compose the finest porcelain. Its colour is generally white, inclining to grey, or reddish, owing to the presence of iron. Lead mines were wrought in the Grampian range above a century ago, and the ore is said to have yielded [illegible] part of silver. The ore, which is galena, is of a blackish colour, and metallic lustre, and is thought to be obtainable in abundance, if pains were taken to make excavations for the purpose. Limestone is plentiful in various parts of this mountainous district; it is frequently streaked with blue and white, or spotted with yellow, and contains crystals and talc. Large veins of slate occur along the declivities, but they are not much wrought for roofing. At Glenesk on the bank of the North Esk, and at Cortachie on the South Esk, large masses of jasper are imbedded in schistose and micacious rocks. It varies in colour from a bright yellow to a deep red, is susceptible of a high polish, and may be fashioned into ornamental trinkets. The third component of the Grampian rocks is porphyry. It occurs in broad veins contiguous to the schistose rocks, and forms numerous hills; is generally of a brown, yellowish, or whitish colour, and is interspersed with grains of quartz and rounded felspars. These rocks, namely granite, gneiss, micacious schist, mica slate, clay slate, and porphyry, are the usual constituents of the primary mountains in Scotland, and they commonly succeed each other in the order here described.

The transition rocks, lying between the granite and flœtz, appear on the declivities of the Grampians towards the valley of Strathmore. They consist of grey schistose wacke slate, in which occur beds of slate, spar, and numerous elliptical masses of jasper, some measuring 30 feet by 10. Greenstone, basalt, and dark coloured limestone are also prevalent, with compact felspar in extensive beds of a reddish brown colour. The flœtz rocks of this lower district, which rest upon the transition rocks, present much variety of composition, but may all be referred to the red sandstone formation of Werner. This sandstone is often fine-grained, and valuable for architectural purposes. It is traversed by extensive beds of conglomerate limestone, greenstone, basalt, amygdaloid, clinkstone, felspar, and porphyry, and contains veins of heavy spar, and traces of copper ores. Pearls have been found in the bed of the North Esk.

Strathmore District.—In descending from the Grampians the first rock that occurs after the porphyry is a coarse pudding-stone, gravel-stone, or breccia. By the peasantry it is called 'yolky-stone,' from being composed of numerous rounded pebbles resembling yolks of eggs, which are held together by a ferruginous cement of great hardness. This rock has evidently been formed from fragments detached from the rocks above described, which, in their progress towards their present position, had been rounded by the action of water. This, and other local circumstances, have induced several scientific topographers to believe that this spacious valley, of which the How of Kincardine is a continuation, was once the channel of a great river or lake. As we descend along the beds of the streams which form the rivers South and North Esk, the pudding-stone graduates into the species of sand-stone which is called rubble-stone, because, owing to its hardness, it cannot be cut with the chisel, and is fit only for what masons call rubble-work. It is of a brown or red colour, and consists of particles of sand united by the cement which combines the pebbles in the pudding-stone. Lower down this first species of sandstone graduates into one which is softer, of a deep red colour, and has beds of deep red clay interposed between its strata. It consists of particles of silex cemented by ferruginous clay. It often occurs in laminæ, or slates, fit for roofing, and is easily cut with the chisel. Its beds frequently contain detached yolks or rounded pebbles, and pudding-stone is often found with it in alternate beds.

Shell-marl, formed from the exuviæ of several kinds of fresh-water shell-fish, abounds in various parts of Strathmore, and is a very useful manure. It is procured in large quantities from beneath beds of peat-moss at the bottom of several antient lochs which have been drained chiefly for this purpose, namely the lochs of Kinordie, Lundie, Logie, and Restennet. From the undrained lochs of Forfar, Rescobie, and Balgavies, it is dragged up by means of iron scoops worked from boats. In the 'Agricultural Survey' it is stated that the value of 100 acres of this marl, averaging five feet in thickness, in the drained bed of Loch Logie, exceeded 100,000*l.*; and that from the small loch of Restennet the sale of part of the drained marl had yielded (in 1813) a clear profit of 16,000*l.* This manure is here also obtained from several drained mosses or peat-bogs. The description of the other alluvial strata comes under the head of soils.

Iron has been discovered, and from the number of ferruginous springs which rise in various parts, several beds of iron ore are conjectured to exist. The only other mineral worthy of notice in this district is a species of pipe-clay, found principally in the south-west extremity of the valley near Glammis.

District of the Sidlaw Hills.—These mountain ridges are composed chiefly of sand-stone, the strata of which lie nearly horizontally towards the south, and decline towards the north at an angle of 45°. It is of various colours; red, brown, grey, white, and greenish. Some of the fine-grained is susceptible of a polish sufficient to form an imperfect mirror. Numerous beds of indurated clay of a red, grey, and bluish colour, are interposed between the strata. It lies in thin layers resembling slates. Interposed between these strata of sand-stone are large beds of the yolky-stone, varying from 50 to 100 feet in thickness. The rounded stones imbedded in this species of rock consist of white and red quartz, jasper, whinstone, porphyry, and grey and red granite, all combined with a ferruginous sandy cement. The superficial stratum of this range of hills is formed of several varieties of whinstone, which appears in the various forms of basalt, greenstone, porphyry, and a cellular stone by some believed to be volcanic lava. The colour varies also from red, brown, and grey to green, dark blue, and black. All the kinds of agate and onyx enumerated by mineralogists are found on these hills, but they are less in number and size than those found on the hills near Falkland, in Fifeshire. Quarries of limestone of a peculiar structure are extensively wrought. It is composed of congeries of rounded fragments of various colours cemented together in a crystallized spar, and is, in fact, a species of mottled marble. Large beds of clay-marl, a very useful manure, occur in several parts of this district along the ravines and alluvial bottoms. On the south-east declivities of the Sidlaw Hills are large quarries of sand-stone flags of superior quality for pavements, steps, tomb-stones, &c. Those which split off from half an inch to an inch in thickness are much used for roofing. The slabs from these quarries are largely exported from Aberbrothwick to Leith, London, and many other places. Their strata form a broad continued zone from the south-west to the north-east side of the county. Lead has been discovered, but not in sufficient quantity for the encouragement of mining. Copper ore has also been found, and veins of this metal are believed to exist in the Sidlaw range.

Maritime District.—Beds of red sand-stone, including rounded fragments as before, occur frequently to the south and east of the zone of sand-stone flags, but no gravel or yolky-stone is found in this district. Veins of whin and porphyry intersect the sand-stone strata, and form numerous hills. At Hedderwick, two miles north of Montrose, quarries of limestone are extensively wrought. The stratum lies deep, and is twenty-five feet in thickness. The stone is hard, white, of a fine grain, and resembles Carrara marble. It is burned at the quarries in several large kilns. On the sea-shore, about two miles south of Montrose, is another very large limestone quarry, which has been worked since the year 1696. Rock and clay marl are abundant in the district round Montrose. Numerous large boulder stones of Grampian granite lie scattered in the lower parts of the county, and shapeless detached masses several tons in weight, evidently of the same origin, are found in the Strathmore and maritime districts. Coal of an inferior quality has been traced a little to the west of Aberbrothwick, but this county may be said to be destitute of this important mineral, and the supply is obtained chiefly from Fifeshire and Newcastle. The poor, who cannot obtain coal without difficulty, procure for fuel peat, brushwood, broom, and furze. There are several chalybeate springs, which are believed to be serviceable in dyspepsia.

Soils.—The general colour of the soils of this county is red, inclining to brown and black. The shade darkens with the degree of moisture. On the Grampians is generally found a thin stratum of moorish earth, through which the rock often juts from a subsoil of whitish clay. In the Grampian glens the alluvial soil is loose and friable, having a predominance of sand. It is well adapted for potatoes, turnips, and artificial grasses. In the lower parts of the county the primary soils, that is, those which have been formed from the mineral strata on which they rest, are generally thin, mossy, and encumbered with loose stones. The primary soils on the sand-stone rocks are composed chiefly of tenacious clay, and are naturally very unproductive, though, when properly wrought, manured, and drained, they produce excellent crops of wheat. The primary soils upon whinstone are very fertile, but often too shallow for the plough, and the solid rock often juts up above the surface. This description applies to the tract along the north side of the Sidlaw Hills, and along their intersecting valleys, as well as to many parts of the maritime district. In the valley of Strathmore the soils are all alluvial, but seldom fertile. Some parts of this valley are gravelly, and others exhibit a soil of barren sand. Fine tracts of rich black and brown vegetable mould occur in several places, as, for instance, at the west extremity of the basin or lake of Montrose. On the whole, the Grampian district and the declivities of the Sidlaw Hills may be said to be generally covered with coarse clay and moor pasture, and all the lower lands have partly retentive subsoils, and partly soils chiefly alluvial. Along the coast, north of Montrose, between Aberbrothwick and Dundee, around the latter place, and in the inland district between Brechin and Forfar, there are downs of loose sand, partially covered with stunted grass, and useful only as burrowing ground for stocks of rabbits. The principal bed of peat is called the Dilty Moss, on a ridge of the Sidlaw Hills. On the Grampians the best peat beds occupy the hollows on the highest summits, which renders it difficult to obtain this fuel in the populous lowland districts.

Hydrography, Roads.—This county has about forty miles of sea-coast, in which there are three ports, namely, Dundee, Aberbrothwick, and Montrose. Formerly there were few parishes in which there was not a lake. The number is now much reduced. Some have been drained to gain an extent of arable land, but many more have been wholly or partially drained for the sake of the rich marl manure beneath their beds. The following are the principal of those which remain: Lochlee, on the Grampians, the source of the North Esk river, is a mile in length, and is embosomed among groups of lofty mountains. Lentrathen Loch is a beautiful sheet of water at the base of the Grampian range, nearly circular, and a mile in diameter. It is enclosed by magnificent mountain scenery, and its banks present some rare botanical plants. The Loch of Forfar lies west of that town; its length is about a mile, but its water has been much reduced by draining for the marl on its sides. Eastward from Forfar is the Loch of Rescobie, of similar dimensions. It is one of a chain of five, extending across the Sidlaw range of hills. The loch or basin of Montrose is an inland bay; it contains an area of more than four square miles, but is so shallow that at low water the greater portion of this space is left a dry tract of sand. All these lakes abound with pike, perch, trout, and eels.

The following are the principal rivers, or, as they are provincially called, waters:—1. The North Esk (Gaelic, *Uisg*, water) issues from Lochlee, which is fed by mountain streams from the west. Descending in a winding course to the east and south-east, it receives almost innumerable mountain torrents, until at Burn it becomes the northern boundary line of the county, when, after receiving the West Water and the Water of Cruick, it flows south-easterly through a fertile district, and falls into the sea about three miles north of Montrose. At Burn, where it descends from the Grampians, it has worn a deep ravine, at the bottom of which it foams from rock to rock with a picturesque beauty, which has been artificially improved by the elegant taste of Lord Gordon, in whose estate it flows. No part of this stream is navigable. 2. The South Esk issues from the north-west summits of the Grampians, and having received numerous mountain streams, it descends into the valley of Strathmore, where it is further augmented by several brooks: continuing easterly by the town of Brechin, it passes through the basin of Montrose into the sea. On several of its falls are erected flax spinning-mills, and other machinery. 3. The Isla rises from numerous torrents among the Grampian summits on the north-west side of the county. Its course is south-west to near Ruthven, where it turns off to join the Tay, in Perthshire. Like the North Esk, in escaping from the Grampians, it has worn a chasm in the granite rocks more than a hundred feet perpendicular; and it forms cascades of the greatest beauty. One has a clear precipitous fall of at least 35 feet. The banks are very steep and richly wooded for several miles, and the scenery, at the junction of the Melgam water is made highly romantic by the extensive ruins of the antient fortified castle of Airlie. The Dean, Lunan, Dighty, and other smaller streams, are not of sufficient magnitude for particular notice. Numerous perennial springs flow from the sand-stone hills. One at Kirktown, in the parish of Kinnettles, emits 25 gallons per minute, or 36,000 per day.

The principal roads branch off from Dundee—1, to Aberbrothwick, Montrose, and thence to Aberdeen; 2, to Forfar and Brechin; 3, to Cupar Angus and westward. These, and other lines of internal communication, are kept in good order. There are numerous stone and wooden bridges across the small streams. The principal one is over the North Esk, on the road from Montrose to Kincardine. A rail-road from Dundee crosses the south-west extremity of the county to Perthshire.

Woods and Plantations.—Numerous trees found in the mosses and marshy ground, consisting of enormous oaks, ashes, elms, and birches, indicate that formerly the lower part of this county was covered with forests. Some of the Grampian glens are partially clothed with oak and hazel coppices and natural birches; and others are covered with thriving plantations, but trees do not grow on the higher parts of the mountains. Near the sea-shore trees do not thrive unless when planted in ravines, or behind banks by which they are sheltered. Plantations are confined chiefly to places not suitable for the plough—to thin moorish soils resting on clay or gravel; but in gentlemen's parks and pleasure-grounds trees occupy soils of the best quality. On the declivities of the Sidlaw Hills extensive tracts have been planted with forest trees, chiefly larch, oak, ash, elm, plane, beech, and poplar. Scotch, spruce and silver firs are planted to shelter the other young trees. Plantations are thinned twelve years after planting, and the tallest and straightest sticks are exported to Kent for hop-poles. In the parks of the gentry and around the old farmsteads are many stately trees of unknown antiquity. Larch, oak, and beech plantations are continually increasing. In the 'Agricultural Survey,' by Mr. Headrick, the space occupied in plantations in 1813 is stated to have been 20,764 acres, which is supposed to be now doubled. Many wealthy proprietors have planted very extensively. The Earl of Airlie alone, since 1811, has planted above 3000 acres near Ruthven. Beautiful inclosures and plantations now appear in every parish. The largest wood is that of Monroman Moor, near Brechin.

The plants of this county have been investigated with great industry and ability by Mr. George Don, who was born and resided here, and who added more new species to the British Flora than any botanist before or since. His ample and curious account of the native plants in Forfarshire, published in 'The Agricultural Survey,' exhibits abundance of interesting facts for the scientific botanist.

Climate.—The great variety of elevation in the maritime, inland, and alpine districts causes a correspondent variety of climate. On the high lands among the Grampians, where the snow lies on the summits during the greater part of the year, the air is generally cold and piercing. In the great midland valley, and in the sheltered parts of the maritime district, the climate is comparatively mild and genial. On the coast the easterly winds are occasionally very severe. The heaviest rains are from the east and south-east, and the deepest falls of snow from the north and north-east. In the evenings of warm summer days a chilling wind, accompanied with a damp and thick haze, often comes from the sea. It is very offensive to the feeling, and productive of colds and rheumatisms, and when precipitated on the earth as hoar-frost is injurious to vegetation. On the whole this county may be said to be rather bleak and unfavourable to delicate constitutions: however, the draining of marshes and stagnant ponds, and the general improvements in cultivation, have greatly ameliorated the climate, and notwithstanding the general variableness and inclemency of the weather, the native inhabitants are a healthy and vigorous race.

Estates, Farms, Agriculture.—About a century ago a great proportion of this county was in the hands of a few antient families; but since the introduction of trade and manufactures, landed property has changed its possessors very frequently, and has become much more minutely divided and more equally distributed, so that, of the forty barons mentioned by Edwards, in his Description of Angus in 1678, only about one-third have at present any possessions in the county. In Mr. Headrick's 'Survey' the value of a large proportion of the estates is stated to be from 100*l.* to 1000*l.* a year; a few from 2000*l.* to 6000*l.*, and one or two above 12,000*l.* a year. The greatest number of the estates are held by charter from the crown, and are termed freehold. Farms vary much in size, some consisting only of 20 or 30 acres, others of 800 acres. They are generally from 100 to 250 acres, but many are less than 100 acres. Leases in the lowland districts are taken usually for nineteen years; in the Grampian highlands for nine years. About one-third of the land in this county is held under deeds of entail, a system which, for the sake of perpetuating a family name, reduces the proprietors to mere life-renters, chills all ardour for improvement, and thus injures the interests of the county. Mr. Headrick gives the following statement of the number and value of farms in 1813:—

Yearly Rent.	Number of Farms.
Under 20*l.*	1,574
From 20*l.* to 50*l.*	565
50*l.* to 100*l.*	682
100*l.* to 300*l.*	315
above 300*l.*	86
Total number	3,222

The walls of the old farm-houses were all constructed with turf and stones in alternate layers, and the roofing was formed of branches of trees and turf, or thatch fastened on with rope. One of these enclosures, with one door and no window, lodged the farmer's family and his cattle, who all slept round a fire on the earthen floor. A hole in the roof let out the smoke, and in the day-time it was a skylight. The position of the dunghill beside the door made the entrance ankle-deep in mire, and filled the dwelling with a continual stench. Many of these dirty, damp, and smoky cabins, with the improvement only of a small glass window, are still to be seen among the Grampian hills. Some are built with mud, mixed up with straw. It must however be remarked that they are every year decreasing in number. The following remarks are made by the reverend author of the description of the parish of Lunan in the 'New Statistical Account of Scotland:'—'It is a subject of deep regret that little attention has been paid to the habitations of the cottagers. Scotland in this respect is very far inferior to England. In vain we look for the neatly whitewashed walls, with their doors and windows encircled with roses and evergreens, and the small tasteful garden in front, so often to be met with in England. Of late years farm-houses and farm-steadings have been generally made commodious and useful, but the cottages of the poor remain for the most part in their pristine wretchedness. In Scotland they have always been proverbially deficient in comfort and neatness.' It is in the eastern lowland districts that the greatest improvements are displayed in the farmers' dwellings and offices. Here the former are commonly built of red sandstone, of two stories, lathed and plastered, and roofed with thatch, blue slate, or sandstone flags.

The number of hands employed in the pursuits of agriculture is estimated at 20,000, without including the great numbers occasionally engaged in seed-time and harvest, and in weeding and making hay. It may in general be stated that almost every useful improvement has been adopted in the modes and implements of agriculture in this county, and that the farmers of Forfarshire cannot be said to be behind those of the most improved counties of Scot land. Threshing-machines and iron ploughs, improved harrows, drilling-barrows, hoeing-machines, &c. are commonly used. Various grasses have been made very productive by the adoption of the grass-seed-sowing machine; and besides the use of farm-yard dung, lime, lime-marl, clay-marl, rock-marl, whale-blubber, soot, mud compost, and sea-weed, as manure, bone dust has become generally used, particularly for crops of turnips, and large mills are established at Dundee and Aberbrothwick for preparing it. Draining of various kinds is practised extensively. Inclosures are made chiefly by stone dykes in the highlands, and by quick-thorn hedges in the plains of Strathmore and towards the sea.

Breeds of stock have been much improved, and several active Agricultural Societies, of which the principal is the Eastern Forfarshire Farming Association, exercise a great influence in the introduction of superior modes of culture and breeding. Mr. Headrick remarks that all classes of the farmers of this county are abundantly sharpsighted, and disposed to adopt any improvement which they see executed by others, or hear described, and that they have a disposition to surmount difficulties by persevering labour and assiduity. The chief crops are of oats, barley, and wheat. The rotation of crops is varied according to different soils. Particulars on this subject will be found fully detailed in 'The Agricultural Survey,' and in the 'New Statistical Account of Scotland.' Oats appear to have been the first species of grain cultivated in Scotland, and are probably indigenous, as wild oats abound in various parts of this county. They still form the prevailing crop, oatmeal and potatoes being the principal articles of food of the great mass of the population. Oats are sown after barley and other crops, but commonly after grass or old pasture has been turned up, several times in succession. Being a very hardy grain, the soil requires less preparation than for any other kind of crop; but they soon degenerate unless the seed is continually renewed from other soils of a different quality and aspect. The kinds of oats cultivated are—1, the common or Angus oat; 2, the Blainsley oat, a small grain yielding abundantly on high and poor land; 3, the barley oat, which requires a good soil and ripens early; 4, the Dutch oat, a large grain in a thick and ample husk; 5, the bearded grey, or black oat, a poor inferior species, which formerly prevailed throughout the county: it grows spontaneously, but is confined for crops chiefly to the Grampian district; 6, the potato oat, which, in all the fertile tracts, has nearly supplanted every other species. Much of the oat crop is consumed by horses and exported from the county. Oatmeal porridge, eaten with milk or beer, forms the breakfast and supper of the labouring classes, among whom oat-cakes are still much used as bread. Their supper commonly consists of sowens, a thick gelatinous and slightly acidulated substance, obtained by steeping the oat-bran in water to extract the still adhering portion of farina and starch.

In refuting the opinion that this immoderate use of oatmeal by the peasantry produces 'the Scotch Fiddle,' and other cutaneous diseases, Mr. Headrick asserts that such disorders are much more prevalent in some of the English counties where oatmeal is not used, and that 'Tho Fiddle' is attributable solely to dirty clothing.

Wheat was formerly confined to the lower maritime district, and was thought to be too delicate to thrive in the mountainous parts, but it is now successfully cultivated at all elevations less than a thousand feet above the level of the sea. Three-fourths of the wheat are sown after summer fallow, the land being well dunged and lined, or manured with compost. The seed universally degenerates if not continually renewed. For this purpose a considerable quantity of seed-wheat is annually imported from England; it being found that this grain, more especially than others, improves by being transferred from a warmer to a colder climate, and crossed by different soils. The seed obtained from London is most esteemed. For the purpose of preventing smut it is commonly steeped in brine; all that floats is skimmed off, and sometimes powdered quicklime is afterwards sprinkled over the grain. Wheat receives scarcely any culture after it is sown. It is reaped from the middle of August to the end of October, according to the time of sowing. Wheaten bread is now generally used by all but the poorest classes. Considerable quantities of wheat are annually exported to London and other ports, and some American, Danzig, and other foreign wheats are imported to mix with that produced in the county.

A species of barley called *Bear*, or *Bere*, *Bigg*, and *Chester* is that which alone was antiently cultivated. It has six rows of grain in the ear, by which it is distinguished from the common barley, which has only two rows. It is a coarser and less valuable species; has a thicker husk, and the awn is longer and more firmly united with the grain. The bleak and elevated lands on the Grampian and Sidlaw mountains are the chief places where it continues to be cultivated, as it thrives on poorer soil and with less cultivation than are requisite for the common barley. The latter is largely sown on all the superior soils and better cultivated tracts. No precautionary preparation of barley seed is used, but it is found necessary, or at least prudent, to renew it annually either wholly or partially from England. Much bear and barley are ground into meal for porridge and cakes consumed by the poorer class of labourers; but in nutritious properties it is much inferior to oatmeal. Hulled pot or pearl barley is much used in the county by all classes in meat broth, commonly mixed with vegetables. This is an antient and very general Scottish dish. Pearl barley is largely exported to Leith and London. The ale and beer breweries of the county, and distilleries for whiskey, consume a great portion of the produce of barley. It is also exported for the same purpose to Leith.

Peas are partially cultivated, chiefly for the haum, or straw. Beans are more generally raised as food for horses and swine. Vetches are also cultivated for feeding cattle. Turnips are grown to a greater or less extent on every farm. The seed is never sown broadcast, but always by drill-barrows, and this is practised even in gardens. The Swedish turnip is much used for feeding milk-cows, and is given sliced to horses. Cabbage and colewort are also seen on almost every turnip-field, chiefly for the same use. Flax is now not near so general a crop as it was formerly. Red and white clover are common, and are usually mixed with rye-grass, which is universally cultivated.

A large portion of the surface of this county on the Grampian and Sidlaw Hills is covered with natural pasture. This extent of land, rendered unfit for the plough by the number of loose stones and other obstacles, is estimated at about 40,000 acres. In some of the valleys Grampian boulders of two or three tons weight have been got rid of by blasting with gunpowder, or by dragging them off on sledges, or by burying them below the reach of the plough Every farmer has some portion of his land laid out in cultivated pasture for his cows, in the rotation of cropping The parks and lawns of the gentry are either stocked with cattle and sheep by their proprietors, or let to graziers. Potatoes are extensively cultivated on every farm and in every garden, and large quantities are exported to Leith and London. Mr. Headrick relates as a curious instance of the influence of learned ignorance, that when, a century ago, a farmer first introduced the potato as a field crop, scientific physicians of that time pronounced the plant to be a species of the deadly nightshade, so that no one would venture to eat of its root, and the poor man, who had made several journeys to Ireland to learn the mode of cultivation, was laughed at, and died in great poverty.

Farm servants live chiefly on potatoes and oatmeal, varied occasionally with pork or bacon; their drink is either milk or beer, and the wages of those who are not fed in the farmer's house are commonly paid wholly or in part with measured quantities of meal, milk, and other domestic provisions.

Gardens and Orchards.—All the resident proprietors have gardens varying from one to five acres, well stocked with all the roots and culinary vegetables which thrive in this climate, and with all the common species of apple, pear, cherry, and plum. Flowers and ornamental shrubs adorn the pleasure-grounds of the wealthy, and here exotic and other plants and fruits which will not thrive in the open air, as grapes, pine-apples, peaches, and nectarines, are reared by horticultural science in artificially heated houses of glass. Most of the cottages have a kail-yard, in which are raised cabbages, onions, and pot-herbs. All the small and hardy fruits, as gooseberries, currants, and raspberries, are plentifully produced in almost every garden. In the neighbourhood of the towns there are market-gardens and nurseries for the supply of the inhabitants. These are particularly good in the vicinity of Dundee. But many apple and other large fruit-trees grow much into wood, yield little fruit, become covered with lichens, and often die at top, which has partly been attributed to the roots having penetrated into an unfavourable subsoil; to prevent which it has been discovered that in the old abbey orchards the monks paved with large flagstones the bottom of the deep hole in which the trees were planted.

Live Stock. Wild Animals.—The antient breed of horses in this county is small, but very hardy, and capable of enduring much fatigue with scanty nourishment. These animals are still numerous in the Grampian district. Their colour is grey, and they are commonly called Garrons. In some of those parts of the county where there are either no roads, or very steep and rugged ones, and where the farmers are obliged to keep many horses to fetch peat from the heights, and carry burdens, instead of conveying them on wheel-carriages, this breed of horses has a peculiar value. They feed chiefly on the stunted grass which they find on the sides of the mountains.

In the lower districts this breed has been much improved in size and form by good and regular feeding, and shelter from the perishing wintry winds; but generally throughout the midland and maritime plains are found the larger animals of the Lanark breed, which, as stated in 'The Agricultural Survey,' are the best working horses in the world. They cost from 30*l.* to 40*l.* each.

A few gentlemen rear horses for the turf, and keep studs of thorough-bred racers. Of late years much attention has been given to the breeding and treatment of horses, and very great improvement has been effected in their qualities, value, and appearance. Formerly as many as six wretched garrons were placed abreast in a large clumsy plough, and the driver, walking before them, struck them in their faces to make them follow him; now a pair of smart horses work a light iron plough, without a driver, and sometimes without any reins. The whole number of horses in 1813 was about 9000, and their value about 220,300*l.* In remarking that it is mere prejudice and inveterate habit that causes us to loathe the flesh of horses while we devour that of oxen, the learned and philosophic author of the 'Agricultural Survey' asserts that he once partook of a ham of a young horse, and found it extremely palatable: he adds that he also partook of a fattened old horse aged above twenty-two years, and that he could not distinguish the flavour from that of beef of the finest quality.

Before the introduction of inclosures, turnips, clover, and sown grasses, the size of black cattle was diminutive, and eight or ten were usually yoked in one plough. The great influence of superior feeding and treatment is shown in the fact, that the same breed of oxen which, when reared on the antient plan still retained in the Grampians, attain, when fattened, only 20 or 30 stones, will, when properly fed and housed in the lower districts, often acquire a carcase of 70 and 100 stone weight. The grazing and stall-feeding of cattle are prosecuted to a much greater extent than the rearing; large numbers being brought into the county to be fed and prepared for the butcher. Almost every herd consists of various breeds and crossings. A large proportion of the permanent stock are without horns. The colours most generally preferred are dark-brown, brindled, and black. Numerous cows of a good description are kept to supply milk for domestic consumption. One of the best will yield eight English gallons a day. The total number of cattle constituting the permanent stock of the county in 1813 was about 37,400, and their value 261,800*l.* Some large herds of fattened oxen are driven to Glasgow, and many are exported to Leith and London, when three or four years old.

The original sheep of this county, and apparently of the British Isles, is the small white-faced breed. Some small flocks of these still remain in the Grampians, but generally they are much crossed with the black-faced breed of Tweeddale, which constitute a very large proportion of the whole stock of the county. Several superior and more delicate breeds are reared in the parks and lawns of the gentlemen's seats. Since the improvements in tillage, and the consequent extension of grain crops over the tracts of natural pasture, the keeping of sheep has become a secondary object, but nearly every farmer has a flock more or less numerous, and much improvement in breeding and rearing has lately been effected by the influence of several wealthy proprietors and the agricultural associations of the county. The total number in 1813 was about 60,000, and their value about 42,000*l.*

Hogs have recently become very numerous, and are kept by every farmer and cottager. There are two principal breeds; one, a thin-backed, raw-boned animal, with long bristles, a tapering snout, and projecting tusks, appears to be the descendant of the antient wild boar of the forest; the other is the small common Chinese breed, which is by far the most numerous.

The common kinds of domestic poultry and pigeons are generally kept by every farmer. A few bees are also very commonly kept, and produce excellent honey. Hares, rabbits, and partridges abound in the tracts of heather and less-frequented hedge-rows and coppices. Grouse and black-cocks are plentiful on the moors, and are much destroyed by wild-cats and foxes. Wild roebucks traverse the extensive plantations and glens of the Grampian and Sidlaw Hills. They are small and timid deer, but very untameable. No fence has been found sufficiently high to confine them, but they are often killed by sportsmen. In antient times, when the whole surface of the county was covered with impenetrable forests, extensive heaths and swamps, the red deer, or stag, abounded, especially among the Grampians, where it is now very rarely seen. The large antlers of the moose-deer are found in the mosses, together with enormous horns, supposed to belong to the Urus. The Alpine hare, whose fur in winter is snowy white, is found in the highest parts of the Grampians. The badger burrows in the woods and stony hill-sides, and its flesh is cured and eaten as bacon by some of the Highland peasants. The hedgehog is found among patches of low brushwood. Foxes are very numerous, and destructive to lambs, poultry, and game. The polecat often kills poultry. Weazels are tolerated by the farmers as destroyers of rats and mice, but they suck the eggs of poultry. To keep rats and mice out of corn-stacks, some farmers sprinkle several ounces of Scotch snuff among the sheaves at the time they are laid together.

Otters and seals frequent the rocks on the eastern sea-coast, and are occasionally taken by the fishermen. The woodcock appears in great numbers in October, and departs in March. Large flocks of wild geese and a few swans visit the county in November. The cuckoo and swallow appear in May and depart in October. Rooks are very numerous, and destructive to the newly-sown grain.

Great flocks of gulls, mews, and other sea-fowl alight on the ploughed lands adjacent to the coast, to feed on the vermin they find. The lofty Grampian rocks are frequented by large eagles, buzzards, kites, and hawks. Aquatic birds of innumerable kinds appear, especially in the winter months, on the lochs and the basin of Montrose. For a more particular account, we refer to a very copious list of the animals of this county given by Mr. Don in the 'Agricultural Survey.'

Fisheries.—The deep-sea fishing off the eastern coast is very productive, and large quantities of salmon and smaller fish are taken in the Frith of Tay, and at the mouths of several streams from thence to the North Esk. The villages of Ferryden and Usan, a little to the south of Montrose, are extensively engaged in the sea-fishery, which employs 700 persons, nearly the whole of their population. Above thirty boats, each carrying five or six men, are constantly going out from three to ten miles from land. In summer weather some go twenty miles eastward to fishing-banks, called the North and South Shold. From fifteen to twenty of these boats often come in together after an absence of twelve hours, each containing about a thousand haddocks, which are commonly sold in the market of Montrose for a farthing a pound. These two villages alone have supplied in one year to the fish-curers at Montrose above 46,000 cod and ling. They take also about two thousand barrels of herrings in one season, that is, from June to August. The value of the annual produce of this fishing station, which is only one of several on the same coast of this county, is estimated at 7400*l.* Large supplies of salmon are sent to the London market packed in boxes of pounded ice. The most abundant kinds of fish are salmon, cod, herrings, haddocks, turbots, sole, skate, sprats, smelts, lobsters, crabs, and muscles. With respect to fresh-water fish, the lochs and principal streams supply abundance of pike, perch, trout, and eels.

Commerce and Manufactures.—This county being bounded on the south by the Frith of Tay and on the east by the British ocean, is so favourably situated for commerce that a ready market for its agricultural and manufacturing produce can always be securely relied upon, and its exportations of linen fabrics, cattle, corn, and salmon are subjects of national interest; but as an account of the manufactures and maritime trade carried on at its principal towns is given under the respective description of each [see under DUNDEE, and the sections of the present article relating to Montrose,] it is sufficient to mention here only a few general facts of commercial importance. There are two custom-houses in the county, one at Dundee and one at Montrose, which have jurisdiction over the port of Aberbrothwick, or as it is commonly called, Arbroath. The navigation of the Frith of Tay is much incommoded by a sand bar across the entrance and a great extent of shallow sands, which were the cause of numerous shipwrecks until the erection of two light-houses on the south-east extremities of the coast, one of which is moveable to admit of adaptation to the shifting of the cross bar. About 12 miles east of the Tay-mouth, and at about the same distance south-east from the port of Arbroath, is the dangerous reef, well known as the Bell Rock, a name derived from the fact that the monks of the antient abbey of Arbroath, to give timely warning to approaching vessels, fixed upon it a large bell which was rung by the motion of the waves. At low water of spring-tides this reef is seen extending 2000 feet by 230, the highest part being about 6 feet above the sea-level; but at high-water this part is 12 feet below the surface. In consequence of the dreadful storm in 1799, when 70 vessels were wrecked along this coast, it was determined to erect upon this reef a light-house similar to that on the Eddystone rock near Plymouth. The admirable edifice, completed accordingly by Mr. Stevenson, in 1810, at a cost of 55,000*l*., is of a circular form, 113 feet in height. The lower part, from the base to the height of 30 feet, is entirely solid. The walls then commence 7 feet in thickness and diminish upwards. The diameter at the base is 42 feet. The lantern is of cast-iron, 12 feet in diameter, 15 feet high, and roofed with copper. The keeper's apartments, 50 feet above the base, are said to be as dry and comfortable as any house in Edinburgh, though, in stormy weather, the spray dashes up to the height of 90 feet. The shore on the Tay and thence nearly to Arbroath is low and sandy. Bold and precipitous rocks then overlook the sea as far as the lofty promontory of Red-head. In these high rocky clifts are 20 deep and gloomy caves into which the waves at high-water enter with resounding echoes. The shore of the Lunan Bay is low and sandy; rocks then commence and terminate just beyond the South Esk, from whence sandy flats extend to the termination of the county at the mouth of the North Esk.

The total tonnage of the shipping belonging to the county amounted in 1813 to about 22,000 tons, but there has since been a very great increase. Seven or eight ships, each about 400 tons, are employed in the Greenland whale fishery. In 1832 the tonnage of vessels belonging to the port of Dundee alone was 32,868 tons, and the number of seamen employed about 3500; chiefly in the Riga, London, and coasting trade, and in the whale fishery. Ship-building is well executed at this port, and at the town of Montrose, which possesses at least 108 vessels, amounting to 11,000 tons register, and employed in similar trading. Arbroath employs in the same way about 30 vessels, each from 50 to 200 tons burden. Formerly this county exported large quantities of grain to Norway and Russia, but this department of trade is now chiefly confined to London, Leith, and Glasgow by the Clyde canal from the Forth.

The weaving of linen, which was the antient manufacture of Scotland, as were woollen cloths of England, was first introduced by the Flemings whom the Scottish kings encouraged to settle in their towns. The coarser kinds of linen fabrics, as huckabacks, canvass, sheeting, dowlas, sacking, &c., are manufactured in this county to a very large extent for exportation. Finer bleached linens for shirting and sheeting, and coloured thread, are also extensively manufactured, especially at Dundee. Mills for spinning flax into thread for weaving, moved by water and by steam, are established throughout the county; and on the banks of streams are many large bleaching-fields. About eleven million yards of linen fabrics are stamped annually, and the greatest part of this large produce of the county is exported. In weaving these fabrics men and women usually work five days in the week, and 15 hours a-day, earning, on an average from 1*s*. 6*d*. to 2*s*. a-day. In the spinning-mills the time of work is 5½ days in the week of 12 hours a-day, and the wages of men are also 1*s*. 6*d*. or 2*s*. a-day. Women in the mills earn 8*d*. or 10*d*. a-day, and children 4*d*. and 6*d*. The following observation is made by the Reverend author of the description of the parish of Kinnettles, in the 'New Statistical Account of Scotland: 'Mill-spinning and weaving, from the long daily confinement, the imperfect ventilation of manufacturing houses, and the noxious flaxen dust inhaled into the lungs in respiration, seldom fail to produce bad effects on the constitution. They cause a pale emaciated countenance, with asthmatic and dropsical diseases. At the same time, by blending together many young persons of both sexes, a bad effect is produced on the morals of youth.' In addition to the above branches of manufacture might be mentioned several breweries, tanneries, distilleries, and various other establishments chiefly for supplying the common articles of domestic consumption. Shoes are made in large quantities for exportation.

The most noted fair for horses and cattle is held at Brechin in June. About 14 other fairs are held at the different towns throughout the county. The places and dates may be found stated in any of the Scotch calendars. Every town, and several of the larger villages, have weekly markets for domestic provisions and utensils, and for the various implements of agriculture and manufactures. (See descriptions of the towns of the county.)

There are 56 parishes, each of which is separately described in the 'New Statistical Account of Scotland.' The following five towns are royal burghs,—Forfar, Dundee, Montrose, Aberbrothwick, and Brechin. The county returns one member to parliament; one is returned for Dundee, and one jointly for the burghs of Montrose, Forfar, Brechin, and Aberbrothwick. The population of the county in 1831 was 139,606. The annual value of the real property at the same time was 361,241*l*.

Education.—Every parish is provided with a school-house and a schoolmaster, who resides in the same building, to which is attached a garden and sometimes a field for a cow In Dundee an academy is established for teaching the foreign languages and the most useful departments of science; and in all the towns the parochial schoolmasters have classes for the elements of mathematics, mensuration, geography, astronomy, navigation, and drawing; besides the English, Latin, and French languages. The following remarks of the Rev. Mr. Headrick, in speaking of the schools of this county, are worthy of transcription:—'The establishment of parochial schools was carried by our zealous reformers, who strenuously impugned the maxim that "Ignorance is the mother of devotion." An approach towards public instruction was made by the bishops who established the first Scotch universities, but their object was to inculcate the nonsense of Aristotle's logic, in which the clergy might find weapons to defend their tenets against the attacks of heretics. It was our reformers who devised the plan by which the poor as well as the rich might be instructed. The parochial schools have diffused a taste for learning among the whole body of the people. Even the meanest cottager thinks it a sacred duty to have his children instructed in reading and writing, and many proceed to the higher degrees of education. Our Scottish aristocracy long looked with a jealous eye on the parochial schools, and foreboded the subversion of all order, and the extinction of all industry, from instructing the lower classes of society; but the fact has turned out to be the very reverse of their predictions; for since knowledge has been generally diffused the people have become much more orderly and industrious; agricultural improvements have advanced with unprecedented rapidity; great numbers of ingenious artists have been trained for every branch of manufacture; numerous improvements have been made in every species of machinery; well qualified persons have been abundantly found for naval and military service; and the numerous Scotchmen appointed to fill various public offices in the kingdom owe their promotion to the education they received at our parochial schools.' Lending libraries are numerous, not only in the larger towns, as Montrose, but in the villages. One of those in the parish of Craig contains 600 volumes. In the same parish a friendly society of fishermen has a fund of 500*l*.; and similar societies are established in many other parts of the county. Several savings' banks are also well appreciated and beneficially used by the labouring population.

According to the Parliamentary Return of 1818, there were in this county at that time 78 parochial schools, containing 3511 children, with a revenue of 2430*l*.; 148 day-schools, unendowed, were attended by 3905 scholars; and 79 sunday schools, attended by 5302 children.

The poor are relieved by voluntary donations, church collections, and interest arising from funded legacies bequeathed by charitable persons.

Towns.—Besides DUNDEE the principal towns are ABERBROTHWICK, BRECHIN, FORFAR, Kirriemuir, and Montrose.

Montrose is a royal burgh and seaport, having separate jurisdiction. It is situated at the mouth of the South Esk river, between the large lake or basin of Montrose and the sea. In antient times it was a place of considerable strength, surrounded by walls. The site of the town and the adjacent northern shore are dry and sandy. One principal street, which is wide and regular, extends from north to south, and is crossed by several smaller streets and lanes. Many of the old houses present their gables to the street, as in the Flemish towns. Water is well supplied in pipes from the parish of Dun, three miles distant on the western side. The town is lighted with gas, and is well paved and cleansed. The river is crossed by a handsome chain suspension bridge, which was designed by Captain Brown, and cost above 20,000*l*. A pontage is levied amounting to about 1300*l*. a year. The church, in the middle of the town, is a large plain building capable of containing 3000 persons. A steeple, 200 feet in height, has been newly erected. An episcopal chapel, and a chapel of ease, are each commodious and neat places of worship; the same remark is applicable to several Dissenting chapels. There are three banking establishments, a custom-house, a town-house, prison, theatre, and post-office. The annual revenue of the latter is about 2000*l*. There are several religious and friendly societies, a savings' bank, a lunatic asylum, hospital, infirmary, and dispensary. Numerous bequests of benevolent persons form a poor's fund, amounting to 10,500*l*. Besides this, some large sums for the same purpose are derived from church collections, the hospital, and occasional donations. In a public academy are taught mathematics, arithmetic, Latin, Greek, French, geography, writing, history, &c. There are two free-schools, one for 42 boys and 35 girls; the other for 100 scholars of both sexes. A school established by the trades teaches writing and arithmetic to 240 children; an infant school instructs 130, and 20 private schools, male and female, are attended by about 700 children. The total number of children is 1634. Three public libraries are established, one of which contains 7000 volumes. The principal manufacture is flax-spinning and weaving. Four flax-mills in the town, moved by steam of 129 horse-power, produce annually 854,869 spindles of yarn. Three other large flax-mills on the river North Esk, belong to the town and parish of Montrose.

There are manufactories for soap, candles, starch, ropes, sails, and steam-machinery; besides five breweries, two tan-works, a foundry, and a steam flour-mill. Ship-building is well executed, and 108 vessels of 11,000 tons, belong to the port. The foreign import of flax in 1834 was 2500 tons, of whale-oil 400 tons, fir timber 1330 loads. The exports coastwise to London, Leith, and other ports, were—

Barley	23,700	qrs.
Oats	3,350	
Wheat	1,430	
Peas and beans . .	3,460	
Potatoes	114,560	stones.
Salmon	1,890	boxes.
Cod	902	barrels.
Herrings	4,970	—

The harbour is formed by a breastwork at the mouth of the river, within which vessels of 400 tons can anchor, the water being 35 feet in depth at high tide, but no vessels enter the basin.

Lime, slates, flagstones, and numerous other articles are largely exported. Four regular traders sail to London, and two to Leith. There is a weekly market on Friday, at which corn is sold by sample, and all kinds of farm and garden produce. The population of the burgh in 1831 was 12,055, besides 800 sailors, but there has since been a considerable increase. James Graham, marquis of Montrose, the champion of the Covenant, was born in the town in 1612. Andrew Melville, the father of the Scottish Presbytery, was educated here; and here a Frenchman, named Marsilliers, first taught the Greek language in Scotland, in a private school, in the year 1534. In cutting a new street through an eminence called Fort Hill, on which an antient castle once stood, a stratum of human bones was discovered, nearly six feet in thickness.

Kirriemuir is an antient burgh of barony and market-town, situated five miles north-west of Forfar, on the edge of a mountain glen, overlooking the valley of Strathmore. It consists of several irregular but handsome streets, and has an elegant church and episcopal chapel, each with a spire, a town-hall, and several other public buildings of modern date. A weekly market is well supplied with provisions, and is numerously attended by the peasantry and farmers of the Grampian mountains. Coarse canvass and various other brown linens are manufactured very extensively. Three or four millions of yards are annually stamped, and several plash-mills and other machinery are established on the rivulet called the Gaire. There are several schools, one of which is endowed with 1700*l*. The population in 1831 was 5056.

Cupar-Angus, so called in contradistinction from Cupar, the county town of Fife, is a small neat market and post town, and a burgh of barony, on the Perth boundary line of the county, about eight miles south-west of Forfar. A magnificent Cistercian abbey, founded here in 1164, by Malcolm IV., on the site of a Roman camp formed by Agricola, still exists in ruins. Coarse linen fabrics are largely manufactured. There are also extensive bleaching-grounds, a large tannery, a well-endowed school, &c. Population in 1831, 2622.

Antiquities. Religious Buildings.—The first monastic churches and cathedrals in this and other counties in Scotland were erected on the sites of the religious schools and cells of the Celedes or Culdees, that is, the primitive Christians who having been banished beyond the Roman empire in the persecutions of the early emperors, sought refuge in these mountain wilds, where, on the revered spots already consecrated by the solemn rites of the Druids, they taught the doctrines and morality of the Christian gospel together with the sciences, so called, of that period. Their name is generally supposed to be derived from the fact of their living together in cells. When the Culdees, after a struggle for independence, gave place to the episcopal system, the abbeys and cathedrals at present still partially standing rose upon the ruins of their school establishments, and in the time of David II. a particular diocese with munificent endowments and revenues was conferred upon each of the bishops, who at first were not locally appointed, but exercised their pastoral functions as itinerants. A large portion of this county was included in the diocese of St. Andrews, and in that of Dunkeld. Brechin was the seat first of the Culdees, then of a bishopric of which the revenues were of great amount. On the edge of a deep ravine stands the part of Brechin cathedral which escaped the demolishing zeal of the Reformers. It is partly formed into a commodious parish church. Close by, and joined by a passage, stands one of the curious round towers, of which, though so common in Ireland, only one other specimen exists in Britain, namely, at Abernethey, in the county of Perth. The whole height is 103 feet, that is, 80 feet to the summit of the cylindrical column, and 23 feet from thence to the apex of an octagonal spire. The diameter of the base is 16 feet including the walls, and 12 feet at the top. In the contiguity of position to a church, in form and dimensions, and the appearance of great age, it corresponds to those in Ireland on which so much curious erudition has been expended. Next in dignity to the cathedral of Brechin, but far surpassing it in magnificence and extent, was the monastery of Aberbrothwick, of which the ruins stand on a lofty position overlooking the sea. Although great masses of the building are much defaced and falling, the remaining parts impress every beholder with surprise and religious awe. The church was cruciform 275 feet by 67. The transept 165 feet by 27. A lofty spire stood in the centre, and two magnificent towers still partially remain. A massive building adjoining is supposed to be the baronial prison. This abbey was founded in 1178 by William the Lion, and was dedicated to Thomas à Becket. A very large proportion of the lands of this county once belonged to it, and it served all the purposes of modern hotels, in receiving every comer with the greatest hospitality and supplying all their wants—but without any charge. The Priory of Restennet, of which the remains are on the lake of this name, near the town of Forfar, was a place of great strength accessible only by a drawbridge. Here the valuable effects and records of the monastery of Jedburgh were deposited for greater safety. Hence the appellation

Res tenet. The magnificent monastic church of Dundee has been elsewhere noticed. Many smaller monasteries stood in various other parts of the county.

Military Structures.—Of the antient vitrified forts, which occur in continuous chains along the heights of the northern parts of Scotland, there are three principal remains in this county. The fort, called the Castle of Finhaven, is on a hill of the same name in the parish of Oathlaw, 1500 feet above the surrounding country. It is quadrangular, 476 feet by 83 feet and 125 feet, and constructed on the edge of an elevated, detached, and precipitous rock. The remains of another of these forts is on the summit of a mount in Drumsturdy Muir, parish of Monyfieth. The third is on the top of the Law of Dundee, a remarkably high conical hill on the north of that town. On the remains of this vitrified fort are antient towers, ramparts, and outworks evidently superadded at some subsequent period. Much has been written by learned and scientific antiquaries on the origin and use of these remarkable structures. By some they have been believed to be the effect of volcanic eruptions. Others contend that they were the walls which surrounded the great beacon fires antiently lighted on mountain tops to alarm and assemble the people against the invading armies of their enemies, and that the vitrification of these large masses of stones was produced by the continued action of such prodigious fires. But the fact that these thick walls are found vitrified on the exterior as well as on their interior side, and often not in the middle, is one proof, besides many others, that the masonry was artificially reduced to a solid vitrified mass by a furnace heat applied for the purpose. The art of squaring stones and cementing them with lime-mortar appears to have been not known until after the Roman invasion. (Chalmers's *Caledonia; Vitrified Forts* in the *Encyc. Brit.;* Headrick's *Survey.*) Hill forts are the next in antiquity. Of these there are many in this county. The most important one is on the summit of a very steep conical hill in the parish of Menmuir, north-west of Brechin. The area of the fortress within the walls, which are of great thickness, is oval, 134 yards by 60. On a similar hill to the east, separated from this only by a deep ravine, is another of these forts formed entirely of earth. Two miles south-west of Glammis, on the Sidlaw Hills, there is one of a semicircular form with a wall 335 feet in circuit, 27 feet high, and 30 feet in thickness. On the hills of Dumbarrow, Caerbuddo, and several others, similar forts are partially remaining. They all contain vestiges of rude buildings formed of loose uncemented stones, and are sufficiently large to have held the inhabitants of the surrounding district and their cattle, which in times of danger were driven therein. They have each a well or excavated basin for collecting rain-water, and their situation is always on the top of an insulated and precipitous rock, or hill encircled with deep entrenchments. There are remains of several extensive Roman camps which formed a chain of military positions in a line from the south-west to the north-east sides of the county, including the towns of Forfar and Brechin. The Roman conquests were here first extended by Lollius Urbicus, in the reign of Antoninus Pius, A. D. 140. The encampment at Harefaulds, north of Caerbuddo, is replete with inner and outer works of stone and earth, and might contain an army of 60,000 men. Other similar camps occur in the parishes of Forfar, Brechin, and Oathlaw; the last encloses an area of 80 acres.

Of baronial castles erected during the prevalence of the feudal system there are several magnificent specimens in this county. At Broughty near Dundee are the remains of a very magnificent castle consisting of several massive towers and walls, standing on a rock which juts into the water of the Frith. The vaults of this castle are used for depositing the ice with which the salmon is packed for the London market. On the shore of Lunan Bay are the ruins of Red Castle, so called from being built of red sandstone. A large square tower and parts of extensive outworks are still standing. There are also remains of the Castle of Finhaven, a lofty quadrangular tower and parts of extensive fortifications. Edzel Castle, the Castle of Invermark, Kelly Castle, the Castle of Affleck, and several others present similar remains. Besides these there are numerous vestiges of less important baronial structures, consisting often of a single tower, now inhabited by some poor farmer or day-labourer. All these buildings indicate the great ferocity of antient manners. The lower rooms are vaulted with stone and lighted only by narrow loop-holes small recesses in the massive walls served for dormitories, every entrance was secured with doors and bars of prodigious substance, and on the outer walls of some are iron spikes on which the baron hanged his prisoners, as at the Castle of Finhaven.

Two miles north-east of Forfar is a Druidical circle composed of stones 12 feet in height and 10 in breadth. Monumental stones with curious sculptures, and cairns containing coffins and urns, occur in various parts of the county. Near Cupar Angus is King Arthur's stone or monument, connected with a cairn which is traditionally said to contain the bones of this legendary prince. Glammis and Dunsinane in the neighbourhood are places of great interest, as mentioned in Shakspeare's tragedy of 'Macbeth,' where the hero says—

> 'By Sinel's death I know I'm Thane of *Glammis*'

Here the usurper made his last stand against his pursuers, Macduff and young Seward, who came to restore Malcolm Canmore to the throne. On the hill of Dunsinane was the castle of Macbeth, from which he sallied when, in the words of the poet, he exclaimed,—

> 'I will not yield
> To kiss the ground before young Malcolm's feet,
> Though Birnam wood be come to Dunsinane,
> And those opposed be of no woman born.'
> —— 'Lay on, Macduff!
> And damned be he who first cries "Hold, enough!"'

Two mounds of earth, called Duff's Know and Bellie Duff, contain, it is said, the remains of Macduff and of his antagonist Macbeth. At Glammis is a large erect monumental stone commemorating by means of emblematical sculptures the assassination of King Malcolm II., whose murderers were drowned in escaping in the night across the frozen loch of Forfar. Many curious specimens of Caledonian, Druidical, Scandinavian, Roman, and monastic antiquities have been discovered in this county, as stone-coffins and urns in sepulchral cairns, battle-axes and other weapons, sculptured stones, coins, &c. In a tumulus opened in the parish of Logie Pert stone-coffins were found containing human skeletons of gigantic dimensions. On some of the uncultivated Grampian moors are vestiges of the antient Caledonian dwellings, consisting of large slab stones planted together in a circle without cement.

Houses of Proprietors.—Of these there are about seventy, many of which are distinguished for architectural magnificence and picturesque beauty of situation. The following are a few of the more important:—Glammis Castle, the residence of the earls of Strathmore, is a venerable castellated mansion, about a mile from this village. In the time of Charles II. it was a large quadrangular mass of buildings, with lofty towers and gateways opening beneath them into two spacious courts. Much of the original structure remains, and great additions were made of wings and turrets under the direction of Inigo Jones. The room is still shown in which King Malcolm II. was murdered in 1034. Brechin Castle, the spacious mansion of the Hon. W Maule, was antiently a place of great strength, and stood a siege by Edward III. in 1303, during three weeks. Many additions to the old buildings were made by the earl of Panmure in 1711.

Panmure Hall, 10 miles north-east of Dundee, belonging to the nobleman of this name, is a large antient edifice, containing a fine collection of paintings. It is surrounded by an extensive park and stately plantations. Craigie Hall, two miles east from Dundee, is a handsome mansion, beautifully ornamented by tastefully disposed plantations. Kinnaird Castle, near Brechin, is one of the most elegant modern houses in the county. It is castellated, and from its turrets are seen a circuit of beautiful plantations and pleasure-grounds, and much distant and delightful scenery. Numerous other mansions of the nobility and gentry might be noticed; but for descriptions of them, as well as of many objects of antiquarian interest, which are only briefly named in the present article, reference must be made to some of the works enumerated below.

(Chalmers's *Caledonia;* the Rev. Robert Edwards's *Description of Angus,* 1678—1791; *Beauties of Scotland,* vol. iv. p. 342—375; Grose's *Antiquities of Scotland;* Chambers's *Picture of Scotland,* vol. ii.; *Geographical and Statistical Description of Scotland,* by Dr. Playfair, p. 421—458; Ainslie's *Map of Angus,* in 4 sheets, 1794; Col. Imrie's *Section of the Grampians;* Rev. W. Headrick's *Agricultural Survey of Forfar; New Statistical Account of Scotland;* MacCulloch's *Statistics; Parliamentary Reports, &c.*)

FORFEITURE, the punishment by loss of lands, estates, rights, offices, or personal effects, annexed by law to certain crimes, and also to certain illegal acts or negligence in the holder of lands or offices.

In criminal cases forfeiture is threefold:—1. Of real estates absolutely, as for high treason; if freehold, to the king; if copyhold, to the lord. 2. Of the profits of the real estate, if freehold, to the crown during the life of the offender, and a year and a day afterwards, in the case of petty treason or murder: [Felony]; after which the land escheats to the lord [Escheat]; if it is copyhold, it is at once forfeited to the lord. 3. Of goods and chattels, in felonies of all sorts. Some other cases of forfeiture of lands or goods, or both, are established by different statutes, as the statutes of premunire, &c.

Lands are forfeited upon attainder, and not before [Attainder]: goods and chattels, upon conviction. The forfeiture of lands has relation to the time of the offence committed; the forfeiture of goods and chattels has not, and those only are forfeited which the offender has at the time of his conviction. A *bonâ fide* alienation of his goods and chattels made by a felon or traitor between the commission of the offence and his conviction, is therefore valid.

Forfeiture, in civil cases, takes place where a tenant of a limited, or, as it is called, a particular estate, grants a larger estate than his own, as where a tenant for life or years assumes to convey the fee-simple. So, if a copyholder commits waste, or refuses to do suit of court, or a lessee impugns the title of his lessor; for in all these cases there is a renunciation of the connexion and dependence, which constitute the tenure, and which are an implied condition annexed to every limited estate.

Forfeiture may also be the consequence of the breach of express conditions or covenants between landlord and tenant, or persons connected in tenure; but in cases of forfeiture where compensation can be made for the breach of the condition, a court of equity will compel the party entitled to the forfeiture to accept compensation. The right to take advantage of a forfeiture may also be waived by any act of the person entitled which recognizes the continuance of the title in the particular tenancy, as, for instance, the receipt of rent by a landlord in respect of a time subsequent to the act by which the forfeiture is incurred.

Lands may also be forfeited by alienation contrary to law, as by alienation in mortmain without licence, or to an alien: in the former instance, if the immediate lord of the fee, or the lord paramount, neglect to enter, the king may; and in the latter, though the conveyance is effectual, yet as an alien cannot hold lands the king may enter, upon office found. [Office Found.]

Offices are forfeited by the neglect or misbehaviour of the holders; and the right to the next presentation to ecclesiastical benefices is forfeited by simony and by lapse. Simony is the corrupt presentation of any one to an ecclesiastical benefice for money, gift, or reward. Lapse is where the patron neglects to present to a benefice within six months after it has become vacant, in which case the right to present accrues to the ordinary; by neglect of the ordinary for the same space of time, to the metropolitan; and by the like neglect of the metropolitan, to the king. [Benefice.]

FORFICU'LIDÆ, a family of insects belonging to the order Orthoptera, and, according to some authors, constituting the order Dermaptera.

To this family belong the various species of earwigs. They are distinguished from the orthopterous insects (excepting the Blattæ and the Mantis tribe, which, with the Forficulæ, constitute Latreille's family *Cursoria*) by having the posterior legs formed for running: their wings, when folded, are almost always disposed horizontally on the body: the females have no corneous ovipositor; both sexes however are furnished with two corneous forcep-like appendages at the hinder extremity of the body: the antennæ are slender, filiform, inserted before the eyes, and vary considerably as to the number of their joints: the thorax is generally of a rounded form, and but slightly convex.

The family Forficulidæ is divided by Dr. Leach into three genera, the principal characters of which are taken from the number of joints to the antennæ. This first genus, that to which he restricted the name of *Forficula*, is distinguished by having fourteen joints to the antennæ. In the next genus (*Labidoura*) the antennæ have thirty joints; and in the last, the genus *Labia*, the antennæ are twelve-jointed.

To the first of these genera belongs our common earwig (*Forficula auricularia*, Linn.), an insect too well known to require a description.

Earwigs appear to prefer damp situations, are found under stones, and under the bark of trees, frequently in great abundance. They are also found in flowers, which they destroy by eating the leaves, &c.

A remarkable fact connected with the habits of the earwig is, that the female sits upon her eggs in the manner of the hen; and the young (which resemble the parent, except in being of a paler colour and having neither wings nor elytra), as soon as they are hatched, creep under the belly of the mother for protection.

The wings of the earwig are transparent, of large size, and when expanded are shaded like a fan; the principal nervures radiate from one point near the anterior margin. These organs, when not in use, are folded beneath two small horny wing-cases; and hence to the common observer the animal appears wingless.

The male and female common earwig differ considerably in their anal forceps, those of the female being less curved and destitute of a tooth-like process which is observed on the inner side at the base of the forceps of the male.

There is in this country another species of earwig, almost equally common with that we have just noticed, but which is of a much smaller size. It is found about hot-beds and dunghills, and differs from the common earwig somewhat in its habits as well as in its structure. This belongs to the genus Labia.

One species of the genus Labidoura is also found in England, but is of rare occurrence. It is of a much larger size than the common earwig.

FORGERY is the false making, counterfeiting, altering, or uttering any instrument or writing with a fraudulent intent, whereby another may be defrauded. The offence is complete by the making the forged instrument with a fraudulent intent though it be not published or uttered, and the publishing or uttering of the instrument, knowing it to be forged, is punished in the same manner as the making or counterfeiting.

It is by no means necessary to bring the offence within the legal meaning of the term forgery, that the name of any person should be counterfeited, though this is the most common mode in which the crime is committed; thus a man is guilty of forgery who antedates a deed for the purpose of defrauding other parties, though he signs his own name to the instrument; and the offence is equally complete, if a man being instructed to make the will of another, inserts provisions of his own authority. In truth the offence consists in the fraud and deceit..

At common law the crime of forgery was only a misdemeanour, but as the commerce of the country increased and paper credit became proportionally extended, many severe laws were enacted, which in most cases made the offence a capital felony.

The extreme severity of these laws tended to defeat their object, and parties very frequently chose rather quietly to sustain the loss inflicted upon them by the commission of the offence, than by a prosecution to subject the offender to the loss of life. This feeling, and the diffusion of the truth, that the object of all laws is to prevent crime and not merely to punish, has caused successive mitigations in the laws relating to forgery, and now by the statute 11 Geo. IV. and 1 W. IV. c. 66; 2 and 3 W. IV. c. 59, and 1 Vict. c. 84, the punishment of death is abolished in cases of forgery, and a punishment varying between transportation for life and imprisonment for two years, is substituted. (1. Hawk, P. C.; Russell *on Crime;* Deacon's *Criminal Law.*)

FORK (Anglo-Saxon *forc;* the same as the Latin *furca*), an instrument divided at the end into two or more prongs for various uses, especially for the table. Addison speaks of a thunderbolt with three forks. It is sometimes used for an arrow, and in old English for a gallows or gibbet. Butler, in his 'Remains,' ii. 195, says, 'They had run through all punishments, and just 'scaped the *fork*'

The agricultural, or dung-fork, and a large fork for the flesh-pot, were the only implements of this name apparently in use among our early ancestors. The first mention of table or eating forks is found in the 'Chronicon Placentinum' of John de Mussis (*Muratori*, vol. xvi. p. 584), a writer of the early part of the fifteenth century, who, when speaking of the luxuries of the people of Piacenza recently introduced, says, 'they use cups, and spoons, and *little forks* of silver' ('et utuntur taciis, cugiariis, et *forcellis* argenti'). Coryate, in his 'Crudities,' edit. 1611, p. 90, announces himself as the person who introduced this Italian fashion into England. He says, 'Here I will mention a thing that might have been spoken of before, in discourse of the first Italian town. I observed a custom in all those Italian cities and towns through the which I passed, that is not used in any other country that I saw in my travels, neither do I think that any other nation of Christendom doth use it, but only Italy. The Italian, and also most strangers that are commorant in Italy, do always at their meals use a little fork when they cut their meat. For while with their knife, which they hold in one hand, they cut the meat out of the dish, they fasten their fork, which they hold in their other hand, upon the same dish, so that whatsoever he be that, sitting in the company of any others at meal, should unadvisedly touch the dish of meat with his fingers from which all at the table do cut, he will give occasion of offence unto the company, as having transgressed the laws of good manners, insomuch that for his error he shall be at the least brow-beaten, if not reprehended in words. This form of feeding, I understand, is generally used in all places of Italy, their forks being, for the most part, made of iron or steel, and some of silver, but those are used only by gentlemen. The reason of this their curiosity is, because the Italian cannot by any means endure to have his dish touched with fingers, seeing all men's fingers are not alike clean. Hereupon I myself thought good to imitate the Italian fashion by this forked cutting of meat, not only while I was in Italy, but also in Germany, and oftentimes in England since I came home: being once equipped for that frequent using of my fork, by a certain learned gentleman, a familiar friend of mine, one M. Laurence Whitaker, who, in his merry humour, doubted not to call me at table *furcifer*, only for using a fork at feeding, but for no other cause.' Coryate's testimony is confirmed by Fynes Morison, in his 'Itinerary,' P. i. p. 208, fol., 1617, who, speaking of his bargain with the patron of the vessel which conveyed him from Venice to Constantinople, says, 'he gave us good diet, serving each man with his knife, a spoon, and a fork.' (See also Ben Jonson's *The Divell is an Asse*, act v. sc. 3; and his *Volpone*, act iv. sc. 1.)

Even when Heylin published his 'Cosmography,' in 1652, forks for the table were still a novelty (see his third book); where, having spoken of the ivory sticks used by the Chinese, he adds, 'the use of silver forks with us by some of our spruce gallants taken up of late, came from hence into Italy, and from thence into England.'

FORLI', LEGAZIONE DI, a province of the papal state, is bounded on the north by the province of Ravenna, on the west by Tuscany, on the south by the province of Pesaro ed Urbino, and on the east by the Adriatic. Its area is reckoned at 1232 square miles, with a population of 188,000 inhabitants, distributed in 8 towns, 32 terre having a communal council, and 404 villages or hamlets. (Calindri; Neigebaur.) The province is watered by the Rabbi, Ronco, Savio, Marecchia, and other rivers which have their sources in the Tuscan Apennines and empty themselves into the Adriatic. The country is in part hilly, being occupied by offsets from the Apennine chain, which extend towards the Adriatic; the climate is healthier than that of the neighbouring flats of Ravenna. The principal productions are corn, oil, wine, flax, hemp, fruits, and silk. There are manufactories of silk, linen, and oil-cloth, and refineries of sulphur, which is found in the province. The chief towns are—1. Forlì, the antient Forum Livii, which is said to have been built after the victory of the Metaurus, and to have taken its name from M. Livius Salinator, one of the two consuls who defeated Hasdrubal. The present town is well built: the streets are lined with arcades. It has a fine square, several handsome palaces and churches with paintings by Carlo Maratti, Guido, Guercino, Cignani, and other masters, a Lyceum, and fine public walks. Forlì is a bishop's see and the residence of the legate. The population of Forlì is 14,700. 2. Cesena, a pretty town in a fertile country near the foot of the Apennines, watered by the river Savio, over which is a fine bridge, has a handsome town-house on the market-place, which is adorned by a colossal statue of Pius VII. (Chiaramonti), who, as well as his predecessor, Pius VI., was a native of this town. Cesena is a bishop's see, has a college for clerical students, and a valuable public library, collected by the Malatesti, who were lords of Romagna in the Middle Ages. it is rich in MSS., among which is a curious work of St. Isidorus, bishop of Seville in the seventh century, entitled 'Etymologiæ,' which is a kind of cyclopædia. (Valéry, *Voyages Littéraires en Italie.*) The population of Cesena is 9500. On a hill outside of the town is the Benedictine convent of La Madonna del Monte, the work of Bramante. 3. Half way between Forlì and Cesena is the little town of Forlimpopoli, the antient Forum Popilii, with a collegiate church, a castle built by Cesare Borgia, and about 2000 inhabitants. 4. Savignano, on the road from Cesena to Rimini, near the site of the antient Compitum, has some good buildings and about 3000 inhabitants. Near Savignano flows a small river, called Fiumicino, which is now generally believed to be the antient Rubicon: it joins below Savignano, another stream, called Pisatello, which flows nearer to Cesena, after which the united stream enters the Adriatic. A Roman bridge is thrown across the Fiumicino. Near it, on a pillar, is an apocryphal inscription, (which has been mistaken by some for an antient one,) containing the senatûs consultum, which forbade, under the heaviest penalties, any commander to cross the Rubicon in arms. 5. Rimini, the Roman Ariminum, a considerable town with 13,450 inhabitants, situated near the mouth of the river Marecchia, which is crossed by a handsome marble bridge of five arches and 220 feet long, begun under Augustus and finished under Tiberius, and still in very good preservation. The sea having receded all along this coast, the antient harbour of Ariminum is now choked up with sand; but there is a small harbour at the mouth of the Marecchia which admits vessels of light burden, by which Rimini carries on some trade by sea. At the eastern entrance of the town, on the road to Rome, is a fine triumphal arch, raised to Augustus [ARCH, TRIUMPHAL], of which an elaborate description has been recently published—*Illustrazione dell' Arco di Augusto, con otto Tavole di Rome*, by the Engineer Brighenti; Rimini, 1825. There are also some remains of an amphitheatre, besides inscriptions and other marbles found on the site of the antient harbour. Rimini, with its Roman monuments, appears a fit entrance into the limits of the classical part of Italy. Among the modern buildings is the church of St. Francis, which Leon Battista Alberti raised by order of the Malatesti, lords of Rimini, and which is adorned with the mausolea of that distinguished family of the Middle Ages; and the fortress, which was also erected by the Malatesti. Rimini has a good library of 30,000 volumes, founded in 1617 by the advocate Alessandro Gambalunga, and which contains MSS. chiefly concerning the history of the town, and a museum of antiquities and a college or Lyceum. 6. Sarsina, at the foot of the Apennines, south-west of Rimini, an antient city of the Umbri, and the birthplace of Plautus, is now a decayed town surrounded by walls, with only 325 inhabitants. 7. Cesenatico, on the sea-coast, north-east of Cesena, in a plain abounding with wheat, Indian corn, and hemp, has 4440 inhabitants, including its territory.

The province of Forlì is one of the finest and richest in the papal state; and the road from Rimini to Bologna is one of the pleasantest in Italy, leading through a succession of neat, considerable, and cheerful-looking towns, in a fine well-cultivated country, with a landscape heightened by a constant view of the Apennines of Tuscany.

FORM. Everything that exists may collectively be termed the 'something,' in opposition to the 'nothing.' This 'something' divides itself into four great divisions namely things, ideas, forms, and appearances. Form is the manner and mode in which a thing is presented to our conceptions. Things are of two descriptions: immaterial as faculties and intellect; and material, as matter and bodies. The forms of the immaterial things are called categories; the forms of the material we may call figures: the form of appearances retains the name of form; and ideas are formless. The categories, according to the opinion of the writer (founded upon those of Aristotle, Kant, and many others), are the following:—1. Categories of position,—to be, not to be, and to become; 2. Categories of quality,—substance, accident, and mode; 3. Categories of relation,—cause, effect, and action and reaction; 4. Categories of quantity,—universality, multiplicity, and unity. The logical categories are possibility, actuality, and necessity. [CATEGORY.] The figures, on account of their variety, do not admit of being classified, yet we may divide them according to the senses, into shapes, colours, sounds, smells, and tastes, and into the different modes of feeling

Form is distinguished from the real nature of things, and, considered in this point of view, the idea of form is practically used in common speech and in science. Thus we speak of a form of law, a form of government, a beautiful form, a logical form, &c. Whoever esteems the form of anything more highly than the thing itself, or through narrow-mindedness confounds the one with the other, is a formalist, as many learned men and official persons are.

FORMA PAU'PERIS. By the statute 11 Hen. VII. c. 12, every poor person having cause of action or suit shall have, by the discretion of the chancellor, original writs or subpœnas, without paying for writing or sealing the same; and the judges of all courts of record, where such suit shall be carried on, are authorised to assign clerks to write, and counsel and attorney to act for such person, without taking any reward. It is discretionary with the court to grant this indulgence, but it is rarely refused upon petition, supported by affidavit that the petitioner is not worth 5*l.* in the world after paying his just debts, exclusive of his wearing apparel, and the right to the matter in controversy, and by a certificate by a barrister that he has good cause of action or suit. This statute extends only to plaintiffs in civil suits at law, but the courts of common law have a discretionary power to allow a party indicted to defend as a pauper, though without special cause shown the advantage is never given to a prosecutor. The Court of Chancery, to which the statute 11 Henry VII. does not apply, has, from an early period, permitted parties to sue and defend as paupers upon the same conditions as the courts of law, though in that court, it seems, if the party be in possession of the subject matter in dispute, and that should be worth more than five pounds, he cannot except it in his affidavit, and therefore will not be regarded as a pauper. The privilege may be granted either at the commencement of the suit, or at any period of its progress, but if granted during the pendency of the suit, it has no retrospective effect, and the party is not relieved from the costs previously incurred.

A person allowed to sue *in formâ pauperis* pays neither for stamps, nor fees to the officers of the court, but if he obtains a verdict with damages above 5*l.*, the officers take the fees. In case of improper or vexatious conduct on the part of the pauper, the courts will sometimes, though rarely, deprive him of the privilege, which is called dispaupering him; but it seems that in such cases a pauper plaintiff is never ordered to pay costs to the defendant, though, according to Blackstone, a pauper, if non-suited in his action, formerly had his election either to be whipped or pay costs. (3 Bl. *Com.* 400; and the various books of practice relating to costs in equity and at law.)

FORMEDON (a compound of the two Latin words *forma doni*), one of the many writs in use under the old law for commencing a real action, before the more convenient mode of trying titles to land by ejectment was established. [EJECTMENT.] It was the peculiar remedy of a tenant in tail, and the highest he could have, and was therefore called tenant in tail's writ of right. The writ of right was granted to such only as claimed the fee simple, for which reason the statute *De Donis* (Westm. 2. 13 Ed. I.) gave this writ to tenants in tail.

The writ was of three kinds; formedon in the descender, in the remainder, and in the reverter, according as the plaintiff alleged his title to have accrued by descent, in remainder, or in reversion. This writ, together with all the others used for the commencement of real actions, was abolished by 3 and 4 Will. IV. c. 27, s. 36.

FORMENTE'RA. [BALEARIC ISLANDS.]

FORMIC ACID, or acid of ants. When these insects are irritated they emit a sour fluid which contains both formic and malic acids; and when repeated quantities of ants have been infused in boiling water, an acid as strong as vinegar is obtained, and has been used for the same purposes. In order to procure formic acid, Gehlen saturated this acid liquor by adding carbonate of potash, precipitating the foreign matters by sulphate of iron, evaporating the solution to dryness, and distilling the residue with sulphuric acid, by which formic acid comes over and is condensed in the receiver, and sulphate of potash remains in the retort.

It has been since shown by Dobereiner that formic acid may be prepared artificially: he heated in a retort 5 parts of sulphuric acid diluted with 15 of water, with 2 parts of crystallized tartaric acid and 5 of binoxide of manganese: by the mutual action of these substances carbonic acid is obtained, which escapes in the gaseous state, and dilute formic acid is condensed in the receiver: this dilute acid is to be saturated with potash, and the resulting formiate, when decomposed by sulphuric acid, yields concentrated formic acid. Professor Emmet (*Lond. and Edin. Phil. Mag.*, vol. xi. p. 399,) has shown that formic acid may be obtained by the action of sulphuric acid and water upon rye or maize, when heated to the boiling point, with precautions mentioned.

The properties of formic acid are, that it is a colourless liquid; its smell is pungent, and its taste very acid; its specific gravity is 1·1168, and, when anhydrous, it consists of

One equivalent	of hydrogen . . .	1
Two ,,	of carbon	12
Three ,,	of oxygen	24
	Equivalent	37

These elements are equal to 1 equivalent of water and 2 equivalents of oxide of carbon, and by the action of sulphuric acid it is resolved into these compounds.

Concentrated formic acid contains 19½ per cent. of water among other peculiarities of formic acid, serving to show that it is different in properties from acetic acid, are the effects which it produces in not precipitating protoxide of mercury from solution as acetic acid does, unless heated, and then metallic mercury is thrown down, with brisk effervescence. Oxide of lead is precipitated from a solution of the acetate by this acid.

The only use to which formic acid is applied has been mentioned. Its saline compounds are termed formiates; and although these are subjects of some curiosity, no one of them is used so as to require a particular description.

FORMIC ÆTHER may be obtained by distilling a mixture of formic acid and alcohol; but it is much better procured by distilling a mixture of 10 parts of concentrated sulphuric acid, 7 of formiate of soda, and 6 of alcohol. The distilled product should be mixed with water to separate the alcohol which it contains, then agitated with magnesia to saturate any excess of acid, and lastly, freed from water by distillation with chloride of calcium. This is Dobereiner's process.

Formic æther is a colourless liquid, of a strong odour resembling that of peach kernels: its taste is peculiar. Its specific gravity is 0·915 at 65°, and it boils at 132° Fahr. It combines with alcohol in all proportions; but water unites with only ⅕th of its weight; and after some time the solution is found to be converted into a mixture of alcohol and weak formic acid: this æther burns in the air with a blue flame, the edges and point of which are of a bright yellow. This æther has not yet been analyzed, but Dr. Thomson, judging from analogy, thinks it is probably a compound one equivalent of formic acid and one of æther.

FORMOSA. [TAÏ-WAN.]

FORMO'SA, RIO, a river in Africa, falling into the Bay of Benin, is also sometimes called Benin, from traversing the kingdom of that name. Its mouth, which alone is known to Europeans, is in about 5° 45′ N. lat. and 5° 5′ E. long. It traverses a flat alluvial country. Lander, in his descent of the Quorra, was told by the natives that the considerable branch which at the town of Kirree turns off to the westward runs down to Benin. Hence it is conjectured that the Rio Formosa is only the most northern of the branches, into which the Quorra divides after entering its extensive delta.

FORMO'SUS, Bishop of Porto, was raised to the see of Rome, A.D. 891, after the death of Stephen V. He had acquired a reputation for learning and piety, but being in opposition to John VIII., in the matter of the election of a new emperor, that pope had deposed him in 878, but Martin II., John's successor, honourably re-instated him in his see. His conduct, after his exaltation to the papal see, was both firm and moderate, as is shown by his letters relative to the schism of Photius, as well as by those which he wrote to Eudes, the competitor of Charles the Simple, and to the bishops of Gaul, exhorting them not to disturb Charles in the possession of the crown. In one instance, however, he has been accused of tergiversation. In February, 892, he crowned Lambert, son of Guido, as colleague to his father in the kingdom of Italy, but soon after, in consequence of disputes between Guido and the

Roman see, Formosus wrote to Arnulph, king of Germany, inviting him to come to Italy and assume the crown. Arnulph came to Italy and was crowned at Rome by Formosus in the beginning of the year 895, after the death of Guido. The history of that period and of the various competitors to the crown of Italy is extremely confused. Formosus died in April, 895, and was succeeded by Boniface VI., who, dying a few days after, was succeeded by Stephen VI., by some styled the VII., who having taken the part of Lambert against Arnulph, instituted proceedings in a council against the memory of Formosus, and had his body disinterred. Romanus however, who succeeded Stephen, in a council held at Rome, in 898, rescued the character of Formosus from this stigma, had his body honourably buried again, and declared the acts of his pontificate to be legal and valid.

FORNAX (Constellation), the Chemist's Furnace, one of the southern constellations of Lacaille. It is situated immediately below Cetus.

Character.	No. in Catalogue of		Magnitude.
	Piazzi ( ). Lacaille C.	Astron. Soc.	
κ	(73)	246	6
	(107)	260	6
τ	(114)	396	6
ω	(122)	267	6
δ	(142)	408	5
σ	(169)	420	6
υ	(194)	305	5
β	(195)	306	5
γ^1	(198)	309	6
ζ	(241)	327	6
ι	(248)	333	6
ο	(257)	347	6
	233 C	337	6

FORSKAL, PETER, a celebrated naturalist and oriental traveller, was born in Sweden, in the year 1736. After studying at Göttingen, where he published a dissertation under the title of 'Dubia de Principiis Philosophiæ recentioris,' by which he gained some credit, he returned to his native country. In 1759 he wrote his 'Pensées sur la Liberté Civile,' a pamphlet which did not prove agreeable to the ruling powers of Sweden. A fondness for natural history had brought him acquainted with Linnæus, then at the zenith of his fame, by whom he was favourably recommended to Frederick V., king of Denmark. In 1761 he obtained the title of professor at Copenhagen, and having been distinguished for his acquaintance with oriental languages, he was selected to join Niebuhr and others in an expedition to investigate Egypt and Arabia. After visiting Marseilles, Malta, some of the Greek islands, and Constantinople, he arrived at Alexandria. For about a year he remained stationary in Cairo and its vicinity; he afterwards visited Suez, and entering Arabia by Loheia, he penetrated by way of Beit el Fakih and Zebid as far as Mocha; thence crossing the mountains to Taes and Abb, he eventually and with difficulty reached Jerim, where he died on the 11th of July, 1763. In the course of this journey, although robbed and ill-treated by thieves near Alexandria and elsewhere, suffering from constitutional timidity, and often bowed down with sickness, he investigated with such extraordinary energy and perseverance the natural productions, especially the plants, of the places he visited, that although he never lived to arrange his papers, the account of the vegetation of Egypt and Arabia, compiled after the return of his companions to Europe, is a model of the manner in which such investigations should be conducted. From his friend and companion Niebuhr, to whom the care of editing Forskal's MSS. was intrusted, we have a 'Fauna Orientalis,' under the title of 'Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium, quæ in itin. orient. observavit Petrus Forskal,' 1775, 4to.; and in the same year and form appeared a 'Flora Ægyptiaco-Arabica,' or an account of the plants found in Lower Egypt and Arabia Felix. This latter work is very remarkable as an illustration of the philosophical mind of Forskal, and is far in advance of the works of a similar kind published by the followers of Linnæus. It is one of the first books in which the relation of vegetation to climate is taken as a great object of consideration, and may in fact be quoted as one of the earliest steps made in geographical botany. We here find an attempt to show the existence of geographical parallels of vegetation, and the remarkable assertion that, 'Given the specimens of plants, you may find the latitude of a country, the elevation of its surface, and the zones of vegetation upon its mountains, from their foot to their highest peaks.' The 'Flora Ægyptiaco-Arabica' is to this day the only good account we have of the plants of those countries, and it may be even doubted whether we have upon the whole so satisfactory a view of the vegetation of any extra-European region. We have 'Floras' with more systematic learning; we have works much more complete in their details, more technical, more laboured, more diffuse, prepared with all the advantages of leisure, experience, and the resources of rich herbaria; but if the botanist is asked to point out one as philosophical, as well contrived, as useful, as rich in valuable observations upon climate, air, soil, native names, and similar important matters, we know not to what other he could refer. Linnæus fixed the name of Forskal to his own Caidbeja adhærens, a worthless Arabian weed, under the title of F. tenacissima; but we are assured by a panegyrist of the great Swedish botanist, that in doing so he intended to compliment rather than satirize the character of his unfortunate countryman.

FORSTER, JOHN REINHOLD, was born in 1729, at Dirschau in Western Prussia, of which town his father was burgomaster. Having studied at Halle, he was appointed in 1753 to the cure of Vassenhoff near Danzig. In 1765 he accepted an offer to go to Russia to take the direction of the new colony established by Catherine at Saratof; but he soon left it in disappointment, and proceeded to England in 1766, where he became known to Mr. Banks and others for his acquirements in natural history. During his residence in England he employed himself for some years as teacher in a Dissenters' school at Warrington in Lancashire. Through Mr. Banks's interest he was appointed naturalist to the second expedition under Captain Cook, and he sailed, together with his son George, on board the Resolution, in July 1772. A sum of 4000*l.* was granted by parliament for his expenses, besides which it was verbally understood between him and the Honourable Daines Barrington, in the name of Lord Sandwich, that Forster should be employed on his return to write the history of the voyage, and receive the profits of the publication. In the course of the voyage repeated disagreements took place between Forster and the officers of the expedition, and Captain Cook himself appears to have censured Forster's indiscretion and want of temper. After the return of the expedition in July 1774, a controversy arose between Forster and Lord Sandwich about writing the narrative of the voyage. It was at last settled that Forster should write the philosophical, and Cook the nautical parts of the work. Forster's MSS. were to be subject to Barrington's correction; but on presenting a specimen of his intended work, he was told that he must not write a connected narrative but only detached observations, and ultimately even these were rejected. The consequence was that Cook's journal appeared alone. Meantime Forster, the son, published a separate account of the voyage in 1777; a circumstance which indisposed the Admiralty still more towards his father, who was believed to have had the principal share in the work, and who thus lost all hopes that he might have entertained of remuneration. Forster's account of the transactions is given in the letters of his son George to Lord Sandwich, and to Mr. Wales, who had written strictures on Forster's narrative. In 1778 Forster returned to Germany, and was well received at Berlin by Frederic the Great, and was soon after made professor of natural history and mineralogy at Halle, where he remained till his death, in December, 1798.

Forster was a man of vast information both in the natural sciences and in philosophy, and general literature. His principal works are:—1. 'De Bysso Antiquorum, 1775;' 2. Characteres Generum Plantarum quas in insulis Maris Australis collegit J. R. Forster,' 4to., 1776; 3. 'Observations faites dans un Voyage autour du Monde, sur la Géographie physique, l'Histoire Naturelle, et la Philosophie Morale,' 4to. 1778. This work was translated into various languages, and forms a good supplement to Cook's journal, although the tone of Forster's observations is not always in accordance with sound criticism. 4. 'Zoologia Indica,' 1781; 5. 'Histoire des Découvertes et Voyages faits dans le Nord, 1784;' 6, 'Tableau de l'Angleterre pour l'année 1780,' a satirical work written under the influence of disappointment and animosity, and consequently with little discrimination.

FORSTER, JOHN GEORGE, son of John Reinhold Forster, accompanied his father in the voyage with Captain Cook, and published an account of the same in 1777, which involved him and his father in an unpleasant controversy. This narrative does not differ materially in the facts from Cook's journal. Forster however has added to his work various observations, which he considered as philosophical, but which are often only declamatory. His book was translated into German, French, Swedish, and other languages. Forster having returned to the Continent, was made professor of natural history at Cassel, and afterwards at Wilna, from which last place he returned to Germany about 1788, and was appointed librarian to the elector of Mayence. After the French took Mayence in 1792, Forster, who had become enthusiastic in the cause of the Revolution, was chosen by the republicans of that city to proceed to Paris, as their representative, to request the incorporation of Mayence with the French republic. While he was at Paris on this mission, the Prussians re-took Mayence, and Forstor lost all his property, including his books and MSS. This loss, and other domestic disappointments, made him resolve on leaving Europe, and he planned a journey to India and Tibet, preparatory to which he applied himself to the study of the Oriental languages; but he fell ill soon after, and died in January, 1794. He left several works; among others, 'Ansichten von Nieder Rhein, von Brabant, Flanders, Holland, England, und Frankreich in 1790,' in three parts, of which the last was published after his death, Berlin, 1794. This work was translated into French under the title of 'Voyage Philosophique et Pittoresque sur les Rives du Rhin, &c.,' 3 vols. 8vo., Paris, 1795-6. The last volume contains an essay on the history of the fine arts in Great Britain. Forster wrote also 'Herbarium Australe,' several memoirs on natural history, and various political and philosophical sketches and pamphlets.

FORSTER, GEORGE, a civil officer in the service of the East India Company, is chiefly known by his journey in 1782 over-land from India to Russia. He set off from Lucknow in December, 1782, and directed his route to the north by Ferahabad, Rampoor, and by the pass of Lall Dong into the upper regions of the Punjab, avoiding the country of Lahore, which was possessed by the Seiks. He then proceeded by Bellaspoor and Jombo into the great alpine valley of Cashmere, which had not been visited by any European travellers before him, Bernier excepted. Forster's account however proved much moro full and satisfactory than that of Bernier. Quitting Cashmere, Forster proceeded to Cabul, crossing the Indus about twenty miles above Attock. From Cabul he followed the caravan road to Candahar, and thence by Herat to the southern coast of the Caspian Sea. From Oude to the Caspian he was nearly twelve months on his journey, the distance being 2700 miles, amidst all sorts of dangers and privations, which were much greater at that time than they would be at present. He embarked at last at Meshed Ser on the Caspian, and sailed from thence to Baku and Astrakan, from which last place he travelled to Moscow and Petersburg, where he arrived at the end of May, 1784. On his arrival in England he published some sketches of Hindoo mythology. He afterwards returned to India, and published in 1790 at Calcutta the first volume of his narrative—Journey from Bengal to England through the most northern parts of India, Kashmere, Afghanistan, and Persia, and into Russia by the Caspian Sea.' On the commencement of hostilities with Tippoo Sultan, Forster was sent as envoy to the Mahratta court of Nagpore in Deccan, where he died in 1792. The MS. of the sequel of his journey was sent to England, where it was published by a booksoller in a second volume, but was edited without much care. Tho whole work was translated into French by Langlès: 'Voyage de Bengale à Petersburg,' 3 vols. 8vo., Paris, 1802. Forster added to his narrative two interesting notices of the Seiks and the Rohillas.

FORSTERITE, a crystallized mineral, the primary form of which is a right rhombic prism. The crystals are colourless, translucent, brilliant, and small; they are harder than quartz. This substance occurs at Vesuvius accompanied by pleonaste and pyroxene. It has not been accurately analyzed, but contains silica and magnesia

FORT, LE. [LEFORT.]

FORT ROYAL. [MARTINIQUE.]

FORTE (Italian *strong*, *loud*), a musical term, directing the performer to sing or play loudly, with strength.

Fortissimo is the superlative of *Forte*.

FORTESCUE, SIR JOHN, KNT., an eminent lawyer, lord chief justice of England in the reign of Henry VI., and afterwards chancellor. He was the author of a treatise 'De Laudibus Legum Angliæ;' a work which has been several times quoted with the highest approbation from the bench, illustrated by the notes of Selden, and recommended by such writers as St. German and Sir Walter Raleigh, in former times, and by every writer who has since given directions for the study of the law. It has been several times translated into English. It is in the form of a dialogue between himself and the young prince Edward, with whose education he appears to have been intrusted. The author undertakes to show that the common law was the most reasonable and the most antient in Europe, and superior to the civil law and the laws of other countries. He considers at length, in particular, the mode of trial by jury; and after examining some other points of difference between the civil and the common law, he concludes with a short account of the societies where the law of England was studied. This book, as well as the other works relating to English law of an early date, is written in a bold style, and displays many sentiments upon liberty and good government, which are very remarkable, considering the fierce and barbarous period at which they were written. 'We cannot,' says Chancellor Kent, 'but pause and admire a system of jurisprudence which, in so uncultivated a period of society, contained such singular and invaluable provisions in favour of life, liberty, and property as those to which Fortescue referred. They were unprecedented in all Greek and Roman antiquity, and being preserved in some tolerable degree of freshness and vigour amidst the profound ignorance and licentious spirit of the feudal ages, they justly entitle the common law to a share of that constant and vivid eulogy which the English lawyers have always liberally bestowed upon their municipal institutions.' The English translation of the treatise 'De Laudibus Legum Angliæ,' and the original Latin text, together with somo notes by Mr. Amos, were published in 1825 at the expense of tho University of Cambridge. (Kent's *Comm.* Reove's *Hist. Eng. Law.*)

FORTH, a river in Scotland, which rises in the mountains separating the western extremity of Loch Cateran or Katrine from Loch Lomond. It is formed by two branches, which after a course of sixteen and twelve miles respectively, unite at Aberfoyle: this united river receives the name of Forth. At Aberfoyle the river issuing from between the mountains, enters a wide valley, which is surrounded by hills rising to a moderate elevation and generally with a gentle slope. From the north it is joined by three tributaries of some note, the Teith, which drains the mountainous country north of Loch Cateran, the Allan, which runs through Strathmore, and the Devon, which brings down the water collected in the greater portion of the Ochill Hills. No considerable river joins it from the south. At the place where it unites with the Devon, the river, which higher up is only a stream of moderate size, begins to widen, and gradually assumes the appearance of a gulf, especially after having passed Kincardine. This gulf, called the Frith of Forth, increases in width in its progress to the east, and joins the North Sea between Fifeness and the rocks of Tantallan Castle, where it is about fifteen miles across. The source of the Forth is not much more than thirty miles from the mouth of the Devon in a straight line, but as it flows in the valley with many sinuosities, its real course is stated to exceed considerably twice that length. The length of the Frith from west to east rather exceeds fifty miles. The Forth is by no means a rapid river below Aberfoyle, and may be navigated by vessels of seventy tons burden as far as Stirling; but as its course is extremely tortuous between Stirling and Alloa, it is not much navigated in this part. To Alloa, which may be regarded as its principal port, ships of 300 tons burden may ascend. On the southern shores of the firth, near the mouth of the river Carron at Grangemouth, the canal commences, which joins the Forth and the Clyde; and contiguous to it on the east, between Grangemouth and Queensferry, is good and secure anchoring ground in the bay. The countries along the northern and southern shores of the Frith comprehend the most fertile and best cultivated parts of Scotland. (MacCulloch's *Highlands, &c.*; Sinclair's *Stat. Account.*)

FORTIFICATION is the art of constructing works for the protection of a town or military position.

The principles which regulate the general plan of the works constituting the fortifications of a town or great military post, have at all times been nearly the same. Among the antients, with scarcely any exception, the polygonal wall surrounding a place was provided with towers projecting from it at intervals towards the front; and a barbacan, or outwork, consisting of two or more towers, connected by walls like those of the fortress itself, was generally constructed on the exterior side of the ditch and opposite a gate of the town, in order to protect that entrance and the bridge leading to it. The towers and walls about an antient town correspond to the bastions and curtains forming the enceinte of a modern fortress, and the barbacan may be considered as the counterpart of its ravelin, or principal outwork.

The necessity which the nations of Europe were under of remodelling their fortified towns in consequence of the change produced in the art of war by the invention of gunpowder, gave occasions for the engineers of Italy, France, and the Netherlands to emulate each other in devising the most advantageous methods of disposing the works for the purposes of defence with relation to the arms then newly introduced: and the result of their labours was the construction of numerous strong fortresses on the frontiers of those countries. In these the bastion system, as it is called, was invariably adopted; and it is remarkable that, of the very numerous projects which have been since offered to the world for fortifying places, so few should have been of a different kind. The variations however which occurred n the details of the plans gave rise to the denominations of the Italian, the French, the Spanish, and the Dutch mehods, in speaking of the works proposed or executed at the end of the sixteenth and the beginning of the seventeenth centuries; but it must be observed that those variations consisted chiefly in the magnitude of the angle which the wo faces of a bastion made with each other, and in the extent of what was called the second flank; that is, the portion of the curtain then generally left between the flank of a bastion and the place where the produced face of the collateral bastion intersected the curtain.

The first bastioned fortresses of France appear to have been very inferior to those which were executed in the Netherlands by the Italian engineers; and there still exist ome remains of these last in which the bastions are sufficiently capacious, and at distances from each other within the effective range of musket-shot. The others, on the conrary, were characterized by small bastions, scarcely capable of receiving artillery, and placed so far asunder as to defend each other very imperfectly. But after the termination of he civil wars which desolated the country, the attention of he French government was directed to the state of the military posts; and Errard, a member of the corps of enineers then instituted, was appointed to superintend the eparation of the old, and the construction of the new fortifications. The citadel of Amiens was built according to he plan proposed by this officer, who, in 1594, published a reatise on fortification, in which some effort is made to determine the principles which should regulate the forms and dimensions of the works.

In the method proposed by Errard the bastions are much arger than those of the earlier time, the length of their aces being, as at present, about one-third of the distance between the salient angles of two collateral bastions; an orillon occupied nearly two-thirds of the length of each lank, which was very short, and formed an angle of about 0° with the curtain. This direction appears to have been given to the flanks in order that the guns behind their paapets might be as much as possible concealed from the iew of the enemy in his counter-battery; but it is evident hat the defenders of the opposite flanks, laying their muskets perpendicularly to the lengths of the parapets, accordng to the general practice, would almost inevitably fire upon each other, or upon those who were stationed on the curtain.

De Ville, who composed a treatise on fortification in 1629, made several improvements on the method proposed by Errard, the principal of which were an augmentation of the ength of the flanks and a perpendicular direction of the latter with respect to the curtain: by these changes a better defence was obtained from the flanks, and the evil above mentioned was diminished. But a still greater amelioration was made by Count Pagan, who, in 1645, proposed to make each flank [See the half-front of Fortification between F and G, *fig.* 1, Bastion] perpendicular to the produced face of the collateral bastion: the reciprocal defence which the works should afford each other is thus complete, and the men are not in danger of being fired on by each other. Pagan retains the orillons at the shoulders of the bastions, and he gives to the latter double or triple flanks; but the construction of these, on account of their numerous inconveniences, has ever since been discontinued.

During the reign of Louis XIV. a general reparation or reconstruction of its fortresses was ordered by the French government; and the talents of Vauban were exercised in devising and carrying into execution those improvements in the art of fortification which, together with the merit displayed in the conduct of fifty-three sieges, have given that engineer so much celebrity. Besides the changes made in the disposition of the parts of the enceinte, the outworks were entirely remodelled; and instead of assigning, for the delineation of the plan, numerous arbitrary rules which varied with the nature of the polygon, Vauban adopted the length of the side of the polygon as a base, and took certain aliquot parts of this line for the dimensions of the several divisions of the rampart; thus reducing the construction to a few simple precepts which were applicable to places of all magnitudes. These precepts being founded on the uses of the works may be justly considered as constituting a system of fortification; and from that time to the present scarcely any deviations have been made from them in the construction of great fortresses. A brief outline of the system will therefore be here given. [See the half-front of fortification between G and E, *fig.* 1, Bastion.]

The length of each side, as F E, of a regular polygon supposed to surround the town or position, is made equal to 360 yards, in order that all the parts of the rampart on each front of the enceinte might be within the range of the arms employed in the defence. Those arms are generally large muskets, whose point-blanc range is estimated at about 300 yards. Now these being supposed to be placed on the flanks, as at *e* or *f*, might be employed to oppose the formation of the counter-battery at H, or at the corresponding point on the left of F; therefore, if we assume the length of the line from *e* to H to be 300 yards, and deduct from it the estimated breadth of the main ditch and covered-way (40 yards), we have 260 yards for the length of *e* E or *f* F, which is called the line of defence. This is also the distance of E or F from the shoulder of the collateral bastion; and if we add to it the length of the face of the bastion, which is 103 yards, or two-sevenths of E F, in order that, in the inferior polygons, the bastion may have sufficient capacity, we obtain about 360 yards for the distance between the salient points F and E of the two bastions; and it may be observed, that a few yards more or less in the dimensions need not be regarded.

The directions of the faces of the bastions on each front coincide with lines drawn from the angles E and F of the polygon, through the extremity of a perpendicular let fall from the middle of the line E F and made equal to one-sixth of that line; and each flank is the chord of an arc, described either from the opposite angle E or F of the polygon, or from the nearest shoulder of the collateral bastion, as a centre. By this construction the flank is rather greater in length than the enemy's counter-battery, which is necessarily limited by the angle of the glacis and the prolonged face of the nearest bastion; and it is nearly perpendicular to the direction of that face: the reason why it is not made exactly so is, that a man on the flank, placing his musket perpendicularly to the line of parapet, will thus be able to fire into and defend a breach which may be made in the face of the collateral bastion. The curtain is determined by a line joining the interior extremities, near *e* and *f* of the flanks; and, with the height which Vauban assigned to the rampart of the enceinte, this length will permit the fire of musketry from each flank to defend the opposite half of the ditch between the flanks. The line which on the plan indicates the directions of the faces, flanks, &c., of the works, is called the magistral line; it forms the exterior side of the ramparts in *fig.* 1 [Bastion], and coincides with the cordon, or projection, at the top of the revetment N, *fig.* 2.

The dimensions of the ditch are determined by the necessity of obtaining from it the earth for the formation of the ramparts and parapets, care being taken that it be not so wide as to allow the enemy, from a battery situated as at K, *fig.* 1, on the crest of the glacis, to see, and consequently to batter, the escarp wall near the foot of the latter. [BREACH.] The counterscarp wall is rounded opposite the flanked angles at E or F, and from thence tends towards the shoulder of the collateral bastion.

The improvements made by Vauban in the ravelin are described under that word: Q represents one-half of that work; and it will be necessary here to say, merely, that its plan is determined by using the angular points near *e* and *f*, formed by the magistral lines of the flanks and curtain, as centres, and with radii equal to the distances from thence to points taken on the faces of the collateral bastions, at 10 yards from their shoulders, describing arcs; the intersection of these arcs determines the salient angle of the ravelin; the magistral lines of its faces tend from that intersection to the points just mentioned, and terminate on the counterscarp of the main ditch.

The traverses in the covered way were proposed by Vauban, in order to diminish the effect of the ricochet; and he was the first engineer who formed the spacious places of arms, as they are called, at L, in the re-entering parts of the covered-way, in order to obtain room for assembling troops, and to afford a good crossing fire of musketry from their faces for the defence of the glacis in front of the bastions and ravelins.

An attention to the reliefs of the several ramparts of a fortress is no less necessary than to the plans; for, as it would be advantageous, when the approaches of the besiegers are near the foot of the glacis, that a fire of artillery should be made from the ramparts of the enceinte or ravelin, and of musketry from the covered-way at the same time, the reliefs of those ramparts should be determined by imagining a line to be drawn from the foot of the glacis through a point three or four feet vertically above the crest of the latter, that is about 11 feet above the ground, and to be produced through the parapet of the said enceinte or ravelin; then, if the soles of the embrasures, which are necessarily 4½ feet below the crest of the parapet, be made to coincide with such imaginary line, the fire of artillery from them may be directed to the enemy's trenches without incommoding the defenders of the covered-way. The crest of the enceinte thus determined will be about 18 feet above the ground, and that of the ravelin about 3 feet less.

The tenaille, P, *fig.* 1, [BASTION,] will be described under that word; but it may be mentioned here that the relief of this work is determined by the consideration that, while it should be high enough to mask the postern in the curtain behind it, the men stationed on it to defend the ditch should be below the lines of fire from the flank of one bastion, when directed to the foot of a breach supposed to be made near the shoulder of that which is collateral to it, in order that they may not be injured by that fire.

As Vauban had occasionally to adapt works constructed according to the principles above mentioned, to the old fortifications which then existed, the particular method employed in disposing them acquired the denomination of his second system; and when, subsequently, he fortified Neu Brisach, some few modifications which he was led to make gave rise to a new distinction, the works of that place being considered as forming a third system. In both these systems the bastions V, *fig.* 3, [BASTION] are separated by a ditch from the enceinte; and this circumstance is so far advantageous, that the place would not be compelled to surrender immediately upon those works being taken by the besiegers. The enceinte consists of a long curtain, either quite straight or broken by two short flanks; and at the angles of the polygon are small bastion-towers of masonry (T, *fig.* 3), in whose flanks are formed casemates to contain artillery for the defence of its ditch. This great engineer died in 1707, at the age of 74 years; and, from his time, the French fortification has been that of all Europe.

It would be improper in this place to omit the name of Coehorn, who was a contemporary of Vauban, and who is also distinguished by the invention of three methods of fortifying places; of which however the first only, and that partially, has been put in execution. The outline of the plan differs but little from that of his rival's first system, but the shoulders of the bastions are strengthened by large towers, or orillons, containing casemates. In the interior of each bastion is another, on a higher level, and on the exterior is a counterguard, or detached work, consisting of two faces. A large ravelin, inclosing a smaller one on a higher level, is placed before the curtain, and the whole is surrounded by a broad covered-way, whose places of arms are retrenched by brick redoubts. The ditches are full of water; and the terrepleins, as well of the bastions and ravelins as of the covered-way, are sunk below the natural surface of the ground, so that it would be impossible, in the marshy soil on which the fortifications are supposed to be constructed, for an enemy to dig trenches there in order to form covered approaches. The terrepleins of the principal works are also well defended by fire from the covered galleries which cross them, or which are formed within the masses of the ramparts.

It should be observed that the salient points E, F, &c., of the bastions and ravelins in Vauban's system being nearly equally distant from the centre of the place, the trench executed by the besiegers to connect the glacis before the former works will also connect that which is before the latter; and that, in consequence of this construction, breaches may be formed, and assaults made, at one time, in the enceinte and outworks. With the view, therefore, of preserving the former untouched till some time after the ravelins may have been taken, the French engineer Cormontaingne proposed, about 30 years after the death of Vauban, to advance the salient points of the ravelins as much as possible, by increasing the length of the faces to the utmost limit which a regard to the due magnitude of the flanked angle will admit. Thus the magistral line of his ravelin is determined by the sides of a triangle whose base is a line joining two points on the faces of the collateral bastions, at 30 yards from the shoulders, and whose opposite angle is equal to about 70 degrees. By this construction it would become impossible for an enemy to crown the glacis of a bastion till he had got possession of the two collateral ravelins, on account of the fire which, from these, might be made upon his approaches between them; and the fall of the place would be delayed by the time spent in conducting the approaches from the ravelins to the intermediate bastion.

In order that this benefit might be obtained in the highest degree, Cormontaingne suggested the propriety of fortifying places on polygons of the superior kind, and even, when possible, of constructing two or more fronts of fortification on one straight line; this practice would have the additional advantage of rendering the flanked angles of the bastions very obtuse, by which, not only would the increased capacity of those works permit stronger retrenchments to be formed in them, but the faces being produced outwards, would tend to points on the faces of the ravelins, and thus would be completely secured from the enfilading fires of the besiegers.

Besides the above general modifications, Cormontaingne made several improvements in the details of the works. He made the flanks exactly perpendicular to the prolonged faces of the collateral bastions, for the sake of a more complete flanking defence. He made the terrepleins of the ravelins merely wide enough to contain the artillery of the defenders; in order to increase the capacity of the redoubt in the ravelin, and to deprive the enemy of the space necessary for a battery on the ravelin, by which he might breach that redoubt. He also gave large casemated flanks to the latter work, in order that a powerful fire might be directed from them against the enemy, if he should attempt to mount the breach in the face of either bastion before he had got possession of the redoubts as well as of the ravelins themselves. A further improvement was made by this engineer in adding to each of the re-entering places of arms a spacious redoubt, which would render the defence of the place more obstinate, and cover the passage between the tenaille and the flank of the bastion.

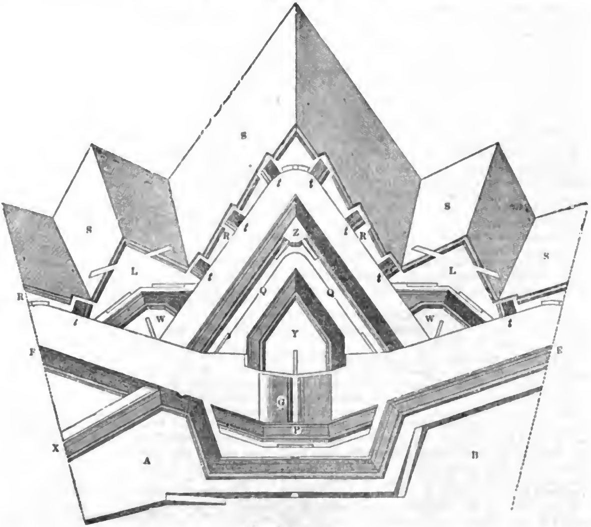
As early as 1640, Dillichs, in a work published at Frankfort, proposed a method of fortifying places, which consist in surrounding them by lines of rampart forming with each other a series of angles alternately salient and re-entering and, subsequently to the time of Vauban, a few other projects of a like nature have been suggested. The most remarkable of these is that which was published in 1776 by the French General Montalembert, who entitles his method *Fortification Perpendiculaire*. Its outline on the plan is a series of the sides of equilateral triangles formed on those of a dodecagon inclosing the place; the re-entering angles being consequently right angles · and, as the general has developed some useful ideas concerning the interior defence of a place, though no existing fortification affords an example of the method, a short description of it may with propriety be given.

Three parallel ramparts of earth, of the form above indicated, and separated from one another by wet ditches, surround the place: the berme at the foot of the first and third is protected by a simple wall, and that at the foot of the middle rampart is covered by a loop-holed gallery on its whole length. Beyond the outer ditch is the covered-way, whose re-entering angles are fortified by strong redoubts. In the re-entering angles of the two interior ramparts are formed casemated batteries, the fires from which would sweep the surfaces of the ditches in front, in the directions of their lengths; and, within the enceinte of the place, a circular redoubt, or tower, of brick-work, carrying several tiers of guns, is intended to defend the interior rampart, if, at length, it should be forced. The merit of this system is supposed to consist chiefly in the powerful fire which the casemates would afford, as from their situation, they would scarcely be injured by the enemy; in the difficulty which the latter would experience in getting over the detached walls; and in the great force which the defenders, by means of the spacious communications, might bring up to oppose the assailants.

During the existence of the French empire, the celebrated Carnot proposed to restore the balance between the attack and defence of fortresses, which the inventions of Vauban had made to preponderate greatly in favour of the former, by means of powerful sorties from the place and an abundant discharge of stones and balls from mortars fired at considerable angles of elevation; thus annoying the besiegers in their trenches, and either putting great numbers of their men hors de combat, or compelling them to recur to the slow process of blinding their approaches. Adopting, in his method of fortifying places, the proportions of Cormontaingne for the plan of his bastions, but making the whole length of his front of fortification equal to 480 yards, he detached the bastions from the enceinte, which he made to consist of a simple polygonal rampart of earth In rear of the tenaille between the bastions he placed a fausse-braye, whose exterior side was to be protected by a casemated tower at each extremity; and, behind the gorge of each bastion, he formed a row of casemate vaults, in which the mortars were to be placed for throwing stones, &c. into that work when gained by the enemy. Adopting also the ideas of Montalembert respecting detached walls, he proposed to surround the enceinte by one, which was to be loop-holed in order that a fire of musketry might be made from it, and to construct a similar wall before the faces and flanks of the bastions. The bastions were to be covered by narrow counterguards; a cavalier, or lofty redoubt, in front of the tenaille, was to defend the collateral faces of both bastions and counterguards; large ravelins were to cover the central parts of the fronts of fortification and afford crossing fires on the ground before the bastions; while mortars placed on the faces of the work and on the barbettes at the angles were to discharge their missiles over the parapets. A ditch surrounds the whole, and its exterior side is made with a gentle slope from the bottom to the level of the natural ground in front, for the purpose of facilitating the sorties; the corresponding facility which the enemy might have for descending into the ditch being disregarded on account of the supposed impossibility of maintaining himself there under the hail of stones and shot from the works.

It was supposed that the detached wall, being covered as before mentioned, would present an impassable obstacle to the assailants; but an experiment made at Woolwich in 1824 has proved the possibility of breaching it by a fire of shot and shells, directed over the parapet of the counterguard, from artillery of great calibre, at the distance of 400 yards from the latter work. The efficiency of the vertical fire, as it is called, of stones and shot from the works has also been controverted; and experiments have been made which seem to prove that the momentum acquired by the missiles in their descent would not be sufficient to do serious injury to a man on whom they might fall, if he were protected by a proper head-piece.

Plan of a Front of Fortification according to the Method of Cormontaingne.



80 yards to an inch.

A, Solid Bastion. B, Hollow ditto. X, Retrenchment. P, Tenaille. G, Caponniere. QQ, Ravelin. Y, Redoubt in ditto. LL, Re-entering places of Arms. WW, Redoubts in ditto. RR, Covered-way. *tt*, Traverses. SS, Glacis. Z, Barbette battery.

Soon after the commencement of the revolution, Bousmard, a French officer, who had entered the service of the king of Prussia, proposed to curve the faces of bastions on the plan, in order to diminish or prevent the effect of the ricochet, and to build casemates in the flanks of the tenailles for the purpose of more effectually defending the main ditch. But his principal improvement consisted in extending the covered way and glacis along the whole of the enceinte, and in placing the ravelin with its proper covered way and glacis on the exterior; in consequence of which disposition it would become impossible for the besiegers to breach the bastion by firing along the ditch of the ravelin, while the latter would possess all the advantages attending the greatest possible saliency. The ideas of Bousmard respecting the disposition of the ravelin were adopted by General Chasseloup de Labat, in the works which he executed, by order of Napoleon, to strengthen the fortifications of Alessandria; and the same engineer constructed a strong polygonal redoubt of earth in each of the places of arms before the flanked angles of the bastions and ravelins, in order to increase the quantity of crossing and reverse fires in front of the works.

The last modification of the bastion system which it will be necessary to mention, is that proposed by Choumara, who, partly to diminish the pressure of the parapets on the escarp revetment, and render the formation of a practicable breach more difficult, and partly to procure a close fire of musketry into the covered-way, suggests that a terreplein, like the old chemin des rondes, but with a slender breastwork to protect the defenders, should be left on the exterior of the parapets. The same engineer recommends that the flanks of the bastions should be lengthened by continuing them within the line of the curtain, and that they should have a greater relief than the latter, in order that a fire of artillery might be directed over it against the works of the enemy: he proposes also that a glacis of earth should be raised in the main ditch, high enough to mask the foot of the escarp revetment, and prevent it from being battered by a fire of artillery on the crest of the covered-way.

It is scarcely probable that any existing fortresses will be demolished for the sake of the advantages which would result from a re-construction according to any of the methods which have been proposed since the time of Vauban; but, on any future occasion which may present itself for fortifying a town or military post of importance, it may be found convenient to adopt some improvements in the construction of the works. Thus, the general system of Vauban, with the modifications proposed by Cormontaingne, being retained as the basis, casemates, like those of Montalembert, might be formed in the re-entering angles of the enceinte or tenailles; and detached walls or galleries for musketry in some of the dry ditches: detached ravelins, as proposed by Bousmard, may be constructed beyond those of the ordinary kind, in order to prevent the enceinte from being breached at the first crowning of the glacis; and a direct defence of the covered-way may be obtained from galleries formed within, or on the exterior of, the parapets along the faces of the works.

In the open attack of a fortified place it is evident that the loss of life would be so much the greater as the defensive works are stronger and better combined; and, in consequence, the necessity of making the approaches under cover to the last moment of the siege would become more urgent.

For the works occasionally constructed beyond the glacis of a fortress, see **Fleche**, **Horn-work**, **Lunettes**, and **Tenaillons**.

Of the works which fall under the denomination of field-fortifications, **Bridge-heads** have been already mentioned. **Redans**, **Redoubts**, and **Star-forts** are described under those words; and the combinations of works which serve for the protection of armies, under **Lines of Entrenchment**. Small forts with bastions are frequently considered as field-fortifications: their plan is similar to that of the enceinte of a fortress; but they differ from the latter in their size, in having low relief, and in the sides of their ditches being unreveted, or only faced with sods.

FORTIGUERRA, NI'COLO, an Italian prelate, whose writings display little of the austerity or seriousness of a churchman, was born at Pistoja, November 7th, 1674. In his youth he studied jurisprudence, and afterwards distinguished himself by his attainments in Greek. Having published a funeral discourse in honour of Innocent XII., he was appointed secretary to the papal nuncio in Spain, and on his return to Rome, in consequence of his ill-health, had a situation as one of his chamberlains bestowed upon him by Clement XI. in 1712, and was likewise made a canon of the church of Santa Maria Maggiore. By another pope (Clement XII.) he expected to be raised to the dignity of cardinal; but although an encourager of both poetry and poets, that pontiff evaded from time to time the fulfilment of the promise which he appears to have made, until Fortiguerra was lying on his death-bed, when he rejected the honour then proffered him in terms the reverse of courtly. Monsignor Fortiguerra's lyric poetry, in which he showed himself an imitator of Petrarch, is now forgotten: his fame rests entirely upon his 'Ricciardetto,' an heroico-comic poem in thirty cantos. This production, which was first published with its author's name Grecianized into Carteromaco, was begun by him without any plan, merely by way of proving with what facility he could imitate Ariosto, Pulci, and Berni, both in regard to their style and their fertile invention of incidents; when, at the instance of those friends for whom the first canto was hit off as a specimen, he was induced to proceed till he completed the whole, at the rate, we are assured, of a canto per day. Little, therefore, is it to be wondered at that the plot should be so desultory and the incidents so extravagant. Yet, notwithstanding the grotesqueness of the characters and events, and likewise the occasional carelessness of the style, this long *improvisatore* poem abounds with so much comic humour, droll satire, and happy burlesque, that it has long taken its place as a classical work of its kind, and has gone through numerous editions. There are two French translations of it; and a German one by Gries, the translator of Ariosto and Tasso, was published 1831-3. In English we have no more than a poetical version of the first canto, with an introduction and notes, by the late Lord Glenbervie (1822). 'Ricciardetto' was not published till after the author's death, which happened in 1735, the date of the first edition being 1738. Fortiguerra was probably aware that, however it might contribute to his fame as a poet, it was not likely to advance him in the church, since many of the descriptions are more spirited than decorous; nor has he been at all sparing of his satire on the monks.

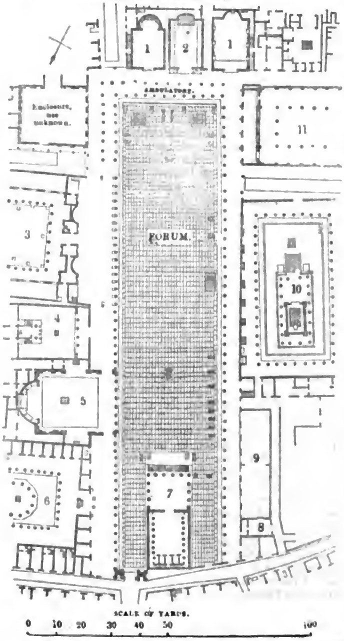
FORTIS, ABBATE, an Italian, born in 1740, died in 1803, wrote many works on various branches of natural philosophy; but his reputation was established by his travels in Dalmatia, 'Viaggio di Dalmazia:' they have been translated into many languages, but the English translation, published at London, in 1778, is not only the best, but even preferable to the original, on account of the Appendix, various plates, and several other additions, which appeared for the first time with this translation.

FORTUNATE ISLANDS. [Canaries.]

FORTUNE, in the Roman mythology, was a goddess who was supposed to dispose, at her caprice, of the destinies of men. She was represented as blind, with winged feet, resting on a wheel. This deity did not figure in the more antient systems of theosophy; Homer does not mention her in the Iliad, but refers the events of this world to the decrees of Jupiter and of Fate. Fortune however was worshipped in Italy of old; by the Etruscans at Volsinii, under the name of Nursia; by the Latins at Præneste; and by the Volsci at Antium, where a splendid temple was dedicated to her, in which a sort of oracles were delivered. She had also temples at Rome. (Horace, *Od.* i, 35; Martial, v. ep. 1.)

FORUM, a large open space in antient Roman cities (corresponding to the Agora of the Greeks), usually surrounded with public buildings, where the citizens met to transact business, and where, previous to the erection of Basilicæ, causes were tried. From this last circumstance the word forum is used metaphorically for a place of justice. Nardini is of opinion, though without any show of authority, that the first forum, or Forum Romanum, at Rome, was placed on the Palatine hill. The Greeks made their Agora square, with a double colonnade, or ambulatory, above and below, but in Italy the width of the forum was made less than the length by a third, and the columns set wide apart, as the gladiatorial shows were formerly given in the forum. (Vitruvius, lib. v., 1.) The Roman fora were of two kinds, Fora Civilia and Venalia: the former were for law and political affairs, the latter for the purposes of trade. Rome contained nineteen fora of importance—the Forum Antonini, Archemorium, Argentarium, Augusti, Boarium, Cæsaris, Cupedinis, Nervæ, Olitorium, Piscarium, Piscatorium, Pistorium, Romanum, Sallustii, Suarium, Tauri, Trajani, Transitorium, and Vespasiani. Of these the Forum Romanum, Nervæ, Trajani, Boarium, and Piscatorium, alone retain any traces of the splendid edifices with which they were once adorned. The Forum Romanum is situated in a narrow valley, not far from the Tiber, between the Palatine and Capitoline hills. It sweeps round towards the Fora of Cæsar and Augustus, which are between it and the larger Fora of Nerva and Trajan, all which, looking at their relative situations, were, no doubt, connected with it on the north. On the south it extended nearly to the Fora Boarium and Piscatorium, which were near the Pons Palatinus, now called Ponte Rotto. The exact limits of the Forum Romanum are very uncertain; Nardini (vol. ii., p. 138) endeavours to point out its boundaries. It was decorated with temples, statues, basilicæ, curiæ, rostra, triumphal columns and arches, which usurped the place of shops, schools, and even private houses, that originally stood in this forum. In the forum were the rostra, or pulpits, decorated with the beaks of ships, whence the orators harangued. According to Appian the rostra were placed in the middle of the forum, and he states that Sulla caused the head of young Marius to be hung up before the rostra in the middle of the forum. Varro, in his fourth book, 'De Lingua Latina,' places the rostra before the curia, which was near the Comitium, so that the orators would stand with their faces towards the capitol; but Plutarch, in speaking of the Gracchi, states the reverse to be the case.

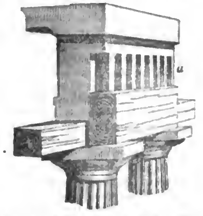
Plan of the Forum at Pompeii.



1, 1, Curiæ; 2, Ærarium; 3, Chalcidicum; 4, Temple of Mercury; 5, Senaculum; 6, Pantheon; 7, Temple of Jupiter; 8, Prison; 9, Granary; 10, Temple of Venus; 11, Basilica.

The Comitium was placed near the Curia; three columns of the former, commonly called the Temple of Jupiter Stator, still remain. Nardini places on the side of the Palatine hill, in succession, the Fabian arch, Græcostasis, Senaculum, Basilica Opimia, Ædicula of Concord, Temple of Romulus, Temple of the Dii Penates, Curia Ostilia, near which was the Comitium, Basilica Portia, Temples of Julius Cæsar, and Castor and Pollux. On the side towards the Tiber stood the Temples of Jupiter Stator, Temple and Atrium of Vesta, Basilica Julia, house of Lucius Tarquinius, and the Temple of Victory. On the side of the capitol was the arch of Tiberius, the temples of Saturn, of Concord, and of Vespasian, the school of Xanthus, the arch of Severus, which still remains, and the Tullian prisons. On the north side of the forum was the office of the secretary to the senate, and the Basilica of Paulus Emilius. There are however but few remains existing of a small number of these numerous buildings, and the greater part have entirely disappeared. A single monumental column stands near the Comitium, called the Column of Phocas. Besides these buildings there are remains of the temples of Fortune, Jupiter Tonans, Jupiter Capitolinus, and the Tabularium, though these are perhaps not within the boundaries of the forum. (See plates in Nardini's *Rome*, vol. ii. lib. v., c. 1.) A very beautiful restored view of the Forum Romanum was made by Mr. C. R. Cockerell, and a reduced view was engraved and published, with his permission, in the second volume of the 'Pompeii,' published by the Society for the Diffusion of Useful Knowledge, to which we refer our readers for an accurate notion of the splendour of the accumulated architecture of the Forum and the Capitol, and its vicinity.

The forum at Pompeii, which was constructed in the Greek style, cannot however be altogether considered, if we are guided by the authority of Vitruvius, a truly Greek Agora, which this author states was to be made square in form. It has however many Greek features. The Pompeian forum is of an oblong shape, surrounded on three sides with rows of columns, forming, with the advanced columns of the various buildings, a colonnade or ambulatory; above this there was a second, if we may judge from the remains of stairs at several places at the back of the colonnade. The fourth side of the forum is inclosed with two arches placed on each side of a large hypæthral temple, called the Temple of Jupiter. On the west side are the prisons and the granary, with an enclosed court before it and the prisons; the Temple of Venus and the Basilica [BASILICA]; and on the narrow side, opposite the Temple of Jupiter, are three buildings generally considered to be the Curiæ and Ærarium: on the east side is an enclosure, the use of which has not been determined, the Chalcidicum [CHALCIDICUM], the Temple of Mercury, the Senaculum, and a building supposed to be a large eating-house, generally known by the name of the Pantheon, in front of which are the Tabernæ Argentariæ. The enclosed area of the forum was paved with large square pieces of marble, and the sides of the area were adorned with statues. Opposite the curiæ and a short way from them is a small triumphal arch. The forum was closed at night with iron-barred gates, and it does not appear that chariots were admitted into it, as the pavement of the streets terminates at the back of the colonnade. The columns of the ambulatory are of the Greek Doric order, and were being restored in the same style, though with better materials, at the time the city was destroyed. The columns were aræostyle, and the architraves were most probably of wood, as we may infer from their being destroyed, while the frieze and cornice of stone re



Construction in wood and stone of the aræostyle portico of the Forum.
a, holes for the joists of the upper floor.

main. The frontispiece to the first volume of the 'Pompeii' is a restored view of the forum, which gives an idea of the double colonnade, or upper and under ambulatory mentioned by Vitruvius as a characteristic of a Greek Agora.

FO'SCOLO, UGO, was born at Zante about the year 1777, of a Venetian family settled in the Ionian Islands. When yet a boy he lost his father, who was a physician and inspector of the hospitals at Spalatro in Dalmatia, and he returned with his mother to Venice, from whence he was sent to study at Padua. Having left that university without having made up his mind to any particular profession, he returned to Venice, and wrote a tragedy, 'Il Tieste,' which was performed in January, 1797. In that same year the antient aristocracy of Venice fell by the hands of Bonaparte, and Foscolo, who, like others of his countrymen, had expected the establishment of a new and popular republic, felt bitterly disappointed at the conqueror giving up Venice to Austria. At Milan and Florence he gave vent to his excited feelings in the 'Lettere di due Amanti,' afterwards published under the name of 'Lettere di Ortis.' This work, of little value as a novel, possesses a higher sort of interest from the political allusions, the bursts of invective, and the picture of society in those disjointed times, which it contains. The language is beautiful and the tone affecting, though perhaps too querulous and desponding; but as such it was in harmony with the then prevailing feeling. The 'Lettere di Ortis' had a prodigious success in Italy; but all the editions were mutilated except a private one printed at Venice in 1802, and that of 1814, which Foscolo himself published at Zürich with the date of London, which alone contains, among several passages left out in the other editions, the letter dated 17th of March, 1798, in which Foscolo clearly expressed his opinion of Bonaparte's character. Foscolo served as a volunteer in the Lombard Legion through the disastrous campaign of 1799, and followed the French in their retreat to Genoa, where he remained during the siege of that city till June, 1800, when the garrison capitulated, and was carried to France by the English ships. Meantime the battle of Marengo took place, Lombardy was reconquered, and Foscolo repaired to Milan: peace being concluded soon after, he returned to private life and to his literary pursuits.

In 1802, Bonaparte having called together at Lyon a meeting of Italian deputies in order to devise a new constitution for the Cisalpine republic, Foscolo was requested by some individuals then in office, to write an address to the First Consul, with an exposition of the state of the country, and the wishes of the people. He did write it, but in a very different strain from what they expected: he wrote it in the style of the Philippics, or the Verrine Orations of Cicero; he drew an eloquent but fearful retrospect of the oppressions, the depredations, the injuries of every kind which the people of Italy had suffered at the hands of the various military and civil authorities appointed by the French since 1796; the disgraceful persecution of the clergy and the so-called aristocrats, and other abuses of party triumph. This oration was, of course, never read to the First Consul, but it was published some time after at Milan—'Orazione à Buonaparte pel Congresso di Lione:' it forms an important memorial of the times, and an honourable testimonial of the uncompromising spirit of Foscolo, who seems to have taken Dante and Alfieri for his models. Foscolo remained for some years quietly at Milan under the mild administration of the vice-president Melzi. He published an Italian version of Callimachus 'De Coma Berenices,' with interesting notes and commentaries.

In 1805 we find him again serving in an Italian regiment which formed part of the army assembled near the coast of the British Channel for the intended invasion of England. Being stationed at St. Omer he there attempted an Italian translation of Sterne's 'Sentimental Journey,' in which he was most successful. When a few months after the camp of Boulogne was broken up, Foscolo went back to Milan, and did not return into active service. He lived for some time near Brescia, where he wrote his poem, 'Dei Sepolcri,' 1807, deprecating certain harsh regulations which forbade any monument or memorial being raised over the tombs of the dead. This beautiful little poem, full of lofty thoughts and lyric power, was dedicated by the author to a brother poet, Ippolito Pindemonte of Verona, and it secured to Foscolo a distinguished rank among the Italian poets. It was commented on, imitated, and even translated into Latin hexameters.

In 1808, Foscolo being appointed professor of Italian eloquence at Pavia, was privately urged by some official persons to begin his course by some tribute of praise to the emperor Napoleon, according to the received custom; and it was hinted to him that the decoration of the Legion of Honour would be the reward of his compliance. Foscolo remained unmoved: he took as the subject of his inaugural oration the origin and the object of literature—'Dell'Origine e dell' Ufficio della Letteratura;' and descanted on the moral and civil duties of literary men; on the nobleness of their calling when conscientiously exercised; and he exhorted the Italian youth to devote themselves to literature for its own sake; 'to study above all the history of their country, and the lives and works of Dante, Machiavelli, Galileo, and Tasso; to bend over their tombs and learn from those illustrious dead how they fed the sacred fire of genius through persecutions, torments, and exile, in the gloom of dungeons and amidst the squalidness of domestic poverty, and how they were supported in their trials by the love of their country, of truth, and of fame, which enabled them to leave to posterity the rich legacy of their works and the benefit of their example.' This address, delivered before a numerous audience, produced a thrilling sensation, and was followed by bursts of applause. Not a word had Foscolo said about emperor or prince, government or minister. A few months after the chair of Italian eloquence was suppressed in all the universities of the kingdom of Italy, and Foscolo retired to Borgo di Vico, near Como, where he enjoyed the society of Count Giovio and his family. He there wrote his tragedy of 'Ajax,' which was performed at Milan, and not only proved a failure, but involved him in a sort of ministerial persecution, because he was suspected to have alluded in his play to Napoleon's ambition. At the same time certain academicians whose pedantry he had ridiculed in another work, expressed their opinion in the Poligrafo, a literary journal, 'that whoever sneers at the labours of professors, academicians, and librarians, taxes thereby with ignorance the monarch who protects them, and becomes, by so doing, guilty of treason.' Foscolo however had some influential friends, and he was merely banished from Milan. At Florence, where he fixed his residence, he completed his translation of 'Sterne:' 'Viaggio Sentimentale di Yorick lungo la Francia, traduzione di Didimo Chierico;' and wrote another tragedy entitled 'Ricciarda,' a Hymn to the Graces, and other compositions.

In 1813 he was allowed to return to Milan, and in the following year, when the French abandoned the country and provisional government was formed, Foscolo was appointed major on the staff, and endeavoured, though ineffectually, to save the ex-minister Prina from the fury of the mob. When the Austrians took possession of Milan, Foscolo drew up a protest in the name of the inhabitants of Lombardy addressed to the Allied Powers. He remained however still at Milan, and had the offer from some of the Austrian authorities of the editorship of a new literary journal; but having learnt that he was charged by the more rigid patriots of being a turncoat, he, all on a sudden, disappeared from Milan towards the end of 1814, and repaired to Switzerland, where he resided for almost two years, chiefly at Hottingen, near Zürich, where he published a correct edition of his 'Lettere di Ortis,' and also a satire in Latin prose, entitled 'Didymi Clerici Prophetæ Minimi Hypercalypseos,' in which he lashed his Milan enemies of the literary and courtly coteries who had annoyed him about his 'Ajax.' Not finding sufficient encouragement in Switzerland for his literary labours as a means of subsistence, he came to England about the end of 1816, and was introduced to some of the best society of the metropolis: he formed literary connexions, and wrote articles both for the Edinburgh and the Quarterly Reviews. In London he published his 'Ricciarda,' the Essays on Petrarch and Dante, which are among his best compositions, the 'Discorso Storico sul testo del Decamerone,' and the 'Discorso Storico sul testo di Dante,' which is a work full of erudition. He had engaged to superintend a new edition of Dante, with ample commentaries, but he did not live to finish this work. Want of order and of judgment in money matters involved him in embarrassments, which, joined to his fretful temper and assiduous application, shortened his days. He died of the dropsy on the 10th of October, 1827, at Turnham Green, near London, being about fifty years of age, and was buried in Chiswick churchyard, with a plain marble slab and inscription over his tomb. Notwithstanding his eccentricities he secured wherever he lived some warm and lasting friends, who felt his death as a loss. The life of Foscolo derives a peculiar importance from the times he lived in, and the political scenes in which he mixed. He had the merit of standing aloof, one of the few, amidst the general prostration of mankind before the shrine of Napoleon. 'His unconquerable silence,' observes a by no means partial biographer, 'amidst the strains of vulgar adulation, deserves to be recorded in history. If amidst the Asiatic idolatry towards Napoleon, any kind of opposition can be said to have existed in Italy, Foscolo must be considered as the leader of it. Among a crowd of literati who prostituted their character, he alone succeeded Alfieri in gathering around him those youths who felt the love of study and independence, and without uselessly challenging an irresistible power, he tempered with his principles and his example their souls for present dignity and future resistance.' (Pecchio, *Vita di Ugo Foscolo.*) When the reaction came he refused likewise to associate with those who would not restore his country to national independence. But his sentiments, as expressed in his works, are never those of a partizan; he deals out with an impartial hand to all; his thoughts are generous and pure, his learning is real and unaffected, and he has added a fresh vigour to Italian prose. His dramas are the weakest of his productions. To his compositions already mentioned, may be added an Italian version of some cantos of the Iliad, 'Alcuni scritti e trattati inediti,' Lugano, 1829, including some of his lectures at Pavia, and various poetical effusions. ('*Opere Scelte di Ugo Foscolo*,' 2 vols. 8vo; Fiesole, 1833, *and an article on Foscolo and his Times, in* No. XVIII. *of the Foreign Quarterly Review*, May, 1832.)

FOSS, or FOSS-WAY, an antient Roman road in Britain, one of the best ascertained of any. It extended from the coast of Lincolnshire, on the north-east, to the coast of Devonshire on the south-west. It is supposed to have derived its name from the circumstance of its having had a ditch (fossa) on each side (Camden; Pointer's *Britannia Romana*), and appears, from a Roman milliare or mile-stone found by its side near Leicester, and now set up in a public place in that town, to have been formed or at least improved by the Romans in the reign of Hadrian, and probably at or about the time of that emperor's visit to Britain. It has retained its name among all classes of people better than any of the Roman roads.

This road first shows itself between Lincoln and the sea. It commenced probably from a Roman station somewhere on the coast between Saltfleet and Grimsby, and ran to Lindum (Lincoln), a Roman station of considerable importance, where it crossed another Roman or British road, the Ermine-street. Near its intersection with Ermine-street some pavement remained in Stukeley's time of flag-stones set edgewise. From Lindum the Foss runs south-south-west to Aquæ Solis (Bath), passing through the heart of the country. The sixth Iter of Antoninus partly coincides with this road, on which appear to have been the stations Crocolana (Brough or Bruffs, on the border of Lincolnshire and Notts, not far from Newark-on-Trent, and on the present road from Lincoln to that town), Ad Pontem (Farndon or Thorpe on the Trent above Newark), Margidunum (at or near East Bridgeford, Notts, on the road from Newark to Leicester), Verometum (near Willoughby, Notts, near the border of Leicestershire), Ratæ (Leicester), and Venonæ (High Cross, near Claybrook, on the border of Leicestershire and Warwickshire, at the intersection of the Watling-street and the Foss-way); the remainder of the road to Aquæ Solis (Bath) does not coincide with any Iter of Antoninus. In one part, between Newark and Leicester, the antient pavement is visible, composed 'of great blue flag-stones, laid edgewise very carefully, taken from quarries by the side of the hill: the breadth of it one hundred feet or more.' In other parts the way has been entirely paved with red flints, seemingly brought from the sea-coast. Near Venonæ (High Cross) part of the road lies open, like a ditch, either never having been filled with stones or gravel, or else owing to these having been removed for the repair of more modern roads, or some other purpose. Between Venonæ and Aquæ Solis the road passes through Durocornovium (Cirencester), where it crossed the road from Londinium (London) to Glevum (Gloucester). From Aquæ Solis the Foss-way continued its course in a pretty direct line to Ischalis (Ilchester), of which town it forms the principal street: from Ischalis, Stukeley supposed that it ran to Moridunum, now Seaton, in Devonshire: but others have conjectured that the Roman road between the river Ax and Honiton, of which there are plain vestiges to be discerned, is a continuation of the Foss; and that it ran through Isca Dumnoniorum (Exeter) across the Teign to Totness, which, according to some early accounts of this road, stood at one extremity of it. Beyond Ilchester some of the original pavement may yet be traced, composed of flat stones laid edgewise, and so close as to look like a wal fallen down. There are tumuli along some parts of the foss. The branches of this road, if any, are not ascertained. (Reynolds's *Iter Britanniarum*.)

FOSSA'NO, a town and bishop's see of Piedmont, in the province of Coni, is situated in a fine plain on the northern base of the maritime Alps, near the river Stura, and on the road from Mondovi to Savigliano. A canal, called Naviglio Nuovo, which leaves the Stura at Coni, and joins the Po at Carmagnola, passes by Fossano. The town carried on a considerable trade in corn, silk, hemp, and cattle, and has manufactories of leather, and also for spinning silk. It is a walled town, with 12,500 inhabitants, has an old castle, four churches, several convents, a royal college, with professors of rhetoric, philosophy, and theology, and a college for boarders, kept by the fathers Sornaschi Fossano lies 15 miles north-east of Coni, 15 east of Saluzzo, 12 north-west of Mondovi, and 35 south of Turin. [CONI.]

FOSSIL COPAL was first found in the blue clay at Highgate, near London; it occurs also at Wochlow in Moravia.

It occurs in irregular pieces or small nodular masses. Its colour is yellowish or dull brown; nearly opaque; lustre resinous; fracture conchoidal; specific gravity 1·046. When heated it yields an aromatic odour, and melts into a limpid fluid; it burns with a yellow flame and much smoke. when strongly heated in contact with the air, it is totally dissipated. It does not appear to have been analyzed.

FOSSILS. The term 'Fossil,' in its general acceptation, signifies that which may be dug out of the earth. In this sense, antiquities, as well as natural metallic and mineral bodies, may be said to be fossils. But the word is generally used among geologists and mineralogists to designate, sometimes, simple and compound mineral bodies, such as earths, salts, bitumens, and metals, but, more generally, the petrified forms of plants and animals which occur in the strata that compose the surface of our globe. Most of these fossil species, many of the genera, and some of the families, are extinct; and all of them were considered in the darker ages to owe their origin to the plastic power of the earth. They were named *Lapides idiomorphi*, *Lapides figurati*, and, as their organic nature began to be suspected, *Lapides diluviani*. Superstition was, in old times, busy with some of them, the Belemnites and Ammonites, for example.

The appellation *Petrifacta*, petrifactions, soon became common in books and catalogues of cabinets, and then Sir John Hill's proposition to denominate such petrified bodies *extraneous*, or *adventitious fossils*, was adopted by many naturalists. Parkinson objected to 'Petrifactions' as a general term, and distinguished 'Fossils' by employing the expression 'Primary Fossils' to denote those mineral substances which are supposed to have been native, or, in other words, to have existed primitively in the earth; and by applying the appellation 'Secondary Fossils' to the petrified exuviæ of plants and animals. Though the terms of this last-mentioned writer are now no longer adopted, he must always be considered as one of the fathers of this branch of geology, a branch which William Smith first effectively used as the key to the stratification. In the steps of Smith the first writers on this subject have since trod; and the study of 'Organic Remains,' by which name the animal and vegetable bodies penetrated by or converted into mineral substances are now known as a whole, has become of first-rate importance in deciphering the history of the lithological structure of the earth's crust. The well-known Eocene, Miocene, and Pliocene periods of Lyell, for instance, depend in a great degree upon the proportionate absence or presence of living species among the organic remains which have hitherto been discovered in certain groups of strata of comparatively modern origin.

Some notices of the fossil plants and animals, when such are known, are given in the articles which relate to existing families, genera, or species; and extinct families, genera, and species, are treated of under their respective heads.

FOSSUM, in the bailiwick of Christiania in Norway, a mining town and district, about 40 miles west of Christiania, near the Houg-Foss, the largest fall in Norway, over which the Semoen is precipitated nearly 50 feet in perpendicular height. Here are iron works and a cannon foundry, and at Modum, near it, is a large manufactory of smalts, zaffres, &c., which are made from the superior kind of cobalt, found in the neighbouring mine at Stutterud.

FOTHERGILL, JOHN, was born of a Quaker family, on the 8th of March, 1712, at Carr-End, near Richmond, in Yorkshire. After obtaining the elements of education in the school of Sedbergh, in the same county, he learned pharmacy from an eminent apothecary named Bartlett, and then proceeded to Edinburgh. Here he took his degree of M.D. in 1737, the thesis which he published on this occasion being on the use of emetics. ('De Emeticorum Usu in variis Morbis tractandis.') In order to become a physician in practice as well as theory, he now diligently attended St. Thomas's Hospital, in London. In 1740 he travelled into Holland, France, and Germany, and then settled in London. In 1748, an ulcerated or gangrenous sore throat, which had prevailed epidemically, gave Fothergill an opportunity of displaying his great practical talents. This kind of sore throat is now believed to be related to scarlet fever, and indeed to be the essential and dangerous part of that disease, of which the eruption is merely the outward and harmless indication. In Fothergill's time, however, this malady was confounded with the ordinary or inflammatory sore throat, and being treated accordingly, with bleeding and purgatives, was very fatal. Fothergill, on the contrary, used emetics, mineral acids, bitters, and a little wine, and lost but few cases.

The two most prominent points in the life of Dr. Fothergill are the remarkable success with which he practised his profession and the unwearied benevolence with which he distributed the fruits of his labours. It is supposed that he gave away at least 200,000*l*.

Dr. Fothergill published several papers in the 'Philosophical Transactions' on the origin of ambergris, the rupture of the diaphragm, &c.; and he is also the author of essays on the plant producing Aleppo scammony; on the use of bark combined with small doses of calomel in scrofula, and calomel alone in sciatica, lumbago, and worms; on the use of hemlock in cancer; on the botanical, chemical, and medical history of the cortex Winteranus and catechu; on the treatment of hooping-cough by very small doses of tartar emetic combined with an absorbent earth; on dropsy, and the disadvantages of putting off tapping too long; on chronic ulcers of the legs; on phthisis, and the abuse of balsams and bark in this disease; on febrile rheumatism of the face; on angina pectoris; on the ulcerous sore throat; on hydrocephalus internus, an essay thought by Vicq-d'Azyr to be one of the most perfect descriptions to be found in medicine; and advice to women between forty and forty-five years of age, or rules to be observed on the cessation of the catamenia.

Fothergill improved the art of recovering the drowned; showed the necessity of prohibiting burials in towns, and the means of diminishing the frequency of fires. The editions of his works are those of London, 1781, 8vo.; 1783, 3 vols. 8vo.; 1784, 4to. Fothergill died on the 26th of December, 1780, in the sixty-ninth year of his age. (*Biographie Universelle; Lives of British Physicians.*)

FOTHERINGAY. [NORTHAMPTONSHIRE.]

FOUCHE', JOSEPH, duke of Otranto, was born in 1763, at Nantes, and educated in the college of the Pères de l'Oratoire. Being unable, on account of his delicate constitution, to follow the profession of his father, who was captain of a vessel, he applied himself to study, and after having completed his course at Paris, he lectured in different towns of France on various philosophical subjects, till on his marriage he finally settled in his native town and began to practise as an advocate. In 1792 he was returned by the department of the Loire Inférieure as a member of the national convention, in which capacity he voted for the death of the king, and against the appeal to the nation. In 1793 he was sent with Collot d'Herbois on that mission which deluged Lyon with blood, but still he had the courage to oppose some measures of his infamous colleague. On his return to Paris, he was elected (1794) president of the Jacobin club, but he was soon expelled from it by the enmity of Robespierre. After the fall of Robespierre, Fouché being considered as a dangerous terrorist, was arrested, but afterwards liberated under the proclamation for a general amnesty, on the 26th October, 1795. He remained in private life till 1798, when he was employed in Italy, and after his return to Paris the Directory nominated him minister of the police of the republic. It was in this capacity that he displayed his great talents, which were united with an extraordinary degree of courage, firmness, and activity. He had the boldness to adopt vigorous measures for the suppression of popular assemblies. Having supported Bonaparte after his return from Egypt, he was confirmed in his office upon the establishment of the consulate. He had the address to render himself necessary to all parties by tormenting Bonaparte on the one hand with rumours of conspiracies, and on the other by screening from his vengeance many royalists. Bonaparte however dismissed Fouché in 1802 from his office, but on his accession to the throne, he restored him to his former post. Fouché's vigilance maintained the tranquillity of the empire while Napoleon was occupied in foreign wars; and having the duties of minister of the interior added to those of his office, he greatly contributed by his arrangements to prevent the success of the English expedition against Holland in 1809. In the last-mentioned year he was created duke of Otranto, but he fell out of favour for having used in his proclamation to the national guards the following expression—'Let us prove that Napoleon's presence is not necessary in order to repel our enemies.' In 1810 he was nominated governor of Rome, on condition of delivering his correspondence to Napoleon, which having refused to do, he was sent to Aix. He was again recalled; but as his views did not coincide with those of the emperor, Fouché retired into the country. In 1813 Fouché was made governor of the Illyrian provinces, but the progress of the allied troops compelled him to relinquish his post and to retire to Italy. After the abdication of Napoleon, Fouché again retired to his estates in the country, and refused to take any part in political intrigues. On Napoleon's return from Elba, he was suspected by the Bourbons, and an order was given for his arrest, but he contrived to make his escape. Napoleon again nominated Fouché minister of police, but he accepted the office only on the understanding that Austria and England secretly connived at Napoleon's return from Elba. As soon as he learned that the congress of Vienna had declared against Napoleon, he tried to persuade the emperor, in case his negotiations should prove unsuccessful, to abdicate and retire to the United States of America. He strongly advocated the principles of liberty during the hundred days of Napoleon's second reign, and strongly urged the emperor to abdicate after the battle of Waterloo. Fouché being put at the head of the provisional government by the chambers, promoted the departure of Napoleon, negotiated with the allied powers, and by his intrigues baffled the scheme of Carnot and other patriots to defend Paris. At the beginning of the negotiation he was not inclined to promote the second restoration of Louis XVIII., but notwithstanding this he was called by the king, immediately after the capitulation of Paris, and nominated minister of police. This circumstance gave rise to a general belief that he had deceived Napoleon all the time after his return from Elba, and that he constantly maintained a secret correspondence with the allied powers and the Bourbons. In his capacity of minister of police he presented to the king two reports on the state of France, which by their boldness excited the hatred of all parties. His advice to grant a general amnesty was not followed; and he signed with his own hand as minister of police the ordonnance of Louis XVIII. of the 24th July, 1815, by which many persons were excepted from the amnesty. Being driven by the hatred of the royalists to resign his office of minister of police, the king nominated him his ambassador to Dresden. The law of the 12th January, 1816, by which all those who had voted for the death of Louis XVI. were banished from France and deprived of the estates which had been granted to them, was extended to Fouché also, who from that time lived in different parts of Austria. He died at Trieste in 1820. 'The Memoirs of Joseph Ant. Fouché, duc d'Otranto,' which appeared at Paris, 1824, were declared by his sons to be a spurious production; but there are many reasons for believing them to be authentic, and it is a known fact that he dictated his memoirs to his secretary Desmarteau

A curious work was published at Paris in 1833, which throws great light on Fouché's character, and on the system of the imperial administration in France, 'Témoignages historiques, ou quinze Ans de haute Police sous Napoléon, par Desmarets.'

FOUGASS, a small military mine, formed by sinking in the ground, to a depth not exceeding 10 feet, a box of powder, or one containing two or more loaded shells. The train of powder by which it is to be fired is contained in a linen tube, and this is frequently protected by being placed in a case of wood. A trench is cut in the ground to receive the train, but it is subsequently filled up.

Fougasses are sometimes employed in the defence of field forts, and then they are formed under the glacis of the latter at the points where the assault is expected: in this case generally the train of powder is conveyed under ground to the counterscarp of the ditch, where the fire is to be applied; but occasionally this is done in the interior of the work, the train being then made to pass under the bottom of the ditch.

Sometimes a fougass is used to destroy a small work, in which case it is sunk within the mass of the rampart or parapet.

FOUGE'RES, a town in France, capital of an arrondissement, in the department of Ille et Vilaine. It is on the left bank of the river Couesnon, 160 miles in a direct line west-by-south of Paris.

Raoul of Fougères built a castle here in the twelfth century in place of one destroyed by Henry II. of England. Fougères was taken by the English under John in the year 1202, and again in the reign of Henry VI., in 1448.

The town is agreeably situated upon a height; it owes to its elevated situation a pure atmosphere and an agreeable prospect. It is not very well laid out, and there is no *place* or open space of any extent; but some of the streets are wide, and the houses are very well built. The ruins of the castle built by Raoul still remain in one of the fauxbourgs; its Gothic towers and ramparts form a picturesque object from some points of view.

The population of Fougères in 1832 was 7446 for the town, or 7677 for the whole commune. The principal manufactures of the town are common linens, sail-cloth, flannel, hats, and leather; there are many dye-houses, and the scarlet dye is particularly famous for its brilliancy, which it is supposed to owe to the quality of the water of the Nânçon, a little stream that falls into the Couesnon a short distance below the town. Trade is carried on in corn, cattle, linens, woollens, butter, honey, and wax. The market is considerable, and there are nine fairs in the year. In the neighbourhood of the town, which is fertile in wheat, oats, buckwheat, chestnuts, fruit, cider, and perry, are a glass-house and several paper-mills. The town is at the convergence of several roads. There are in it a subordinate court of justice and some other public offices, a high school, and public baths. In the forest of Fougères, about half a mile north of the town, are three remains of antiquity—two cromlechs, one of them with its upper stone about 16 feet long, 8½ wide, and nearly 4 thick; the other nearly destroyed; and a suite of subterranean apartments, built with freestone and vaulted, called *Les Celliers de Landéan*, and said to have been formed by Raoul of Fougères (mentioned above) in order to conceal his own treasures and those of the people of Fougères from the avidity of Henry II. of England. His precautions were, however, in vain, that king having taken his effects before they could be placed in security.

The arrondissement of Fougères comprehends 6 cantons and 57 communes; it had, in 1832, 81,788 inhabitants. Paper and glass are manufactured by them.

FOULAHS or **FOULHAS**, a nation widely spread along the western coasts of Africa, occupying the countries north of Cape Palmas as far as the banks of the river Senegal. Some of the tribes are found 400 or 500 miles from the coast. They do not however occupy this tract alone, but together with three other nations, the Mandingoes, Serrawollies, and Jaloffs or Yalloffs. The principal kingdoms of the Foulahs are Fouta-Toro, Bondou, Casson, Ludamer, Kaarta, and Fooladu, on both sides of the Senegal; and south of the sources of the Gambia, the great kingdom of Foota-Jallore. The countries east of the last-mentioned nation are little known, but it would appear that the Foulahs extend to the very boundary of the kingdom of the Ashantees.

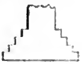
Major Gray describes the Foulahs of Bondou as being of the middle size, well made, and very active. Their 'skin is of a light copper colour, and their faces of a form approaching nearer to those of Europe than any of the other tribes of Western Africa, the Moors excepted. Their hair too is not so short or woolly as that of the black, and their eyes are, with the advantage of being larger and rounder, of a better colour and more expressive.' Mungo Park observes, that at Bondou and in other parts in the vicinity of the Moorish territories, their complexion is more yellow than in the countries farther south. In speaking of the negro nations, they rank themselves always among the white people. Their principal occupation is the rearing of cattle, and agriculture. Even on the banks of the Gambia, in the territories of the Jaloffs, and other tribes, the greater part of the corn is raised by them, and their herds and flocks are numerous, and in good condition. In the northern countries they have mostly embraced the Mohammedan faith, and send their children to schools, in which they learn to read and write. In the southern countries they are still heathens. They speak a peculiar language, different from those of the other nations among which they are settled. (Mungo Park; Goldbery; Gray.)

FOULIS, ROBERT and **ANDREW**, two learned printers of Scotland, were, it is supposed, natives of Glasgow, and passed their early days in obscurity. Robert is asserted to have been a barber. Ingenuity and perseverance however enabled them to establish a press, from which have issued some of the finest specimens of correct and elegant printing which the eighteenth century has produced. Even Bodoni of Parma, and Barbou of Paris, have not gone beyond some of the productions of the Foulis press. Robert Foulis began printing about 1740, and one of his first essays was a good edition of 'Demetrius Phalereus,' in 4to., published in 1743. In 1744 he brought out his celebrated immaculate edition of 'Horace,' 12mo., and soon afterwards was in partnership with his brother Andrew. Of this edition of 'Horace,' the sheets as they were printed were hung up in the college at Glasgow, and a reward was offered to those who should discover an inaccuracy. It has been several times reprinted at Glasgow, but not probably with the same fidelity. The two brothers continued to produce for thirty years a series of correct and well printed books, particularly classics, which, whether in Greek or Latin, are as remarkable for their beauty and exactness as any in the Aldine series. Among them may be enumerated 'Homer,' Greek, 4 vols. fol., 1756-58; 'Thucydides,' Greek and Latin, 8 vols. 12mo., 1759; 'Herodotus,' Greek and Latin, 9 vols. 12mo., 1761; 'Xenophon,' Greek and Latin, 12 vols. 12mo., 1762-67: with small editions of Cicero, Virgil, Tibullus and Propertius, Cornelius Nepos, Tacitus, Juvenal and Persius, and Lucretius. To these may be added a beautiful edition of the Greek Testament, in small 4to.; Gray's Poems, Pope's Works, &c. &c.

It is a melancholy reflection that the taste of these worthy men for the fine arts at last brought about their ruin; for having engaged in the establishment of an academy for the instruction of youth in painting and sculpture in Scotland, the enormous expense of sending pupils to Italy to study and copy the antients, gradually brought on their decline in the printing business, and they found the city of Glasgow no fit soil to transplant the imitative arts to, although their success in printing the Greek and Latin Classics had already produced them ample fortunes. Andrew Foulis died September 15th, 1775, and Robert in 1776 exhibited and sold at Christie's, in Pall Mall, the remainder of his paintings. The catalogue formed three volumes. But the result of the sale was, that after all the expenses were defrayed, the balance in his favour amounted only to the sum of fifteen shillings. He died the same year on his return to Scotland. A person of the name of Foulis, a descendant of one of the brothers, continued to print at Glasgow as late as 1806. His 'Virgil' of 1778, and his 'Æschylus,' printed in 1795, are considered beautiful productions. (Lemoine's *Hist. of Printing;* Nichols's *Lit. Anecd.*, vol. iii., pp. 691, viii., 475; Chalmers' *Biog. Dict.*)

FOUNDATION, the lower part or courses of the basement walls or piers of a building. In foundations it is of the utmost importance to prevent the settlement of the walls in an unequal manner: this can only be done by making the earth on which the foundation is set equally solid throughout its whole extent.

If the earth, when excavated to a sufficient depth to form a good hold for the wall which is to be built in it, should not be solid or should be likely to swell or shrink with the change of temperature, as clay is apt to do; and if the superincumbent weight to be placed on the foundation is considerable, it is advisable to pile by driving pieces of timber into the excavation. The thickness of piles should be about a twelfth of their length, and their width apart depends on the weight to be placed upon them. Sometimes a level row of crossbearers or sleepers is laid on the piles, and the spaces between them are filled with stone or brick rammed up to the level of their upper faces, and then the whole is planked over. On the planking are laid the footings which are wider than the wall and project one beyond another, the lowest being the widest (thus).



Footings of the Foundation.

This is done to prevent the wall from sinking with its own weight into the earth, or rocking with the wind. In foundations from two to four courses of footings are usually employed. Inverts or inverted arches are often used between the foundations of piers, to distribute the weight more equally along the whole line excavated for the foundation. Where the ground is not very soft, and where the wall is to be supported on narrow piers, a piece of timber is sometimes split in half and laid at the bottom or on the lower courses of the brickwork or masonry.

The breadth of a substructure should be proportioned to the weight of the superstructure. Nicholson, in his architectural dictionary, says, 'if the texture of the ground is supposed to be constant, and the materials of the same specific gravity, the breadth of the foundation will be as the area of the vertical section passing through the line on which the breadth is measured; thus, for example, suppose a wall 40 feet high 2 feet thick to have a sufficient foundation of 3 feet in breadth, what should be the breadth of a wall 60 feet high 2½ feet thick? By proportion it will be $40 \times 2 : 3 :: 60 \times 2\frac{1}{2}$: the answer = 5⅝ feet.

'This calculation will give the breadth of the foundation of the required wall, equal to the breadth of the insisting wall itself, when the height of the required wall is equal to the ratio, which is the first term ($40 \times 2 = 80$) divided by the second term (3) $= \frac{80}{3} = 26\frac{2}{3}$ feet. Thus a wall of 26⅔ would have the breadth of its foundation equal to its thickness above the foundation, and less than 26⅔ feet would have a thinner foundation than even the superstructure. But though the calculation in this case gives the foundation less in breadth than the thickness of its superstructure, it must be considered that it only calculates the true breadth of the surface that should be opposed to the ground, in order to prevent the wall from penetrating by its weight: though the rule gives all the width that is necessary, on account of the weight of the insisting wall, yet the breadth of the footing should always be greater than that of the superstructure, as it will stand more firmly on its base when affected by lateral pressure, and be less liable to rock by the blowing of heavy winds.' (Nicholson's *Dictionary*, *Foundation*.)

Concrete composed of gravel or shingle and hot lime is often used to form a solid bearing for the footings of foundations. The greatest care and judgment are required in making foundations for heavy superstructures, for if the piles should be of a bad quality and the ground in which they are driven of a very loose and boggy nature, the same catastrophe which occurred at the new custom-house in London may be expected to take place. In this building it was found necessary to remove the piles and loose earth and form a solid concrete foundation.

In brick foundations the footings have sets off, or projections of about an inch and sometimes more. In stone walls the footings are at least six inches in projection on each side of the wall which is to be carried on the foundation.

FOUNDING, one of the mechanical arts which embraces all the operations of reducing ores, and of smelting and casting metals. There are various branches of the art, and some difference prevails in the minor details of the processes, as in iron, brass, and bronze founding; casting guns and cannon, types for printing, and bell founding. The finishing operations of chasing, burnishing, plating, &c., are also parts of the founder's art. In this country, where metal-working is of so great importance in a commercial point of view, improvements are constantly being made in the operations of the foundry. The practice on the continent differs also in many respects from that pursued in our foundries: this but applies chiefly to details, as there is of course a general resemblance in the principles upon which the several processes are conducted.

Before entering upon the practical part of the subject a few preliminary remarks respecting the knowledge that existed of these arts in the earliest ages, may not be out of place; to show, at least, that founding is of very high antiquity. We trace it back, in the sacred writings, to the very infancy of the human race, where it is recorded that Tubal Cain was skilled in working in metals. In the patriarchal ages we have also the description, with their materials and weight, of the presents in earrings and bracelets that were offered to Rebekah by the servant of Abraham, with other allusions to similar objects of luxury, which prove that considerable progress must have been made in these arts, since there were artizans at that time who could execute works of such delicacy and minuteness as to be used merely for ornament. There is the same authority for the fact that the arts of metallurgy were known and practised very extensively by the early Israelites; and we have the names of two Hebrew artists who were so celebrated for their great skill in working in the precious and other metals as to be accounted divinely instructed. (Gen. xxiv., 22; Exod. xxxi., &c. &c.) There can be no doubt that the Egyptians were well acquainted with some very refined processes of founding long prior to any written historical record, and it is not unlikely that they may have been, to a certain extent, the instructors of the Israelites who were so long resident in their country. The Phœnicians, who possessed considerable knowledge in these arts, as may be judged from the fact stated in the sacred history, that when Solomon required skilful artificers to execute the decorations for the Temple, he obtained the assistance of a native of Tyre, 'who was cunning to work all works in brass—*cast*,' we are told, '*and wrought*.' (1 Kings, vii.) Homer also bears evidence to the well-known ability of this people in an epithet particularly applied to the Sidonians. The extent to which metal-working was employed by the Greeks, Etruscans, and Romans, and the excellence to which it was occasionally carried in the fine arts, are too well known to need further observation in this place: a general history of it, as a branch of sculpture, has already been given in the article BRONZE, which also contains some notices from the antient writers on the different methods adopted of solid hammer-working, hammer-work in plates, and in casting; as well as on the varieties and composition of metals. It must however be acknowledged that in all the practical points of antient founding our information is very limited, the writers of antiquity having confined themselves, generally, to a description of finished productions, and leaving us little or nothing by which we can judge of the mode of working.

It appears that furnaces of considerable size, and producing a great tonnage of metal, were constructed in this country as early as the reign of Queen Elizabeth; but it was not till the beginning of the seventeenth century that a revolution took place which effected a great change in the character and importance of founding. Prior to that date all the operations of melting, &c., had been performed by means of wood fuel; but the demand for various objects in metal was now so greatly increased that it was evident, first from the consumption of timber for the foundries, and next from the destruction of forests in consequence of the agricultural improvements which were taking place in various parts of the country, that this provision must soon prove insufficient to meet the wants of the trade. It was then that the attempt was made to bring coal into use, and it is curious at this time to know how much difficulty, first from ignorance of its real value in the operations of metallurgy, and then from prejudice against such an innovation upon the old habit of burning wood only, (to which must also be added the interference with the interests of wood monopolists,) was thrown in the way of its introduction. One of the earliest and most zealous advocates for its use, Dudley, had all his works destroyed, and was nearly ruined by the violence of his rivals, or rather opponents; but at length its employment was fully established, and from that time the rapid advance of the iron and other metal works of this country may be dated.

We have stated the chief reason for having recourse to the coal-mines for fuel to have been the apprehension that the supply of wood fuel would fail; but for this well-grounded fear wood or charcoal would always have been preferred for many of the operations of metallurgy, from its being less objectionable, as regards its chemical composition, than coal. The iron that is smelted in Sweden by wood fuel is considered a superior article, and is still much sought after; and the smelters in this country find it necessary to *char* the pit and sea-coal which they use, in order to adapt it to the purposes required. There are various ways of making this charred coal, which is called coke or coak. The common process is to place a quantity of small coal or coal dust in a kiln heated with large coal: the small coal then runs together and forms a large mass which, when it is completely red, is pulled or drawn out in lumps with iron rakes and laid on the ground. It is spongy and porous in its texture, but it loses little or nothing of its valuable qualities, as it is only deprived by this process of its volatile parts, and nothing remains but the carbon and earthy impurities. Sometimes coke is made in the open air; ashes being thrown upon the mass which, after it has lost its volatile parts and emits no smoke, becomes red hot. The object of this covering is to prevent the access of air. Some years ago a plan was discovered and carried into effect for saving the volatile products of the coal which were lost by the processes hitherto adopted for making coke. By burning the coal in a range of stoves, with as little air as possible at the bottom, and conducting the smoke to a capacious close tunnel, the bitumen is condensed in the form of tar. This improvement upon the former method was discovered by Lord Dundonald. It is not necessary to enter into the niceties attendant on the methods employed for reducing the ores of different metals. Many of these details would be useless, except to the operative smelter; while others can only be known to those experienced in the several processes, and are perhaps scarcely communicable but by exhibiting them in practice. The following observations on the reduction of the ores of iron, tin, copper, and lead, the metals produced and worked in the greatest abundance in this country, must therefore be received as introductory to more complete information on the subject, to be acquired only from works of elaborate detail, or from personal examination of the process.

Iron is obtained from a very abundant ore in this country, viz. the common iron-stone of our coal-measures. It is found that for the reduction of the ore to a metallic state it is necessary to add a certain quantity of lime, which acts as a flux; and it is worthy of remark that, while the ore itself from which the metal is produced, and the coal for melting it, are found together, the limestone by which its reduction is facilitated usually abounds in the lower regions of the carboniferous strata, and sometimes, as in the great coal basin of South Wales, a bed of millstone grit capable of enduring the fire, and used in constructing the furnaces, is also found in connexion or alternating with the iron ore and limestone. 'In many coal-fields, the occurrence of rich beds of iron ore in the strata of the slaty clay that alternate with beds of coal, has rendered the adjacent districts remarkable as the site of most important iron foundries; and these localities usually present a further practical advantage, in having beneath the coal and iron ore a substratum of limestone that supplies the third material required as a flux to reduce this ore to a metallic state.' (Buckland, *Bridgewater Treatise, Geological and Mineral*, vol. i.) 'The occurrence of this most useful of metals,' says Mr. Conybeare, 'in immediate connexion with the fuel requisite for its reduction, and the limestone that facilitates that reduction, is an instance of arrangement so happily adapted to the purposes of human industry, that it can hardly be considered as recurring unnecessarily to final causes, if we conceive that this distribution of the rude materials of the earth was determined with a view to the convenience of its inhabitants.' The first operation the ore undergoes is *roasting*. This is done in various ways, both in this and in other countries. Sometimes it is conducted in kilns, sometimes on the ground, and in the open air. The first method is by heaping the iron ore on a mass of ignited coal. In the other, a thick layer of ironstone, broken in pieces, is placed upon a bed of coal, or wood, or charcoal (on the Continent wood or charcoal is always used), six or eight inches thick, and covering an area of several yards; upon this another layer of fuel is placed, and then another pile of ore, which diminishes both in area and thickness towards the top. The whole is then covered with small coal or charcoal dust till it reaches some feet above the ground. The lower stratum of fuel is then lighted, and by degrees ignites the whole mass. In the course of a few days the ironstone becomes cool, and the sulphur, arsenic, water, and inflammable matter being driven off, it is fit for smelting. It is then placed in a furnace, with fuel and limestone in determined proportions. At Dudley, in Staffordshire, for 2¼ tons of roasted ore, which affords a ton of cast metal, 19 cwt. of transition limestone are employed as flux. In the course of a few hours the whole runs down, and the iron is melted, and in that state is allowed to flow into furrows made in sand, where it forms what is termed *pig-iron*; or is poured into moulds where it forms the various articles of cast-iron ware. There are various sorts of cast-iron, but it is usually divided into three classes relatively to its colour and qualities, which are in this country called *numbers one, two,* and *three*, sometimes more descriptive names are given to the different qualities, as *smooth-faced, grey, white, forge pigs, ballast*-iron, &c., &c. Cast-iron is converted into *bar*-iron by smelting it by means of charcoal, when it is welded and hammered: of this there are also varieties, of which the toughest, called *stub*-iron, is used in forming fowling-piece barrels. It is made by inclosing old horse-shoe nails tightly in a broad iron ring, generally made of Swedish iron; a welding heat is then applied, and the whole mass is hammered till by degrees the nails and ring become completely united: it is then drawn into bars, which make an iron of peculiar closeness, toughness, and malleability. *Steel* is produced by a process called cementation, in which the iron is placed in alternate layers of charcoal, and heated for several days in a close furnace, and then suddenly cooled by plunging it in cold water.

The best ore of tin is found in Cornwall. It is commonly blasted by gunpowder, and is procured in pieces of considerable size, which are stamped to powder by beams shod with iron: it is then well washed till the earthy particles are carried off, and the tin is fit for the smelting house. After being roasted in a reverberatory furnace, and again washed, it is a second time subjected to the furnace, being now mixed with small coal, and, in some cases, with a small quantity of lime. The melted tin thus produced is at last placed in a small furnace and exposed to a very gentle heat, when the purest portion melts first and is drawn off. This is called *common grain tin*, and the inferior, which still contains a small proportion of copper and arsenic, is then cast into pigs called *block tin*. The finest grain tin is procured from the stream works of Cornwall. Good stream tin affords from 65 to 75 per cent. of the best *grain*.

The reduction of copper ore is made by several consecutive processes. The first is by calcining it, and when the ore is sufficiently *roasted* to oxidate the iron which it contains, it is melted. The melted metal is after a time suffered to flow into a pit filled with water, by which it becomes granulated. It then undergoes further heating, and what is called technically its *slag* (or scoria) is taken off, and it is again allowed to run off into water. After other nearly similar processes it is cast in sand, when it becomes solid, and in this state is called *blistered copper*. It is now fit for what is termed the refinery, and undergoes an operation called refining or toughening. This is considered to be an operation of delicacy, and requires great skill and care in the workmen. It is conducted in a furnace similar to the melting furnace, and the object is to thoroughly purify the metal from any portions of oxygen, which is performed by adding charcoal to the copper while it is in fusion, and stirring it occasionally till it is judged to be pure. When tin is united with copper, it forms the compound called *bronze*; and it is remarkable that when thus composed the specific gravity of the metal is always greater than would be deduced from the computation of the quantities and specific gravities of the component parts taken singly. The uses to which this valuable composition is applied in the fabrication of cannon, bells, statues, &c., &c., are well known. United with zinc, copper forms the compound called *brass*. It is not easy to effect this union by simple fusion; it is therefore usually done by cementation, when the granulated copper is combined with the vapour of zinc.

The greater part of the lead met with in England is procured from a substance called *galena*, in which it is found combined with sulphur. There are, however, other ores of lead. The galena, being freed by hammering it and by the hand, from whatever impurities can be separated from it by those means, is broken up into small pieces, and after repeated washings is placed in a reverberatory furnace; but only sufficiently heated to drive off certain ingredients without melting the lead itself. The *roasting* being finished charcoal is added till the reduction is completed. The lead, after the *slag* has been removed from it, is suffered to run out of the furnace into a pan, and being first skimmed is ladled out into moulds and left to cool. There are various methods adopted in different places and under different circumstances for procuring metals from their ores.

The furnaces that are used in founding are chiefly of two kinds, and though strictly speaking both are *air* furnaces, yet they are distinguished as *air* or *wind* furnaces and *blast* furnaces. The first acts by a draught through a chimney. In the other the air is forced into the body of the furnace by means of bellows. The forms and relative proportions of the different parts of the furnace, and particularly the size, elevation, and direction of the chimnies, and the dimensions and space of the flues when these are required, are of great importance; the volume and intensity of heat and consequent certainty of the operations depending in a great measure on the knowledge and science displayed in adapting the parts to each other. The *blast* furnace was most probably known at a very early period. The old mode of working the bellows was by hand, or by cattle, or more usually by water-wheels; but the discovery of the power of steam, and the certainty and regularity of its action, have rendered its employment almost universal, at least in works of any extent. There is another variety of furnace to which allusion has been made in describing certain processes; it is called a cupol or cupola, and sometimes a reverberatory furnace. It is used for many operations in founding, and is often preferred for apeculiar application of heat different from those before mentioned. In this furnace the ore and fuel, or the metal and fuel, if it is used for casting, do not come in contact, but it is so contrived that the flame only shall pass over the material to be acted on. The reverberatory furnace is generally employed for smelting lead and copper ores and for refining some of the finer metals.

Founding is practised either in melting or casting any quantity of metal in the solid, or with a core (by means of which the metal is preserved of a determined thickness or substance), or in plain casting. Before any object can be cast in metal it is necessary that a model of it be prepared. The models may be made of various substances; clay or wax, or sand with clay, are those usually employed, but they may also be of wood, stone, or any other material. Upon those models *moulds* must be made; these are commonly composed of plaster of Paris mixed with brickdust, sometimes sand, or sand with a mixture of cow-hair. For moulds for iron and brass work a yellowish sharp sand is preferred, which is prepared by mixing it with water and then rolling it on a flat board till it is well kneaded and fit for use. This process is called, in technical language, *tewing*. If the object is cylindrical, or of a form that admits of it, it is moulded and cast in two pieces; these two parts are then carefully joined together, and the edges or seams carefully cleaned. This doubling is an easy and cheap mode of execution, and only requires care to be successful. For the smaller class of works, instead of melting and running the metal at once from a large furnace, earthen crucibles are used, into which the metal is thrown in small pieces: the crucible is placed in a strong heat in a close stove, and as the metal is melted and sinks more is added till the vessel is full. It is then lifted out by means of iron instruments adapted to the purpose, and the metal is poured from it into the moulds, in which channels or ducts for receiving it have been previously made. There is one great advantage in using crucibles, viz. that the metal may be carried in them to any part of the foundry, whereas in general it is essential to have the moulds and the furnace close together. It is obvious however that melting metal in crucibles can only be practised where the casting is on a comparatively small scale.

In noticing the different ways of casting, mention has been made of one in which a core is used, and which may require some explanation. The *core*, as its name denotes, is a part or portion situated within the body of the cast; and its purpose in founding is to form a centre to the work by which the thickness or substance of the metal may be regulated. In coring, the mould must first be made complete; into this, clay or wax, or any other fit substance or material, is then squeezed or pressed in a layer of uniform thickness; in large works it is usually from half an inch to an inch thick. This layer represents the metal. The mould, if in parts, is then to be put together, the abovementioned layer being left within it, and into the open space in the centre a composition (usually of plaster of Paris with other substances mixed with it) is introduced, and made to adhere to, or rather is filled up to the clay or wax. This is the core, and it is often made to occupy the whole interior of the mould. When this is *set*, or dry, the mould is taken to. pieces and the material which has been made to represent the metal removed. The mould is then again put carefully together round its core or nucleus, the two portions being secured from contact by stops and keys properly arranged for that purpose. It is now obvious that when the mould is placed, with its channels and ducts, to receive the metal, this latter can only enter the interstice or space between the outer *mould* and the inner *core*; and thus, by an ingenious and simple contrivance, the cast is insured of sufficient substance to answer every object required, with, at the same time, a great saving of metal and reduction of weight.

In all these operations it is essential that the mould and the cores be perfectly free from moisture, as the sudden and violent expansion of air that is at all damp, upon the heated metal flowing into the mould, would cause it to burst, to the destruction of the work and the great danger of the workmen, In order to guard against this, the moulds and core are usually placed in an iron closet or drying-stove in which large fires are constantly kept up, and from whence they are not removed till it is ascertained that they are perfectly dry, and just before they are required for being cast into. The moulds and cores of works of large dimensions are usually strengthened with bars and hoops of iron, to prevent their springing or changing their form during the drying, and during the necessary moving and shifting about in the foundry. All that is now necessary before casting is to cut the channels or ducts for the metal to penetrate easily and quickly into the mould; and to place the mould conveniently with respect to distance and inclination from the furnace. The first operation is easily performed; the founder takes care to distribute the channels, both in number and in their size (or width), according to the parts of his work into which he requires a greater or less volume of metal to flow, and also, if the object is of great extent or complicated form, that the different parts of the mould may as nearly as possible be filled simultaneously; it being most desirable that the *whole getto*, or cast, should be made before the metal in any of the parts has time to settle or lose its fluidity. Other channels are also made for allowing the air to escape as the melted metal enters the mould; these are called vents, and are very necessary where the works are on a considerable scale. With respect to placing the mould, it is only important to secure a sufficient inclination of plane from the mouth of the furnace to the mould that the metal may run easily and uninterruptedly, and not have time to grow cool and therefore sluggish. The usual method in great bronze works is to bury the mould in a pit a little below the level of the furnace, and by ramming sand firmly round it to insure its not being affected by any sudden or violent shock, or by the weight of metal running into it. When every thing is ready and the metal found to be in a state fit for running, the orifice or mouth of the furnace (which is usually plugged with clay and sand) is opened, when the metal descends, and in a few minutes the mould is filled. The metal is allowed to run till it overflows the mouths of the channels into the mould. The work is then left to cool, after which the mould is scraped or knocked off and the cast undergoes the necessary processes (such as cleaning, chasing, &c.) to render it fit for the purpose designed.

Brass ordnance is always cast solid. The model is made round a nucleus of wood called a spindle, and the mould of loam and sand made over it. When this is perfectly dry, the model and spindle within are removed, and the mould is subjected, as in the instances before described, to a strong heat, till it is well dried or baked. When ready for casting, it is placed upright in the pit, and the metal is allowed to run into it till it is filled. What is called a dead head is left at the upper and smaller or mouth end of the gun, which presses the metal down, and prevents its becoming porous as it settles and cools. After a few days the mould is knocked off, and the gun is ready for finishing. The dead head is turned off, and the boring, which is an operation requiring great care and skill to insure its being true, is effected by a machine adapted to the purpose. Wood fuel is used for this branch of founding, but the furnace is a reverberatory, and the flame, and not the fuel, comes in contact with the metal. The composition for brass ordnance is 90 copper and 10 tin in 100 parts.

In ordnance-casting in France the proportion of copper is greater, being stated at 100 copper to 11 of tin, which is about the composition of the bronze of which medals are formed. Metal casts usually require a good deal of working over after they are freed from the mould; this depends however upon the quality of the object, and also on the degree of success in the casting. These operations are chasing, burnishing, lackering, plating, gilding, &c.

Chasing is performed by scraping with edged tools and by filing till any portions of the work which may have become heavy or indistinct in the casting, or were not highly finished in the model, are rendered sharp and clear. Many patterns for ornamental work, as foliage, flowers, and such devices, are cast roughly, and are afterwards placed in the chaser's hands, who completes them for use.

Burnishing consists in making the raised parts of the design complete. It is effected by rubbing rather than cutting. The usual mode of operating is by fastening the object down in a vice, and working up the face with tools of various sizes formed of a shaft of steel fixed in a wooden handle. These tools are slightly turned up at the end. This operation is also called heightening. The workman occasionally dips his instrument in a lacker. The operation of producing embossed or vilicort work by pressure from behind is called punching; the term snarling is also used for a branch of this work.

Lackering is employed both for use and ornament. It gives to brass work the bright yellow colour generally seen in articles of general use, as door-plates, handles, hinges, &c.; and it also preserves metal from tarnishing or turning black by exposure to the air. The lacker is made of alcohol and seed or shell lac, with spirits of saffron, arnotto, or turmeric for colouring matter; it is laid on lightly with a soft brush, the object to be lackered being first warmed; when perfectly dry, the surface is rubbed.

Soldering is the operation of uniting metallic bodies with each other, which can only be done by means of simple or mixed metals. Solders are distinguished into two kinds, viz. hard and soft. Hard solders are ductile, and will bear hammering; that used for brass is made of brass with one-sixth, one-eighth, or even one half of zinc; this may also be used for the hard solder of copper. It is called and sold as spelter solder. Soft solders are easily melted, but are brittle and will not bear hammering. These are made of tin and lead in equal parts; or bismuth, tin, and lead in like proportions. Iron is often soldered with copper, and copper and brass with tin, especially in large works. In the operation of soldering the surfaces of the metal intended to be joined must be perfectly clean and applied closely to each other. The solder is then laid upon the joint, with a small quantity of sal ammoniac or borax or common glass: these additions defend the metal from oxidation. For the operation of GILDING, see that article.

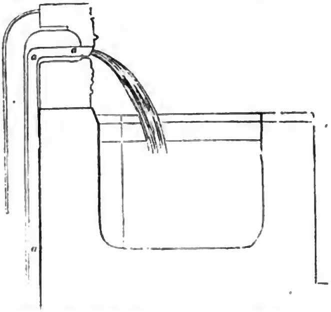
FOUNDLING HOSPITALS are charitable institutions, which exist in most large towns of Europe, for taking care of infants forsaken by their parents, such being generally the offspring of illegitimate connexions. These institutions date from the Middle Ages, and were established for the purpose of preventing the destruction of children either by actual violence or by being exposed in the streets or highways. Among the Romans and other nations of antiquity, the exposure of children by poor or unfeeling parents was a frequent practice, and was not punished by the laws. After Christianity became the religion of the empire, it was forbidden by the Emperors Valentinian and Gratian. At the same time, the greater strictness of the laws concerning marriage and against concubinage, the religious and moral denunciations against unwedded intercourse, and afterwards the obligatory celibacy introduced among the clergy, and the severe penalties attending its infraction, all tended to increase the danger to which illegitimate infants were exposed from the sentiments of fear and shame in their parents. Child-murder and the exposure of children became nearly as frequent in Christian countries as they had been in Heathen times, only the parents took greater care to conceal themselves; and humane individuals in various countries began to devise means to collect and provide for the forsaken infants found in the streets. In this, as in other acts of charity, ecclesiastics stood foremost. At Rome, Innocent III., in 1198, when rebuilding and enlarging the great hospital of S. Spirito, allotted a part of it to the reception of foundlings, several infants having been found drowned in the Tiber about that time. This asylum for the 'esposti,' or foundlings, was afterwards enlarged and endowed by subsequent popes, and the institution was adopted by degrees in other cities. It was thought that by providing a place where mothers might deposit their illegitimate children in safety without being subject to any inquiry or exposure, the frequent recurrence of the crime of child-murder would be prevented. For this purpose a turning box was fixed in an opening of the wall in a retired part of the building, in which the child being deposited by the mother in the night and a bell being rung at the same time, the watch inside turned the box and took the infant, which from that moment was placed under the protection of the institution, was nursed and educated, and afterwards apprenticed to some trade or profession. Those parents who were in hopes of being able to acknowledge their child at some future time, placed a mark or note with it, by which it was afterwards known when they came to claim it, and it was then restored to them on their defraying the expense incurred for its maintenance.

In France the philanthropist Vincent de Paule, the founder of the Society of the Missions in the first half of the seventeenth century, exerted himself to found an asylum for infants, which were at that time frequently left to perish in the streets of Paris. It was at first supported by private subscriptions, but afterwards was made a national establishment—'Hôpital des Enfans trouvés.' Similar institutions were founded in other great French cities. In 1831 there were 71,411 illegitimate children born in France—about one-thirteenth of the whole number of births;—but in Paris the proportion is much greater, being one illegitimate child in every three births. Of the whole number of illegitimate children, about 58 out of every 100 are abandoned by their mothers and taken to the foundling hospitals, where nearly two-thirds of them die before they are a year old. (Guerry, *Statistique Morale de la France*.) Mortality appears to be very great in most foundling hospitals of the continent, owing to carelessness, mismanagement, or want of sufficient funds for the administration of those institutions. The infants are given out to cheap nurses in the country, where a great number of them die. At the same time, it is remarkable that the number of illegitimate births has greatly increased over all Europe during the last forty years. (Benoiston de Châteauneuf, *Considérations sur les Enfans trouvés dans les principaux Etats de l'Europe*, 1824.)

The principal objection that has been raised against foundling hospitals is, that they tend to encourage the procreation of illegitimate offspring. On the other side, they are supposed to have the effect of preventing in a great measure child-murder. The whole of this question, in all its bearings, is extremely difficult to solve. One distinction ought to be made, namely, that in countries where there is no legal provision for the poor, foundling hospitals appear to be more necessary, or at least less objectionable, than in those where the mothers of illegitimate children, if unable to support them, have, like other destitute persons, the resource of the parish poor-house. It must also be observed that mothers of illegitimate children often neglect their unfortunate offspring, and are ill calculated by their habits to rear them up so as to make of them useful and honest members of society.

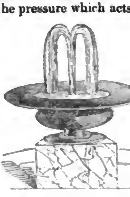
FOUNTAIN, a jet or jets of water, flowing either naturally out of the earth, or from structures formed by art. Artificial fountains consist of water flowing from statues, vases, or architectural buildings combined with sculptured figures and other ornamental decorations.

Many antient Greek cities were decorated with fountains. Pausanias informs us that Corinth was adorned with several fountains, and he mentions one in particular which stood near the statue of Diana, representing Pegasus, with the water flowing through his feet (ii. 3, 5). He describes another as consisting of a bronze Neptune seated on a dolphin, from the mouth of which the water issued (ii. 2, 8). Frontinus, who lived in the reigns of Nerva and Trajan, was superintendent of the fountains at Rome, and wrote a work, 'De Aquæductibus Urbis Romæ Commentarius,' in which he treats, among other things, of the distribution of the waters of fountains. The public fountains of Pompeii, some of which are almost perfect, evince the knowledge which the antients possessed of the property of water to rise to its level, and their practical application of the principle.



Section of Fountain, from Pompeii, showing the ascending pipe, a, a, a.

Not only were the streets, but even the private houses of the Pompeians, decorated with fountains; and it appears that the antients were acquainted with that law by which fluids may be made to ascend in a vertical jet to a height proportionate to the pressure which acts upon them.



Fountain, from the paintings of Pompeii.

One of the domestic fountains of the Pompeians is encrusted with coloured glass and shells. The fountain of water flowed from a large mask set on steps, placed within a large niche.

At Rome, the proper distribution of the rivers which flowed through her aqueducts was a matter of great importance, entrusted to the care of an officer of very high rank. It appears from Frontinus, who filled that office under the Emperor Nerva, that the letting out of the public waters to private persons was a source of revenue; and from his numerous complaints of fraud, and directions to prevent it, we learn something of the manner of distribution. The aqueducts were each charged with a certain number of pipes of supply; and no new pipe could be inserted without a special application to the emperor. Permission being obtained, the overseer assigned to the applicant a calix, as it was called, of the assigned dimensions. This was a brass measure (modulus) fixed in the castellum or reservoir, the diameter of which regulated of course the quantity of water which passed through it. It was ordered to be made of brass, that it might not easily bend, and that there might be less room for fraud, either on the public or the individual, by enlarging or diminishing the prescribed aperture. Beyond the calix the pipe was private property; but more effectually to prevent fraud, it was enacted, that for fifty feet from the calix the pipe and it were to be of the same dimensions; and to prevent the breaking up of the public pipes, it was expressly provided that every person should draw his water direct from one of the castella, or reservoirs in which the aqueducts terminated. The right to a supply of water was strictly personal, not attached to houses, so that the supply was cut off at every change of ownership. The waters which had once been granted were sold by the superintendents, as they fell in, to the highest bidders Those whose means or interest were insufficient to obtain a private pipe, were obliged to fetch water from the public fountains.' (*Pompeii*, vol. ii. pp. 73, 74.)

The number of leaden pipes found in Pompeii leads us to conclude that they were universally employed in fitting up the fountains of that city. Some fountains flowed through bronze figures, of which several are preserved in the Museum at Naples.

Some of the cities of Italy and the East are adorned with fountains, which are no less agreeable to the eye than useful to the inhabitants. Of all places in the world none appear to be so abundantly furnished with this agreeable convenience as modern Rome, though this profusion is most probably only a tithe of the luxury with which the antient city was supplied. Many of the fountains of Rome are highly decorated, of great magnitude, and very varied in their mode of ejecting the waters with which they are supplied from the existing aqueducts. The fountains of Trevi, and the Pauline fountain at San Pietro in Montorio, are immense piles of architecture, the former highly decorated with sculpture. In Italy, almost every species of design which the imagination can form has been adopted by their ingenious artists in the construction of fountains.

The city of Paris is well supplied with fountains, many of which are elegantly designed. The fountains of Versailles and St. Cloud in France, and the fountains at Wilhelmshöhe near Cassel, are the largest in Europe. London, though well supplied with water, is almost destitute of fountains.

FOURCROY, ANTOINE-FRANÇOIS DE, an eminent French chemist, councillor of state, commander of the legion of honour, member of the Institute, and of most of the academies and scientific societies of Europe, professor of chemistry at the Museum of Natural History, at the Faculty of Medicine of Paris, and at the Polytechnic School, was born at Paris, on the 15th of June, 1755, and was the son of Jean-Michel de Fourcroy and Jeanne Laugier.

His family had long resided in the capital, and several of his ancestors had distinguished themselves at the bar. Antoine-François de Fourcroy sprung from a branch of the family that had gradually sunk into poverty; and his son, the subject of the present article, grew up in the midst of it. When seven years old, he lost his mother, and his sister preserved him with difficulty till he went to college; and in consequence of the ill treatment of a master he left it at fourteen years of age, somewhat less informed than when he went to it.

He entertained various projects for obtaining a livelihood. While uncertain what plan to follow, the advice of Vicq-d'Ayr, who was a celebrated anatomist and a friend of his father's, induced him to commence the study of medicine; and after successfully struggling against every kind of difficulty, he at last obtained the necessary qualification to practise in Paris.

The first writings of Fourcroy did not evince any peculiar predilection for any particular branch of science; he wrote upon natural history, anatomy, and chemistry; he published an 'Abridgment of the History of Insects,' and a 'Description of the Bursæ Mucosæ of the Tendons;' and in consequence of the celebrity which he acquired by the last-mentioned performance, he was admitted as an anatomist into the Academy of Sciences in 1785.

After the death of Macquer, which happened in 1784, he succeeded to the chair of professor of chemistry at the Jardin du Roi, and he continued there till his death, which took place 25 years afterwards. He was greatly admired for the eloquence with which he delivered his lectures, and the writer of this article was a witness of his great flow of language during a sitting of the Institute in 1802.

In 1795 he was elected a member of the National Convention, but notwithstanding his reputation for eloquence he never opened his mouth in the Convention till after the death of Robespierre: prudential motives induced him to resist the temptation of exhibiting his talents while the tyrant reigned, although he was well known to be a determined enemy to the old order of things, from which indeed his father and himself also had severely suffered.

After the 9th Thermidor, when the nation was wearied with destruction, and efforts were making to restore institutions which had been overturned, Fourcroy began to acquire influence, and he took an active part in whatever related to the establishment of schools, whether of medicine, or for the purposes of general instruction. Among these was the Polytechnic School, at which, as already stated, he was professor of chemistry; and both as a member of the Convention and of the Council of Antients, he was concerned in the establishment of the Institute and the Museum of Natural History.

The great exertions made by M. de Fourcroy, and the prodigious activity which he displayed in the numerous situations which he filled, gradually undermined his constitution; he was sensible of his approaching death, and announced it to his friends as an event which would speedily take place. On the 16th of December, 1809, after signing some dispatches, he suddenly exclaimed—'Je suis mort;' and fell lifeless on the ground.

M. de Fourcroy was twice married; by his first wife he left a son, an officer in the artillery, who inherits his title, and a daughter, Madame Foucaud.

In his 'History of Chemistry,' Dr. Thomson thus concludes his notice of the works of Fourcroy:—'Notwithstanding the vast quantity of papers which he published, it will be admitted, without dispute, that the prodigious reputation which he enjoyed during his lifetime was more owing to his eloquence than to his eminence as a chemist; though even as a chemist he was far above mediocrity. He must have possessed an uncommon facility of writing. Five successive editions of his 'System of Chemistry' appeared, each of them gradually increasing in size and value: the first being in two volumes and the last in ten. This last edition he wrote in sixteen months: it contains much valuable information, and doubtless contributed considerably to the general diffusion of chemical knowledge. Its style is perhaps too diffuse, and the spirit of generalizing from particular and often ill authenticated facts, is carried to a vicious length. Perhaps the best of all his productions is his 'Philosophy of Chemistry.' It is remarkable for its conciseness, its perspicuity, and the neatness of its arrangement.'

Besides these works and the periodical publication entitled 'Le Médecin éclairé,' of which he was the editor, there are above one hundred and sixty papers on chemical subjects, with his name attached to them, which appeared in the Memoirs of the Academy and of the Institute; in the 'Annales de Chimie,' or the 'Annales de Musée d'Histoire Naturelle,' of which last work he was the original projector. Many of these papers contained analyses, both animal, vegetable, and mineral, of very considerable value. In most of them the name of Vauquelin is associated with his own as the author, and the general opinion is that the experiments were all made by Vauquelin, but that the papers themselves were drawn up by Fourcroy.

It would serve little purpose to go over this long list of papers. Though they contributed essentially to the progress of chemistry, yet they exhibit but few of those striking discoveries which at once alter the face of the science by throwing a flood of light on every thing around them. We shall merely notice a few of what we consider his best papers.

1. He ascertained that the most common biliary calculi are composed of a substance similar to spermaceti. During the removal of the dead bodies from the burial-ground of the Innocents at Paris, he discovered that the bodies were converted into a fatty matter, which he called *adipocire*. It has since been distinguished by the name of cholestrine, and has been shown to possess properties different from those of adipocire and spermaceti.

2. It is to him that we are indebted for the first knowledge of the fact, that the salts of magnesia and ammonia have the property of uniting together and forming double salts.

3. His dissertation on the sulphate of mercury contains some good observations. The same remark applies to his paper on the action of ammonia on the sulphate, nitrate, and muriate of mercury. He first described the double salts which are formed.

4. The analyses of urine would have been valuable had not almost all the facts contained in it been anticipated by a paper of Dr. Wollaston published in the 'Philosophical Transactions.' It is to him that we are indebted for almost all the additions to our knowledge of calculi since the publication of Scheele's original paper on the subject.

5. We may mention the process of Fourcroy and Vauquelin for obtaining pure barytes, by exposing nitrate of barytes to a red heat, as a good one. They discovered the existence of phosphate of magnesia in the bones, of phosphorus in the brain, and in the milts of fishes, and a considerable quantity of saccharine matter in the bulb of the common onion, which, by undergoing a kind of spontaneous fermentation, was converted into manna.

In these and most other similar discoveries which we think it unnecessary to notice, we do not know what fell to the share of Fourcroy and what to Vauquelin; but there is one merit at least to which Fourcroy is certainly entitled, and it is no small one: he formed and brought forward Vauquelin, and proved to him ever after a most steady and indefatigable friend. This is bestowing no small panegyric on his character; for it would have been impossible to have retained such a friend through all the horrors of the French revolution if his own qualities had not been such as to merit so steady an attachment.

In concluding, we may remark that this circumstance, coupled with the well-known fact of his having saved the lives of some men of merit, and among others, of Darcel, tend greatly to acquit Fourcroy of the disgraceful charge which has been made against him of having contributed to the death of the illustrious Lavoisier. This acquittal is rendered complete by the annexed declaration of Cuvier in his Eloge of Fourcroy:—'If, in the rigorous researches which we have made, we had found the smallest proof of an atrocity so horrible, no human power could have induced us to sully our mouths with his Eloge, or to have pronounced it within the walls of this temple, which ought to be no less sacred to honour than to genius.'

FOURIER, JOSEPH. The biographical part of this article rests on the authority of M. Cousin's notes to his *éloge* of Fourier (Paris, 1831).

Joseph Fourier was born at Auxerre in 1768: he was the son of a tailor in that town, and there received his education at a school directed by the Benedictines. Into this order he was about to enter, and had passed a part of his noviciate, when the Revolution commenced. He had applied himself very early to the mathematics, and had gained such reputation that in 1789 he was appointed professor in the school at which he had formerly studied. He had not confined himself to one branch of learning, as appears from his giving courses of history, rhetoric, and philosophy. Before this time, in 1787, he had sent to Paris a memoir on the theory of equations, to be presented to the Academy of Sciences. This memoir contained the first steps of the theory which was afterwards published: it was lost during the Revolution, but a sufficiently attested copy exists.

Fourier took some part in the civil troubles, at their commencement, and was a member of the Committee of Public Safety at Auxerre. He was more than once the object of proscription, having been twice either saved or delivered from prison by his fellow-townsmen of Auxerre, once saved from the guillotine by the death of Robespierre, and once by the interference of the professors of the Ecole Polytechnique. Having previously been a pupil of the Ecole Normale, he was appointed a sub-professor of the Polytechnic School in 1794, and remained in that post till 1798. In the latter year Monge proposed to him to accompany the expedition to Egypt. His occupations in that country were various: he was secretary of the Institute which was formed at Cairo, he superintended the commission which was employed in collecting materials for the great work on Egypt, and was employed in judicial and diplomatic capacities. At his return from Egypt he was appointed by the first consul prefect of the department of Isère, which place he continued to fill till 1815, his situation having been preserved to him at the fall of Napoleon in 1814, by the high estimation in which he was held, and the gratitude of those adherents of the old monarchy whom he had served. When Napoleon, in 1815, passed through Grenoble (a town of Fourier's prefecture), Fourier, who had hesitated much, issued a moderate Bourbonist proclamation, and left the town by one gate as Napoleon entered it by another. Napoleon was extremely enraged at this step, and causing Fourier to be brought into his presence, reminded him in strong terms of former benefits, and telling him that, after the proclamation, he could not remain at Grenoble, appointed him prefect of the department of the Rhône. Fourier appears to have been softened by the matter, or subdued by the manner, of Napoleon's address to him, and went quietly to his new post. He resigned it however on the 1st of May, in consequence of his determination not to execute the orders of Carnot, which required him to make numerous arrests among the Bour bonites; and he was in Paris when the news of the battle of Waterloo arrived. Here he remained for some time, entirely neglected, and with very moderate funds, until his former pupil, M. de Chabrol, gave him the superintendence of a *bureau de statistique*. In 1816 he was chosen a member of the Institute, but Louis XVIII. refused to ratify the election, and it was not till a year after that this king could be induced to allow it. On the death of Delambre he was chosen secretary of the Academy, and on that of Laplace president of the council of the Polytechnic School. Fourier died at Paris in May, 1830.

The character of Fourier was in every point of view respectable. His appearance and manners were decidedly good, and his address, united with the respect which he created, enabled him to manage the prejudices and passions of others to a remarkable extent, of which M. Cousin gives several instances. He knew how, says the last-named gentleman, 'prendre chacun par où il était prenable;' and his own explanation of this faculty was 'je prends l'épi dans son sens, au lieu de le prendre à rebours.' The influence of his conversation produced in one case at least abiding and remarkable effects: it was he who first gave a taste for Egyptian antiquities to the Champollions.

The writings of Fourier consist of papers in the Memoirs of the Academy of Sciences, the 'Annales de Physique,' and the 'Récherches Statistiques sur la Ville de Paris,' &c., as well as of two separate works, namely, the 'Théorie de la Chaleur,' Paris, 1822, and the 'Analyse des Equations déterminées,' Paris, 1831. The last work is posthumous, and was completed under the inspection of M. Navier.

In the first of the two works, the object of which is the deduction of the mathematical laws of the propagation of heat through solids, Fourier extended the solution of partial differential equations, gave some remarkable views on the solution of equations with an infinite number of terms, expressed the particular value of a function by means of a definite integral containing its general value (which is called *Fourier's Theorem*), &c. This work is full of interesting details, and is one of the highest productions of analysis of our day.

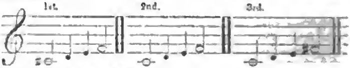
The latter of the two works contains an extension of Descartes' well known rule of signs, by means of which the number of the real roots of an equation may be determined. Considered with respect to results merely, the method of Fourier may perhaps be considered as superseded by the remarkable theorem of M. Sturm; but there is nevertheless much in the course marked out by Fourier, which it would be worth while to examine. The work also contains a method of solving equations by determination of the successive figures of the root, analogous to that proposed by Mr. Horner and others. The preface of M. Navier contains attestations as to the time at which the several parts of the work were written, which it will be worth the while of those to consult, who think that 'all which has been done by Fourier was virtually done by Mr. Horner long before.' The treatise of Fourier, published by M. Navier, is only the first part of the work: the remainder has not yet appeared, to our knowledge. A full account of its principal points will be found in Mr. Peacock's report on Analysis to the British Association.

FOURMO'NT, ETIE'NNE, born at Herbelay, near Paris, in 1683, was the son of a surgeon: he studied in several colleges at Paris, and showed an early and extraordinary facility for learning languages. He made himself master of the Latin, Greek, Hebrew, Syriac, and Arabic, and was appointed professor of the last-mentioned language in the College Royal of Paris. In 1715 he was made a member of the Academy of Inscriptions and Belles Lettres, and afterwards of the royal societies of London and Berlin. A young Chinese named Hoan-ji having been brought to Paris by the missionaries, Fourmont was appointed to assist and direct him in the compilation of a Chinese grammar and dictionary. After a few years Hoan-ji died, and left to Fourmont only very scanty materials for the intended work. Fourmont prosecuted the labour alone, and after several years he published his 'Meditationes Sinicæ,' 1737, which contain a kind of introduction to the Chinese grammar. Five years later he brought forth the grammar itself, which had cost him twenty years of study: 'Linguæ Sinarum Mandarinicæ Grammatica duplex, Latine et cum Characteribus Sinensium,' fol., 1742. Fourmont availed himself of the suggestions of several Jesuits, and he is said to have borrowed from Father Varo's 'Arte de la Lengua Mandarina,' printed at Canton in 1703, which was little known in Europe. He also compiled a catalogue of the Chinese MSS. in the king's library at Paris. Peter the Great having forwarded to the Academy of Inscriptions some fragments of a Tibetan MS. found by the Russian soldiers, Fourmont deciphered it, and his version is given in Boyer's 'Museum Sinicum.' His 'Reflexions sur l'Origine, l'Histoire, et la Succession des Anciens Peuples, Chaldéens, Hebreux, Phéniciens, Egyptiens, Grecs, &c., jusq'au tems de Cyrus,' were published after his death in 2 vols. 4to, Paris, 1747, with a biographical notice of the author. He wrote numerous other works, dissertations, memoirs, some of which appeared in the 'Memoirs of the Academy,' others were published separately, and many he left in MS. He published himself a catalogue of all his works in 1731, which then amounted to about 120, but many of them were mere unfinished sketches. Fourmont was not extremely modest, and was fond of speaking in praise of his own erudition, which was undoubtedly very extensive. He died at Paris, in December, 1745.

FOURMO'NT, MICHE'L, younger brother of Etienne, born in 1690, exhibited also a facility for learning languages; he assisted his brother in his philological labours, was made professor of Syriac in the College Royal in 1720, and he gave also from his chair lectures on the Ethiopic language. In 1726, being sent by the government to Greece to purchase MSS. and copy inscriptions, he gathered a rich harvest of both. He boasted of having copied more than 1000 inscriptions, chiefly in Attica and the Peloponnesus, which had escaped the researches of Spon and Wheeler and other travellers. These copies were deposited in the royal library at Paris. Many of these inscriptions are authentic, but others are forgeries, although Raoul Rochette (*Lettres sur l'Authenticité des Inscriptions de Fourmont*, Paris, 1819) defends their authenticity. In his letters to Freret and Count Maurepas, Fourmont boasts of having defaced or destroyed the remains of antiquity of several cities of Greece, and among others those of the temple of Jupiter at Amyclæ, a boast as unmanly as it is false, or at least absurdly exaggerated. (Dodwell, *Tour through Greece*, vol. ii. ch. 11.) He died in 1746, having published only some detached papers in the 'Memoirs of the Academy of Inscriptions,' of which he was a member. His nephew, Claude Louis Fourmont, who had accompanied him to Greece, returned to the Levant, and remained several years in Egypt. On his return to France, he published a 'Description historique et géographique des Plaines d'Heliopolis et de Memphis,' 12mo, 1755. It is a sensible, unpretending little work, and gives a satisfactory account of the condition of Egypt at the time. The author died in 1780.

FOURNIER. [CREEPER, Vol. viii. p. 148.]

FOURTH, an interval in music, and to be enumerated among the discords; though it seems to have puzzled many writers on music, some of whom are much inclined to view it as a concord. [CONCORD.] Its ratio is 4 : 3. Of fourths there are three kinds: the *Diminished Fourth*, the *Perfect Fourth*, and the *Extreme Sharp*, or *Superfluous Fourth* (called also the *Tritonus*, from being composed of three whole tones). The first (C ♯, F) is composed of a whole tone and two semitones; the second (C, F) of two whole tones and a semitone; and the third (C, F ♯) of three whole tones. Example:—



FOVEO'LIA. [MEDUSA.]

FOWEY. [CORNWALL.]

FOWLING, the act or art of taking birds with nets, by shooting, snares, the use of bird-lime, or other devices. It is also sometimes used for the taking of birds with hawks and falcons, more properly called falconry. In Latin the sport is termed Aucupium. See Bargæus *de Aucupio*, liber i., *ad Franciscum Medicem Florent. et Senens. Principem*, 4to. Flor. 1566. Olina's *Uccelliera*, 4to. Rom. 1684, is another work on fowling, the plates of which, representing the different modes of following the sport, are extremely curious. In English we have Blore's *Gentleman's Recreations*, fol. Lond. 1686 and 1716; and *The Experienced Fowler, or the Gentleman's Recreation*, 18mo. Lond. 1704.

FOX, *Vulpes*, Brisson, the generic name for a species of that subdivision of the great genus *Canis* which has the pupils of the eyes elliptical or almost linear by day, though they become round or nearly so in the hours of darkness.

Genus Vulpes.

Although the dental formula and general osteological character of the *Foxes* agree with that of the true *Dogs*, the lengthened and sharp-pointed muzzle, the round head, the erect and triangular ears, the form of the pupil, the long body, short limbs and elongated, thick, and bushy brush, constitute differences which separate the former from the latter, at least sub-generically.

EUROPEAN FOXES.

The *Common Fox*, *Vulpes* of Ray, *Canis vulpes*, and *Canis alopex* (the latter the variety, if variety it may be called, with the tip of the tail black?) of Linnæus, *Vulpes vulgaris* of Brisson, *Volpe* of the Italians, *Raposa* of the Spanish, *Rapoza* of the Portuguese, *Fuchs* of the Germans, *Vos* of the Dutch, *Raff* of the Swedes, *Rev* of the Danes, *Tod* of the Scotch, *Llwynog*, fœm. *Llwynoges* of the Welsh, is too well known to require description. The time of gestation may be taken at from sixty to sixty-five days, and the birth of the young takes place in April. In a year and a half they attain their full size, and have been known to live thirteen or fourteen years; but as this can only have been ascertained, observes Mr. Bell, of individuals in confinement, it is very probable that, in a state of nature, it considerably exceeds that period. Of its cunning much has been said and a great deal of it is true. The reader will find some interesting remarks on the habits and economy of the common fox by Dr. Weissenborn in the number of Loudon's *Magazine*, (N. S.) for October, 1837.

Geographical distribution.—The *Common Fox* inhabits, according to Linnæus, Europe, Asia, and Africa.* Cuvier mentions it as reaching from Sweden to Egypt, both inclusive. Mr. Strickland notes it as occurring near Smyrna. The fox named *Melanogaster* by the Prince of Musignano in his *Fauna Italica* is probably a variety only. The strong smell proceeding from the anal glands and urine of the common fox is very offensive.

AMERICAN FOXES.

The *American Fox*, *Vulpes fulvus*, which is, according to Dr. Richardson, very plentiful in the wooded districts of the fur countries, about eight thousand (skins) being annually imported into England from thence, bears a strong resemblance to the common European fox, and, until De Beauvois pointed out its peculiarities, was considered identical with it. Thus it is the *European Fox* of Pennant. Dr. Richardson observes that the *American* or *Red Fox* does not possess the wind of its English congener, its strength being exhausted by the first short burst, though it runs about a hundred yards with great swiftness, and is soon overtaken by a wolf or a mounted huntsman. He gives the following synonyms:—*European Fox* of Pennant; *Red* or *Large Fox* of Hutchins; *Large Red Fox* of the plains, of Lewis and Clark; *Renard de Virginie* of Palisot de Beauvois; *Canis fulvus* of Desmarest; *Red Fox* of Sabine (Franklin's *Journ.*), and Makkeeshew of the Cree Indians.

Dr. Richardson is inclined to adhere to the opinion of the Indians in considering the *Cross Fox* of the fur traders (*Renard barré ou Tsinantontonque* of Sagard Theodat.; *European Fox*, var. β. *Cross Fox* of Pennant; *Canis decussatus* of Geoffroy, Sabine, and Harlan; *Cross Fox* of the Hudson's Bay Company's lists; *Beloduschki* of the Russians;) to be a mere variety of the *Red Fox*. He also considers the *Black* or *Silver Fox* (*Renard Noir ou Hayuha* of Sagard Theodat.; *European Fox*, var. *a*. *Black* of Pennant; *Renard Noir ou Argente* of Geoffroy; *Grizzle Fox* of Hutchins, MSS.; *Renard Argente* of F. Cuvier; *Canis Argentatus* of Desmarest, Sabine, and Harlan; the *Black* or *Silver Fox* of Godman; *Tschernoburi* of the Russians;) to be another variety of the same. F. Cuvier doubts the identity of the American species with the *Black Fox* of the north of Europe.

Our limits will not permit us to give more than a few examples of the genus, and we select the *Arctic Fox*, *Vulpes Lagopus*, as the American species of whose manners the most interesting accounts have been given.

Description.—The Arctic Fox is considered by Dr. Richardson to be identical with the *Pied Foxes* of James; *Canis Lagopus* of Linnæus and Forster, Captain Sabine, Mr. Sabine, Dr. Richardson, and Dr. Harlan; *Arctic Fox* of Pennant and Hearne; *Greenland Dog* of Pennant? a young individual; *Isatis* and Arctic Fox of Godman; *Stone Fox* of authors; *Terreanee-arioo* of the Esquimaux of Melville Peninsula; *Terieniak* of the Greenlanders; *Wappeeskeeshew-makkeeshew* of the Cree Indians, and *Peszi* of the Russians.

Winter Dress.—The winter dress of the *Arctic Fox*, which when full grown measures about 3 feet 3 inches from the point of the nose to the tip of the tail, is entirely pure white, or white with a slight tinge of yellow, except at the tip of the tail, where there are a few black hairs intermixed. Before the eyes and on the lower jaw, the hair is short and sleek; on the forehead and posterior part of the cheeks considerably longer; and on the occiput and neck it is as high as the ears, and is intermixed with a soft wool or down. There is so much wool on the body that it gives the fur the character of that of the Polar hare. The ears are rounded and covered with shorter hairs than the neighbouring parts: the shortest hair is on their edges, and terminates so evenly with that on the back and front of the ear, as to give the appearance of having been trimmed with a pair of scissors and make the ear look thicker than it is. The long fur on the back part of the cheeks is directed backwards and contributes to give a peculiar cast to the physiognomy and an apparent great thickness to the neck. The vibrissæ about the mouth are very strong, and in some specimens nearly white, in others dusky-brown. The hair on the body, particularly on the sides, is long: it is rather longer on the belly than on the back, but not so close and woolly, and denser and coarser on the tail than elsewhere. Fur on shoulders and thighs long; but the foreparts of the legs are covered with short hair, and that on the hind-legs is shortest and smoothest; on the hinder surface of the legs the hair is longer, and the soles of the feet are clothed with dense dirty-white woolly hair like those of the hare, whence the Linnæan name. Claws long, compressed, slightly arched, and of a light horn-colour. (Dr. Richardson.)

Summer Dress.—The long white hair which formed the winter clothing falls off in April or May, when the snow begins to disappear, and is replaced by shorter hair which is more or less coloured.

Head and chin brown, having some fine white hairs scattered through the fur; ears, externally, coloured like the head; within white: a similar brown colour extends along the back to the tail, and from the back is continued down the outside of all the legs, but, on the latter, a few white hairs are intermixed; the whole under parts and the insides of the legs are dingy-white; the tail is brownish above, becoming whiter at the end, and is entirely white beneath (Joseph Sabine, from a specimen killed at York factory on Hudson's Bay in August.) 'On the approach of winter,' says Dr. Richardson, 'the fur lengthens, the white hairs increase in number, all the hairs become white at the tips, but retain more or less of the bluish or brownish-gray colour at the roots, until the fur is in *prime* winter order, when it is of its full length, and almost everywhere of a pure white colour from the roots to the tips. The fur on the soles of the feet becomes thinner and shorter in the summer time, and several naked callous places then appear, but they are not so large as those which exist on the soles of the feet of the other North American foxes at the same season of the year.'

Food.—Eggs, young birds, blubber, and carrion of any kind; but their principal food seems to be lemmings of different species. (Richardson.)

Habits.—Extremely cleanly. It never soils its habitation, nor has it any unpleasant smell. Breeds on the sea-coast, chiefly within the Arctic Circle. Is very unsuspicious and easily taken by traps, even, as it is stated, when baited in its presence. Captain Lyon, R.N., received fifteen from one trap in four hours. Is gregarious, forming burrows in sandy spots, twenty or thirty together. Dr. Richardson saw one of these fox villages on Point Turnagain, in lat. 68½°. Soon becomes tame in confinement and is eager to hide its food as soon as it obtains it, even when there seems no danger of losing it. Snow is the material generally used for this purpose, and when piled over the food is forcibly pressed down by the nose. 'I frequently observed my dog-fox,' writes Captain Lyon, 'when no snow was attainable, gather his chain into his mouth, and in that manner carefully coil it so as to hide the meat. On moving away, satisfied with his operation, he, of course, had drawn it after him again, and sometimes with great patience repeated his labours five or six times, until in a passion, he has been constrained to eat his food without its having been rendered luscious by previous concealment. Snow is the substitute for water to these creatures, and on a large lump being given to them, they break it in pieces with their feet, and roll on it with great delight. When the snow was slightly scattered on the decks, they did not lick it up, as dogs are accustomed to do, but by repeatedly pressing with their nose, collected small lumps at its extremity, and then drew them into the mouth with the assistance of the tongue.' The same author gives the following account of the sagacity of the same dog-fox:—'He was small and not perfectly white; but his tameness was so remarkable, that I could not afford to kill him, but confined him on deck in a small hutch with a scope of chain. During the first day, finding himself much tormented by being drawn out repeatedly by his chain, he at length, whenever he retreated to his hut, took this carefully up in his mouth, and drew it so completely after him, that no one who valued his fingers would endeavour to take hold of the end attached to the staple.'

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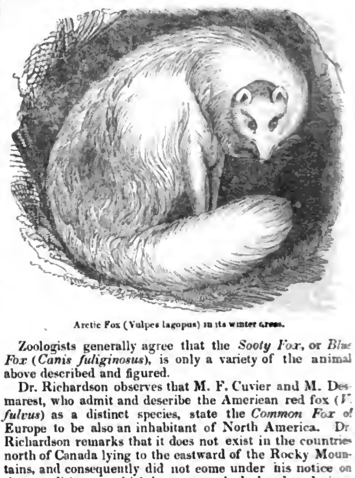
* With regard to its inhabiting America, see the concluding paragraph of the section relating to American Foxes.

Captain James Ross, in his Appendix to Captain Sir John Ross's last voyage, gives the following account of the *Arctic Fox*:—'It brings forth from six to eight young early in June. In July, 1831, one of their burrows was discovered on the sandy margin of a lake: it had several passages, each opening into a common cell, beyond which was an inner cell, where the young, six in number, were taken. They were precisely of the same colour as the old ones at that season of the year. Hearne says that the young are all over of a sooty black. This probably refers to the following variety of the Arctic Fox (*Canis Lagopus*, var. *fuliginosus*). In the outer cell, and in the several passages leading to it, we found great numbers of the two species of lemming, several ermine, and the bones of hares, fish, and ducks in great quantities. Four of the young foxes were kept alive till the end of the following winter, and were a great amusement to our crew by their playfulness, as they soon became very tame. They never attained the pure white of the old fox, a dusky lead-colour remaining about the face and sides of the body. There is a remarkable difference in the disposition of these animals, some being easily tamed, whilst others remain savage and untractable, notwithstanding the kindest treatment. The females are much more vicious than the males. A dog-fox that lived several months became so tame in a short time that he regularly attended our dinner-table like a dog, and was always allowed to go at large about the cabin. A pair, kept for the purpose of watching the changes of their fur, threw off their winter dress during the first week in June; the female a few days earlier than the male. Towards the end of September the brown fur of summer gradually became of an ash-colour, and by the middle of October was perfectly white: from that period it continued rapidly to increase in thickness until the end of November, when the last of the two died, having lived in confinement nearly ten months.'

Geographical Distribution.—'The highest northern latitudes throughout the winter. The young generally migrate to the southward late in the autumn and collect in vast multitudes on the shores of Hudson's Bay: they return early the following spring along the sea-coast to the northward, and seldom again leave the spot they select as a breeding-place.' (Captain James Ross.) 'Their southern limit in North America appears to be about lat. 50°. They are numerous on the shores of Hudson's Bay, north of Churchill, and are found at Behring's Straits; but the brown variety (*fuliginosus*) is the more common in the latter quarter.' (Dr. Richardson.) The Doctor continues thus:—'Towards the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast, and going much further to the southward in districts where the coast-line is in the direction of their march. Captain Parry relates that the Arctic foxes, which were previously numerous, began to retire from Melville Peninsula in November, and that by January few remained. Towards the centre of the continent, in lat. 65° they are seen only in winter, and then not in numbers; they are very scarce in lat. 61°, and at Carlton House, in lat. 53°, only two were seen in forty years. On the coast of Hudson's Bay however, according to Hearne, they arrive at Churchill, in lat. 59°, about the middle of October and afterwards receive reinforcements from the northward until their numbers almost exceed credibility. Many are captured there by the hunters, and the greater part of the survivors cross the Churchill River as soon as it is frozen over, and continue their journey along the coast to Nelson and Severn Rivers. In like manner they extend their migrations along the whole Labrador coast to the Gulf of St. Lawrence.'

Utility to Man.—The fur is considered to be of small value in commerce, but the flesh is said to be good food, particularly when young. Captain Franklin and his party compared the flavour of the young animal to that of the American hare. Captain Lyon thought it resembled the flesh of a kid. Captain Sir John Ross's party (last voyage) named them 'lambs,' from their resemblance in flavour to very young lamb. 'The flesh,' continues Captain James Ross, 'of the old fox is by no means so palatable; and the water it is boiled in becomes so acrid as to excoriate the mouth and tongue. During our late expedition they constituted one of the principal luxuries of our table, and were always reserved for holidays and great occasions. We ate them boiled, or more frequently, after being parboiled, roasted in a pitch-kettle. They were taken by us in considerable numbers, and formed a valuable addition to our provisions when meat was very scarce.'



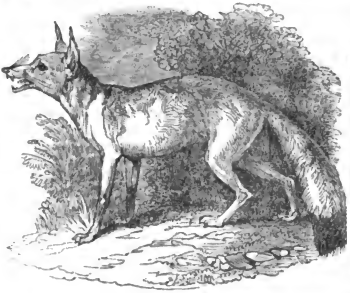
Arctic Fox (Vulpes lagopus) in its winter dress.

Zoologists generally agree that the *Sooty Fox*, or *Blue Fox* (*Canis fuliginosus*), is only a variety of the animal above described and figured.

Dr. Richardson observes that M. F. Cuvier and M. Desmarest, who admit and describe the American red fox (*V. fulvus*) as a distinct species, state the *Common Fox* of Europe to be also an inhabitant of North America. Dr. Richardson remarks that it does not exist in the countries north of Canada lying to the eastward of the Rocky Mountains, and consequently did not come under his notice on the expeditions to which he was attached; but he admits it into 'Fauna Boreali Americana,' as being most probably an inhabitant of New Caledonia; and Kalm remarks that he had two different accounts of their coming over. Mr. Bartram, and several others, were told by the Indians that these foxes came into America soon after the arrival of the Europeans after an extraordinary cold winter, when all the sea to the northward was frozen. But Mr. Evans, and some other persons, assured Kalm that it was still known by the people that a gentleman of fortune in New England who had much inclination for the chase, brought over a great number of foxes from Europe, and let them loose in his territories that he might indulge his passion for hunting, at the very beginning of New England's being peopled with European inhabitants. These foxes were believed to have so multiplied that all the red foxes in the country were their offspring. Kalm, who states that these foxes were very scarce at New York, but that they were entirely the same with the European sort, considers neither of these accounts satisfactory. Dr. Godman remarks that these reddish foxes were numerous in the middle and southern States of the Union, and were every where notorious depredators of poultry-yards. Dr. Richardson thinks it very probable that an investigation into the characters of the American foxes will show that the reddish fox of the Atlantic States is a variety of the *Canis cinereus*, which has been mistaken for the European fox.

AFRICAN FOXES.

The species are numerous, but our limits not permitting us to enter at large into a history of them, we select as an example the Caama, *Canis* (*Vulpes*) *Caama*, the smallest of the South African foxes. Dr. Smith, in his Catalogue to the South African Museum, from a specimen in which our figure is taken, observes, that some few individuals are to be met with within the limits of the colony, but that the favourite residence of the species seems to be to the northward; though there it is daily becoming less and less numerous, owing to the skins being much in request among the natives as a covering in the cold season. Many of the Bechuanas, it is stated, find their sole employment in hunting these animals with dogs or snaring them. Like other foxes, it is a great enemy to birds which lay their eggs on the ground; and it is suspiciously watched by the ostrich in particular during the laying season. The Caama, when he succeeds in obtaining the eggs, pushes them forcibly along the ground till they come in contact with some substance hard enough to break them, when he feasts on the contents. The natives take advantage of the watching of the ostrich for this robber to lure the bird to its destruction. Knowing that the anxious parent runs to the nest the moment a fox appears, they fasten a dog near it and hide themselves. The ostrich approaches to drive away the supposed fox, and is shot by the concealed hunter. (*Catalogue of the South African Museum.*)



Canis Caama.

ASIATIC FOXES.

As examples of the Asiatic foxes we select the small Indian insectivorous fox (*Canis Bengalensis* of Shaw), which Mr. Hodgson notes among the *mammalia* of Nepâl, as occurring in the Tarâi. It is brown above, with a longitudinal black band. The space round the eyes is white, and the tail is terminated with black.

The *Fox* of the Dukhun (Deccan), *Kokree* of the Mahrattas, *Canis Kokree* of Sykes, which the Colonel considers to be new to science, although it much resembles the descriptions of the *Corsac*, is described by him (*Zool. Proc.*, 1831) as a very pretty animal, but much smaller than the *European Fox*. Head short; muzzle very sharp. Eyes oblique; *irides* nut-brown. Legs very slender. Tail trailing on the ground; very bushy. Along the back and on the forehead fawn colour, with hair having a white ring near to its tip. Back, neck, between the eyes, along the sides, and half way down the tail, reddish-grey, each hair being banded with black and reddish-white. All the legs reddish outside, reddish-white inside. Chin and throat dirty-white. Along the belly reddish-white. Ears externally dark-brown, and with the fur so short as to be scarcely discoverable. Edges of the eyelids black. Muzzle red-brown. Length 22 and 22¼ inches; of the tail 11¾ to 12 inches (Sykes).

The *Canis Himalaicus*, *Hill Fox* of the Europeans in the Doon, in Kumaon, and the more western and elevated parts of the mountains, described by Mr. Ogilby in the zoological part of Mr. Royle's 'Flora Himalaica,' is greatly admired for the beauty of its form and the brilliancy and variety of its colours. The whole length to the origin of the tail is 2 feet 6 inches; that of the tail 1 foot 6 inches, that of the ears 4 inches; and the height is stated at about 1 foot 4 or 5 inches. The animal agrees with the common European and American foxes (*C. vulpes* and *C. fulvus*) in the black marks on the backs of the ears, and in front of the hind and fore-legs. The coat consists of long, close, rich fur, as fine as that of any of the American varieties, and of infinitely more brilliant and varied colours. Mr. Royle procured one at Mussooree in its winter dress. Mr. Hodgson notes it as a large *Fox* N. S. ? peculiar to the Kachâr. For details we refer the reader to the interesting work above mentioned, and the *Zool. Proc.* for 1836, p. 103.

FENNEC.

This animal, which has given rise to much controversy, is generally placed by the French zoologists among the *Foxes:* but the observations of Mr. Yarrell, to which we shall presently allude, lead him to pronounce decidedly that the Fennec appears to him to belong to the genus *Canis* properly so called; the osteological part of the structure closely resembling that of the dog, and the pupil of the eye being circular. We owe to Colonel Dixon Denham the first good figure of the animal, and in the Appendix to his travels is a very luminous history and description of it, as far as the information went at the time of its publication.

The *Fennec* obtained by Bruce when he was consul general at Algiers, was said to be more frequently found in the territories of Benni Mezzab and Werglah, where the date grows. In these districts the Fennecs are hunted for their skins, for which there is a market at Mecca, whence they are exported to India. Bruce, after leaving Algiers, bought two more Fennecs, one at Tunis, which had been brought by the Fezzan caravan to the Island of Gerba, and thence to the place where Bruce procured it; the other at Senaar, and he knew not whence this last came. Both these resembled the first, and were called Fennecs. The Fennec which Bruce had at Algiers lived for several months, and when he left that place he gave the animal to Captain Cleveland, R.N., who presented it to Mr. Brander, the Swedish consul. His favourite food consisted of dates or any sweet fruit; but he was also very fond of eggs. He would eat bread when hungry, more especially if it was rendered palatable by honey or sugar. The sight of a bird aroused him to eager watchfulness as long as it was present; and a cat was his aversion. He would endeavour to hide from the latter; but never showed a disposition to resist or defend himself. The animal was disposed to sleep by day, but as night came on it became restless to excess. Bruce never heard it utter any sound. He says that the animal is described in many Arabian books under the name of *El Fennec*, by which appellation he states that it is known all over Africa; and he conceives that the word is derived from the Greek φοινιξ, a palm or date-tree, adding that the animal builds his nest on trees, and does not burrow in the earth.

Description of Bruce's Fennec.—Length about 10 inches; tail 5½ inches, near an inch at the tip being black. From the point of the fore-shoulder to that of the fore-toe 2⅞ inches; from the occiput to the point of nose 2¼ inches. Ears erect, 3⅜ inches in length, 1⅛ inch in breadth, with a plait or fold at the bottom externally; the interior borders were thickly covered with soft white hair, but the middle part was bare, and of a pink or rose-colour; interior cavity very large. Pupil of the eye large and black; iris deep blue. Whiskers strong and thick. Nose sharp at the tip, black and polished. Upper jaw projecting: number of cutting teeth in each jaw six; those in the under jaw smallest; two long, large, and exceedingly pointed canines in each jaw; molars four on each side above and below. Legs small; feet very broad, with four toes, armed with crooked, black, and sharp claws on each; claws of fore-feet more crooked and sharp than those behind. Colour of the body dirty-white, bordering on cream-colour; the hair on the belly rather whiter, softer, and longer than that of the rest of the body: look, sly, and wily.

Lacépède is said to have given the animal the generic name of *Fennecus*. Illiger describes it under the appellation of *Megalotis*, placing it in his order Falculata, immediately before Canis and Hyæna, and gives the number of molars in each jaw as six, but without quoting any authority.

Sparman makes the Fennec the species he has called Zerda, and a little animal found in the sands of Cambeda, near the Cape of Good Hope· after him, Pennant and Gmelin named the animal *Canis Cerdo.* Brander considered it as a kind of fox, but Blumenbach inclined to place it among the Viverræ. Geoffroy St. Hilaire, holding Bruce's description to be inaccurate and imperfect, supposes the Fennec to be a Galago; but Desmarest, like Illiger, gives it a position at the end of the *Digitigrades* in the order *Carnassiers.* Cuvier, in his 'Règne Animal,' speaks of the animal doubtingly and loosely.

Mr. Griffith figures two animals, both, according to him, belonging to this genus. One came from the Cape of Good Hope, and is in the Paris Museum, where Cuvier named it *Canis Megalotis;* and Desmarest has described it in his Mammalogie. (*Ency. Meth. Supp.*, p. 538.) This is called by Col. Hamilton Smith, who made the drawings of both, Megalotis Lalandii, to distinguish it from Bruce's Fennec. The other is from the interior of Nubia, and is in the Frankfort Museum. The first of these is as large as the common fox, and differs altogether from Bruce's Fennec. Col. Smith considers the second to be Bruce's animal.

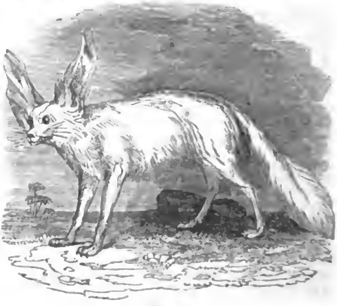
M. Leuckart states (Isis 2, Cahier, 1825) that M. Temminck and himself saw the Frankfort animal which had been drawn by Col. Smith, and recognised it as the true Zerda; and M. Temminck, in the prospectus of his 'Monographies de Mammalogie,' announced it as belonging to the genus *Canis.* M. Leuckart agrees with him, and would suppress the generic terms *Megalotis* and *Fennecus*, because, in his opinion, the animal very obviously belongs to the genus Canis, and to the subgenus Vulpes, the number of teeth and their form being precisely the same as those of the fox, to which it bears a great resemblance in the feet, number of the toes, and form of the tail, and the principal difference lying in the great length of the ears and the general smallness of the animal.

Description of Major Denham's Fennec (Fennecus Cerdo). Dental formula:—Incisors $\frac{6}{6}$; Canines $\frac{1}{1}$; Molars $\frac{6}{7}\,\frac{6}{7}$. Length of head from extremity of nose to occiput (inches) $3\frac{3}{8}$; breadth between eyes $0\frac{7}{8}$; length of ears 3_{8}; widest breadth 2; breadth of cranium between the ears $1\frac{5}{8}$; length from occiput to insertion of tail $9\frac{1}{3}$; tail 6; height before, from the ground to the top of back, above shoulder, $6\frac{5}{8}$; height behind to top of back, above loins, $7\frac{1}{2}$; breadth of extremity of nose $0\frac{5}{16}$; length of middle claws of fore-feet $0\frac{7}{16}$; external claws $0\frac{1}{3}$; middle and external claws of hind-feet $0\frac{1}{3}$. General colour white, slightly inclining to straw-yellow; above from the occiput to insertion of tail light rufous-brown, delicately pencilled with fine black lines from thinly scattered hairs tipped with black; the exterior of the thighs lighter rufous-brown; chin, throat, belly, and interior of thighs and legs, white or cream-colour. Nose pointed and black at the extremity, covered above with very short whitish hair inclining to rufous, with a small irregular rufous spot on each side beneath the eyes; whiskers black, rather short, and scanty; back of head pale rufous-brown. Ears very large, erect, and pointed, covered externally with short, pale, rufous-brown hair; internally thickly fringed on the margins with long, greyish-white hairs, especially in front; the rest of the ears internally, bare; externally, folded or plaited at the base. Tail very full, cylindrical, rufous-brown, pencilled with fine black lines on the back, deeper above than underneath, and with a small dark brown spot at an inch below its insertion on the upper side; ends of the hairs at the extremity of the tail black, forming a black tip about three quarters of an inch long. Anterior feet pentadactylous, posterior tetradactylous; both covered to the claws with moderately long whitish hairs, slightly inclining to straw-yellow; claws moderately hooked, very much compressed, and very sharp, yellowish-white or light horn-colour; hinder claws most compressed, longest, and least arched. The fur very soft and fine; that on the back from the forehead to the insertion of the tail, as well as that on the upper part of the shoulder before, and nearly the whole of the hinder thigh, formed of tri-coloured hairs, the base of which is of a dark lead-colour, the middle white, and the extremity light rufous-brown. (*Appendix to Major Dixon Denham's* and *Captain Clapperton's, R. N., Travels and Discoveries in Northern and Central Africa,* 4to., London. John Murray, 1826.)

After the appearance of the account in the appendix to Col. Denham's Travels which had been drawn up by Mr. Children and Mr. Vigors conjointly, Mr. Cross, then of Exeter Change, presented a fine young specimen immediately after its death to the Zoological Society, by which means a complete skeleton, as well as a preserved skin, was set up. Mr. Yarrell, to whom the skull was submitted for inspection, found that the teeth agreed in every particular with the dentition of the genus *Canis*, in which it was originally placed by Bruce. The frontal sinus was somewhat less than the general proportion observed in this family, and the top of the head had no appearance of the central ridge for the insertion of the upper edge of the temporal muscle so conspicuous in the *Canes Lupus* and *Lycaon, Vulpes*, and *Lagopus.* There was a greater development of the lateral portions of the parietal bones by which it obtains a larger volume of brain; the zygomatic arch was more compressed, and the post orbital portion of the bones forming the arch was much weaker. The head, compared with those of the most perfect English breed of dogs, more closely resembled that of the *terrier* (Canis Britannicus of authors, Canis terrarius of Dr. Caius) than any other, but the muzzle in the *Fennec* was more pointed. The form of the lower jaw and its condyles also agreed precisely with the same parts in the dog. The head of the *Fennec* however presented another peculiarity—the auditory cells were larger than the same parts in the *common fox*, though the *Fennec* is two-thirds less than the *fox* in size. The *ossicula auditûs* were as large in proportion, and equally perfect in form. The external conch was also large, and it is probable that the *Fennec* hears more acutely than most quadrupeds. The skeleton, generally, so closely resembled that of the dog as to make a particular description unnecessary: there was also one other point of similarity—the pupil of the eye was circular.

Mr. Vigors ascertained from the same skull that the teeth of the *Fennec* correspond almost precisely with those of the *fox*.

M. Rüppel has figured and described in his *Atlas Zu der Reise im nördlichen Afrika*, together with six other species of *Canis*, the *Fennec*, Canis Zerda, Zimm. Three specimens were transmitted to Frankfort, all perfectly alike in markings, and differing little from each other in size. They were found in the neighbourhood of Amlenkal, and in the desert of Korti, where they inhabit holes made by themselves. They do not nestle on trees as Bruce asserted.



Fennec.

Fossil Foxes.

Dr. Buckland, in his 'Bridgewater Treatise,' figures a *fox* as recent and fossil among the mammalia of the first period of the Tertiary series (Eocene of Lyell), and mentions the *fox* in his list of vertebral animals found in the gypsum of the Basin of Paris. The most complete fossil specimen is that which was found in the quarries of Œningen, near Constance, overlaid by upwards of twenty feet of marl, limestone, and building stone, brought to England by R. I. Murchison, Esq., then president of the Geological Society of London, who describes the deposit in the 'Geological

Transactions' (vol. iii., 2nd Series), and gives excellent figures of the *fox*, which is accurately described in the same paper by Dr. Mantell. Mr. Murchison's observations lead him to think that the Œningen formation is exclusively of antient lacustrine origin, but that it is entirely posterior to the molasse of Switzerland. Birds, reptiles, fishes, insects, crustaceans, conchifers, mollusks, and plants, a leaf of one of the latter being scarcely distinguishable from the *Acer villosum* of Nepâl, occur in the Œningen beds. The other mammalia found there were Rodents, see Cuv., *Ossem. Foss.*, tome v., partie i., p. 61-64); one is in the British Museum, and has been subsequently figured and named by Mr. König, *Anœma Œningensis*, and Professor Sedgwick brought one from the quarries which M. Laurillard referred to the genus *Lagomys*. It is worthy of notice that lemmings are said to be the principal food of the *Arctic fox*, and that Captain James Ross found in the burrow of one great numbers of the two species of lemming, and the bones of hares, fish, and ducks, in great quantities as well as several ermine, (p. 392). Mr. Murchison's *fox* is stated to be scarcely distinguishable from the *common* fox. One slab of this fine fossil is in Mr. Murchison's possession: the other half he most liberally presented to the Geological Society of London, in whose museum it now is*.

FOX, RICHARD, bishop of Winchester, an eminent statesman, and minister of Henry VII. and VIII., was born of poor parents, towards the middle of the fifteenth century, at Ropesley, near Grantham, in Lincolnshire, studied at Magdalen College, Oxford, and Pembroke College, Cambridge, and finally went to the University of Paris for his further improvement in divinity and the canon law. There he laid the foundation of his fortunes, by gaining the friendship of Morton, bishop of Ely, a zealous Lancastrian, who had fled from England in 1483 upon the failure of the duke of Buckingham's insurrection against Richard III. Through Morton's introduction, Fox was taken into the earl of Richmond's service; and having been of material use in the negotiations with the French court preparatory to the descent upon England, continued to enjoy the earl's confidence after his accession to the throne by the title of Henry VII. He was successively made privy councillor, bishop of Exeter, keeper of the privy seal, secretary of state, bishop of Bath and Wells, Durham, and Winchester, and was frequently employed in important embassies. Indeed, no one stood higher in favour, or had more weight with the king, who appointed him one of the executors of his will, and recommended him strongly to the notice and confidence of Henry VIII. He was also executor to Margaret countess of Richmond [BEAUFORT], and in that capacity had a great share in settling the foundation of St. John's College, Cambridge. Henry VIII. no doubt appreciated his talents and integrity, for he continued him in his offices; but the habits of the aged minister, trained to frugality under a most parsimonious master, were ill suited to retain the favour of a young, gay, ostentatious monarch, and he was thrown into the background by the earl of Surrey, lord treasurer. In hope of supplanting that nobleman by one qualified to win Henry's regard as a companion, yet too humble to aspire to the first place in the state, Fox introduced Wolsey, then his chaplain, to the king's society, in 1513. The result is well known. Wolsey soon engrossed the king's confidence; and in 1515 the bishop of Winchester, disappointed and disgusted, retired to his diocese, and spent the rest of his life in works of munificence and piety, and the discharge of the duties of his office. Corpus College, Oxford, and the free-schools of Grantham and Taunton, in Somersetshire, are of his foundation. He became blind about ten years before his death, which took place Sept. 14, 1528. He was buried in a chapel of his own building, on the south side of the high altar of Winchester cathedral. (*Biographia Britannica.*)

FOX, JOHN, commonly called the Martyrologist, from the work by which he is principally known, was born at Boston, in Lincolnshire, in 1517, was entered at Brazenose College, Oxford, in 1531, and elected a fellow of Magdalen College in 1543. Before this he had been chiefly distinguished for the cultivation of Latin poetry; but he had lately applied himself with great earnestness to the study of divinity, the result of which was that he became a convert to Protestantism, and on a charge of heresy being brought against him, was deprived of his fellowship in 1545. His father had left him some property, but this was also now withheld from him, on the same ground, by a second husband whom his mother had married, and he was in consequence reduced to great distress. At last he obtained the situation of tutor in the family of Sir Thomas Lucy, of Charlecot, in Warwickshire, the same whose deer-park Shakspeare is accused of robbing. This place however he left after some time, and was again subjected to many disappointments and hardships. At length he was taken into the house of Mary duchess of Richmond, to instruct the children of her brother the earl of Surrey, who was then confined on the charges for which he soon after suffered death. After the accession of Edward VI. Fox was restored to his fellowship; but he fell again into danger in the time of Mary, in consequence of which he went abroad, and after wandering through different parts of Germany was taken into employment as a corrector of the press by Oporinus, the eminent printer at Basil. On the death of Mary he returned to England, where his former pupil, the eldest son of the unfortunate earl of Surrey, who was now duke of Norfolk, received him with great kindness, and settled a pension on him for life. A prebend in the church of Canterbury was also given to him by Cecil. Although however he retained this preferment till his death, Fox never would subscribe to the articles of religion as finally settled, and this prevented his ever attaining any higher dignity in the church. He may be considered as having belonged properly to the sect of the Puritans. 'Fox the Martyrologist,' says the Rev. Michael Tyson, in a letter to Mr. Gough, dated Old House, 4th of August, 1779, and printed in Nichols's 'Literary Anecdotes of the Eighteenth Century' (viii. 649), 'is the first man I have seen depicted with a broad-brimmed hat and band; (see the print of him in the 'Herωlogia,' p. 209).'

Fox died in 1587. He was the author of numerous works, a list of which is given in the 'Biographia Britannica;' but the only one that is now remembered is his 'History of the Acts and Monuments of the Church' (commonly called his 'Book of Martyrs'), which was first printed in one volume folio, in 1553, but was afterwards divided into three volumes, and has been repeatedly reprinted both entire, and in an abridged, modernized, or otherwise mutilated form. The trustworthiness of this great record of the sufferings of the early English reformers has been bitterly assailed by many Catholic writers; but nothing beyond a few comparatively unimportant mistakes, arising from some degree of credulity, and a natural, though exaggerated zeal, seems to be established against it; the veracity and honesty of the venerable author may be affirmed to be quite unimpeached. It has preserved many facts, some of greater, some of less importance, that are nowhere else to be found. It ought also to be noted to the credit of the author, that he showed himself throughout his life, if not a friend to toleration in the largest view, yet a decided enemy to persecution and severity in the suppression of religious errors. In this sentiment he was a considerable way ahead of the general, it may almost be said, the universally prevalent notions of his age. His mind was certainly not a very capacious one, nor had he any pretensions to great depth or accuracy of learning; but for the consistency and excellence of his moral character no man of his time was held in higher regard. Fox was a frequent preacher, as well as a voluminous writer. One of his early performances in Latin poetry, a comedy (as it is called) entitled 'De Christo Triumphante,' has been translated into English by Richard Daye, a son of John Daye, the printer, from whose press the first edition of the 'Acts and Monuments' proceeded, and who indeed would seem to have suggested that work. Daye's epitaph on his tombstone in the chancel of the church of Little Bradley-juxta-Thurlow, Suffolk, says that he—

> 'Set a Fox to write how martyrs run
> By death to life. Fox ventured pains and health
> To give them light; Daye spent in print his wealth.'
> (See Nichols, viii. 590; also 673.)

There is also a French translation of the abovementioned comedy under the title of 'Le Triomphe de J. C.,' by Jacques Bienvenu, citizen of Geneva, 4to., Genev., 1562; a very scarce work.

In a letter of Dr. Samuel Knight (author of the 'Life of Erasmus') to Dr. Z. Grey, dated Bluntsham, near St. Ives

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* N. B. The reader is requested to take notice that in the article FELIDÆ the descriptions of the cuts of the Lion's claw are misplaced (p. 218). The words, 'Fore foot' ought to have been placed under the upper figure, and 'Hind foot' beneath the lower figure. In the fifth line from the bottom of the same article the word 'in' is printed for 'see.'

24th of March, 1734 published by Nichols (v. 360), the writer says, 'I made a visit to old father Strype, when in town last; he is turned ninety, yet very brisk, and with only a decay of sight and memory. . . . Mr. Strype told me that he had great materials towards the life of the old lord Burleigh, and Mr. Fox the Martyrologist, which he wished he could have finished, but most of his papers are in characters; his grandson is learning to decypher them.'

FOX, GEORGE, founder of the sect of Quakers, an enthusiast honest, zealous, illiterate, yet of no mean capacity and influence, was born at Drayton, in Leicestershire, in July, 1624. His origin and the beginning of his preaching are thus shortly told by Neal. (*Hist. of Puritans*, iv. c. 1.) 'His father, being a poor weaver, put him apprentice to a country shoe-maker; but having a peculiar turn of mind for religion, he went away from his master, and wandered up and down the countries like an hermit, in a leathern doublet: at length, his friends, hearing he was at London, persuaded him to return home, and settle in some regular course of employment; but after he had been some months in the country, he went from his friends a second time in the year 1646, and threw off all further attendance on the public service in the churches. The reasons he gave for his conduct were, because it was revealed to him that a learned education at the university was no qualification for a minister, but that all depended on the anointing of the spirit; and that God who made the world did not dwell in temples made with hands. In 1647 he travelled into Derbyshire and Nottinghamshire, walking through divers towns and villages, which way soever his mind turned, in a solitary manner. He fasted much, and walked often abroad in retired places, with no other companion but his Bible. He would sometimes sit in a hollow tree all day, and frequently walk about the fields in the night like a man possessed with deep melancholy. Towards the latter end of this year he began first to set up as a teacher of others, the principal argument of his discourse being, that people should receive the inward divine teachings of the Lord, and take that for their rule.'

From the beginning of his teaching he discontinued the use of outward marks of respect. He says, in his journal for 1648, 'When the Lord sent me forth into the world, he forbid me to put off my hat to any, high or low, and I was required to thee and thou all men and women, without any respect to rich or poor, great or small; and as I travelled up and down, I was not to bid people good-morrow or good-evening, neither might I bow or scrape with my leg to any one; and this made the sects and professions to rage.' Nothing probably conduced so much to the virulent persecution of the Quakers as their refusal of such tokens of respect, which persons in office interpreted into wilful contempt, except their conscientious refusal to take any oath, which involved them in the heavy penalties attached to the refusal of the oaths of allegiance and supremacy.

We shall not enter on a detail of his religious tenets, labours, or sufferings; the latter are fully recorded in his journal, and noticed in most histories. It is necessary however to refer to his doctrine (*Journal*, 1649, p. 26), that 'it is not the scriptures, but the holy spirit, by which opinions and religions are to be tried.' By this test, each convert might believe himself possessed of a peculiar infallible internal guide; and, in fact, it proved a warrant for any wild fancies which entered the minds of his followers, and led some into extravagances which gave a colour for the cruel treatment which all experienced. (Neal, iv. c. 3.) Into such extravagances Fox himself does not appear to have been betrayed. From 1648 till within a few years of his death his life was made up of travel, disputation, and imprisonment. He visited the continent of Europe several times, and in 1671 made a voyage to our American colonies. Wherever he went he seems to have left permanent traces of his preaching and presence. Quaker meeting-houses were first established in Lancashire and the parts adjacent in 1652, and in 1667 the congregations were organized into one body for purposes of correspondence, charity, and the maintenance of uniform discipline. The term Quaker arose at Derby in 1650, on occasion of Fox being brought before one Justice Bennet, 'who was the first that called us Quakers, because I bid them *Tremble at the Word of the Lord*.' In 1677, and again in 1681, he visited the Netherlands, where his tenets had taken deep root. After his return from the latter journey, his constitution being broken by the labours and hardships of near 40 years, he desisted from travelling, but continued to preach occasionally in London till within a few days of his death, which took place January 13, 1691.

To Fox, and others among his associates [BARCLAY; PENN], the praise of zeal, patience, self-denial, courage, are amply due; and their sufferings under colour of law are a disgraceful evidence of the tyranny of the government and the intolerance of the people. But there was one point in Fox's early conduct which justly exposed him to censure and punishment, his frequent interruption of divine worship as performed by others. From this practice, in the latter part of his ministry, he seems to have abstained. His moral excellence and the genuineness of his devotion are unquestioned. Penn, a favourable witness, but a grave, sober, learned man, not likely to be caught by mere ranting, has left an elaborate tribute to Fox's virtues in the preface to Fox's Journal, from which we extract the following detached passages.

'He had an extraordinary gift in opening the scriptures, but above all he excelled in prayer. The inwardness and weight of his speech, the reverence and solemnity of his address and behaviour, and the trueness and fullness of his words, have often struck even strangers with admiration. The most awful living reverent frame I ever felt or beheld, I must say was his in prayer. ** He was of an innocent life, no busy-body, nor self-seeker ** a most merciful man, as ready to forgive as unapt to give or take an offence** an incessant labourer; as unwearied, so undaunted in his services for God and his people; he was no more to be moved to fear than to wrath ** civil beyond all forms of breeding, very temperate, eating little and sleeping less, though a bulky person.' Fox's writings were for the most part short, they are very numerous, and in the collective edition fill three volumes, folio. (Fox's *Journal*; Neal's *History of Puritans*; Sewell's *History of Quakers*. Aikin's *Gen. Biog.* contains a better account of Fox than any other dictionary that we have seen.)

FOX, CHARLES JAMES, was born on the 24th of January, 1749. He was the third son of the Right Hon. Henry Fox, who, in 1763, was created Lord Holland, and of Lady Georgiana Carolina, the eldest daughter of Charles, second duke of Richmond.

Having commenced his education in a preparatory school at Wandsworth, Fox was sent, at the age of nine, to Eton. Here his progress was very rapid; and while he thus early gave unequivocal indications of the powers of mind which afterwards yielded so rich and abundant a harvest, he was not less distinguished among his school companions for that warmth of feeling and amiability of character which, through life, served to make men his friends and keep them so. His education was interrupted, before he was fifteen, by a three months' trip to Paris and to Spa, in which he was accompanied by his father; and the interruption is of more consequence than otherwise it could have been, if it be true, as is represented, that to the misplaced indulgence of the father during this tour is to be traced the devotion to the gaming table, which, ever after, was the principal alloy of Fox's happiness. 'He had left school a boy,' says Mr. Allen, in his biographical sketch in the 'Encyclopædia Britannica;' 'he returned to it with all the follies and fopperies of a young man.' He continued at Eton but one year longer, and, in the autumn of 1764, entered at Hertford College, Oxford. Here, as during the latter part of his course at Eton, learning and pleasure were his pursuits in turn. He left Oxford in the autumn of 1766. He then went abroad, and having passed two years chiefly in Italy, returned to England in August, 1768. In his absence, and before he was yet of age, he had been elected member of parliament for Midhurst.

Fox took his seat in parliament as a supporter of the duke of Grafton's ministry. His father, who had entered public life under the auspices of Sir Robert Walpole, had in the progress of time become estranged from the Whig party; and it was from the opinions of the father at this period in favour of the court and of an administration whose strength was in the court, that the beginning of Fox's political career derived its character. Fox made his first speech on the 15th of April, 1769, on the subject of the famous Middlesex election, supporting the decision in favour of Colonel Luttrel and against Mr. Wilkes. In February, 1770, when the duke of Grafton was succeeded by Lord North as premier, Fox was appointed a junior lord of the admiralty. He resigned this situation two years after, in consequence of some misunderstanding with Lord North; but in less than twelve months he was brought back into the ministry, being appointed, in January, 1773, one of the lords of the Treasury. In February of the next year he was again dismissed from his situation, and that somewhat unceremoniously. The immediate cause of the dismissal was the following. A motion had been made in the House of Commons that Mr. Woodfall, the printer of the 'Public Advertiser,' be taken into the custody of the serjeant-at-arms, in consequence of some remarks on the Speaker which had appeared in that newspaper; when Fox, thinking this punishment insufficient, without consulting Lord North moved an amendment to the effect that Mr. Woodfall be committed to Newgate. Lord North, being compelled, or thinking himself compelled, to support the amendment against the original motion, was left in a minority on a division. There had previously been some coolness between Fox and the premier. The defeat which Lord North considered had been brought upon him by an act of insolent temerity on the part of Fox did not of course tend to diminish it; and a few days after, as Fox was sitting in the House of Commons on the ministerial bench, he received from the hands of one of the door-keepers the following laconic note:—'Sir, His Majesty has thought proper to order a new commission of the Treasury to be made out, in which I do not perceive your name. North.' In a very short time Fox was in opposition.

So long as Fox was a ministerialist he had by no means concurred on all occasions in the opinions of his colleagues, nor, when he differed, had he abstained from expressing and acting upon his own. When he retired from office in 1772, one chief reason for the step was his opposition to the Royal Marriage Act, which was introduced that year by the ministry. Afterwards, in 1773, when he was again in office, he not only spoke, but voted against his colleagues, in favour of a motion by Sir William Meredith for a committee of the whole house to consider the propriety of subscription to the Thirty-nine Articles. He went even so far as to be one of the tellers for the minority on this occasion. And, in order to protect Fox from the suspicion of being actuated by vengeance or other discreditable motives in the course of opposition upon which he now entered, it must be added, that the question of American taxation, on which, and on the measures arising out of which, he violently opposed Lord North's administration, was never once brought under discussion during the time that he himself formed a part of it. Again, he had formed, since the time of his entrance into public life, an intimate friendship with Mr. Burke; and if the influence exercised over him by this distinguished statesman—an influence to whose strength Fox frequently testified in after days, when their paths were dissevered and a cloud had settled upon their friendship—contributed at all to bring about the change which now took place in Fox's political position, neither is this surely any ground for reproach. Mr. Burke's conversation, doubtless, as well as his speeches and writings, assisted to open Fox's eyes to the evils of that system of court intrigue and domination to which for a while, in a subordinate part, he had allowed himself to be subjected. From those evils again he had now smarted in his own person; and while it would have been strange if any longer he had been blind to them, it would have been a despicable thing if the fear of men's tongues, or the pride of an outward consistency, had prevented him from speaking and acting by the light of his newly-gotten wisdom. It should be borne in mind also that his father, who was mainly instrumental in connecting Fox with the ministry, died in the summer of 1774; and this event would most probably have removed many scruples that hitherto might have served to restrain Fox from entering the ranks of opposition.

On the 23rd of March, 1774, the House went into committee on Lord North's Boston Port Bill, the object of which was to deprive that harbour of its privileges in consequence of the opposition made by the inhabitants of Boston to the tea duty. This was the first occasion on which Fox opposed the minister. But from this time forward he was unremitting in his opposition. He took his stand first on the principle that the American colonies ought not to be taxed without being represented; and secondly, on the inexpediency of endeavouring to wring taxes from them by force and at the risk of rebellion. Thus condemning the war in which Lord North involved the nation as unjust and inexpedient, he also took many opportunities to censure strongly the manner in which it was carried on. He denounced the heavy expenditure which ministers, in prosecution of a war unjust, inexpedient, and little likely to be successful, were recklessly entailing upon the nation; and when he saw no prospect of their desisting from the war, he zealously sought, in conjunction with his party, to effect by other means a diminution of the public burdens. In the beginning of 1780 Mr. Burke brought forward his plan of economical reform, which was zealously supported by Fox. After having passed through its earlier stages, it was ultimately rejected. But the people had now come to feel the weight of their burdens and to speak out. Petitions poured in from all parts of the kingdom for a reduction of the public expenditure; and on the 6th of April resolutions were carried against the influence of the crown and in favour of an inquiry into the expenditure of the country and of a diminution thereof. A concurrence of favourable circumstances enabled the minister to stand up against this vote, and to recover his once lost majority. But even a dissolution of the parliament, which took place shortly after, enabled him to gain only a short respite. On the 22nd of February, 1782, a motion of General Conway's for an address to the crown against a continuance of the war was lost only by one vote; and when revived under a somewhat different form five days after, was carried by a majority of 19. On the 19th of March, the ministers having shown for a short time a disposition still to cling to office, resigned their situations.

It is needless to say how much Fox's exertions had contributed to this result. He had indeed risen by this time to be considered the leading member of opposition, and to be, more than any other statesman of the time, 'conspicuous in the nation's eye.' At the last general election, in the autumn of 1780, he had been solicited to stand for Westminster, and had been returned in the teeth of every court effort and every trick of private intrigue and intimidation. On the formation of the new ministry under Lord Rockingham, Fox was appointed secretrary of state for foreign affairs. He immediately set about negotiations for peace. For this purpose he instructed Mr. Grenville, the plenipotentiary at Paris, to propose in the outset the independence of the United States of America, not making it a condition of a general treaty. This he did in pursuance of a resolution which, upon his recommendation, had been passed in the cabinet, and to which the king's assent had been obtained. But the ministry had contained within itself from the beginning in the person of Lord Shelburne, who had been introduced by the king without consulting the wishes of Lord Rockingham, an element of dissension. This nobleman, between whom and Lord Rockingham's friends there was no cordial co-operation, and who was naturally led to presume much on his fancied possession of the royal confidence, was now doing his best to thwart Fox's measures of pacification. He sought to represent the offer of recognition of independence as a conditional one; and, after Lord Rockingham's illness had rendered him unable to attend the deliberations of the cabinet, he succeeded in getting a majority to concur in this view. He was afterwards discovered by Fox to be carrying on a clandestine communication with Dr. Franklin. Fox now made up his mind to resign. He did so at once upon the death of Lord Rockingham, which took place in July, but four months after the formation of the ministry; and the same course was then taken by other friends of Lord Rockingham, by Lord John Cavendish, the Duke of Portland, and Lord Keppel. The Rockingham ministry was now broken up.

The Shelburne ministry, though, as regards its mode of formation, it was but a modification of the old one, was yet essentially different in character. Mr. Pitt, who had entered parliament on the occasion of the general election in 1780, and who, during the short time that he had had a seat, had fought by the side of Fox against the American war and in favour of parliamentary reform, accepted the office of chancellor of the exchequer in the new ministry. Other vacant offices were filled up by old supporters of the war which Mr. Pitt had opposed, men who had held subordinate places in Lord North's administration. Lord North was himself excluded from the new arrangements. Hence it came to pass that Fox and Lord North, who for the last eight years had been violent antagonists, were found by one another's side in opposition; and that after a time, the great question of peace or war with America which had formerly divided them having been settled, and each being assured that he could place reliance upon the good faith of the other, the similarity of their political positions brought about a coalition. That coalition called forth at the time and has called forth since, much disapprobation. It may have been ill-judged; and the result indeed showed that the parties had not formed a correct estimate of the public opinion, which was an important element in the problem to be solved. But there was not a shade of dishonesty in the transaction. And inasmuch as it should be the object of every statesman to extract the greatest possible amount of good out of the political circumstances of the time, such a coalition would seem to be correct in principle, and to be approved, if only it be expedient and free from dishonour.

The question being now no longer whether there was to be peace or war with America, but in what way peace was to be brought about, the two parties in opposition united to pass a vote of censure on the terms of peace proposed by the ministers. This was in February, 1783. The ministers, unable to obtain the king's consent to a dissolution, resigned; and after some difficulties a ministry was formed on the 2nd of April, of which the Duke of Portland was premier, and Lord North and Fox secretaries of state. This again was a short-lived administration; and, like that of Lord Rockingham, it fell by the influence of court intrigue. The principal measure which it attempted was that known by the name of Fox's East India Bill, which went to vest the government of the East Indies in a board consisting of seven members, who were to be appointed, the first time by parliament, but always afterwards by the crown, for a period either of three or five years. The objections to the bill were principally of two kinds, 'violation of charter' (to adopt Mr. Fox's own mode of putting them) 'and increase of influence of the crown;' but there were others again who denounced it as tending to diminish the influence of the crown for the aggrandizement of the ministers, and who opposed it upon this ground. Such was the view adopted by George III. himself. Accordingly, when the bill had passed through the Commons, and came on for the second reading in the Lords, the king sent a message, through Lord Temple, to all noblemen to whom his personal influence extended, that he should consider those who voted for the bill not only not his friends, but his enemies. The ministers were consequently left in a minority. The next day they were dismissed; and the ministry which had been formed in April ended its career in December of the same year. A new ministry was formed almost immediately under Mr. Pitt.

The new ministers very soon found themselves in a minority in the House of Commons. Two resolutions, one for preventing the payment of any public money from the treasury, exchequer, or bank of England, in case of a prorogation or dissolution, unless the supplies should be previously appropriated by act of parliament; and the other, postponing the Mutiny Bill, were moved by Fox and carried by a considerable majority. The object of these resolutions was to render an immediate dissolution impracticable. Resolutions against the ministers and against the mode of their appointment, together with addresses to the crown for their dismissal, followed. But the majority against ministers, which at first had been formidable, fast dwindled down; and after the king had twice refused his assent to their dismissal, he dissolved the parliament. The last effort of the opposition had been the carrying of a representation to the crown, which, written by Fox, pointed out forcibly and at length the evils of an administration that was at variance with a majority of the representatives of the people.

Fox was again elected for Westminster; but Sir Cecil Wray, the unsuccessful candidate, having demanded a scrutiny, the high bailiff took upon himself to make no return of representatives for this city. Fox was in consequence compelled to appear in parliament as member for a Scotch borough; but the conduct of the high bailiff was one of the first matters brought before the house on its meeting. The Westminster scrutiny was one of the chief questions agitated for some time. Mr. Pitt and his friends did all that party and personal animosity could suggest to prevent, or at any rate to delay, the announcement of Fox's election for Westminster; and it was not until after a struggle of a year's duration that the scrutiny was stopped and the return ordered to be made. In the beginning of the subsequent year, 1786, the question of Mr. Hastings's Indian administration was first brought forward by Mr. Burke; but the trial did not begin before 1788. From the commencement to the close of this affair, in all the preliminary discussions, in the preparation of the articles of charge, and in the managing of the impeachment, Fox took a most active part. Towards the end of the year 1788 the king's illness rendered it necessary to resort to a regency. Fox now violently opposed the course proposed to be taken by Mr. Pitt; and while the latter contended that it was for the two houses of parliament to appoint the regent, Fox maintained that the regency belonged of right to the Prince of Wales. Holding this opinion, he opposed a motion made in the first instance by the minister for a committee to inquire into precedents, and subsequently a bill tending to limit the powers of the regent. It so happened that the king's speedy recovery rendered it unnecessary to bring the regency question to a conclusion; but it must be admitted that the ground taken up by Fox upon this occasion was not a tenable ground, any more than the ground taken up by the minister. The case which now came before parliament was a new and unforeseen case, a case unprovided for by the constitution. There was consequently no right in the matter; there was neither a right attaching to the lords and commons, as was maintained by Mr. Pitt, nor a right attaching to the Prince of Wales, as was contended by Mr. Fox. The question to be decided was which of two courses was the more expedient, not which was the legal one. And when both sides made it a question not of expediency but of right, both sides were wrong, and it is difficult to say which was the more so.

In the session of 1789 Fox distinguished himself by the support of a motion for the repeal of the Test and Corporation Acts. A year after he himself brought forward a motion for the same purpose. On the dissolution of parliament in 1790 he was again returned for Westminster, and at the head of the poll. On the meeting of the new parliament an attempt was made to get rid of the impeachment of Mr. Hastings, on the ground that it had abated by the dissolution, and that the new House of Commons could not proceed with what had been begun by the old one. Fox made a powerful speech in opposition to this view; he had on this occasion the support of Mr. Pitt, and it was carried against the lawyers by a large majority.

The discussions arising out of the question of the French Revolution, replete as they are with public interest, are also important in a life of Fox, on account of their having led to a termination not merely of his political alliance, but also of his friendship with Mr. Burke. The difference of their opinions on that great question had been shown so early as in February, 1790, during a discussion on the army estimates. At this time, however, each spoke of the other in terms of kindness and regard. But it was not always thus. When on the 6th of May, 1791, the Quebec Government Bill, or Bill for regulating the government of Upper and Lower Canada, came under discussion, Mr. Burke rose and was proceeding to deliver a violent diatribe against the French Revolution, when, after he had been several times ineffectually called to order, it was moved by Lord Sheffield, and seconded by Fox, 'that dissertations on the French constitution, and narrations of transactions in France, are not regular nor orderly on the question; that the claims of the Quebec Bill be read a second time.' The remarks made by Fox in seconding the motion, though there seems to have been but little in them calculated to irritate, irritated Mr. Burke; and when he rose to reply, he did so under the influence of strong excitement, and complained bitterly that he had not been treated by Fox as one friend should be treated by another. He observed, towards the conclusion of his speech, that it certainly was indiscreet at his time of life to provoke enemies, or give his friends occasion to desert him; yet if his firm and steady adherence to the British constitution placed him in such a dilemma, he would risk all; and, as public duty and public prudence taught him, with his last breath exclaim, 'Fly from the French constitution.' Fox here whispered that there was no loss of friendship. 'Yes, there is,' Mr. Burke exclaimed, 'I know the price of my conduct; I have done my duty at the price of my friend; our friendship is at an end.' At the conclusion of Mr. Burke's speech, Fox rose, but it was some minutes before his tears allowed him to proceed. So soon as he could speak, he pressed upon Mr. Burke the claims of a friendship of five-and-twenty years' duration.

out to no purpose. Mr. Burke remained relentless; and the breach was never made whole.

Fox distinguished himself during the same session of 1791 by his opposition to the ministerial project of an armament against Russia, by his support of Mr. Wilberforce's motion for the abolition of the slave trade, and by the introduction of a bill for the amendment of the law of libel. From the latter part of 1792 to 1797 his efforts were unceasing, first to prevent a war with France, and afterwards, when his warnings had been of no avail, and it had been entered into, to bring it to a close. During this period many of his friends, filled with alarm at the progress of events in France, and their probable influence on their own countrymen, left him to swell the majorities of the minister; and pitiable indeed were the minorities by which Fox's motions, one after the other, were supported; but this in no way daunted him. We must mention also the support which, in 1793, he gave to Mr. (now Earl) Grey's famous motion for parliamentary reform, his eloquent advocacy in 1794 of the cause of Muir and Palmer, the Scottish martyrs, his indefatigable opposition to the treason and sedition bills of 1795, and his attempt to procure attention to the state of Ireland and to the grievances of Irish Catholics, by a motion made in 1797, as additional important incidents during that period of his career, the principal object of which was opposition to the first French revolutionary war.

On the 26th of May, 1797, Mr. Grey made a second motion on the subject of parliamentary reform. Fox took this opportunity of announcing a resolution which he had formed to discontinue his attendance at the house, seeing that he and his friends were destitute of power to carry out their views. It is perhaps a question whether such a step as this can be taken by a member of the legislature without dereliction of duty, even though it may be a means of influencing the public mind, and, through it, the legislature, and though the consent of the member's special constituents may have been procured thereto. But, at the same ime, it would be unjust to apply to the conduct of ndividuals acting under a very defective system of epresentation, tests which spring from, and form parts of, a perfect theory. The five years then, from 1797 o 1802, were passed by Fox principally at St. Ann's Hill, in retirement, and in the pursuits of literature. t was during this period of retirement that he formed the project of his 'History of the Reign of James II.' A dissolution of parliament took place in June, 1802, and Fox, whose popularity with his constituents had not been a whit diminished by his absenting himself from the house, was gain returned for Westminster. Almost immediately after his re-election he paid a visit to Paris, principally for the purpose of collecting documents for his projected historical work. During his stay in Paris it is said that he was treated with marked attention by Napoleon.

Mr. Pitt had retired from office in March, 1801, on finding himself unable to procure the king's assent to the measure of Catholic emancipation; and he had been then succeeded by Mr. Addington. The new ministers had almost immediately set about negotiations for peace with France; nd when the preliminary articles, signed at London on he 1st October, 1801, had come under discussion in the House of Commons, Fox had emerged from his retirement o express his joy at the prospect now opened of a conclusion of the war, and to give his best support to the ministry. He appeared again in his place on the meeting of the new arliament, in the autumn of 1802, still hoping to contribute to the bringing about of peace, but beginning by this time to doubt the sincerity of the ministers. A message from the crown, in May, 1803, announced that the negotiations were broken off. The following year Mr. Addington resigned office, having completely shown his unfitness for the discharge of its duties, and unable to stand against an opposition which included both Fox and Pitt. It was now hoped that Mr. Pitt, to whom was intrusted the making of the ministerial arrangements, would be able to avail himself f the services of Fox, by whose side, though not in recognized conjunction, he had been now sitting for some time n opposition. But the king would not hear of Fox being admitted to office. Lord Grenville, Lord Spencer, Mr. Windham, and others, who, like Mr. Pitt, had been latterly co-operating with Fox, refused to take any part in an administration from which Fox was excluded; and Mr. Pitt was thus compelled to throw himself upon the scattered subordinates of the Addington ministry. Peace came not from this ministry. On the 23rd of January, 1806, Mr. Pitt's death dissolved it; and in the new ministry which was formed under Lord Grenville, Fox was appointed secretary for foreign affairs. His life was spared but for seven months longer: but during this short period he did much towards the abolition of the slave-trade, which had ever been one of the objects that he most cared for, and he entered zealously into negotiations for peace with France, which it was a heavy misfortune to his country that his death did not allow him to complete. He died on the 13th September, 1806, in the 58th year of his age. The complaint which caused his death was water on the chest.

Such is a brief sketch of the public life of Fox. With the exception of the first six years of it, in which he was either a supporter or a member of a court administration, it was in substance consistent. From the beginning to the end it was honest. There are parts of his public life certainly which have led others to call his honesty into question, and to deny to him the quality of consistency; and of these parts, or at any rate of some of them, there are those among his friends and admirers who have professed disapprobation. Such parts are his early connexion with the court, his coalition with Lord North, and, shortly before his death, his coalition with Lord Grenville. Mr. Hazlitt has observed that 'his life was deficient in the three principal points, the beginning, the middle, and the end. He began a violent tory, and became a flaming patriot out of private pique; he afterwards coalesced with Lord North, and died an accomplice with Lord Grenville.' (*Political Essays and Public Characters*, p. 377.) The charge that he was actuated by private pique when, in 1774, he became an opponent of Lord North's ministry, has been already met, so far as it is possible to meet a charge which it is so very easy to make. But in a case where no unworthy motives have operated to produce a change of course, and it proceeds from change of opinion, it is for a vulgar mind alone to make this a ground of attack and abuse. And equally vulgar is that view of a statesman's duty which would prevent him from ever entering into alliance with one to whom at a previous period he may have been opposed, even though the question or questions on which they differed may now have been settled, and there may only remain questions upon which they are agreed. Though Mr. Fox was not, in the full and strict sense of the term, a philosophic statesman, he came nearer to it perhaps than any other English statesman, not even excepting Mr. Burke. His speeches always display in a preeminent degree a sense of the importance of principle. Sir James Mackintosh has said of him, as an orator, that 'he possessed above all moderns that union of reason, simplicity, and vehemence, which formed the prince of orators. He was the most Demosthenean speaker since the days of Demosthenes.' Fox's speeches were collected, and published in six volumes with a short biographical and critical introduction by Lord Erskine, in 1825. The fragment which he left of his projected history of the reign of James II. was published in 1808, with a preface by Lord Holland.

FOX ISLANDS. [ALEUTIAN ISLANDS.]

FOXGLOVE. [DIGITALIS.]

FOY, MAXIMILIAN SEBASTIAN, one of the best, if not the first, of the political orators that have appeared in France since the establishment of a constitutional charter, was born in 1775, at Ham, in Picardy. His father, an old military officer, died when Foy was only five years old, and the education of his five children devolved on their mother, Elizabeth Wisbeck, who was a woman of English extraction, and of a superior character. Foy displayed from his earliest boyhood remarkable talents and great application. He made considerable proficiency in Latin, and produced some well-written little compositions in his own language, when he was only nine years old. At fourteen he completed his course of studies at the college of Soissons, after which he passed to the military school of Lafere, and, at the end of 1790, entered the army as a second lieutenant of artillery. He served with great credit in Flanders during the beginning of the war of the Revolution. Having however frankly expressed his opinions about the horrors perpetrated at Paris, he was imprisoned at Cambray, but was released from his confinement by the events of the 9th Thermidor. He now re-entered the army, made two campaigns under Moreau, and rose to the rank of a chef d'escadron, when the treaty of Campo Formio suspended his military career. He took advantage of the short peace which followed that treaty to study public law under the celebrated Professor Koch at Strasburg. In 1798 he again joined the army, and served in Italy, Switzerland, and on the Rhine, till the peace of Amiens, when he returned to France with the rank of colonel. Foy was at Paris during the trial of Moreau, and he expressed himself against that proceeding with so much animation, that he would have been arrested if he had not left the capital and joined the camp of Utrecht, where he refused to sign a congratulatory address to the first consul on the occasion of his escape from the conspirators' plot. He was very far from approving of any such schemes, but he gave no credit to the accusations against Moreau, under whom he had a long time served. Being a sincere republican, he voted against the election of Bonaparte to the imperial dignity. Notwithstanding that circumstance, Napoleon employed Foy, but left him a long time without promotion. In 1807 Foy was commissioned by Napoleon to conduct 1200 French cannoniers to assist Sultan Selim II. against Russia, but the revolution which took place at Constantinople prevented their departure. Foy himself went however to Constantinople, where he assisted the Turks in making dispositions for the defence of the Dardanelles. From Constantinople he went to Portugal, distinguished himself in many battles, received several wounds, rose to the rank of lieutenant-general, and continued to serve during all the peninsular war, till he received a severe wound at the battle of Orthez. He was employed at the Restoration by the Bourbons, but joined Napoleon after his landing from Elba, and fought bravely at Waterloo, where he was again wounded. From that time he retired from military service, and devoted himself entirely to the study of history, political and military science, to which he had previously applied all his leisure time. In 1819 Foy was chosen deputy of the department of Ain, and the talents which he displayed in the new career now opened to him surpassed the most sanguine expectations of his friends. His debut in the parliamentary field was an eloquent defence of the rights of his old companions in arms, the veterans of the imperial army, whom the organs of the Restoration sought to deprive of their well-earned rewards. He vigorously attacked the lavish expenditure of public money for the maintenance of useless establishments, and to support the instruments of an anti-national party; but he was always a steady advocate of every expenditure which was requisite for the support of the power and dignity of a great nation. Foy had a hard battle to fight against the retrograde party, which sought to destroy the effects of the constitutional charter by introducing into the electoral body the privileges which had been abolished by the above-mentioned charter. Yet the noble efforts of Foy and of a patriotic minority were unavailing against the party, which, according to an expression of Foy himself, reckoned in the legislative chamber two members to one, and in the nation one individual in a thousand. Counter-revolutionary measures followed one another; the elective franchise was restricted, the liberty of the press curtailed, independent writers prosecuted, and the constitutional government of Spain overturned by a French expedition. Notwithstanding all these defeats of the liberal party, Foy never deserted the post where he was placed by the confidence of his countrymen, and he castigated the unprincipled proceedings above referred to with an eloquence worthy of Cicero exposing the exactions of a Verres or the plots of a Catiline. When provoked by his enemies, who never lost an opportunity to attack him in a most annoying manner, he sometimes burst out into the most eloquent but bitter invective. On one occasion, being interrupted in the midst of a speech by a sneering question, what he meant by the expression *aristocrats?* he made an answer which has been perpetuated in the annals of the French parliamentary debates: 'The aristocracy of the nineteenth century,' said he, 'is the coalition of all those who wish to consume without producing, to live without working, to occupy all situations without being able to discharge the duties attached to them, to possess all the honours without having deserved them—this is the aristocracy.'

In November, 1825, Foy began to suffer from the symptoms of an aneurism: he felt his end approaching, but remained calm and collected under the most severe sufferings, till his death on the 28th November. His death was considered in France as a national calamity; his funeral was attended not only by his political friends, but even by his opponents who no longer refused to pay the tribute of just admiration to a deceased adversary As he left a family in rather straitened circumstances, one million of francs was raised for them by a national subscription. Foy left two volumes of speeches, and a History of the Peninsular War, a work which is much esteemed, but unfortunately has not been completed. It is particularly characterized by the fairness with which it treats the opponents of France during that memorable struggle, and it has been warmly eulogized not only in France but even in England by writers professing political opinions completely opposed to those of General Foy.

FOYLE, LOUGH, a bay on the northern coast of Ireland, whose narrow entrance is 7° west of Greenwich. It extends from south-west to north-east about fifteen miles, and is in the middle eight miles and three quarters wide, but it narrows towards both extremities. Its mouth between Magilligan Point on the east, and Green Castle on the west, is less than a mile across. The bay, being much encumbered with shoals, requires some attention in navigating it. The deepest water is along the west side, both of the lake and its mouth. Near Green Castle there are from eight to ten fathoms water. In front of the entrance is a sand-bank called the Tuns, over which the sea sometimes breaks with great violence. Vessels of 400 tons and upward may ascend the Lough and the river Foyle, which falls into its southern extremity, as far as Londonderry.

FRACASTO'RO, HIERO'NYMUS, one of the most learned men of his time, as well as one of the best modern Latin poets, was born at Verona, in 1483, of an antient family. From his earliest youth he applied himself to the study of the sciences, particularly to medicine, and he became professor of logic at the university of Padua when he was only nineteen years old. Fracastoro died in 1553. He enjoyed during his lifetime the esteem and friendship of many eminent men of his time, and Ramusio, who owed to Fracastoro the idea as well as many materials for his collection of the 'Navigazioni et Viaggi,' erected a brass statue to his memory at Padua. Julius Cæsar Scaliger was such an admirer of Fracastoro's poetical talents that he wrote a poem in his praise, entitled 'Aræ Fracastoriæ.' The principal works of Fracastoro are, 'Syphilides, sive morbi Gallici, libri tres,' published at Verona, 1530, in 4to; at Paris, 1531 et 1539, in 8vo and in 16mo; Basil, 1536, in 8vo; Lyons, 1547, in 12mo; Antwerp, 1562 and 1611, in 8vo; London, 1720, in 4to, and 1746 in 8vo; Padua, 1745, in 8vo. It has been translated into French by Maquer et Lacombe, Paris, 1753, in 12mo; into Italian by Antonio Tirabosco, Verona, 1739, in 4to; by Pietro Belli, Naples, 1731, in 8vo; by Sebastian degli Antonii, Bologna, 1738, in 4to; the best Italian translation is however that of Vizentio Benini de Colonia, published, with the complete collection of Fracastoro's works, at Padua, 1739, in 4to. Fracastoro's reputation rests chiefly on this work, which he dedicated to Bembo, who was his particular friend, in a poetical epistle, of which Roscoe has given an English translation in his life of Leo X. In this poem Fracastoro rejects the commonly-received opinion that the disease, which is the subject of his poem, was imported from America, and argues that it was known in antient times, and was generated by the corruption of the atmosphere, to which he attributes the origin of all diseases that attack the animal and vegetable creation. He recommends as a means of eradicating that fatal disease the use of mercury, and he describes the discovery of that remedy in a fiction full of the greatest poetical beauties. The hero of the poem is a young man called Syphilis, who is attacked by that disease, not in consequence of any profligacy, but by the wrath of Apollo, and is cured by plunging three times into the streams of quicksilver, which flow in the subterraneous regions. It is remarkable that the name of the hero from which the title of the poem is derived gave birth to the technical appellation by which the above-mentioned disease is known. It seems that in adopting such a subject for his poem Fracastoro wished to display in one work his extensive knowledge in the various branches of natural philosophy, his skill in medicine, and his admirable genius for Latin poetry. Many critics have compared the Syphilis to the Georgics of Virgil, and Sannazaro, the contemporary of Fracastoro, declared it to be superior to his own Latin poem 'De partu Virginis,' on which he was twenty years. Besides the poem of 'Syphilis,' Fracastoro published the following works: 'De Vini Temperatura,' Venice, 1534, in 4to; 'Homocentricorum, sive de Stellis liber unus: de Causis Criticorum dierum, libellus,' Venice

1535, in 4to; 1538, 8vo; 'De Sympathiâ et Antipathiâ Rerum, liber unus; de Contagionibus et Contagiosis Morbis, et eorum Curatione, libri tres,' Venice, 1546, in 4to. Fracastoro began a poem entitled 'Joseph,' but he was prevented by death from finishing more than two cantos. He also left a volume of Latin poetry on different subjects, addressed to several eminent personages of his time. All these poetical productions were collected and published at Padua, 1728, 8vo. The complete works of Fracastoro appeared for the first time at Venice, 1555, in 4to, and they were reprinted in the same town in 1574, 1584, 4to; Lyon, 1591; Montpelier, 1622; Geneva, 1621, 1637, and 1677. The beautiful poem of Fracastoro entitled 'Alcon, sive de Cura Canum Venaticorum,' which many critics consider as scarcely inferior to the 'Syphilis,' appeared only in the editions of his complete works published after the sixteenth century, and it seems to have never been separately printed. For further particulars about Fracastoro and his works, see Tiraboschi's *Storia della Litteratura Italiana;* Ginguené, *Histoire de la Littérature Italienne;* and Roscoe's *Life and Pontificate of Leo the Tenth.* A German author of the name of Mencken wrote in Latin a Commentary on the Life and Writings of Fracastoro, which was published at Leipzig in 1731, in 4to.

FRACTIONS, COMMON AND DECIMAL. By a fraction is meant, in the first instance, a part of any magnitude. Thus, 'three and a fraction' means three units and a part of a fourth. The next meaning of the term confines fractions, in an arithmetical point of view, to the *aliquot* parts or *submultiples* of the unit; which unit must therefore be divided into a number of equal parts, of which parts a certain number is to be taken.

Under the heads ADDITION, &c. will be found the various rules by which operations containing fractions are conducted. We shall here confine ourselves to fundamental points connected with the theory.

A fraction is thus denoted: $\frac{a}{b}$ means the quantity obtained by dividing a unit into b equal parts and taking a of those parts. If a be greater than b, it will obviously be necessary to divide more units than one, each into b equal parts, until enough have been subdivided to furnish the a parts required. It was usual, in English works on arithmetic, to call fractions in which a is less than b, *proper* fractions; and all others *improper* fractions: this absurd distinction is now beginning to be abolished. In the preceding fraction a is called the *numerator*, and b the *denominator*. The first term is correct, for a is the number of parts of a certain kind which are to be taken; the second is not quite so correct, for the denomination of which the number a is to be taken, is not b, but $\frac{1}{b}$; the bth part of a unit (not b units) is to be repeated a times.

The preceding fraction may be considered in several different ways. It is 1st, the bth part of a unit repeated a times; or, in common language, a-$b$ths of a unit; 2nd, the number of times, or parts of a time, or both, which a contains b; 3rd, the proportion which a is of b; 4th, the expression which ought to be written for a, on the supposition of that which was b units being made the unit. Thus $\frac{2}{5}$ expresses two-fifths of a unit, the part of a time which 2 contains 5, the proportion which 2 is of 5, and the expression which must be written for what is now 2, when that which is now 5 is made the unit. All these meanings, *except the first*, are perfectly intelligible when we write a fraction in which the terms are both fractional. Thus

$$\frac{1\frac{1}{3}}{3\frac{2}{3}} \quad \frac{6}{1\frac{1}{4}} \quad \frac{\frac{2}{3}}{\frac{5}{6}} \quad \frac{3\frac{2}{3}}{\frac{1}{4}}\text{, \&c.}$$

may be thus explained. We can readily imagine the part of a time which $1\frac{1}{3}$ is of $3\frac{2}{3}$, the proportion which the first is of the second, and the expression which must be substituted for $1\frac{1}{3}$ when a larger unit is used, amounting to $3\frac{2}{3}$ of the present unit. But though we see clearly what is meant by dividing 1 into 3 equal parts and into 4 equal parts, what idea are we to attach to the division of 1 into $3\frac{2}{3}$ equal parts?

The generality of mathematical conceptions is frequently destroyed by the peculiar idiom of a language. The science of arithmetic requires the abolition of all those distinctions which depend on singular and plural, noun and pronoun, &c. Thus, when we speak of the answer to a problem being a number of feet (unknown), it is better to allow the word to imply a part of a foot, a foot itself, or a number of feet together with a part of a foot, than to repeat all those possible cases every time a number is to be mentioned. Again, when one particular phrase seems absurd, but another which is synonymous appears clear, we must either reject the former altogether, or attribute to it the meaning of the latter, and the second course is generally the more convenient. We now observe that the direction to 'divide *one* into 10 equal parts' is the same as 'find a part such, that ten of them shall make a unit.' Now there is no absurdity in requiring to 'find a part such that $3\frac{2}{3}$ of them shall make a unit,' though it is inconsistent with our idiom to speak of 'dividing 1 into $3\frac{2}{3}$ equal parts.' The meaning of the phrase which is intelligible should then be extended to that which is not, or 'to divide 1 into $3\frac{2}{3}$ equal parts' should mean that the part is to be found which repeated 3 times and $\frac{2}{3}$ of a time shall give the unit. And this must be extended even to the case in which the number or fraction thus obtained is greater than a unit. Thus in the fourth of the preceding fractions such a number or fraction must be found, that $\frac{1}{4}$th of it shall be a unit; that is,

$$\frac{1}{\frac{1}{4}}\text{ stands for the number 7;}$$

and this must be repeated $3\frac{2}{3}$ times. The preceding considerations show that fractions with fractional denominators may be explained (without reference to any rule of reduction) by an extension of the definition which applies to integer denominators. The use of such an extension is as follows:—at present, algebraical students learn results which are perfectly intelligible with regard to whole numbers, or to fractions with integer terms, but of which they do not see the meaning when fractional or mixed terms are employed. In the latter case they trust to what they see in the former that their results will remain true; but they can have no distinct perception on this point until they have learnt to include every possible form of $\frac{a}{b}$ under one definition.

The fundamental property of fractions on which all others depend, is this—that no fraction is changed in value by multiplying or dividing both its terms by the same number or fraction, that is—

$$\frac{a}{b} = \frac{ma}{mb}$$

whatever may be the values of a, b, and m. This result should be studied in all the variety of its cases, from such as

$$\frac{3}{5} = \frac{3 \times 10}{5 \times 10} \quad \text{to such as} \quad \frac{2\frac{1}{3}}{\frac{10}{3}} = \frac{2\frac{1}{3} \times 1\frac{1}{2}}{\frac{10}{3} \times 1\frac{1}{2}}$$

There is another theorem which is much neglected in elementary works, but which is of considerable importance, namely, that if the numerators of two fractions be added for a numerator, and their denominators for a denominator, the resulting fraction must lie between the two from which it was derived. Thus of the three fractions,

$$\frac{2}{7}, \quad \frac{6}{11}, \quad \text{and} \quad \frac{2+6}{7+11} \quad \text{or} \quad \frac{8}{18}$$

the third is greater than the first, but less than the second.

In practice it is convenient to employ fractions having either the same denominators, or which may easily be reduced to others of equal value having the same denominators. The numbers 10, 100, 1000, &c., suggest themselves for this purpose: indeed it may immediately be seen that the ordinary system of decimal numeration may be extended so as to allow of a representation of such fractions. If we consider the number 11111, we see that for every step which we make to the right, we find a unit which is only the tenth part of the preceding unit. Place a point after the unit's place (to mark its position), and let the same method of valuation be carried further. Then in 11111·1111, the first 1 after the point should stand for one-tenth of the preceding, or one-tenth of a unit; the second for one-tenth of a tenth, or one-hundredth, and so on. The fundamental theorem of decimal fractions, in this view of the subject, is that which shows, for example, that 12·2345 (defined to mean 1 ten, 2 units, 2 tenths, 3 hundredths, 4 thousandths, and 5 ten-thousandths) is the same as 122345 ten thousandths; or that all the number, such as it would be if the units' column were on the right, may be taken as a numerator, and the denomination of the right hand figure as a denominator. Thus—

$$65{\cdot}483 \quad \text{or} \quad 60 + 5 + \frac{4}{10} + \frac{8}{100} + \frac{3}{1000}$$

$$\text{is} \quad \frac{60000}{1000} + \frac{5000}{1000} + \frac{400}{1000} + \frac{80}{1000} + \frac{3}{1000}$$

$$\text{or} \quad \frac{65483}{1000}$$

No fraction can be reduced to an equivalent decimal fraction, if its denominator contain any prime factor except 5 or 2 (the divisors of ten). But this is of no consequence in practice, since it may easily be shown that for any fraction can be found a decimal fraction which shall be as near to it as we please. For instance, suppose it required to find a decimal fraction which shall not differ from $\frac{3}{41}$ by so much as the hundred thousandth part of a unit. Then—

$$\frac{3}{41} = \frac{300000}{4100000} = \frac{\frac{300000}{41}}{100000} = \frac{7317\frac{3}{41}}{100000}$$

or 7317 hundred thousandths of a unit differs from $\frac{3}{41}$ by only $\frac{3}{41}$ of the hundred thousandth of a unit, or by less than the hundred thousandth part. It is from such a transformation that the common rule is derived.

It is common to say that a result is true to a certain number of places of decimals when any alteration of any place would make it further from the truth. Thus, the diameter of a circle being unity, the circumference lies between 3·1415 and 3·1416, but nearer to the latter; whence the same circumference, true to four places of decimals, is 3·1416. Similarly 62·13299, taken true to two places, is 62·13; to three, 62·133; to four, 62·1330. Again, ·625, taken true to two places, might be either ·62, or ·63; but the latter is generally taken. When a decimal fraction cannot be found exactly equal to a given common fraction, the division by which the numerator is found, leads to what is called a CIRCULATING DECIMAL.

For subjects closely connected with the theory of fractions, see RATIO; PROPORTION; INCOMMENSURABLE.

FRACTIONS, CONTINUED. A continued fraction is one which has a fraction in its denominator, which again has a fraction in its denominator, and so on: such as

$$\cfrac{1}{2 + \cfrac{3}{7 + \cfrac{6}{1 + \cfrac{2}{3}}}}$$

A more convenient way of writing such fractions is desirable; in the present article we shall adopt the following:

$$\frac{1}{2+}\,\frac{3}{7+}\,\frac{6}{1+}\,\frac{2}{3}$$

$$\text{Thus} \quad \overline{b + \cfrac{c}{d + \cfrac{e}{f}}} \quad \text{is written} \quad \frac{a}{b+}\,\frac{c}{d+}\,\frac{e}{f}$$

The use of continued fractions is as follows:—by converting a common fraction, with a large numerator and denominator, into a continued fraction, we are able to find a succession of more simple fractions, which are alternately greater and less than the given fraction, and approach to it with great rapidity. Let $\frac{a}{b}$ be the given fraction, a being less than b; proceed as in the rule for finding the greatest common measure of a and b, and let q, r, s, t, &c., be the quotients obtained in the process; then

$$\frac{a}{b} = \cfrac{1}{q + \cfrac{1}{r + \text{\&c.}}} \quad \text{or} \quad \frac{1}{q+}\,\frac{1}{r+}\,\frac{1}{s+}\,\frac{1}{t+}\ \text{\&c.}$$

For instance, let the fraction be $\frac{5119}{28319}$

5119) 28319 (5
Rem. 2724) 5119 (1
2395) 2724 (1
&c., as in the method of finding the greatest common measure.

The succession of quotients thus obtained is

5, 1, 1, 7, 3, 1, 1, 2, 1, 3, 1, 2;

which are to be used as follows in forming the succession of approximate fractions. The first and second are always

$$\text{1st} \ \frac{1}{\text{first quotient}} \ \text{in this case} \ \frac{1}{5}$$

$$\text{2nd} \ \frac{\text{2nd quotient}}{\text{1st. qu.} \times \text{2nd qu.} + 1} \ \cdots\cdots \ \frac{1}{5 \times 1 + 1} \ \text{or} \ \frac{1}{6}$$

To form the succeeding numerators and denominators there is one uniform rule for both, as follows:—multiply the last found term by the first quotient remaining to be used, and add the last but one; as in the following process, where * denotes that the incoming quotient is unity, and that the multiplication is therefore unnecessary.

	Numerators.	Denominators.
1st	1	5
2nd	1	6
3rd *	2	11
New quotient	7	7
	14	77
	1	6
4th	15	83
New quotient	3	3
	45	249
	2	11
5th	47 *	260 *
	15	83
6th	62 *	343 *
	47	260
7th	109	603
New quotient	2	2
	218	1206
	62	343
8th	280 *	1549 *
	109	603
9th	389	2152
New quotient	3	3
	1167	6456
	280	1549
10th	1447 *	8005 *
	389	2152
11th	1836	10157
New quotient	2	2
	3672	20314
	1447	8005
12th	5119	28319

The succession of fractions continually approximating to the given fraction, and ending in it, is then

$$\frac{1}{5}, \frac{1}{6}, \frac{2}{11}, \frac{15}{83}, \frac{47}{260}, \frac{62}{343}, \frac{109}{603}, \frac{280}{1549}, \frac{389}{2152}$$

$$\frac{1447}{8005}, \frac{1836}{10157}, \frac{5119}{28319};$$

these approach nearer and nearer to the last, than which they are alternately greater and less; the first greater, the second less, the third greater, and so on: but the second is not so much too small as the first is too great, nor the third so much too great as the second is too small, &c. The error committed by assuming any one of the approximate fractions instead of the final result, is less than a fraction having unity for its numerator, and the product of the denominator in question and the next denominator for its denominator. Thus—

$$\frac{1}{5} \quad \text{is not wrong by} \quad \frac{1}{5 \times 6} \quad \text{or} \quad \frac{1}{30}$$

$$\frac{1}{6} \quad \cdots\cdots \quad \frac{1}{6 \times 11} \quad \text{or} \quad \frac{1}{66}$$

$$\frac{[illegible]}{11} \text{ is not wrong by } \frac{1}{11 \times 83} \text{ or } \frac{1}{913}$$

$$\frac{15}{83} \quad . \quad . \quad . \quad . \quad . \quad \frac{1}{83 \times 260} \text{ or } \frac{1}{2158}, \text{ \&c.}$$

If it be desired to verify one of the fractions without proceeding to the end of the process, observe that the numerator of the difference of any two succeeding fractions is unity. Thus—

1 × 6	exceeds	1 × 5	by	1
1 × 11	falls short of	2 × 6	by	1
2 × 83	exceeds	15 × 11	by	1
15 × 260	falls short of	83 × 47	by	1 &c.

No fraction, having a less denominator than one of the approximate fractions, can come so near to the original fraction as the one which is obtained by the process. Thus, [illegible] is nearer to [illegible] than any possible fraction which has an integer numerator, and an integer denominator less than 603.

FRACTIONS, VANISHING. This term is applied to fractions in cases where a supposition is made which destroys both numerator and denominator at the same time. Thus—

$$\frac{x^2-1}{x-1} \qquad \frac{\log. x}{x-1}, \qquad \frac{a^x-a}{b^x-b},$$

are fractions which all assume the form $\frac{0}{0}$, when $x = 1$: that is, though for any other value of x they represent operations of ordinary arithmetic, yet in the particular supposition that x is unity, they all end in a direction to find out how many times *nothing* is contained in *nothing*. The first answer to this seems to be that the fraction may, in such a case, have any value we choose to assign, for nothing taken once, or twice, or thrice, &c., is still nothing: that is to say, according to the rules of common algebra, since $0 = 0 \times a$, whatever a may be, it follows that 0 divided by 0 may be a. But this is carrying operations which are defined with regard to magnitudes further than is contemplated in their definition, and applying them to a symbol which simply represents the absence of all magnitude. Such a process may then be rejected without scruple.

But this question remains: granting that the preceding reasoning does not entitle us to give the preceding fractions any value we please, can they be said to have a value at all when $x = 1$? To settle this point in part, we must ask not what the preceding fractions are when x is unity, but what becomes of their value when x is made to approach nearer and nearer to unity. To take the first as an instance, we find that

$$\frac{x^2-1}{x-1} = x + 1 \text{ for all \textit{values} of } x.$$

Consequently—I. Whenever x is greater than 1, the fraction is greater than 2. II. As x approaches to 1, the fraction approaches to 2. III. The fraction may be made as near to 2 as we please by making x sufficiently near to unity. Hence it follows that if when $x = 1$, the fraction have a value at all, that value must be 2. Similarly it may be proved of the second and third fractions that if they *have* values when $x = 1$, these values must be 1 and $\frac{a \log a}{b \log b}$.

Much discussion has arisen as to whether vanishing fractions have values or not, as if such a question could be one of deduction from the ordinary reasonings with regard to magnitude. The truth is, that any one may either assert that such fractions have values, or may altogether refuse to consider them, according to his ideas of convenience or propriety. Nobody doubts that if the answer to a problem were

$$\text{'}y = \text{the value of } \frac{\log x}{x-1} \text{ when } x = 1,\text{'}$$

one of two courses must be taken; either the value of y must be declared to be unity, or the evanescent form of the fraction must be recognized as arising from a misconception of the problem, by which factors of the form $x - 1$ (where $x = 1$) have been used under the idea that they were of the form $x - 1$ (where x is not $= 1$): the problem must then be reconsidered, and the (so called) mistake corrected. But the correction will always lead to the result $y = 1$, and those who employ the second method in preference to the first will not deny that they knew as much when they first saw their (so called) erroneous result.

It is not worth while to discuss the particular arguments used with respect to the isolated question of vanishing fractions, since the difficulty raised with regard to them belongs to a class of questions so extensive that they might form the subject of a separate science. Under the heads, NOTHING—INFINITY—LIMITS, THEORY OF—&c., will be found those considerations which apply to all the cases.

The method of finding the value (or correction, if the reader please) of a vanishing fraction whose numerator and denominator disappear when $x = a$, is to make a new fraction with the differential coefficients of that numerator and denominator, and then to substitute a for x. If the result be still a vanishing fraction, repeat the process with new differentiations, and so on. Thus to find the value of the third fraction above mentioned—

$$\text{diff. co. of } a^x - a \quad \text{is} \quad a^x \log a$$

$$\text{diff. co. of } b^x - b \quad \text{is} \quad b^x \log b$$

$$\frac{a^x \log a}{b^x \log b}, \text{ when } x = 1, \text{ is } \frac{a \log a}{b \log b}.$$

FRACTURE. Injuries complicated with the breaking of a bone are called fractures.

The comparative importance of such accidents depends in the first place upon that of the bone which is broken. The most dangerous fractures in this point of view are those of the vertebræ and skull, which inclose organs immediately essential to life, and extremely susceptible of injury. The *processes*, or projecting parts, of the vertebræ are sometimes broken without very serious consequences; but if any of the rings of bone which encompass the spinal chord be thus injured, death almost certainly ensues, and the danger is imminent in proportion to the nearness of the injured vertebra to the head. If the fracture take place above the fourth vertebra of the neck, reckoning downwards, death is generally instantaneous from paralysis of the nerves of respiration. Fracture of the *basis* or floor of the skull is often instantly fatal, for analogous reasons. The *sternum*, or breast-bone, and ribs, cover parts not so immediately essential to life, and, for many reasons, not so liable to suffer from violence done to their external defences as those to which we have already adverted. Fracture of the sternum can scarcely happen without the direct application of considerable force; and for that reason is both serious and rare. The ribs, on the contrary, are more easily and frequently broken than any other bones; and generally speaking the consequences are not at all serious, if proper measures be adopted. The fracture unites readily; and the chief danger to be apprehended is inflammation of the serous membrane called the *pleura*, which lines the cavity of the chest, or of the lung. [PLEURISY; PNEUMONIA.] This danger is of course increased if the lung be wounded by the splintered ends of the bone, which is sometimes the case, especially when the fracture is the result of direct force. The bones of the pelvis are seldom broken, for the same reason that determines the rare occurrence of fracture of the sternum; but the accident is generally serious, and not unfrequently fatal, from injury to the bladder and other important organs included in the pelvic cavity, or connected with the bones which circumscribe it. Fractures of the bones of the face, though distressing and painful at the time, generally do well; and are of consequence chiefly on account of the disfigurement they sometimes occasion.

The limbs are so essential to the purposes of life, and their usefulness depends so much upon the preservation of the shape of their numerous bones, upon the integrity of their joints, and upon the free and separate mobility of their muscles and tendons, that anything calculated to injure them permanently in these particulars is a matter of serious importance. Hence the great interest that has always been attached to fractures occurring about these parts; none of which can be considered as slight accidents, for in various degrees they all threaten the future usefulness of the limb.

We feel that the subject of fracture, particularly of the limbs, is one that hardly admits of compression within moderate limits; and are aware that in attempting to compress it we must sacrifice order, if not perspicuity, to brevity. Our principal object however will be to give a clear explanation of certain technical terms, by which important varieties of these injuries are distinguished; and which, though frequently made use of in conversation and in the course of judicial proceedings, are often misapplied or imperfectly understood: with this we shall interweave as much general information as possible, subjoining what may be necessary to complete an outline of the whole subject.

It can hardly be necessary to explain what is meant by *transverse* and *oblique* fracture: we may observe, however, that the distinction is practically of great consequence. In the first, or *transverse* variety, the bluntness of the ends of the broken bone in some measure preserves the contiguous soft parts from laceration at the time of the accident; it also opposes a considerable obstacle to the displacement which arises afterwards from muscular contraction; but it chiefly conduces both to the diminution of present suffering and to the prosperous event of the case, by facilitating the speedy and perfect restoration of the displaced bone to its proper situation, and its steady retention, when restored, by mechanical means.

On the other hand, as most of the bones liable to fracture are cylindrical, or present flattened surfaces meeting in as many solid angles, if they be broken obliquely, the ends of the bone will be sharp-edged or pointed: hence they are generally separated from each other to a much greater extent than is usual in transverse fracture, and there is not only much more suffering from the laceration of sensitive parts and from portions of them being included and pressed between the broken surfaces, but great difficulty is often experienced in disentangling the ends of the bone, and bringing them into close apposition; and still more in retaining them, from their tendency to slip past each other during the spasmodic and powerful contractions of the wounded and irritated muscles. The result of such fractures is often unsatisfactory, in spite of the utmost care and skill; and some distortion and shortening of the limb is inevitable in severe cases.

Comminuted Fracture.—When a bone is crushed, or fissured in more than one direction, so that portions of it are detached from the rest, the fracture is said to be comminuted. From the facility generally experienced in replacing the bone, or at least in straightening and supporting the limb in these cases, they often end better than apparently less serious oblique fractures. Perhaps one reason may be that the direct application of force, by which they are generally produced, has some effect in stunning the muscles and deadening the injurious influence of their contraction. If there be much contusion of the soft parts, considerable inflammation and fever may supervene, and the recovery will be tedious in proportion; but the eventual restoration of the natural shape and length of the limb is frequently more complete than might be expected.

Fracture extending into a joint.—A bone may of course be broken in the situation of a joint; or, if the fracture occur at some distance, a fissure may extend longitudinally into one of these cavities. This circumstance is a very important aggravation of the injury. The synovial membranes which line the joints are peculiarly impatient of irritation, and when they become inflamed, the constitutional disturbance is often considerable, and the attendant, or, as it is called, the *symptomatic* fever, is of a very acute type. When the larger joints, such as the knee, are concerned in injuries of this kind, the old surgeons frequently recommended amputation of the limb. Modern experience has shown that this may generally be dispensed with; but the greatest skill and watchfulness are required and often baffled in endeavouring to prevent the occurrence of a stiff joint (*anchylosis*), and to keep the limb in the most useful position, if it should occur; a position which is not always the most conducive to the ease, or indeed to the recovery, of the patient, and therefore not always eligible.

Fracture complicated with dislocation.—If a bone be dislocated as well as broken, it may be difficult or impossible to carry into effect the measures which are necessary for the satisfactory treatment of either injury, and the result is permanent distortion and crippling of the limb. This is of course an extreme case, and is not likely to happen unless the fracture take place very near the dislocated joint, so that a firm hold cannot be taken of the detached end of the bone. If however the fissure in the bone does not extend to the joint, the constitution does not, upon the whole, suffer so materially as might be expected in consequence of the double injury, except in particular cases, such as those complicated with traumatic delirium, on which, as the subject is curious, we shall here take occasion to say a few words.

Traumatic delirium (τραῦμα, *a wound*). This affection is by no means confined to fractures with dislocation, or to injuries of which fracture forms a part. It appears however to be more frequently a consequence of injuries of this nature than of others, and particularly of fracture of the fibula immediately above the ancle, which is often followed by dislocation of the foot. [Fibula.] The patient rambles in his ideas, is generally very talkative, and in a state of great alarm and apprehension, expecting, for instance, to be led to execution for some fancied crime. He is commonly pale and cold, free from fever, and quite unconscious of pain. If not prevented, he will rise from his bed and move about the room, using his shattered limb with perfect unconcern. Traumatic delirium has some points of resemblance with delirium tremens, and, like it, occurs for the most part in over-stimulated and exhausted constitutions. It is sometimes fatal, but may generally be relieved by large quantities of wine and opium.

Compound fracture.—If the injury of which we are treating be confined to the bones and the parts immediately around them, the fracture is said to be *simple;* but if the bone be protruded through the skin, or an external wound otherwise inflicted communicate with the interval between the broken surfaces, the fracture is said to be *compound.* However small the wound in the skin may be,—unless it can be brought to heal by the first intention, which, though it rarely succeeds, should be always attempted,—this is by far the most serious aggravation of the injury, whether we regard the suffering of the patient, the progress of the case, or the prospect of recovery. A simple fracture, however extensive, if not into a joint, may generally be expected with confidence to be well enough to permit the accustomed use of the limb in a period ranging from two to eight weeks; the pain and constitutional derangement seldom lasting beyond a few days. But a compound fracture threatens life, and, speaking generally, is at best an affair of many months of suffering and sickness. This remarkable difference originates in the wide constitutional sympathies of the skin as an organ of sensation and secretion; in the importance of its function as a covering for the subjacent parts; and in its great proneness to become inflamed when the subject of a punctured and lacerated wound. It further results from the tendency of the inflammation to propagate itself from the edge of the skin along the track of the wound to the periosteum and other deep-seated parts; it commonly spreads very extensively in the cellular tissue between the muscles, under the aponeurotic expansions which invest and separate them, and within the synovial sheaths of their tendons. Some degree of inflammation among these parts takes place in simple fractures, but it seldom exceeds manageable limits, and the lower degrees of it may perhaps be considered as curative. But the inflammation which follows a compound fracture puts a stop to all the natural processes of restoration, and renders the artificial means, in other cases usefully employed to promote them, ineffectual or inapplicable. It is attended with incessant and exhausting fever, at first ardent and afterwards irritative and hectic [Fever], and occasions deep-seated abscesses, extensive destruction of the soft parts (*sloughing*), and tedious separations of dead bone (*exfoliation*). Such are some of the disastrous consequences of a compound fracture, an accident which, in its severer forms, presents such a scene of suffering and a succession of such formidable drains upon the strength, that, on the balance of evils, amputation is often a preferable alternative.

Diagnosis of fracture.—Much need not be said of the means by which the existence of a supposed fracture may be ascertained. The nature of the accident is generally obvious enough, and the less the parts are handled the better: but where there is any doubt, it may be removed by attending to the grating sound, or the sensation communicated to the touch occasioned by slightly moving the broken ends of the bone against each other. This symptom is called *crepitation.*

Treatment.—The principles of treatment are, in the first place, to soothe by all possible and prudent means the muscular irritation and spasm which are the immediate and most urgent consequences of a recent fracture. The patient is to be placed in the easiest posture, which, if the [illegible] or leg be broken, is generally on the same side or on the back; the limb is to be supported on soft pillows, the contiguous joints being half-bent in order to favour as much as possible the relaxation of each class of muscles, especially the flexors; gentle friction, warm fomentations, or cold evaporating lotions are to be used according to the circumstances of the case and the feelings of the patient.

When the relaxing rigidity of the muscles will permit, which may not be for some hours or days, the bone is to be restored as nearly as possible to its proper situation by the gentle application of force in any required direction. Violence would defeat its own object by reproducing spasm. One hand or an assistant should steady the upper portion of the limb while the lower portion is drawn down and turned till the proper length and bearings are restored. This process, which is called the *reduction* or *setting* of the fracture, cannot always be completed on the first attempt; and it is sometimes advisable, and indeed only possible, to effect it by degrees. The displacement may also return; and in oblique fracture this will certainly happen unless the case admits of a very fortunate adjustment of the bandages. The process we have described must then of course be repeated as often as circumstances may render it necessary. The setting of a broken limb is not, as people generally imagine, a piece of legerdemain, to be effected in a moment by some wonderful exertion of dexterity, and then to be announced in oracular phrase by the surgeon as if it were something too mysterious for a plain man to understand. It is a perfectly simple and straightforward measure; and little more than common sense and a gentle hand are necessary for its proper execution if it be possible to effect it at all.

When the limb is reduced, it is to be placed in *splints*, which are thin pieces of wood or other material of the requisite firmness and length, and suitably shaped and hollowed out to fit evenly without making undue pressure upon prominent points, such as the ankle. The skin is to be protected by folds of linen or thin soft pads a little wider than the splints, which are also useful to prevent them from slipping. When everything is properly arranged as to position, the splints are to be bound upon the limb with a moderate degree of pressure; and it is right to remove and re-adjust them occasionally, in order to detect and rectify any deviation from the correct line of the bone that may arise or become apparent as the swelling subsides.

Where there is no fear of the bone being displaced by the action of the muscles that are attached to it or by the restlessness of the patient, it is not necessary to apply splints, which are only useful in preventing motion, and otherwise rather retard the progress of the case by their pressure, and for other reasons.

In fracture of the ribs it is sufficient to apply a broad belt or bandage to prevent them from alternate depression and elevation in the act of breathing, which can be carried on sufficiently well by the diaphragm alone [RESPIRATION]: and all such means are inapplicable in many cases, such as fracture of the vertebræ and of the neck of the thigh-bone; where all that can be done of a mechanical kind is to place and keep the patient in a proper position. This can be done most effectually by the help of a bedstead invented by Mr. Earle, the frame of which is jointed, so that the back may be raised to any required inclination, the knees being also raised, and the feet, if necessary, bound to a cross-board. The mattress is provided with movable pieces, which preclude the necessity of change of position for any purpose. The paramount importance of constitutional treatment and a strict regulation of the diet need scarcely be adverted to in this as in all cases of injury, in which a primary object is to repress or prevent inflammation.

Union of fractured Bone.—The process by which fractured bones are united is generally uninterrupted in simple cases, if the constitution be good and the accompanying contusion not very considerable. The extravasated blood is soon absorbed, and the swelling and inflammation subside. The interior lacerations heal, and the soft parts round the ends of the fracture become consolidated with the periosteum, or fibrous investment of the bone, which swells and unites at the torn edge. In this consolidated mass, which forms a soft case for the bone for some distance above and below the fracture, but is thickest just at that point, particles and spicula of bone are gradually deposited, till at length it becomes rigid and firm, holding the ends of the bone in close contact and preventing them from slipping away from each other, like the slider of a parasol. At length the patient finds the strength of his limb restored, and conscious of the change, can no longer be persuaded to refrain from using it. After a certain period, which has been differently stated—perhaps six or seven months in the case of a large bone—the fractured ends become firmly adherent by the deposit of bony matter between them; the exterior case becomes absorbed, and the cure is complete, the bone being rather thicker and generally somewhat stronger and more solid in the situation of the fracture than before the accident. The whole of this process is much quicker in infants and children than in adults, and somewhat more slow in advanced periods of life than in the middle age. Taking all ages, it ranges, as we have said, from two to eight or ten weeks—speaking, of course, of the period at which the limb becomes firm enough to perform its functions.

The treatment and progress of compound fracture depend upon the circumstances of each case; and it would lead us too far to enter upon them. The principles of management, however, are the same, as are likewise, in the main, the natural processes by which firm union is established.

Ununited Fracture.—It sometimes happens that, without any assignable cause, the processes we have just spoken of do not go forward; and the fracture, originally perhaps a very simple and promising one, either does not unite at all, or unites only by a tough and flexible substance like ligament or tendon; and this even where nothing faulty can be discovered in the constitution of the patient or in the management of the surgeon. Attempts are made to excite irritation and promote the deposition of bony matter in this new substance by rubbing the ends of the bone together and in other ways. Such attempts not unfrequently fail, and the bone remains flexible and useless for life.

Causes of Fracture.—We have said nothing of the various ways in which fractures may accidentally take place, because each reader can imagine them for himself. There are, however, some circumstances with reference to this subject which it is proper to mention. In the first place, the simple action of the muscles, without any blow or external pressure, is sufficient to break the bones. Such is, generally speaking, the case in transverse fractures of the *patella* or knee-pan, and occasionally in those of the *olecranon*, or point of the elbow. When these are broken off by a sudden jerk of the muscles attached to them, the detached portion of bone is carried up to some distance, and can rarely be brought into sufficiently close apposition to unite by bony matter. But the ligamentous substance we have mentioned in speaking of ununited fracture is formed between the broken surfaces; and if proper care be taken not to permit it to be stretched while it is yet soft and extensible, it answers every purpose in these cases nearly as well as bone. When one patella has been broken in this way, the other is almost sure to follow soon after, having a double duty to perform in supporting the muscular contraction by means of which the thigh is brought to a straight line with the leg in the erect posture.

Imperfect Fracture.—There are some conditions which modify the liability to the occurrence of fractures. Among these may be mentioned the soft and cartilaginous state of the bones in young infants before the earthy matter has been completely deposited. At this period it is not uncommon to find that although the limb is flexible at a certain point, no crepitation can be felt, and that in point of fact there is no actual separation of the ends of the bone. This is called *imperfect* fracture.

The opposite state of brittleness prevails in old age; and owing to this circumstance, a very slight accident will often cause a fracture of the neck of the thigh bone, the soft parts commonly receiving little injury. In these instances ligamentous union is sometimes all that can be effected, and the limb remains for the remainder of life to a great degree crippled.

Fragilitas Ossium.—A still more brittle condition of the bones is sometimes co-existent with cancer and probably other morbid states of the constitution. It is called *fragilitas ossium* (fragility of the bones), and sometimes reaches a remarkable pitch. A late eminent physician informed the writer that being called to attend upon a lady in her pew at church, he found she had broken her thigh in rising from her hassock; and in attempting to raise her, he broke both her arms. There is generally little injury of the soft parts in these fractures, and they are said to unite rather more quickly than others.

Some persons have asserted that the bones are more brittle in winter than in summer; but it does not require an hypothesis so improbable as this to explain the principal fact on which the proof has been rested, namely, the more frequent occurrence of fractures in frosty weather.

FRACTURE, in mineralogy, means the irregular surface which appears when a mineral is broken, so that surfaces do not constitute a *cleavage*. The kinds of fracture are determined by the aspect and forms of the surface presented by the mineral. Werner divides the varieties of fracture into compact, fibrous, radiated, and foliated. The compact may be splintery, even, conchoidal, uneven, earthy, or hackly The fibrous may be coarse or delicate, straight or curved, parallel or diverging; and the diverging again is either stellular, scopiform, or promiscuous. The radiated fracture is broad or narrow, straight or curved, diverging or promiscuous; and streaked or smooth.

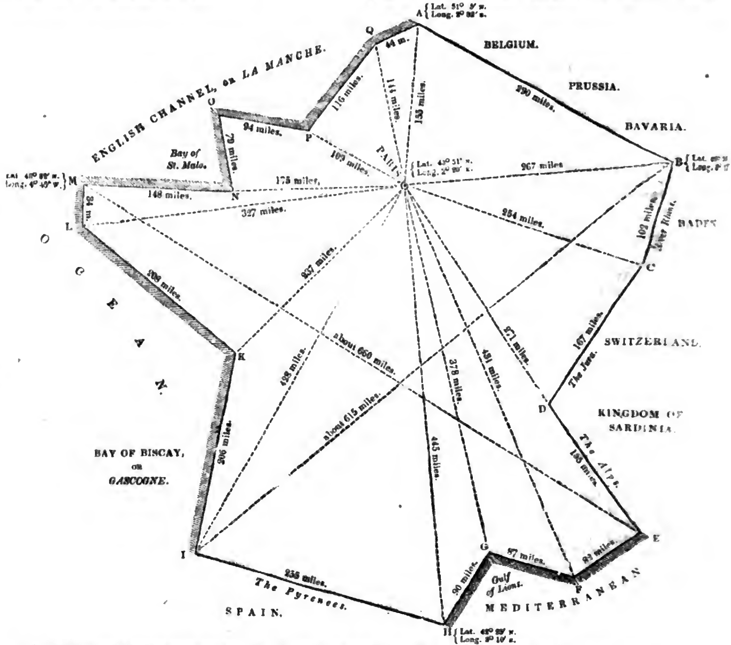
Other mineralogists do not employ so many descriptive terms as the above; thus, on looking through the description of minerals by Mr. Brooke, we find little else but the following varieties of fracture:—conchoidal, fine conchoidal; earthy, fine earthy; foliated; granular; indistinct, very indistinct; splintery, coarse splintery, and uneven.

FRAGA'RIA. [STRAWBERRY.]

FRAISE is a row of palisades placed in a horizontal or inclined position on the exterior of a rampart of earth, in order to increase the difficulty of passing over it at the time of an assault.

FRAMLINGHAM. [SUFFOLK.]

FRANCE, the most westerly of the kingdoms of continental Europe with the exception of the Spanish Peninsula. Its form is very compact, and resembles an irregular polygon, the general contour and dimensions o which, with the latitude and longitude of the extreme points, are given in the subjoined diagram. From this it appears that it is comprehended between 42° 25′ and 51° 5′ N. lat. and 8° 17′ E. and 4° 46′ W. long.; that the aggregate length of the circumscribing lines of the polygon is 2157 miles, of which 1188 miles are coast (929 miles on the ocean and 259 on the Mediterranean) and 969 miles of land frontier. If all the less important windings of the coast or of the frontier were followed, these numbers would of course be materially increased. The longest diagonal is from south-east to north-west (E to M on our diagram), about 660 miles; and the next longest from north-east to south-west (B to I), about 615 miles.



A, the frontier towards Belgium meets the coast.
B, the frontier towards Bavaria meets the Rhine.
C, the frontier towards Switzerland meets the Rhine.
D, junction of the Rhône and the Guiers.
E, mouth of the Var.
F, Cape Nôtre Dame, on the coast near Toulon.
G, mouth of the canal of Aigues Mortes.
H, the frontier towards Spain meets the Mediterranean.
I, the same frontier meets the ocean.
K, mouth of the Sèvre of Niort.
L, Bec du Raz.
M, on the coast north-west of Brest.
N, Mont St. Michel, in Cancale Bay.
O, Cape La Hogue.
P, Le Hâvre, at the mouth of the Seine.
Q, Cape Gris Nez, between Calais and Boulogne

⁂ The measurements are from the map of France by A. H. Brué, in four sheets, Paris, 1818.

The area of France may be computed at 26,766 square geographical leagues of 25 to a degree (=204,711 square English miles), including the island of Corse, or Corsica, which, though by its geographical position and antient political ties rather pertaining to Italy, is now incorporated with France, and forms one of its departments; or 26,2 square geographical leagues (=200,925 square miles) exclusive of that island. The population, by the last census, that of 1836, was 33,540,908 (164 to a square mile), inclusive of Corsica, or 33,333,019 (166 to a square mile) exclusive of that island. The number of inhabitants was greater than at the census last preceding, viz. that of 1831-2, 979,974, being an increase in the population of about 3 per cent. Paris, the capital, is in 48° 51′ N. lat. and 2° 20′ E. long. from Greenwich; its population in 1836 was 909,126. It is the second European city in respect of population, being inferior only to London. The population of the metropolitan department of Seine, which comprehends Paris and its environs for six or eight miles all round, was 1,106,891.

Coast, Islands, and Frontier.—That part of the coast which faces the north-north-west (M to A in our diagram, 481 miles) lies along the channel which separates England from the continent, to which the French give the name of La Manche (the Sleeve). This coast is generally irregular in its outline. It forms two large bays, separated from each other by the peninsula of Cotentin, of which Cape La Hogue (O in diagram) forms the north-west extremity. Of these bays, that which is the most easterly is divided into two subordinate bays by the rounded projection of the coast about Fécamp and St. Valery. One of these subordinate bays receives the Somme, the other the Seine, at the mouth of which the town and port of Le Hâvre (P in diagram) are situated. This part of the coast is mostly low and shelving, lined in many parts with sand-hills, which prevent the tide from overflowing the lands which are below the level of the sea. About Cape Gris Nez there are cliffs, and west of the mouth of the Seine the shore is skirted by rocks. The peninsula of Cotentin has, besides Cape La Hogue, another considerable promontory to the north-east—Cape Barfleur. The coast of this peninsula is commonly shelving, interrupted, however, by groups of rocks. The bay of St. Malo, the second of those formed by the coast of the Manche, is a deep bay, the sides of which, facing respectively the west-by-south and the north, form an acute angle with each other in the neighbourhood of Mont St. Michel, in Cancale Bay. The coasts of the bay of St. Malo are rocky and much broken, especially to the west of Mont St. Michel, by a multitude of small inlets with their intervening promontories. No important river falls into this bay, but many of the inlets are the æstuaries of small streams. The remainder of the coast of the ocean faces the south-west and west, and extends 448 miles. At its north-western extremity (L to M in diagram) it is broken by a deep inlet, the subdivisions of which form the water of Brest and the bay of Douarneriez. The coast here is lofty and precipitous. From the Bec du Raz (L) the coast runs facing the south-west, and continues for some time to present the same general features as the adjacent part of the Channel coast—a broken outline, frequent inlets with intervening promontories, and a shelving coast interspersed with rocks. As it proceeds to the south-east of the mouth of the Loire (which falls into the ocean mid-way between K and L), it becomes less broken in its configuration, low, and lined with salt marshes. This character it retains to the mouth of the Gironde (a little to the southward of the point K), from which the coast follows a line nearly direct, broken only by one small inlet, the bay or basin of Arcachon, and is skirted by sandy downs to the foot of the Pyrenees (at I), near which the coast assumes a rocky and precipitous character. This coast forms one side of that bay known familiarly to us as the bay of Biscay, but designated by the French the bay of Gascogne.

The coast of the Mediterranean forms by its sinuosities the two great bays of Lions and Genoa, which are separated from each other by the projection of the coast about Toulon (F in diagram). The gulf of Lions (which, it may be observed, derives its name not from the city of Lyon or Lyons, but from the lion-like violence of the tempests by which it was supposed to be agitated—'It is called the Lion's Sea because it is ever rough, tempestuous, and destructive'[*]—) is characterized by the étangs or lagoons by which its coast is skirted; it receives the waters of the Rhône. This part of the coast is commonly low, but towards the foot of the Pyrenees (H in diagram) and near Toulon (F) it assumes a bolder character. The coast of the bay or gulf of Genoa, of which only a part belongs to France, is elevated and broken. It has many smaller inlets, as the harbour of Toulon, the road of Hières and that of Bormes, and the gulfs of Grimaud, Fréjus, Napoule, and Juan.

Along the coast are several islands. In the Manche or English Channel are Gernesey or Guernsey, Jersey, Aurigney or Alderney, and Gers or Sark, which, though belonging to France by geographical position, and connected with it by the language and origin of their population, are politically united to the British isles, and form indeed the sole relic of the once extensive Norman or other French possessions of the early English kings; the Islands of Brehat, les Sept Iles (the Seven Islands), and the Isle of Bas, are of minor importance. At the western extremity of France are the Isles of Ouessant or Ushant, and along the remainder of the coast of the ocean are the Isles of Glenan, Groaix, Belle-île, Noirmoutier, Ile-Dieu, Ré, Olerón, and others of less importance. In the Mediterranean we have the Islands of Hières and Corse, or Corsica. All these are noticed either under their respective articles, or under those of the departments to which they belong: ALDERNEY, BAS, BELLE-ILE, CHARENTE INFERIEURE, CORSICA, COTES DU NORD, FINISTERE, GUERNSEY, JERSEY, MORBIHAN, VAR, VENDEE.

The land frontier of France is, for the most part, formed by great natural barriers. On the southern or Spanish frontier are the Pyrenees, along the crests of which from the Mediterranean to the ocean (H to I in diagram) the line of demarcation runs. On the south-east, the frontier towards the continental dominions of the king of Sardinia (from between C and D to E in diagram) is formed by the lofty ridges of the Alps; and that towards the Swiss Confederation (from C towards D) by the lower, but still considerable heights of the Jura. On the east the broad stream of the Rhine (B to C) separates France from the dominions of the grand-duke of Baden. The remaining part of the frontier (A to B) is purely conventional, and has varied materially in the last half century, as the fortune of war has enabled the French to extend or obliged them to contract their dominions. The conterminous states are Bavaria, Prussia, and Belgium.

Surface, geological character, hydrography.—The loftiest mountains in France are those on the Sardinian and Spanish frontiers, the Alps and Pyrenees. Of the Alps the loftiest summits lie beyond the boundary of France, in Savoy or Switzerland; but some of those on or within the line of the frontier are of great elevation: as Mont Olan, in the valley of Godemard, on the upper waters of the Drac, 13,819 feet; Pelvoux de Vallouise, south west of Briançon, 13,442; a peak west of the village of Maurin 13,107; Mont Trois Ellions 12,737, and others. Of the Pyrenees the highest point, Mont Maladetta, is in Spain, but other points which nearly equal it are in France or on the frontier, as Viguemale, at the head of the valley of Cauteretz, 11,001 feet; Peak, near the Cascade of Gavarnie, 10,745 feet; Montcalm 10,663; Peak of Estats 10,611, and several others of above 10,000 feet. The highest summits of the Jura belong to Switzerland; Le Mont d'Or, near Rochejean on the Doubs in France, has a height of 4797 feet, and Le Gros Taureau, near Pontarlier, 4351. [ALPS; PYRENEES.]

The Cévennes, of which the Montagnes Noires, or Black Mountains, of Languedoc and the mountains of Espinouse and the Garrigues are subdivisions, are separated from the Pyrenees by a valley, through which the great canal of Languedoc runs: they extend in a north-eastern direction, and after sending off branches to join the group of primitive and basaltic mountains of Auvergne, turn to the northward and skirt the valley of the Rhône and the Saône: in this part of their course they are known (according to the districts through which they pass) as the heights of Vivarais, Forez, Lyonnois, Beaujolois, or Charollois. Mont Mezen, the highest of Cévennes, is 5820 feet high, and Mont Gerbier de Jones, at the source of the Loire, 5125. The mountains of Auvergne rather surpass these in height. Le Pic de Sancy, the summit of Mont d'Or, is 6224 feet high, Le Puy Ferrand is 6116 feet, and Le Plomb de Cantal is nearly as high. There are several other 'Puys' or volcanic summits of inferior height.

The comparatively humble slopes of the Côte d'Or of Bourgogne (Burgundy) may be regarded as a continuation of the Charollois heights, and serve with the heights of Langres to connect the Cévennes with the Vosges, whose branches extend to the south-east so as to unite with the Jura, and whose wild and wooded steeps form the western boundary of the valley of the Rhine. The principal summits of the Vosges are Le Ballon de Sultz or Guebwiler, 4695 feet high, Le Haut d'Honnec, 4391 feet high, Les Chaumes, 4203 feet, and Le Ballon d'Alsace, 4124 feet.

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[*] 'Mare Leonis nuncupatur quod semper asperum, fluctuosum, et crudele.'—*William of Nangis*, a monk of the thirteenth century, quoted by Malte Brun.

From the heights of Langres a range of high lands extends in a north-west direction to the coast of La Manche, about Cape Gris-Nez, separating the streams which belong to the great system of the Rhine from those which belong to the river systems of central France. A branch from these heights divides the basins of the Seine and the Somme. From the Charollois heights a range of hills of gradually diminishing elevation extends to the neighbourhood of the Loire, separates that river from the streams which flow into the Seine, and connects the mountain system of Central France with the heights of Beauce, which are a prolongation of the Menez mountains of Bretagne. These run from the headlands near Brest in an eastward direction. A range which proceeds in a north-west direction from the central group of the Auvergnat mountains toward the mouth of the Loire, called the heights of Gâtine, separates the basin of the Loire from that of the Garonne; and another range, which branches off from the Pyrenees near the Pic du Midi, and runs north-west till it subsides in the Landes (heaths) of Bordeaux, separates the basins of the Garonne and the Adour.

The Cévennes, the heights of Langres, and the range proceeding from the latter to the coast of the Channel, separate the western or oceanic slope (*versant Océanique* of Malte Brun) from the eastern; the latter is subdivided by the heights which connect those of Langres with the Vosges and by those branches of the Vosges which unite with the Jura, into the north-eastern or Rhenish slope (*versant Rhenan*), and the south-eastern or Mediterranean slope (*versant Mediterraneen*).

The western slope includes the basins of the Adour, the Garonne, the Charente, the Loire, the Vilaine, the Orne, the Seine, the Somme, and a number of others of less importance. The basin of the Adour is bounded by the Pyrenees and the range which extends from these to the mouth of the Garonne: the length of this river is about 194 miles. The basin of the Garonne is bounded by the heights last mentioned, by the Pyrenees, the Cévennes, the mountain group of Auvergne, the heights of Gâtine, and a small branch from these which divides the basins of the Garonne and Charente. The general course of the Garonne is to the north-west; that of its principal tributaries which flow from the Cévennes and the Auvergnat group (as the Dordogne, the Lot, and the Tarn) is to the west; that of the Pyrenean tributaries, which are smaller, to the north; the Dordogne is the last tributary of importance which it receives in its course to the ocean; and their joint æstuary is called the Gironde, a name which like that of our own Humber applies to the æstuary alone. The basin of the Garonne is inferior in extent to that of the Loire, but exceeds that of the Seine in the proportion of 7 to 6. The length of the principal streams of the system of the Garonne is thus given by Malte Brun: the Garonne itself 360 miles, the Dordogne 293 miles, the Lot 166 miles, and the Tarn 207 miles. The basin of the Charente is bounded by the heights of Gâtine or their branches, and the length of the river is 235 miles or thereabout. The basin of the Loire, the largest river that wholly belongs to France, is bounded by the heights of Gâtine, the Auvergnat group, the Cévennes in which it rises, the Charollois heights, the heights which connect these with the heights of Beauce, the heights of Beauce, and the Menez mountains of Bretagne. The direction of a line drawn from the source of the Loire to its mouth would be north-west, and it would lie nearly along the ridge of the heights of Gâtine, but from the great bend which the river makes, its course is first north and then west; its principal tributary, the Allier, has a northward course nearly parallel to and not far distant from the upper part of the Loire: the Cher, the Indre, and the Vienne, have a north-west course. These all join the Loire on the left bank; the most important tributary which it receives on the right bank is the Mayenne. The length of the Loire is given by Malte Brun at above 600 miles; that of the Allier at about 250; that of the Cher, 215; that of the Vienne, 207; and that of the Creuse, an affluent of the Vienne, 166 miles. The basin of the Vilaine is bounded on the north by the Menez mountains, and on the east by a branch of the same mountains which separates the basin of the Vilaine from the basin of the Loire; the length of the Vilaine is about 124 miles. The basin of the Orne is bounded by the Menez mountains, or their branches; the length of the river is above 82 miles. The basin of the Seine is bounded by the heights of Beauce and those of Langres with their connecting range; and by the hills which branch off from the heights of Langres toward the Channel. The length of the Seine is given by Malte Brun at 470 miles; that of its principal tributary, the Marne, is 268 miles. The basin of the Somme is bounded by the heights that run from those of Langres to the coast of the Channel; the length of the river is about 110 miles.

The north-eastern or Rhenish slope comprehends parts of the basins of the Escaut or Schelde, the Meuse or Maes, the Moselle, and the Rhine. Only a comparatively small part of the course of each of these rivers belongs to France; no part of the course of the Rhine is indeed included in that country, of which it only forms the boundary.

The Mediterranean slope comprehends the basin of the Rhône, and of one or two other streams, which are too small to require notice. The basin of the Rhône is bounded by the Cévennes, the heights of Charollois, the Côte d'Or, the heights of Langres, the Vosges, the Jura, and the Alps: its greatest extension is from north to south, and it is comprehended partly in Switzerland and the Sardinian states, but chiefly in France. The course of the Rhône in Savoy, Switzerland, and part of France is nearly west; at the great city of Lyon it bends to the southward: its whole course is about 525 miles; that of the Saône, its principal affluent, is 304 miles; that of the Isère and the Durance, two other affluents, about 190 and 220 respectively; and that of the Doubs, a feeder of the Saône, about 250.

General Geological Character.—Of the geology of France our limits and our materials restrict us to a general and rapid sketch. The sands, clays, limestones of later formation, marls, and sandstones, which constitute the strata above the chalk (including the alluvial and diluvial beds), and may be designated the 'super-cretaceous group,' occupy several extensive districts. 1. The largest of these districts is in the south-west of France; it extends from a line drawn along the foot of the Pyrenees from the ocean to the Mediterranean, northward to a line drawn from the mouth of the Gironde below Blaye to the Etang de Sigéan, near Narbonne. It comprehends nearly the whole of the valleys of the Adour and the Garonne, with the intervening 'landes,' or heaths; the lower part of the valleys of the Dordogne, the Lot, the Tarn, the Ariège, and the other streams which join the Garonne on the right bank; the whole of the valleys of those streams which join it on the left bank, except such as have their sources in the higher part of the Pyrenees; and a narrow belt from the valley of the Garonne to the Mediterranean, along the coast of which, beds of this formation, probably alluvial, extend to the border of Spain. 2. The next district in extent is what is designated 'the Paris basin,' extending for several miles in every direction round that city, bounded by an irregular line drawn from the neighbourhood of Gisors, on the north-west of Paris, to La Fère on the Oise; from thence to the neighbourhood of Epernay on the Marne; from Epernay to the Seine, at the junction of the Loing, and along the valley through which the canals of the Loing and of Briare have been cut, to the valley of the Loire, along which valley these formations extend upwards to Cosne, and downwards below Blois: from this last point they are bounded by a line drawn northward to the neighbourhood of Gisors. 3. The third district extends along the valley of the Saône on the east side of that river from the junction of the Doubs to Lyon, and then along the east side of the valley of the Rhône to below the junction of the Drôme: this long strip has a breadth of several miles on the east side of the Saône and Rhône, but does not extend to the west of those rivers, except between the junction of the Doubs and the Canal du Centre with the Saône. 4. The next district comprehends the alluvial formation of the delta of the Rhône, and the lower part of the valley of that river, and of its tributaries the Aigues, Ouvèze, and Durance. 5, 6, 7. There are three other narrow portions occupied by these later formations, extending along that part of the valley of the Rhine which belongs to France; along the valley of the Allier, from near Brioude to below Moulins; and along the valley of the Loire from near Feurs to the junction of the Avron. 8. That small part of France which lies to the north of a line drawn from Calais by St. Omer to the Belgian frontier, is occupied by those formations which extend into Belgium, and occupy a large part of the country.

The chalk formation skirts the district occupied by the super-cretaceous group on the north-east side alone, extending from the coast between the Gironde and the Charente to the river Lot, southward of which it is not found: the breadth of this belt of chalk is tolerably uniform; about 25 or 30 miles. The Paris basin is surrounded on almost every side by the chalk which forms a circular belt of very variable breadth, from 24 or 25 miles (from Reims to Rethel), to more than 100 (from Clermont, near the Oise, to the coast near Calais): the continuity of this belt is only interrupted by the extension of the super-cretaceous strata up the valley of the Loire toward Cosne. The chalk formation occupies the coast of the Channel from Cape Grisnez, a little to the south-west of Calais, to the west of the mouth of the Seine, except near Boulogne, where it is interrupted for a short interval by the strata of the formations below it, which here rise to the surface. This chalk formation is opposite to that of the south-east of England (Kent and Sussex), a section of which occupies part of the sea-coast of these two counties.

The group which comprehends the oolitic and other formations, from the chalk marl (which underlies the chalk) to the lias, surrounds the chalk belt of the Paris basin on the west, south, and east sides. On the west side the district occupied by these formations is narrow, except just on the coast of the Channel, along which it extends from near the mouth of the Seine to the peninsula of Cotentin. On the south-west it becomes wider, and extends to the chalk belt which bounds on the north-east the 1st super-cretaceous district: along this belt it extends, forming an outer belt from the ocean, to the river Lot; and from the Lot it extends towards the south-east, skirting the super-cretaceous district. Along the south side of the chalk of the Paris basin, these under-lying strata have a variable breadth: on the south-east and east they extend, interrupted only by the more antient strata of the Vosges, to the valley of the Rhine and the upper waters of the Saône, and across that river to the Jura, the heights of which consist of these formations. From the Saône and the Jura these formations extend southward to the Mediterranean, bounding the 3rd super-cretaceous district on the east, and then, extending westward across the Rhône, enclose the 4th super-cretaceous district between their branches. A belt of these strata extends, with one or two interruptions, along the foot of the Pyrenees, on the south of the great or 1st super-cretaceous district, from the ocean nearly to the Mediterranean.

The new red sandstone or red marl, and the magnesian limestone which underlies it, formations which in England spread over a great extent of country, occupy only a small part of France: they are found in the Vosges, the Cévennes, and one or two other places.

The coal-measures, the slates, and the granites and other primitive rocks, occupy several extensive districts. 1. The whole of Bretagne and the adjacent part of Normandie, and the other conterminous provinces in the west. 2. The mountain district of Auvergne, part of the Cévennes, the hills of Vivarais, Forez, and the Charollois, and a large extent of country west of Auvergne, as far as the banks of the Vienne and the sources of the Charente: this district is intersected by the 6th and 7th super-cretaceous districts; and here the oldest and the latest formations may be found in juxtaposition, without the intervention of any of the intermediate strata. 3. The Alps. 4. The Pyrenees, in which calcareous formations abound, and organic remains are found at a vast height. 5. The Vosges, where they are not occupied by the new red sandstone or magnesian limestone, by which formations the primitive district is nearly surrounded. 6. A considerable insulated district in the southern part of the Cévennes, between districts 2 and 4. 7. A small tract in the northern part of France, between the Sambre and the Meuse.

The great primitive district of central France (the 2nd in our enumeration) abounds in extinct volcanos; and in the rocks, such as trachytes, basalt, lava, &c., which have arisen from them. Several of the 'Puys' of Auvergne consist of the craters of these volcanos, resting on the granite, which is the prevailing rock of the district, and other crystalline rocks. [Auvergne.] The Cévennes and the valley of the Rhône (even in those parts occupied by the strata between the chalk and the primitive rocks) exhibit traces of volcanic agency, as likewise the isolated primitive district between Auvergne and the Pyrenees. Others are observed in the antient Provence, near the sources of the Argens, and one or two in the north-east of France.

The island of Corsica consists chiefly of granite and other primitive rocks, bounded on the east and west by sandstone which form the coast, and on the south by the later, or super-cretaceous formations, which occupy the neighbourhood of Bonifacio. (*Geological Map in the Atlas to* Malte Brun's *Géographie Universelle.*)

The mineral riches of France are considerable. Granite, sienite, porphyry, variolites, and serpentine are quarried in the department of Hautes Alpes (High Alps), in Corsica, and in some of the departments of the north-west; lava in Auvergne, and marble of great variety and beauty in the Pyrenees, in Corsica, and in various other parts. Vast slate quarries are wrought at the foot of the Pyrenees and in the department of Maine et Loire, as well as in some parts of the east of France, near the Belgian frontier; and excellent limestone quarries for building are wrought in different departments of the centre, east, north-east, and north, and in that of Hérault in the south. Good stone, adapted for the purpose of lithography, is also found. The departments of the north-east, into which the former provinces of Champagne, Bourgogne, Flandre, and the Ile de France have been divided, furnish the best clay for bricks and tiles; the department of Haute Vienne (part of the antient Limousin) the best kaolin or fine clay for porcelain; that of Seine Inférieure (antient Normandie) the best pipeclay; and the neighbourhood of Paris abundance of excellent gypsum. The departments of Seine, Seine et Oise, Seine et Marne, and Oise yield chalk, sandstone for paving, and millstones. Of the metals, iron is the most plentiful; of the oxide of manganese there is a quantity sufficient to supply all Europe; of antimony there is a great quantity; and of lead, which is combined with silver, there is a great abundance, especially in the departments of Finistère, Isère, Lozère, and Vosges. Silver, uncombined with any other metal, is found in the department of Isère. Some copper-mines are wrought, the most important in the neighbourhood of Lyon. Gold is found in the soil brought down by some of the streams which rise in the Pyrenees and the Cévennes, by the Rhône and by the Rhine. A gold-mine in the department of Isère, though now abandoned, might, it is supposed, be wrought with advantage.

No less than thirty-three of the departments contain coal-pits, and some, especially Bouches du Rhone, Isère, Mayenne, Sarthe, and Bas Rhin, produce lignite, or fossil wood, and anthracite; sulphate of iron, alum, asphaltum, bitumen, and petroleum, are also found. The most productive coal-districts are near Valenciennes in the north, and St. Etienne in the south of France. The mines near Valenciennes are not so numerous as those round St. Etienne, but are wrought on a much larger scale, and produce a more valuable coal. Much coal is dug in the departments of Saône et Loire, Aveyron, and Gard. The department of Meurthe contains brine-springs and rock-salt. There are in France two hundred and forty mineral springs, of which more than one hundred and fifty are collected in baths for the reception of patients; the others are taken internally, and are frequented, the greater part by visitors from a distance, the others by persons in the neighbourhood.

Climate.—It appears from observations which have been made, that the northern and western parts of France are drier than the southern and eastern. In the department of Isère, the mean annual quantity of rain is 32 inches; in the mountainous part of Haut Rhin 30 inches (French measure); in the plains of the same department more than 28 inches; and in the department of Rhône (Lyon) above 29 inches: while in the department of Ille et Vilaine it is only 21 inches; in those of Orne and Eure, between 20 and 21; and at Paris, in the department of Seine, between 19 and 20 inches. Of the difference and the variations of temperature in different parts of France, a judgment may be formed from the following table, some of the statements of which are however to be regarded as approximations to the truth rather than as of ascertained exactness:—

Place.	Average Temperature. Summer.	Average Temperature. Winter.	Place.	Average Temperature. Summer.	Average Temperature. Winter.
Clermont in Auvergne	64·4°	34·5°	Bordeaux	70·9	42·1
			Marseille	72·5	45·5
Dunkerque	64·	38·7	Montpellier	75·4	44·1
Paris	64·6	38·7	Toulon	75·0	48·4
St. Malo	66·°	42·1°	Nîmes	73·4	48·2
Nantes	68·5	40·5	Agen	83·7	36·5

We give the table from the last edition of Malte Brun's *Géographie Universelle*, substituting Fahrenheit's scale for the Centigrade.

Agriculture.—France has always been considered one of the most agricultural countries in Europe; and if the husbandry of France is not superior to that of other countries, it is not for want of writings on this important subject: the French authors on agriculture have collected all the information which has been handed down from the antients, or which experience has taught the moderns. But this has had little influence on the practice of the great mass of the cultivators of the soil, who are too ignorant to read books, and who, if they could read them, would seldom adopt methods not sanctioned by the usage of their forefathers. The want of ready communication by roads and canals must ever prevent any great exertions being made to increase the produce of the soil, beyond the immediate demand of the neighbourhood. One part of France has often had a deficiency of corn approaching to a famine, when plenty reigned in another. Even now (1837) the price of grain in the south of France varies so much from that in the north, that there is a difference in the duty paid on the importation of foreign corn in different ports; whereas in Great Britain the price is brought so nearly to a level everywhere, that the only difference arises from the expense of carriage by water, which is always inconsiderable.

In traversing France from north to south, and from east to west, the traveller, who expects to find an improved state of agriculture, is much disappointed. Arthur Young, in his tour through France in 1787, was surprised to find the state of cultivation so low in every province, except those bordering on the Netherlands. His observations have been acknowledged to be just by the French agricultural writers themselves, and a certain spirit of improvement has been excited by his remarks. Since the Revolution in 1793, every encouragement to agriculture has been held out by the government; but notwithstanding the numerous excellent publications which have been produced, and the establishment of agricultural schools, and model farms, the progress towards a more general adoption of improved methods of cultivation is very slow. In most parts of France the farmer still resides in or near the village, and the land which he cultivates is dispersed over a considerable extent of distant uninclosed fields. He loses much time in going and returning, and he has a great way to carry the little manure which he makes. Although the use of manure is fully appreciated, there is little knowledge of the means by which it may be increased. Artificial grasses are cultivated to a considerable extent, especially in the southern provinces, but not sufficiently to maintain as much stock as would produce the requisite quantity of manure; and the very small demand for animal food, at a distance from the large towns, gives little encouragement to the feeding and fattening of cattle, except where natural meadows abound, which is only along the course of the rivers, and in the provinces of Normandy and Brittany.

The great division of property which arises from the law of equal distribution among all the children at the death of the parent, tends much to lessen the size of farms. In a country where there are domestic manufactures to give employment to the labourer or peasant, when his plot of ground does not require all his time, a more careful cultivation is the consequence of small occupations. Habits of constant employment excite industry; and the ingenuity is sharpened by the practice of the mechanical arts. But in an ignorant peasant leisure produces idleness; and if a mere sufficiency of food can be procured from a small possession, for which no rent is paid, it is seldom that a great surplus is raised.

The proportion of the population of France, which is occupied in agriculture, is much greater than in those countries which are chiefly engaged in manufactures and commerce; and yet the inhabitants of the latter are in general better fed not in consequence of the importation of grain, but of a better cultivation of the soil, as is the case in Belgium. If Holland imports much corn, it exports in return butter, cheese, and cattle. Great Britain and Ireland have required little assistance from foreign countries of late years, although the population has greatly increased.

There are in France very few large proprietors of land, who, like the English country gentlemen, spend a great part of their time in the country, and take an interest in agricultural pursuits. There are not many speculative farmers who have capital, and are possessed of a superior practical, as well as a theoretical knowledge of agriculture, and who make it a means of acquiring wealth. Few expensive instruments can consequently ever be tried, or brought into general use, nor any extensive improvements undertaken. All these causes concur in preventing a rapid improvement in French agriculture.

The northern part of France, on the confines of Belgium, and in the immediate neighbourhood of Paris, are the best cultivated. In most other parts, except where the maize is cultivated, the old system of two or three crops of corn, and a fallow, is generally adopted. If the fallows were well worked and clean, the crops would be better; but this is by no means the case. The variegated appearance of the corn in May, from the abundant blossoms of weeds, proves that they have not been extirpated. When they appear likely to choke the corn, they are sometimes weeded out; but as the method of sowing the seed in rows or drills with an instrument is unknown or undervalued, there is no possibility of hoeing the intervals between the growing plants, and all the weeding must be effected with the hand.

The best account we have in English of the state of French agriculture is contained in the journal published by Arthur Young, of his journeys through France in 1786-7-8; and although some improvements have been introduced since the Revolution of 1793, and several Englishmen have purchased farms in various parts of France, where they have introduced a better husbandry, the present state is not very different from what Arthur Young represents it to have been half a century ago. He very properly divides the whole of France into four distinct climates as regards agriculture. In the northern the vine does not thrive so as to make good wine. This district lies north-west of a line which passes near Paris, and is parallel to the line of the French coast on the Channel; that is, in a direction nearly east-north-east and west-south-west, so that it advances more to the north on the eastern part, and less so on the western. The next division is that in which wine is made, but the maize or Indian corn does not thrive. The boundary of this district to the south is nearly parallel to the line first mentioned, and passing through Nancy in Lorraine divides France nearly into two equal parts. The third division is that in which both maize and wine abound, but where the climate is still too severe for the olive or the white mulberry; this is bounded on the south-east by the Jura and a line passing to the north of Lyon. The last division consists of the southern provinces from the last-mentioned line to the Pyrenees, where the olive and the mulberry abound, as well as maize and the vine. In this part the year often yields two harvests of corn, but the soil is not well adapted to permanent pastures, except at a considerable elevation above the sea.

The finest climate is in the third division, where corn, maize, and wine are good and abundant. The heat is not so oppressive as in the southern provinces; and there is the greatest scope for agricultural operations. The most fertile lands are towards the north and east. The Beauce immediately south of Paris is a fine country, and so are Touraine, Alsace, and the plain of the Garonne. The worst soils are in Champagne, Sologne, and along the coast of the Bay of Biscay. Arthur Young gives the following distribution of the land and its productions:—The whole surface of France he takes at 131 millions of acres, of which 70 are arable, 5 are taken up by vineyards, 20 covered with wood, 4 in meadows and good pastures, 5 in artificial grasses (which may be added to the arable part), and 27 in wastes, heaths, and poor pastures. These quantities were only an approximation; but they serve to show the small proportion of permanent grass land in France, the greater part of which is in Normandie and Bretange.

The arable land of France is now estimated at 23,000,000 of hectares, which (taking the hectare = 2·47 acres nearly) are about equal to 56,810,000 acres English measure. The yearly agricultural produce of France is given by Malte Brun as follows:—

Wheat	60,500,000	hectolitres	=	about	20,900,000	quarters
Rye	37,000,000	"	"	"	12,700,000	"
Maslin, or mixed corn . .	30,300,000	"	"	"	10,400,000	"
Maize	6,300,000	"	"	"	2,160,000	"
Buck-wheat . . .	8,400,000	"	"	"	2,900,000	"
Oats	32,000,000	"	"	"	11,000,000	"
Potatoes	20,000,000	"	"	"	6,900,000	

We have given the equivalent quantities in English measures in round numbers (taking the quarter = 2·91 hectolitres nearly).

The quantity of grain produced in France now, very little exceeds what was grown fifty years since, although the population has advanced in the interval from 25,000,000 to 32,000,000. The cultivation of the vine, of the artificial grasses, of pulse, and, above all, of potatoes, has however much increased. Beet-root is extensively grown for the manufacture of sugar. The esculent roots and table vegetables are common. Flax and hemp are cultivated in various parts of the country, and to a considerable extent; the hop, tobacco, and madder, in a small degree; and the colza and rape, for oil, is grown in the north. The industry of the peasants in some of the more sterile districts is very great: in the Cévennes and in Auvergne they build walls to retain the alluvial soil brought down by the mountain streams, and cultivate the sides of the mountains by means of the terraces thus formed.

In the south the soil of the hills is stony, which suits the vine, but is unfit for the growth of corn; between the hills there are valleys which abound in every kind of produce; and where there is a command of water to irrigate the fields the most productive water-meadows may be made. But there are many spots quite unproductive for want of improvement. Wherever the maize is cultivated, it is sown every second year alternately with wheat. This succession cannot fail to exhaust the soil, however good it may have been at first; for maize returns little to the ground in the way of manure, and the straw of the wheat is not sufficient for that purpose. The French-bean is likewise cultivated for its seeds, which, when boiled, are said to contain more nutritive matter than any other seed, in the same compass. These crops cannot be raised to any extent without much manure; and the number of cattle kept is not sufficient to produce an adequate supply of it. The arable land and pastures are not intermixed as in England, but generally lie wide of each other. The horses and cows are fed chiefly on clover, lucern, saintfoin, and other artificial grasses, of which no greater extent is raised than is absolutely necessary. The keeping of more beasts than are immediately required to cultivate the land, for the sake of their manure, is a thing of which the generality of French peasants have no idea, at least in the central part of France. The consequence appears in the average produce of land which has every advantage of soil and climate. The increase of five or six measures of wheat for each measure sown is the full average of production: of barley and oats it may be somewhat more. The mode of valuing a crop by a comparison with the quantity sown is very fallacious: the produce per acre is a better criterion of the goodness of the soil, or the skill of the husbandman. Wherever agriculture is imperfect, more seed is sown than would be necessary with better tillage and manuring. In France the produce of an acre of wheat on good land may be averaged at 15 to 20 bushels, of barley 20 to 25, and of oats 25 to 30, or about one-third less than on similar lands in England, and not much more than half the produce of good land in Scotland, where the climate is much inferior. This is owing to the imperfect manner in which the land is usually worked, cleaned, and manured, and particularly to the deficiency of cattle. In the northern districts of France, where they have the example of Flemish industry, a better system is adopted: but it is astonishing to see the rapid decrease of good cultivation in travelling from Lille to Paris, and still more from Paris to Dijon and the Jura.

The agricultural implements in use in France are few, and not of an improved kind. Each province has its own fashion in making ploughs, most of which are rude and do their work imperfectly. A plough, called a *binot*, with a double mouldboard, is used in several districts, and is useful in stirring fallows; but when no other plough is used the whole soil is not moved, but the land is merely scored, and the roots of perennial weeds are not destroyed. The heavy turn wrest plough is used in other districts, chiefly in the northern part, and in heavy soils. The hack, or heavy hoe, is very generally used in those provinces where the maize is cultivated: the ground is ploughed in rough ridges, and pulverised by means of the hack: both men and women labour with this instrument; they go in rows, each taking a furrow, and digging up the earth turned over by the plough, reduce it to a proper degree of fineness. If this were well done, and the plough had gone deep, it would be an excellent cultivation, but the soil is only stirred four or five inches deep, and the weeds are not exterminated. Instead of harrows they use a board called a *traineau*, on which a man stands, while it is drawn over the land by a horse or ox: this levels the surface and covers the seed. The corn is reaped with the sickle, chiefly by women. In the northern parts the barns are very large, to hold the whole crop of the farm; for stacking corn, or even hay, is almost unknown. In the south the corn is thrashed out in the field, and put into granaries immediately after harvest. The size of farms in France is much less than the average of English farms; and the multitude of small occupations, by which a family is barely enabled to exist, is astonishing.

Model farms and establishments for the diffusion of agricultural knowledge have been established in various parts of France. That of Roville, under M. de Dombasle, has been long celebrated by the publication of the 'Annales de Roville.' At Grignon, near Paris, is an agricultural establishment supported by the government; and in several of the provinces similar establishments have been founded of late years. They cannot fail gradually to introduce improved methods of cultivation, and to bring France to its proper place amongst agricultural nations.

The vine is one of the most important objects of cultivation in France. In 10 of the 86 departments it is not grown for the purpose of making wine, or at all upon a considerable scale: in the other departments it is more or less an object of attention. The amount of land occupied by this culture is estimated at rather more than 2,000,000 of hectares, or 5,000,000 of English acres. The average yearly produce of the French vineyards is estimated at 42,000,000 hectolitres (about 924,000,000 gallons), of which, about one-sixth is converted into brandy. The former provinces of Champagne, Bourgogne (Burgundy), Lyonnois, Dauphiné, and the Bordelais, from which last district the clarets come, produce the finest growths. The banks of the Charente and the neighbouring districts produce the best (viz., the Cognac) brandy. The wines of Languedoc, Provence, and Roussillon are remarkable for fulness of body; but they want the fine odour (bouquet) of the first class of wines. The annual produce of the vineyards is estimated at 720,000,000 of francs, or about 28,500,000*l.*: of this quantity the exports amount to about 65,000,000 francs, or 2,700,000*l.* The rest is consumed in the country. In the departments of the north and north-west, which do not produce the vine, cider forms the usual drink of the poorer classes.

Of the fruits which are cultivated on a considerable scale in France, the mulberry is one of the most important: it is reared for the nourishment of the silk-worm. This branch of culture has much increased of late years. The olive, the orange, the lemon, the pistachio, are grown along the shore of the Mediterranean, but are not equal to those of other lands: the plum when dried furnishes a considerable article of export. The apple and the pear are grown in Normandie and Bretagne for making cider and perry, which furnish the peasantry with their common drink: the apple is also exported in a dried state. The chestnut furnishes the peasantry of the more barren districts with an important article of food, and the walnut is grown for the oil which is expressed from the fruit.

Of forest trees France has the oak, the cork-tree (*quercus suber*), which is cultivated in the departments of the south-west, the elm, the ash, the beech, the birch, the poplar (white and black), the larch, the juniper, the wild cherry, and the pine. The box, the cornel, the maple, and others furnish the cabinet-maker with ornamental wood. The eastern part of central France is the best wooded district, and the former province of Bretagne is the most destitute of wood. As in France wood is almost universally used for fuel, it is an object of considerable attention; and it is calculated that about one-seventh of the whole country is occupied as wood-land. The principal forests are on the various mountain ranges: except on the Alps and Pyrenees, which are rather bare of wood. The ranges of the Jura and the Vosges furnish good deals, which are often substituted for those of the northern countries of Europe; and the forests of the maritime pine enable the peasant of the Landes, or heaths, between the Garonne and the Adour, to turn that else barren tract to some account: these forests yield charcoal, rosin, and pitch.

Animals.—The domesticated animals of France are, for the most part, similar to those of Great Britain.

Horses in France are by no means equal either in number or in excellence to what they might be under a better system of agriculture. A considerable number are imported annually: although the richness of the soil should rather enable the natives to export. Considerable pains have been taken by the establishment of government studs and by other means to improve and increase the breed. The horses of the departments of the north and north-east, Somme, Pas de Calais, Ardennes, Haut Rhin, and Bas Rhin are well adapted for war, posting, and agriculture: those of the departments of Orne and Calvados are excellent for the saddle or the carriage: those of the departments of Maine et Loire, and Sarthe, and the departments adjacent to the mountain-chains of the Alps and the Jura, are adapted for the light cavalry: the horses of the former provinces of Limousin and Auvergne (known as *the Limousin breed*), and those of the former Guienne, Gascogne, and Béarn (called *Navarrins*), are in the highest repute for the combination of lightness and strength. The horses of Corsica and Bretagne are a rough hardy breed.

The ass, though probably superior to that of Great Britain, is, except in the department of Vienne, far inferior to the ass of Spain or Italy. Mules are bred in many parts, and some of them are exported. Oxen in France are much employed in the labour of the field instead of horses: they are of 12 or 15 different breeds; among the largest are those of the departments of Seine et Marne, Aisne, Haut Rhin, Pas de Calais, Charente Inférieure, Deux Sèvres, Lot et Garonne, and Gironde: among the smallest are those of Bretagne, and part of Orléanois, and the mountain cattle of the Alps, Pyrenees, Cévennes, and Corsica. Oxen are frequently bred in one part of the country and fattened in another part. The rich plains of Lower Normandie afford pasturage to great numbers of oxen which are brought thither from various quarters, especially from the hilly districts of central France where they are bred. The sheep are of various breeds, some of which have been so far improved as to furnish a wool equal to that of Saxony. The number of sheep in proportion to the population is by no means equal in France to what it is in England; they are most numerous in the former provinces of Berri, Bourbonnois, Normandie, Picardie, Ile de France, Orléanois, Rouerque in Guienne, and part of Languedoc. The sheep of Poitou and Picardie, and of some parts of Normandie, the Isle de France, and Guienne, are the fattest; those of Bourgogne and the Ardennes are most esteemed for their mutton: but the best on the whole are those reared on the sandy districts near the sea. The sheep of Roussillon approach nearest to the Merinoes in the fineness of the fleece. Some goats are bred in the former province of Berri, in the mountainous districts of Auvergne, the Cévennes, the Vosges, and the heights which connect these two chains, in the Pyrenees, the Alps, in the Landes of Guienne and Gascogne, and especially in Corsica: the Thibet goat, whose hair is woven into the Cachemire shawls, has been naturalized in the Pyrenees. The swine are of three races: the original breed, which existed in the time of the Celts, and which is still found in Normandie, especially in the valley of Auge; the Poictevin breed, and that of Perigord: from the crossing of these breeds a number of varieties have resulted. The trade in salt provisions forms an important branch of industry in the department of Basses Pyrénées (where the Bayonne hams are cured), and in the frontier departments of the east and north-east. The number of horses in France is estimated at 2,500,000. The number of oxen in 1830 was ascertained to be 7,130,632: they were most numerous in the departments of the north-west, comprehending the western part of Normandie, and the whole of Anjou and Bretagne. The number of sheep at the same period was 29,130,231, and of goats 1,206,093.

The rearing of poultry is in some parts much attended to. The cock and hen of the peninsula of Caux constitute a peculiar race, which are fattened in the environs of Barbézieux, La Flèche, and especially Mans: the goose is reared in the former provinces of Languedoc and Alsace, and in several places in the west of France: and the duck in Lower Normandie and Languedoc. By a peculiar mode of treatment the livers of the duck and goose are rendered very large and very delicate. The duck's-liver pies of Toulouse and the goose-liver pies of Strasbourg are known to epicures.

Of wild animals there are some which are not found in England. The black and brown bear have their haunts in the French Pyrenees: the lynx is found, though very rarely, in the recesses of the higher Alps; and the wolf and the wild boar are common in the forests of any extent. The chamois and the wild goat are found on the summits of the Alps and Pyrenees. The stag, the roebuck, the hare, and the rabbit are common. The marmot inhabits the Alps and the Pyrenees, and the ermine and the hamster are found in the neighbourhood of the Vosges.

The red squirrel, the alpine squirrel, and a species of the flying squirrel are also found in the forests of the Vosges and in the woods on the banks of the Moselle or on the slopes of the higher Alps. The smaller beasts of prey and vermin, such as the fox, the badger, the hedgehog, the polecat, the weazel, the rat (of which the original black species has been, as with us, exterminated and replaced by the invasion, a century since, of a larger kind), the mouse, the mole, and the field-mouse are sufficiently numerous in their respective haunts. Among the amphibious animals are the otter and the water-rat; the beaver is occasionally found on the banks of the Rhône [Beaver, p. 124]; and the 'desman,' an aquatic animal little known, is sometimes seen in the neighbourhood of Tarbes.

Of birds the chief songsters and the birds of passage are much the same as in England, with the addition of the hoopoe and one or two others.

The flamingo is found on the shores of the Mediterranean. Of game, there are the red partridge, common in the departments of the centre and west, and the grey partridge, common in the south; the quail, the ortolan, the beccafico, the pheasant, the woodcock, abundant in Picardie, and the snipe in Auvergne. The plover, lapwing, wild duck, and others are taken in great numbers on the coasts of the Channel and the Ocean, especially in the department of Charente Inférieure.

Of other animals we mention only a few: the gecko of Mauritania is found on the Mediterranean coast. There are several species of vipers and of harmless snakes: the latter are in some places regarded as fit for food. Frogs are numerous and of many species: one, the prickly frog (*crapaud épineux*), is of great size and hideous form.

The tortoise, the salamander, the scorpion, and a kind of spider closely resembling the tarantula of Italy, are found. The bee and the silk-worm are the most valuable insects; and the Spanish fly is sufficiently numerous to furnish an article of exportation.

Fisheries.—The coasts abound in fish of various kinds the taking of which occupies a number of hands: the herring, the mackerel, and especially the sardine or pilchard, are the chief objects of attention to the fishermen of the coasts of the Channel and the Atlantic: the tunny and the anchovy, to the fishermen of the Mediterranean.

The sardine fishery of the coast of Bretagne is calculated to employ 1400 vessels, and (allowing five men to a vessel) 7000 men: there are above 250 curing-houses in which 1500 women find employment; each curing-house finds work enough for a cooper, and it is calculated that more than 8000 barrels of the fish are cured annually. The mackerel and herring fisheries are carried on by the inhabitants of Dieppe, St. Valery, Fécamp, Boulogne, and other towns on the coast of Normandie and Picardie. The whale and the cachelot have been found occasionally on the French coast.

The oyster is in great demand, especially in Paris. The best are found on the coast of the departments of Manche, Calvados, and Charente Inférieure. The mussel is used as food by the poor on some parts of the coast, and the crab, the lobster, and other crustacea are consumed to a considerable extent.

Administrative divisions, Civil, Military, Judicial, Ecclesiastical.—The present civil division of France is into 86 departments. The departments are under the government of a prefect, and are subdivided into circuits or arrondissements, each comprehending a certain number of communes which for their extent and average population may be compared with our parishes. [Departments.] This system of division was introduced by the National Assembly, A.D. 1789. The name of the department is usually borrowed from some marked natural feature, a river, a chain of mountains, &c.: the name of the arrondissement is invariably taken from its chief town. As the divisions (military governments or provinces) and the principal subdivisions which existed before the introduction of the present departments are continually referred to, though no longer officially recognised, it is desirable to give them in a tabular form, together with the departments which correspond to them.

Military Governments, with their respective Capitals (in brackets).	Principal Subdivisions.	Departments, with the population, 1836.	Capital of Department (in Capitals)—Chief towns of Arrondissements* (in Italics), with the population of their respective communes in 1836, and other places of importance.
I. La Flandre Françoise (*Lille*).	La Flandre Maritime, La Flandre Wallonne, Le Cambraisis, Le Hainaut François.	1. NORD, 1,026,417.	LILLE, 72,005; *Dunkerque*, 23,808; *Valenciennes*, 19,499; *Douai*, 19,173; *Cambrai*, 17,846; *Hazebrouck*, 7674; *Avesnes*, 3030; Roubaix; Tourcoing.
II. L'Artois (*Arras*).		2. PAS DE CALAIS, 664,654.	ARRAS, 23,485; *Boulogne*, 25,732; *St. Omer*, 19,032; *Béthune*, 6805; *Montreuil*, 3867; *St. Pól*, 3452; Calais.
III. La Picardie (*Amiens*).	L'Amienois, La Santerre, Le Vermandois, Le Thiérache, Le Pays reconquis or Le Calaisis, Le Boulonnois, Le Ponthieu, Le Vimeux.	3. SOMME, 552,706.	AMIENS, 46.129; *Abbeville*, 18,247; *Péronne*, 4119; *Montdidier*, 3790; *Doullens*, 3912.
IV. La Normandie (*Rouen*).	Le Pays de Caux, Le Pays de Bray, Le Vexin Normand, Le Roumois, Le Pays de la Campagne, Le Pays d' Ouche, Le Lieuvin, Le Pays d'Auge, Les Marches, Le Bessin, Le Bocage, Le Pays d'Houlme, Le Cotentin, or Le Cotantin, L'Avranchin.	4. SEINE INFÉRIEURE, 720,525.	ROUEN, 92,083; *Le Hâvre*, 25,568; *Dieppe*, 16,820, *Yvetot*, 9213; *Neufchâtel*, 3463; Elbœuf; Fécamp.
		5. EURE, 424,762.	EVREUX, 10,287; *Louviers*, 9927; *Pont Audemer*, 5358; *Bernay*, 7244; *Les Andelys*, 5085.
		6. CALVADOS, 501,775.	CAEN, 41,876; *Lisieux*, 11,473; *Bayeux*, 9676; *Falaise*, 9498; *Vire*, 7339; *Pont L'Eveque*, 2137.
		7. MANCHE, 594,382.	ST. LÔ, 9065; *Cherbourg*, 19,315; *Coutances*, 7663; *Avranches*, 7690; *Valognes*, 6655; *Mortain*, 2521.
		8. ORNE, 443,688.	ALENÇON, 13,934; *Argentan*, 5772; *Mortagne*, 5692; *Domfront*, 2417.
V. L'Ile de France (*Paris*).	Le Parisis, Le Beauvaisis, Le Laonnois, Le Soissonnois, Le Noyonnois, Le Vexin François. La Gouelle, Le Valois, Le Mantois, Le Hurepoix, La Brie Françoise, Le Gâtinois François.	9. AISNE, 527,095.	LAON, 8230; *St. Quentin*, 20,570; *Soissons*, 8124; *Château Thierry*, 4761; *Vervins*, 2571.
		10. OISE, 398,641.	BEAUVAIS, 13,082; *Compiègne*, 8895; *Senlis*, 5016; *Clermont*, 3235.
		11. SEINE, 1,106,891.	PARIS, 909,126; *St. Denis*, 9332; *Sceaux*, 1670.
		12. SEINE ET OISE, 449,582.	VERSAILLES, 29,209; *E'tampes*, 7896; *Pontoise*, 5408; *Mantes*, 3818; *Corbeil*, 3690; *Rambouillet*, 3006; St. Germain-en-Laye.
		13. SEINE ET MARNE, 325,881.	MELUN, 6846; *Meaux*, 7809; *Fontainebleau*, 8021; *Provins*, 6007; *Coulommiers*, 3573.
VI. La Champagne (*Troyes*).	Le Réthelois, Le Porcien, Argonne, La Principauté de Sedan et Raucourt, Le Rhémois or Rémois, Le Perthois, La Champagne (properly so called), Le Valage, Le Bassigny, Le Senonois, La Brie.	14. MARNE, 345,245.	CHALONS-SUR-MARNE, 12,952; *Reims*, 38,359; *Vitry-le-François*, 6822; *Epernay*, 3457; *Sainte Menehould*, 3962.
		15. ARDENNES,	MEZIERES, 4083; *Sedan*, 13,719; *Réthel*, 6771; *Rocroy* 3682; *Vouziers*, 2101.
		16. AUBE, 253,870.	TROYES, 25,563; *Bar-sur-Aube*, 3940; *Nogent-sur-Seine*, 3355; *Arcis-sur-Aube*, 2752; *Bar-sur-Seine*, 2350
		17. HAUTE MARNE, 255,969.	CHAUMONT, 6318; *Langres*, 7677; *Vassy*, 2694.
VII. La Lorraine (*Nancy*).	La Lorraine (properly so called). La Lorraine Allemande. Le Pays des Vosges, Le Pays Messin, Le Toulois, Le Verdunois, Le Luxembourg François, La Principauté de Bouillon, Le Barrois.	18. MEUSE, 317,701.	BAR-LE-DUC, 12,383; *Verdun*, 10,577; *Commercy*, 3716; *Montmédy*, 2251.
		19. MOSELLE, 427,250.	METZ, 42,793; *Thionville*, 5680; *Sarreguemines*, 4113; *Briey*, 1730.
		20. MEURTHE, 424,366	NANCY, 31,445; *Luneville*, 12,798; *Toul*, 7333; *Château Salins*, 2621; *Sarrebourg*, 2340.
		21. VOSGES, 411,034.	EPINAL, 9526; *St. Dié*, 7900; *Mirecourt*, 5684; *Remiremont*, 5055; *Neufchâteau*, 3645.
VIII. L'Orléanois (*Orléans*).	Orléanois (properly so called), La Beausse or Beauce (comprehending Le Chartrain, Le Dunois, Le Vendômois,) Le Blaisois, La Sologne, Le Gâtinois Orléanois.	22. EURE ET LOIR, 285,058.	CHARTRES, 14,750; *Châteaudun*, 6776; *Nogent-le-Rotrou*, 6861; *Dreux*, 6379.
		23. LOIRET, 316,189.	ORLEANS, 40,161; *Montargis*, 7757; *Gien*, 5330; *Pithiviers*, 4023.
		24. LOIR ET CHER, 244,043.	BLOIS, 13,628; *Vendôme*, 8206; *Romorantin*, 7181.
IX. La Touraine (*Tours*).	La Haute Touraine, La Basse Touraine.	25. INDRE ET LOIRE, 304,271.	TOURS, 26,669; *Chinon*, 6911; *Loches*, 4753.
X. Le Berry or Berri (*Bourges*).	Le Haut Berri, Le Bas Berri.	26. CHER, 276,853.	BOURGES, 25,324; *St. Amand*, 7382; *Sancerre*, 3482.
		27. INDRE, 257,350.	CHATEAUROUX, 13,847; *Issoudun*, 11,654; *La Châtre* 4471; *Le Blanc*, 5095.
XI. Le Nivernois (*Nevers*).		28. NIÈVRE, 297,550.	NEVERS, 16,967; *Cosne*, 6212; *Clamecy*, 5539; *Château-Chinon*, 2775.
XII. Le Bourbonnois (*Moulins*).	Le Haut Bourbonnois, Le Bas Bourbonnois.	29. ALLIER, 309,270.	MOULINS, 15,231; *Gannat*, 5109; *Montluçon*, 5034; *La Palisse*, 2286.
XIII. La Marche (*Guéret*).	La Haute Marche, La Basse Marche.	30. CREUSE, 276,234.	GUERET, 4796; *Aubusson*, 5631; *Bourganeuf*, 2940; *Boussac*, 952.
XIV. Le Limousin or Limosin (*Limoges*).	Le Haut Limousin, Le Bas Limousin.	31. CORRÈZE, 302,433.	TULLE, 9700; *Brive*, 8843; *Ussel*, 4135.
		32. HAUTE VIENNE, 293,011.	LIMOGES, 29,706; *Bellac*, 3581; *St. Yrieix*, 6900; *Rochechouart*, 4123.
XV. L'Auvergne (*Clermont*).	La Haute Auvergne (comprehending La Haute Auvergne, properly so called, Carladez), La Basse Auvergne (comprehending La Basse Auvergne, properly so called, Le Pays de Combrailles, La Limagne, Le Livradois, and Le Dauphiné d'Auvergne.	33. CANTAL, 262,117	AURILLAC, 10,889; *St. Flour*, 5640; *Murat*, 2503, *Mauriac*, 3420.
		34. PUY DE DOME, 589,438.	CLERMONT, 32,427; *Riom*, 11,473; *Thiers*, 9982; *Issoire*. 5741; *Ambert*. 8016.

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* As the capital of a department is always the capital of an arrondissement, and as all the chief towns of arrondissements are given, the number of these subdivisions in any department is readily ascertained.

XVI. Le Maine (*Le Mans*). Le Haut Maine, Le Bas Maine, Le Perche.	35. SARTHE, 466,888.	Le Mans, 23,164; *La Flèche*, 6420: *Mamers*, 5704; *Saint Calais*, 3783.
	36. MAYENNE, 361,765.	Laval, 17,810; *Mayenne*, 9782; *Château Gonthier*, 6226.
XVII. L'Anjou (*Angers*). Le Haut Anjou, Le Bas Anjou (of which Le Saumurois is a part).	37. MAINE ET LOIRE. 477,270.	Angers, 35,901; *Saumur*, 11,925; *Baugé*, 3400; *Beaupréau*, 3288; *Ségré*, 2130.
XVIII. La Bretagne (*Rennes*). La Haute Bretagne, La Basse Bretagne, La Moyenne Bretagne.	38. LOIRE INFE'RIEURE. 470.768.	Nantes, 75,895; *Paimbœuf*, 3872; *Ancenis*, 3667; *Châteaubriant*, 3634; *Savenay*, 2079.
	39. MORBIHAN, 449,743.	Vannes, 11.623; *Lorient*, 18,975; *Pontivy*, 6378; *Ploërmel*, 5207.
	40. FINISTERE, 546,955	Quimper, 9715; *Brest*, 29,773; *Morlaix*, 9740; *Quimperlé*, 5541; *Châteaulin*, 2968.
	41. COTES DU NORD, 605,563	St. Brieuc, 11,382; *Dinan*, 7356; *Guingamp*, 6466; *Lannion*, 5461; *Loudéac*, 6865.
	42. ILLE ET VILAINE, 547,259.	Rennes, 35,552; *St. Malo*, 9744*; *Vitré*, 8901; *Fougères*, 9384; *Redon*, 4506; *Montfort*, 1772.
XIX. Le Poitou (*Poitiers*). Le Haut Poitou (comprehending Le Haut Poitou, properly so called, Le Loudunois, Le Mirebelois, Le Thouarsois, La Gâtine, and Le Niortois), Le Bas Poitou.	43. VENDE'E, 341,312.	Bourbon Vendee, 5257; *Fontenay*, 7650; *Les Sables d'Olonne*, 4778.
	44. DEUX SE'VRES, 304,105.	Niort, 18,197; *Parthenay*, 4288; *Melle*, 2724; *Bressuire*, 1894.
	45. VIENNE, 288,002.	Poitiers, 22,000; *Châtellerault*, 9695; *Loudon*, 5032; *Montmorillon*, 4157; *Civray*, 2100.
XX. Le Pays D'Aunis (*La Rochelle*).	46. CHARENTE, 365,126.	Angouleme, 16,910; *Cognac*, 3830; *Ruffec*, 2859; *Barbézieux*, 3013; *Confolens*, 2766.
XXI. La Saintonge (*Saintes*) and **L'Angoumois** (Angoulême), La Haute Saintonge, La Basse Saintonge.	47. CHARENTE INFE'RIEURE, 449,649.	La Rochelle, 14,857; *Rochefort*, 15,441; *Saintes*, 9559; *St. Jean d'Angély*, 5915; *Marennes*, 4542; *Jonzac*, 2514.
XXII. L'Alsace (*Strasbourg*). La Haute Alsace, La Basse Alsace.	48. HAUT RHIN, 447,01.	Colmar, 15,958; *Belfort*, 5687; *Altkirch*, 3028; Mulhausen.
	49. BAS RHIN, 561,859.	Strasbourg, 57,885; *Schélestadt*, 9700; *Weissembourg*, 5575; *Saverne*, 5352.
XXIII. La Franche Comte (*Besançon*). Les Baillages d'Amont, du Milieu & d'Aval.	50. HAUTE SAONE, 343,298.	Vesoul, 5887; *Gray*, 6535; *Lure*, 2950.
	51. DOUBS, 276,274.	Besançon, 29,718; *Montbéliard*, 5117; *Pontarlier*, 459; *Baume*, 2519.
	52. JURA, 315,355.	Lons-le-Saulnier, 7684; *Dôle*, 10,137; *Poligny*, 6492; *St. Claude*, 5238.
XXIV. La Bourgogne (*Dijon*). Le Dijonnois, Le Pays de Montagne, L'Auxerrois, L'Auxois, L'Autunois, Le Charolois or Charollois, Le Brionois, Le Mâconnois, Le Châlonois, La Bresse, Le Bugey (in which are comprehended Le Bugey, properly so called, and Le Valromey), Le Pays de Gex, La Principauté de Dombes.	53. YONNE, 355,237.	Auxerre, 11,575; *Sens*, 9095; *Avallon*, 5309; *Joigny*, 5494; *Tonnerre*, 4271.
	54. COTE D'OR, 385,624.	Dijon, 24,817; *Beaune*, 10,678; *Sémur*, 4035; *Châtillon-sur-Seine*, 4430.
	55. SAONE ET LOIRE, 538,507.	Macon, 11,944; *Châlons-sur-Saône*, 12,400; *Autun*, 10,435; *Louhans*, 3674; *Charolles*, 3226.
	56. AIN, 346,188.	Bourg, 9528; *Belley*, 3970; *Nantua*, 3696; *Trévoux*, 2559; *Gex*, 2894.
XXV. Le Lyonnois (*Lyon*). Le Lyonnois, properly so called, Le Franc Lyonnois, Le Beaujolois, Le Forez.	57. RHONE, 482,024.	Lyon, 150,814; *Villefranche*, 7553; La Guillotière, La Croix Rousse.
	58. LOIRE, 412,497.	Montbrison, 6266; *St. Etienne*, 41,534; *Roanne*, 991; Rive de Gier.
XXVI. Le Languedoc (*Toulouse*). Le Haut Languedoc, Le Bas Languedoc, Les Cévennes (comprehending Les Cévennes, properly so called, ou Comté d'Alaix, L'Uzégeois), Le Vivarais, Le Velay, and Le Gevaudan.	59. HAUTE LOIRE, 295,384.	Le Puy, 14,924; *Brioude*, 5247; *Yssengeaux*, 7621.
	60. ARDE'CHE, 353,752.	Privas, 4219; *Tournon*, 4174; *Largentière*, 2879.
	61. LOZE'RE, 141,733.	Mende, 5909; *Marvejols*, 4025; *Florac*, 2246.
	62. GARD, 366,259.	Nimes, 43,036; *Alais*, 13,566; *Uzès*, 6855; *Le Vigan*, 5049; Beaucaire.
	63. HERAULT.	Montpellier, 35,506; *Béziers*, 16,233; *Lodève*, 11,2; *Saint Pons*, 6995; Cette.
	64. AUDE, 281,088.	Carcassonne, 18,907; *Narbonne*, 10,792; *Castelnaudary*, 10,186; *Limoux*, 7105.
	65. TARN, 346,614.	Alby, 11,801; *Castres*, 17,602; *Gaillac*, 8199; *Lavaur*, 7205.
	66. HAUTE GARONNE, 454,727.	Toulouse, 77,372; *St. Gaudens*, 6020; *Muret*, 39; *Villefranche*, 2765.
XXVII. Le Roussillon (*Perpignan*). Le Roussillon proper, Le Valespir, Le Conflent, Le Capsir, La Cerdagne Françoise, La Vallée de Carol.	67. PYRE'NE'ES ORIENTALES, 164,325.	Perpignan, 17,618; *Prades*, 3013; *Céret*, 3302.
XXVIII. La Comte de Foix (*Foix*). La Partie Haute, La Partie Basse, Le Donnezan.	68. ARRIE'GE OU ARIE'GE, 260,536.	Foix, 4699; *Pamiers*, 6905; *Saint Girons*, 4282.
XXIX. La Guienne or Guyenne (*Bordeaux*), and **La Gascogne** (*Auch*).	69. AVEYRON, 370,951.	Rhodez or Rodez, 9685; *Milhau*, 10,450; *Villefranche*, 8738; *Ste. Affrique*, 6421; *Espalion*, 4082.
La Guienne. La Guienne (properly so called), or Le Bordelois, Le Bazadois, Le Perigord, L'Agenois, Le Quercy, Le Rouergue.	70. LOT, 287,003.	Cahors, 12,417; *Figeac*, 6237; *Gourdon*, 5334.
	71. TARN ET GARONNE, 242,184.	Montauban, 23,865; *Moissac*, 10,618; *Castel-Sarrasin*, 7408.

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* St. Servan is little else than a suburb of St. Malo, to which in population it is about equal.

La Gascogne. Le Condomois, Le Gabardan, La Chalosse, Le Pays des Landes, Le Pays des Basques (comprehending La Basse Navarre, Le Pays de Labour, and Le Pays de Soule), Le Bigorre, L'Armagnac (comprehending Le Haut or Le Blanc Armagnac, Le Bas or Le Noir Armagnac *), Le Comminge (comprehending Le Haut Comminge, Le Bas Comminge, and Le Couserans†).	72. GERS. 312,882.	Auch, 10,461; *Condom*, 7098; *Lectoure*, 6355; *Mirande*, 2532; *Lombez*, 1622.
	73. HAUTES PYRE'NE'ES, 244,170.	Tarbes, 12,630; *Bagnères*, 8108; *Argelès*, 1420.
	74. LANDES, 284,918.	Mont de Marsan, 4082; *Dax*. 4776; *St. Sever*, 5863.
	75. LOT ET GARONNE, 346,400.	Agen, 13,399; *Villeneuve d'Agen*, 11,222; *Marmande*, 7527; *Nérac*, 6603.
	76. DORDOGNE, 487,502.	Perigueux, 11,576; *Bergerac*, 9285; *Sarlat*, 5669; *Nontron*, 3573; *Ribérac*, 3775.
	77. GIRONDE, 555,809.	Bordeaux, 98,705; *Libourne*, 9714; *Blaye*, 3801; *La Réole*, 3931; *Bazas*, 4446; *Lesparre*, 1404.
XXX. Le Bearn (*Pau*).	78. BASSES PYRE'NE'ES, 446,398.	Pau, 12,607; *Bayonne*, 15,912; *Oloron* or *Oléron*, 6620; *Orthez*, 7857; *Mauléon*, 1259.
XXXI. Le Dauphine (*Grenoble*). Le Haut Dauphiné (comprehending Le Grésivaudan, Le Royanès, Le Champsaur, Le Briançonnois, L'Embrunois, Le Gapençois, and Les Baronnies), Le Bas Dauphiné (comprehending Le Viennois, Le Valentinois, Le Tricastinois, Le Diois, and La Principauté d'Orange, now comprehended in the Department of Vaucluse).	79. HAUTES ALPES, 131,162.	Gap, 7854; *Embrun*, 3169; *Briançon*, 3455.
	80. DROME, 305,499.	Valence, 10,406; *Montélimar*, 7966; *Die*, 3900; *Nyons*, 3208; Romans.
	81. ISE'RE, 573,645.	Grenoble, 28,969; *Vienne*, 16,484; *St. Marcellin*, 2885; *La Tour du Pin*, 2484.
XXXII. La Provence (*Aix*). La Haute Provence, La Basse Provence.	82. BOUCHES DU RHONE, 362,325.	Marseille, 146,239; *Aix*, 24,660; *Arles*, 20,048; Tarascon.
	83. VAR, 323,404.	Draguignan, 9794; *Toulon*, 35,322; *Grasse*, 12,825; *Brignoles*, 5652; Hières.
	84. BASSES ALPES, 159,045.	Digne, 6365; *Sisteron*, 4546; *Forcalquier*, 3022; *Barcelonnette*, 2154; *Castellane*, 2069.
La Corse or Corsica. Not included in the thirty-two provincial governments.	85. CORSE, 207,889.	Ajaccio, 9003; *Bastia*, 13,061; *Corte*, 3587; *Sartène* 2682; *Calvi*, 1457.
Le Comtat d'Avignon and Le Comtat Venaissin, in reality subdivisions of Provence, but subject to the Pope; until ceded by him to France in 1791.	86. VAUCLUSE, 246,071.	Avignon, 31,786; *Carpentras*, 9224; *Orange*, 8874; *Apt*, 5958.

Political Divisions and Administration.—This division into departments serves as a basis for all the other administrative divisions.

France is divided for military purposes into nineteen provinces or 'military divisions:' of these we subjoin a list, according to the arrangement made in 1829, when two military divisions, the head-quarters of which were at Caen and Perigueux, were suppressed.

No. of Divisions.	Head Quarters.	Departments included.
I.	Paris.	Seine, Seine et Oise, Seine et Marne, Aisne, Oise, Loiret, Eure et Loir.
II.	Chalons.	Ardennes, Meuse, Marne.
III.	Metz.	Moselle, Meurthe, Vosges.
IV.	Tours.	Indre et Loire, Loir et Cher, Maine et Loire, Mayenne, Sarthe.
V.	Strasbourg.	Haut Rhin, Bas Rhin.
VI.	Besançon.	Ain, Doubs, Jura, Haute Saône.
VII.	Grenoble.	Isère, Drôme, Hautes Alpes.
VIII.	Marseille.	Basses Alpes, Vaucluse, Bouches du Rhône.
IX.	Montpellier.	Ardèche, Gard, Lozère, Hérault, Tarn, Aveyron.
X.	Toulouse.	Aude, Pyrénées Orientales, Arriège, Haute Garonne, Hautes Pyrénées, Gers, Tarn et Garonne.
XI.	Bordeaux.	Landes, Gironde, Basses Pyrénées, Dordogne, Lot, Lot et Garonne.
XII.	Nantes.	Charente Inférieure, Loire Inférieure, Deux Sèvres, Vendée, Vienne, Charente.
XIII.	Rennes.	Côtes du Nord, Finistère, Ille et Vilaine, Morbihan.
XIV.	Rouen.	Seine Inférieure, Eure, Manche Calvados, Orne.
XV.	Bourges.	Cher, Indre, Allier, Creuse, Nièvre, Haute Vienne, Corrèze.
XVI.	Lille.	Nord, Pas de Calais, Somme.
XVII.	Bastia.	Corse.
XVIII.	Dijon.	Aube, Haute Marne, Yonne, Côte d'Or, Saône et Loire.
XIX.	Lyon.	Rhône, Loire, Cantal, Puy de Dôme, Haute Loire.

The principal fortresses are: along or near the Belgian, Prussian, and Bavarian frontier—Gravelines, Dunkerque, Lille, Douai, Cambrai, Valenciennes, Condé, Maubeuge, Avesnes, Rocroy, Givet et Charlemont, Mézières, Sedan, Thionville, Metz, Bitche, and Weissembourg; along the Rhenish frontier—Haguenau, Strasbourg, Schelestadt, and Neuf Brisach; towards the Jura—Béfort or Belfort, Besançon, and the new Fort de l'Ecluse; towards the Alps and the Sardinian frontier—Grenoble and Briançon; along the Spanish or Pyrenean frontier—Perpignan, Bellegarde, Mont Louis, St

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* Armagnac had other subdivisions more minute: two of these subdivisions were strictly what was called Le Haut or Le Blanc Armagnac, and Le Bas or Le Noir Armagnac.

† It is on the authority of the 'Dictionnaire Universelle de la France' that we make Le Couserans a subdivision of Le Comminge: other authorities make them independent.

Jean-Pied-de-Port, and Bayonne. The naval dock and building yards are Brest, Toulon, Rochefort, Cherbourg, and Lorient. Sloops of war are built also at Bayonne, Nantes, and St. Servan, a suburb of St. Malo. In time of war Dunkerque and St. Malo send out a great number of privateers.

The administration of the laws in France has led to other divisions. The smallest judicial divisions are cantons, each of which is under the jurisdiction of a *juge de paix* (justice of peace), and in the rural districts comprehends several communes; but in the large towns, which consist of but one commune, there are usually several *juges*. These *juges de paix* have a final jurisdiction in smaller matters; and all suits must come before them, with a view, if possible, to an amicable adjustment, before they are carried into a superior court. They are all salaried, and are professional men. The whole number of cantons in the kingdom is 2834. The *maires* of communes appear to have also some judicial authority. The *Tribunaux de Première Instance*, or primary courts, which may perhaps be compared to our quarter-sessions, are one for every arrondissement. The whole number of arrondissements in France is 363. Each tribunal consists of from three to eight or more members (besides supplementary members), according to the population or business of the arrondissement, with a *procureur du roi*, or attorney for the crown. These courts take cognizance of civil and criminal cases within certain limits, but not of offences against the state. The section of the tribunal which takes cognizance of criminal cases is called *Tribunal de Police Correctionnelle*. The *Cours Royales* (twenty-seven in number) are the highest courts with the exception of the *Cour de Cassation*), and may be compared with our assize courts. They have jurisdiction over several departments as given below, and the number of the judges varies according to the extent and business of the circuit over which they preside. The *Cour Royale* of Paris consists of fifty judges, and the whole number of judges of these courts is about nine hundred: their salaries are very small. Each *cour royale* is divided into several chambers; one decides on bills of indictment, in the same manner as an English grand jury; another tries criminal cases; others take cognizance of civil cases. Some members of these courts visit the chief towns of the departments subject to their jurisdiction about once in three months for the purpose of holding *Cours d'Assise*, or assize courts for criminal cases exclusively. An appeal lies from the subordinate courts to the *Cours Royales*; but not from these to any other court, except to the *Cour de Cassation*, at Paris, and that, not on questions of fact, but only as to matters of law. The *Cour de Cassation* can, if it finds any defect of this kind, order a new trial before another *Cour Royale*. [CASSATION.] The decisions of all these tribunals are regulated by *Les Cinq Codes*. [CODES, LES CINQ.] Juries are only occasionally employed, and under regulations materially different from our own.

COURS ROYALES.

Place of sitting.	Departments in their jurisdiction
AGEN.	Gers, Lot, Lot et Garonne.
AIX.	Basses Alpes, Bouches du Rhône, Var.
AMIENS.	Aisne, Oise, Somme.
ANGERS.	Maine et Loire, Mayenne, Sarthe.
BASTIA.	Corse.
BESANÇON.	Doubs, Haute Saône, Jura.
BORDEAUX.	Charente, Dordogne, Gironde.
BOURGES.	Cher, Indre, Nièvre.
CAEN.	Calvados, Manche, Orne.
COLMAR.	Bas Rhin, Haut Rhin.
DIJON.	Côte d'Or, Haute Marne, Saône et Loire.
DOUAI.	Nord, Pas de Calais.
GRENOBLE.	Drôme, Hautes Alpes, Isère.
LIMOGES.	Corrèze, Creuse, Haute Vienne.
LYON.	Ain, Loire, Rhône.
METZ.	Ardennes, Moselle.
MONTPELLIER.	Aude, Aveyron, Hérault, Pyrénées Orientales.
NANCY.	Meurthe, Meuse, Vosges.
NÎMES.	Ardèche, Gard, Lozère, Vaucluse.
ORLEANS.	Indre et Loire, Loiret, Loir et Cher.
PARIS.	Aube, Eure et Loir, Marne, Seine, Seine et Marne, Seine et Oise, Yonne.
PAU.	Basses Pyrénées, Hautes Pyrénées, Landes.
POITIERS.	Charente Inférieure, Deux Sèvres, Vendée Vienne.
RENNES.	Côtes du Nord, Finistère, Ille et Vilaine, Loire Inférieure, Morbihan.
RIOM.	Allier, Cantal, Haute Loire, Puy de Dôme
ROUEN.	Eure, Seine Inférieure.
TOULOUSE.	Arriège, Haute Garonne, Tarn, Tarn et Garonne.

The whole cost of the administration of justice in France, according to the Budget of 1838, is 19,000,675 francs, which is thus distributed:—

Central Administration . . .	524,800	francs
Council of State	516,400	,,
Cour de Cassation	969,000	,,
Cours Royales	4,243,130	,,
Cours d'Assises . . .	154,400	,,
Tribunaux de Première Instance .	5,880,145	,,
Tribunaux de Commerce et de Police .	242,300	,,
Justices de Paix . . .	3,103,200	,,
Expenses of Criminal Justice, and of Civil and Criminal Statistics .	3,322,000	,,
Miscellaneous	45,000	,,
	19,000,375	francs

The ecclesiastical division of France has undergone many changes. Before the Revolution there were eighteen archbishoprics, exclusive of Avignon. Of these, one (Cambrai) has been reduced to a simple bishopric, and four united with others, viz., Arles and Embrun with Aix; Vienne with Lyon; and Narbonne with Toulouse: the addition of Avignon makes the present number fourteen. The archbishops, before the Revolution, had as suffragans one hundred and seven bishops in France; one in the county of Nice (Nice), and two (Annecy and Maurienne), in Savoy, in Italy; two (Bâle and Lausanne) in Switzerland; and two (Tournay and Namur) in the Low Countries. Besides these, four French bishoprics were under the jurisdiction of German archbishops, making the whole number of French bishoprics one hundred and eleven. Of these dioceses forty-nine have been suppressed; viz., Agde, Alais, Aleth, Apt, Avranches, Auxerre (the archbishop of Sens now takes an additional title from Auxerre); Bazas, Bertrand (St.), Bethléem, Béziers, Boulogne, Castres, Couserans, Condom, Dax, Die, Dol, Glandèves, Grasse, Laon, Lavaur, Lectoure, Lescar, Lisieux, Lodève, Lombez, Malo (St.), Mirepoix, Noyon, Oléron, Omer (St.), Orange. Papoul (St.), Pol (St.), Pol-de-Léon (St.), Pons (St.), Rieux, Riez-Saintes, Sarlat, Senez, Senlis, Sisteron, Toul, Toulon, Treguier, Uzès, Vabres, and Vence: the remainder, with the addition of the ex-archbishopric of Cambrai and the new sees of Nancy, St. Dié, and Moulins, make the present sixty-six bishoprics of France.

Archbishoprics in Italics, and Bishoprics with the Departments included in them. Each Archbishopric is followed by its suffragan dioceses.

Paris.	Seine.
Chartres	Eure et Loir.
Meaux	Seine et Marne.
Orléans	Loiret.
Blois	Loir et Cher.
Versailles	Seine et Oise.
Arras	Pas de Calais.
Cambrai	Nord.
Lyon et Vienne.	Rhône, Loire.
Autun	Saône et Loire.
Langres	Haute Marne.
Dijon	Côte d'Or.
St. Claude	Jura.
Grenoble	Isère.
Rouen.	Seine Inférieure.
Bayeux	Calvados.
Evreux	Eure.
Séez	Orne.
Coutances	Manche.
Sens et Auxerre.	Yonne.
Troyes	Aube.

Nevers	Nièvre.
Moulins	Allier.
Reims.	
Arrondissement of Reims, in the department of Marne,	Ardennes.
Soissons	Aisne.
Châlons	Marne (except the arrondissement of Reims).
Beauvais	Oise.
Amiens	Somme.
Tours.	Indre et Loire
Le Mans	Sarthe, Mayenne
Angers	Maine et Loire
Rennes	Ille et Vilaine
Nantes	Loire Inférieure.
Quimpér	Finistère.
Vannes	Morbihan
Saint Brieuc	Côtes du Nord

Bourges.	Cher, Indre.
Clermont	Puy de Dôme.
Limoges	Creuse, Haute Vienne.
Le Puy	Haute Loire.
Tulle	Corrèze.
Saint Flour	Cantal.
Alby.	Tarn.
Rodez	Aveyron.
Cahors	Lot.
Mende	Lozère.
Perpignan	Pyrénées Orientales.
Bordeaux.	Gironde.
Agen	Lot et Garonne.
Angoulême	Charente.
Poitiers	Vienne, Deux Sèvres.
Périgueux	Dordogne.
La Rochelle	Charente Inférieure.
Luçon	Vendée.
Auch.	Gers.
Aire	Landes.
Tarbes	Hautes Pyrénées.
Bayonne	Basses Pyrénées.
Toulouse et Narbonne.	Haute Garonne.
Montauban	Tarn et Garonne.
Pamiers	Arriège.
Carcassonne	Aude.
Aix, Arles, Embrun.	Bouches du Rhône (except the arrondissement of Marseille).
Marseille	Arrondissement of Marseille in the department of Bouches du Rhône.
Fréjus	Var.
Digne	Basses Alpes.
Gap	Hautes Alpes.
Ajaccio	Corse.
Besançon.	Doubs, Haute Saône.
Strasbourg	Haut Rhin, Bas Rhin.
Metz	Moselle.
Verdun	Meuse.
Belley	Ain.
Saint Dié	Vosges.
Nancy	Meurthe.
Avignon.	Vaucluse.
Nîmes	Gard.
Valence	Drôme.
Viviers	Ardèche.
Montpellier	Hérault.

Government.—The general outline of the supreme government of France bears a resemblance to our own, being an hereditary constitutional or limited monarchy. Its general constitution is defined in the charter granted by Louis XVIII. upon his restoration in A.D. 1814; modified in 1830 after the revolution which drove out the elder branch of the Bourbons; and farther modified since that time. The charter, as modified after the revolution of 1830, consists of sixty-seven articles arranged under seven heads. We give an abstract of its chief provisions, as best conveying an idea of the present constitution of France. The chief alteration made since has been the abolition of hereditary peerages, and the restriction of the liberty of the press.

1st head, containing eleven articles.—*Droit public des Français* (*Public or national Rights of the French*).—This head provides for the equality of all Frenchmen in the eye of the law, their equal admissibility to civil and military employments, and their equal freedom from arrest otherwise than by legal process. It guarantees the full enjoyment of religious liberty; and while it recognizes Catholicism as the religion of the majority of Frenchmen, provides for the payment not only of the Catholic priesthood, but of the ministers of other Christian denominations, out of the public purse. It insures the liberty to all Frenchmen of printing and publishing their opinions (subsequent enactments have, however, restricted this freedom), and prohibits the re-establishment of the censorship. It abolishes the conscription; provides for the oblivion of all political offences previous to the restoration of the Bourbons; and guarantees the security of property (including the so-called 'national domains'), except when the public good, as made out in a legal manner, requires the sacrifice of individual property, in which case the owner must be indemnified.

2nd head, containing eight articles.—*Formes du Gouvernement du Roi* (*Limits of the kingly Power*).—This head secures to the king the supreme executive power, the command of the army and navy, the right of making war and treaties of peace, alliance, and commerce; of nominating to all the offices of public administration; and of making all regulations needful for the execution of the laws, without the power of suspending them or dispensing with them. It provides that the legislative functions shall be exercised by the king, the Chamber of Peers, and the Chamber of Deputies; that every law must be agreed to by a majority of each chamber, (the discussions and votes of which are to be free,) and sanctioned by the king; that bills may originate with either of the three branches of the legislature, except money bills, which must originate in the Chamber of Deputies; and that a bill rejected by either branch of the legislature cannot be brought in again the same session. The civil list is fixed at the commencement of every reign, and cannot be altered during that reign.

3rd head, containing ten articles.—*De la Chambre des Pairs* (*Of the Chamber of Peers*).—This head provides for the assembling of this chamber simultaneously with the deputies, and renders every sitting illegal (except when the chamber is exercising its judicial power) unless it is held during the session of the deputies. The nomination of the peers is vested in the king; (the princes of the blood are peers by right of birth;) their number is unlimited, and their dignity may be for life or hereditary. (Hereditary peerages have been since abolished.) The peers have no right of entry into the chamber under twenty-five years of age or of voting under thirty. The chancellor of France is president, or, in his absence, a peer nominated by the king. The sittings of the peers are public. The chamber takes cognizance of offences against the state. A peer can only be arrested by the authority of the chamber, and is not amenable to any other tribunal than the chamber in criminal matters.

4th head, containing sixteen articles.—*De la Chambre des Deputés* (*Of the Chamber of Deputies*).—This head provides for the election of the deputies and the sittings of the chamber. The electors must be not less than twenty-five years of age and the deputies not less than thirty (since reduced to twenty-five), and each must possess whatever other qualifications the law requires. The deputies are elected for five years, and one-half of the deputies for each department must be residents in it. The chamber elects its own president at the opening of each session. Its sittings ordinarily are public; but any five members can require that it form itself into a secret committee. Bills are discussed in separate *bureaux*, or committees. No tax can be levied without the consent of both chambers. The land-tax (*impôt foncier*) can be granted only year by year; other taxes may be voted for several years. The king convokes the two chambers, and prorogues and dissolves that of the deputies, but must in that case assemble a new one within three months. All members are free from arrest for debt during the session and for six weeks before and after, and from arrest on a criminal charge during the session, unless taken in the act or arrested by permission of the chamber.

5th head, containing two articles.—*Des Ministres* (*Of the Ministers*).—These may be members of either chamber; and have, besides, the right of entry into the other chamber, in which they can claim to be heard. The deputies may impeach the ministers; the peers alone have the right to try them.

6th head, containing twelve articles.—*De l'Ordre Judiciaire* (*Of the Administration of Justice*).—This head provides for the continuance of the previously existing institutions until properly modified by law; the publicity of criminal proceedings (except in particular cases); the non-removability of the judges (the justices of peace are however removable); and the right of the king to remit or commute the penalty awarded. It prohibits the confiscation of goods; the creation of special commissions or tribunals; and the withdrawal of any from the jurisdiction to which he is legally subject.

7th head, containing eight articles.—*Droits particuliers garantis par l'Etat* (*Individual Rights guaranteed by the State*).—Among other things, this head renders inviolable all engagements with the public creditor; provides for the government of the colonies by particular laws; and requires the king and his successors, on their accession, to swear to the faithful observance of the constitutional charter.

The deputies are all chosen by the departments: or, to borrow the language of our own institutions, they are all 'county members;' but the nature of the electoral qualification, which is the payment of rather more than 8*l.* direct taxes, precludes in those departments which contain large towns any undue predominance of the agricultural interest, or rather in the depressed condition of the agriculturist, secures the predominance of the residents in towns. The votes are given by ballot. The whole number of deputies is now 459, having been increased within the last few years from 430. They are thus returned.—

1 Department. Seine, (containing Paris and its environs) 14 members 14

1	Department. Nord, (containing Lille and other manufacturing towns) 12 members	12
1	Department. Seine Inférieure (containing Rouen) 11 members	11
1	Department. Gironde (containing Bordeaux), 9 members	9
2	Departments. Manche and Pas de Calais, 8 members each	16
15	Departments. Aisne, Calvados (containing Caen), Charente Inférieure, Dordogne, Eûre, Ille et Vilaine (containing Rennes), Isère, Loire Inférieure (containing Nantes), Maine et Loire (containing Angers), Orne, Puy de Dome (containing Clermont), Saône et Loire, Sarthe, Seine et Oise, Somme (containing Amiens), 7 members each	105
10	Departments. Bouches du Rhône (containing Marseille), Côtes du Nord, Finistèrre, Morbihan, Moselle (containing Metz), Bas Rhin (containing Strasbourg), Haute Garonne (containing Toulouse), Hérault (containing Montpellier), Marne (containing Reims), Meurthe, 6 members each	60
25	Departments. Ain, Aude, Aveyron, Charente, Côte d'Or, Doubs, Gard (containing Nîmes), Gers, Loire (containing St. Etienne), Loiret (containing Orléans), Lot, Lot et Garonne, Mayenne, Oise, Basses Pyrénées, Haut Rhin, Rhône (containing Lyon), Seine et Marne, Tarn, Var, Vendée, Vienne, Haute Vienne, Vosges, and Yonne, 5 members each	125
20	Departments. Allier, Ardêche, Ardennes, Aube (containing Troyes), Cantal, Cher, Corrêze, Creuse, Drôme, Eure et Loir, Indre, Indre et Loire, Jura, Haute Marne, Meuse, Nièvre, Haute Saône, Deux Sèvres, Tarn, Tarn et Garonne, Vaucluse (containing Avignon), 4 members each	80
7	Departments. Arriège, Landes, Loir et Cher, Haute Loire, Lozère, Hautes Pyrénées, Pyrénées Orientales, 3 members each	21
3	Departments. Hautes Alpes, Basses Alpes, Corse, 2 members each	6
86	Departments.	459

⁂ The towns mentioned in the above list have in their respective communes a population of 30,000 or upwards, according to the census of 1831-2.

The cabinet council of the king consists of eight ministers for the following departments:—1, Finance; 2, the Interior; 3, Justice (the minister of justice is also keeper of the seals); 4, Marine: 5, Foreign Affairs; 6, War; 7, Public Instruction, and 8, Commerce and Manufactures. The superintendence of public worship, so far as the state has to do with it, has of late years been connected with the ministry of public instruction, of the interior, or of justice; at present it is connected with the last. There has not been since the revolution of 1830 a distinct ministry of public worship. (*Ministère des Cultes.*) Their salaries are commonly 120,000 francs (5000*l.*): the minister for foreign affairs has 150,000 francs (6250*l.*), and the minister of public instruction 100,000 francs, or above 4000*l.* One of these is appointed president of the council, and is considered as the head of the ministry, or in our phrase, prime minister.

Revenue, Expenditure, Army and Navy.—The chief branches of the revenue and expenditure will be best seen from the following statements of the 'budget' (a term in use in France as well as in England) of 1832, laid before the chambers in 1831; and of the budget for 1838, laid before the chambers of 1837:—

BUDGET FOR 1838.

It must be observed that this gives the anticipated revenue, and the sums granted by the Chambers.

REVENUE.	francs.
Revenue arising from landed property	262,000,000
Poll tax, tax on personals, door and window tax	85,000,000
Patents	35,000,000
Stamps on registry, and changes of property	206,000,600
Revenue arising from the national property, such as the national domains, forests, &c.	39,000,000
Customs and indirect taxes	284,000,000
Produce of various works carried on on account of the government; as the manufacture of snuffs and of gunpowder, and the posts	129,000,000
Sundries and extraordinaries.	13,000,000
Total revenue	1,053,000,000
Or about	£43,875,000

EXPENDITURE.	francs
Ministry of justice and of public worship (including the charge of the legion of honour, and the *imprimerie royale*, or king's printing-office)	65,175,275
" foreign affairs	7,348,000
" marine	64,952,900
" public instruction	19,005,673
" finance (including interest and charges on the national debt, securities, sinking fund, pensions, and the charge of collecting the public revenue).	549,051,179
" war	232,780,119
" commerce and public works.	56,904,300
" interior	74,417,776
Chamber of deputies	677,100
Total expenditure	1,060,163,339
Or about	£44,173,472

It is estimated that the national debt of France, on Jan. 1, 1838, will be as follows:—

	francs.
Rentes, 5 per cents.	147,053,472
4½ "	1,026,600
4 "	11,978,265
3 "	35,905,696
Sinking fund	44,616,463
Interest and principal of canals	9,936,000
Interest of securities	9,000,000
Interest on annuities	9,000,000
Annuities and pensions	58,050,000
Total	326,566,496
Deducting the sinking fund, and that portion of the debt which has been redeemed, the debt amounts to	254,566,496

Besides the revenues of the state, the communes raise taxes for defraying their own expenses: of these taxes the octrois, or local duties, levied in the towns on all goods which pass through the barriers, constitute a leading portion.

The army in 1837 consisted of upwards of 300,000 officers and men. They may be thus classified:—

Officers of all ranks, and of all portions of the staff	15,539
Subalterns, non-commissioned officers, drummers and trumpeters, soldiers not in the ranks, and children	75,835
Soldiers of all kinds, *i.e.* cavalry, infantry, artillery, and engineers	210,734
	302,108

Of general and superior officers the number was as follows:—

Marshals of France			11
Lieutenant-Generals,	in active service	99	
	in reserve	7	
	unemployed	28	
			134
Major-Generals (*Maréchaux de Camp*),	in active service	143	
	in reserve	25	
	unemployed	35	
			203
Colonels, Lieutenant-Colonels, and subordinate officers, to Sub-Lieutenants			567
Adjutants, Intendants, and Sub-Intendants			220
			1,135

The troops were distributed as follows:—

Infantry.—Veteran Subaltern Officers, 10 companies; Veteran Fusiliers, 23 ditto; Infantry of the Line, 67 regiments; Light Infantry, 21 ditto: Ditto in Africa, 3 battalions; Training Companies (*Compagnies de discipline*), 12 companies.

Cavalry.—Veteran Cavalry, 4 companies; Carbineers, 2 regiments; Cuirassiers, 12 ditto; Dragoons, 12 ditto; Light Dragoons (*Chasseurs*), 12 ditto; Lancers, 8 ditto; Hussars, 6 ditto; African Light Dragoons (*Chasseurs d'Afrique*), 3.

Artillery and Engineers.—Artillery, 14 regiments; Engineers, 3 ditto; Pontoon-men, 2 battalions: Training Companies, 8 companies; Pioneers, 4 ditto.

Gendarmerie in the Departments, 24 legions; Municipal Guard of Paris, 1 ditto; beside the Colonial troops.

During part of the years 1831-34 (in which last year the other powers of Europe reduced their armies), the military force of France amounted to above 400,000 men.

Of the military seminaries the Ecole Polytechnique is the most celebrated. The national guard corresponds to our yeomanry and volunteers; and as every town of consequence has a force of this description, the number of men trained to the use of arms is immense.

The French Navy, in the year 1836, consisted of the following vessels:—

Ships of the line, in service, in ordinary, or building	[illegible]
Frigates	[illegible]
Corvettes	[illegible]
Brigs	[illegible]
Gun-brigs	[illegible]
Cutters and luggers	[illegible]
Steam-boats	[illegible]
Other vessels	[illegible]
Vessels of all kinds	[illegible]

The number of superior officers at the same time was as follows:—

Admirals, and other flag-officers, not given.		
Post Captains (*Capitaines de Vaisseau*)	[illegible]	
Commanders (*Capitaines de Corvette*)	150	
		[illegible]
Lieutenants	[illegible]	
Enseignes de Vaisseau	[illegible]	
		[illegible]

Population, Religion, Educational Establishments, Crime.—The principal stock from which the French nation derives its origin is the Celts. At the period of Cæsar's invasion these Celts occupied nearly all the midland, western, and southern parts of the country, extending in one direction from the promontory of Bretagne to the mountains of Switzerland and Savoy, and perhaps to the frontier of the Tyrol; and in another direction from the banks of the Garonne to those of the Seine and Marne. The south-western corner of the country was occupied by the Aquitanians, whose territory extended from the Garonne to the Pyrenees: and probably some Ligurian tribes were intermingled with the Celts on the shore of the Mediterranean. Some Greek settlements occurred along that coast; and Greek blood, though in a minute proportion, has mingled in that of the modern inhabitants of Languedoc and Provence. The north-eastern parts of the country, from the Seine and Marne to the Channel and the Rhine, were occupied by the Belgians, a race probably of mixed Celtic and Germanic blood; and the immediate vicinity of the Rhine was occupied by some tribes of purer and more immediate German original. The subjugation of the country by the Romans produced an intermixture, though probably not a great one, of Romans with the natives: but it was not until the overthrow of the vast fabric of the Roman empire, and the settlement of the northern barbaric nations within its limits, that the population of France underwent any important modification. But however little the population might have been affected, the habits of the Celts had undergone material changes under the Roman dominion; and the modern French language shows how extensive and how permanent has been the influence of the Latin tongue.

At the breaking up of the Roman empire, three of the invading tribes possessed themselves of France: the Visigoths south and west of the Loire, the Burgundians in the south-east, extending from the Saône and the Rhône to the Jura and the Alps, and the Franks in the north and east. A branch of the Celtic nation, migrating from the British Isles, and differing in dialect or language from their kindred tribes in France, settled in the extreme west, and have transmitted to the present age their peculiarity of language and the name of the island (Bretagne or Britain) from which they came. Politically the ascendency of the Franks extinguished the independence of their co-invaders; but the tribes which succumbed to their yoke remained in the settlements they had acquired, and have influenced more or less the characteristics of their descendants. But notwithstanding these admixtures, the Celtæ may still be considered as the main stock of the French people; and it has been considered that the national characters of the antient and the modern race bear no inconsiderable resemblance to each other.

As the predominance of the Celtic race may be inferred from that of their adopted language in the greater part of France, so the local predominance of other tribes is indicated by that of their peculiar tongue. The Breton, an adulterated form of the language imported by the British settlers, is still the language of the rural districts and of the poorer classes in Bretagne, and is subdivided into four dialects: the Basque is yet found at the foot of the Pyrenees, and may be considered as the representative of the antient dialect of the Aquitanians: the Lampourdan, one of its principal dialects, is spoken in the Pays de Labour and in Basse Navarre. In Alsace the German language is predominant; a circumstance which may be ascribed to that province having been more completely occupied by those tribes who overthrew the Roman empire; and who have preserved their own language, and also to the long incorporation of Alsace with Germany, and its comparatively late annexation to the rest of France. The dialect of Lorraine, the adjacent province to Alsace, may be considered also as having strong affinity to that of Germany, from similar causes to those stated above.

The population of France, at the commencement of the eighteenth century, was about 19,669,320, exclusive of Corsica and part of Lorraine, which were not then united to France. In the year 1762 the population had increased to 21,769,163, inclusive of Corsica and the whole of Lorraine. In 1784 it had further increased to 24,800,000.

The population by the different census of the present century has been ascertained to be as follows:—

Census.	Population.	Increase in ten years.
1801	27,349,003	
1811	29,092,734	1,743,731
1821	30,461,875	1,369,141
1831	32,569,223	2,107,348

The predominant religion of France is doubtless the Catholic; but there is a considerable number of Protestants, especially in Alsace and in Languedoc. According to the statements of M. Balbi, more than fourteen-fifteenths of the population belong to the Catholic church; but this statement is to be received as true only upon the assumption that all are Catholics who do not worship under some dissenting form. The ecclesiastical divisions of the country have been already given. Those of the Catholic hierarchy who have the dignity of cardinal have a yearly income of about 1300*l.*; the archbishops have about 800*l.*; and the bishops about 600*l.* Of the working clergy the incomes are very small, from 20*l.* or 30*l.* to 40*l.* or 60*l.* a year: there is one in almost every commune. The number of clergy in 1836 was as follows:—

Archbishops	14	
Bishops	66	
Vicars-general	174	
Canons	660	
Curés	3,401	
Desservans	26,776	
Vicaires	6,184	
		37,275

Before the first French Revolution, the country abounded with monastic establishments for both sexes, some of them endowed with vast possessions. The abbeys and convents for men have been, with very few exceptions, abolished; and the sale of their property precludes the expectation of their being re-established. The nunneries and abbeys for women for the most part remain, and have existed throughout the Revolution, with the exception of a few years at the time of its greatest violence. The French nuns, who amount to more than 20,000, do not, except a few, lead a life of pure meditation, but are actively engaged in attendance upon the sick, or in the instruction of youth.

The Protestants are partly of the Lutheran, but chiefly of the Reformed church. The members of the Lutheran church are found in Alsace, in the capital, and in the department of Isère, a part of the former province of Dauphiné. The members of the Reformed church amount to about 1,000,000, according to M. Balbi; they constitute by far the majority of the French Protestants. They are found chiefly in the south Languedoc, and in the west, about Rochelle, once the stronghold of the Huguenots. A few Baptists are found in the Jura and the Vosges, and are remarkable for the innocence of their lives, and the simplicity of their manners. Some Jews are found in Paris, Marseille, Bordeaux, Strasbourg, Lille, Metz, Nancy, Dijon, Besançon, Montpellier, and at Winzenheim, in the department of Haut Rhin: they are calculated by some authorities at 60,000. The Catholic priests are chiefly educated in *Séminaires* established for the express purpose of clerical instruction. There is one establishment for the higher studies at Paris; and above 200 seminaries scattered throughout France. Strasbourg is the chief place of instruction for the clergy of the Lutheran church; Montauban for those of the Calvinistic or Reformed church.

The cost to the state of the maintenance of public worship, according to the budget of 1838, is as follows:—

Cost of the administration of this branch of the public service	178,500 fr.
Cardinals, Archbishops, and Bishops (Catholic)	1,017,000
Members of Chapters and Parochial Clergy (do.)	28,145,000
Royal Chapter of St. Denis	112,000
Seminaries	1,000,000
Grant (*Secours*) to Ecclesiastics and Monks	1,070,000
Maintenance of cathedral service	455,000
Building and keeping up cathedrals	1,600,000
Grants to Catholic establishments	862,000
Protestant sects' salaries	808,000
Worship of do., edifices, &c.	116,000
Jewish worship	90,000
	35,443,500

Before the Revolution, France had twenty-three universities, of which Paris was the most important, and enjoyed great privileges. The others were at Aix, Angers, Avignon, Besançon, Bourges, Bordeaux, Caen, Cahors, Dijon, Douai, Montpellier, Nantes, Orange, Orléans, Pau, Perpignan, Poitiers, Pont-à-Mousson, Reims, Strasbourg, Toulouse, and Valence. Under Bonaparte, a body was organised with the title of *Université*, which has continued with some modifications to hold to the present time the chief direction of education. Of this body, which is incorporated, and which possesses large disposable funds, arising partly from real property, partly from public grants, and partly from the payments of pupils, all public teachers are members. The highest officer of this body is the minister of public instruction, who has a seat in the cabinet; he fills up all appointments in this branch of the administration, and all vacancies in the *académies* and *collèges*, upon the recommendation however of the local authorities, by whom strict examinations are instituted. He is assisted by a council of ten members, men of the highest rank in the literary world. Twenty-six *académies universitaires* are established in different parts of France; and the whole territory is divided into as many circuits, one to each. The *académies* are at Aix, Amiens, Angers, Besançon, Bordeaux, Bourges, Caen, Cahors, Clermont, Dijon, Douai, Grenoble, Limoges, Lyon, Metz, Montpellier, Nancy, Nîmes, Orléans, Paris, Pau, Poitiers, Rennes, Rouen, Strasbourg, and Toulouse. Each *académie* consists of a rector or superintendent, who inspects all schools and places of public instruction within his circuit, and communicates with the higher authorities at Paris. He is assisted and controlled in the exercise of his functions by a council of ten members. These form the administrative portion of the *académie*. The branch of instruction, if the institution is complete in all its parts, comprehends the five faculties of theology, law, medicine, literature, and the sciences; together with a college or high-school. The preparatory instruction to the academies is furnished in the colleges or high-schools, which are established in almost all the larger towns. Paris has several *collèges*. That of Louis le Grand contained, in 1836–7, 1054 pupils; that of St. Louis 990; that of Bourbon 864; that of Charlemagne 810; that of Henri IV. 720; that of Versailles 409; that of Rolieu 390; and that of Stanislas 330. The *collège Henri IV.* is eminent for literature; the *collège Stanislas* for philosophy. The lowest grade of schools comprehends the *écoles primaires*, or elementary schools, in which France until of late years was miserably deficient.

In 1833 a law was passed ordaining that every commune by itself, or by uniting with others, should have one school of elementary instruction (*i. e.* reading, writing, arithmetic, and the legally established system of weights and measures); that every commune, the population of which exceeded 6000, should have also a school for superior instruction (*i. e.* in addition to the acquirements of the lower schools, the elements of geometry, and its application to the arts, the elements of chemistry and natural history, as applied to the ordinary habits and pursuits of life, the elements of history and geography, and more especially the history and geography of France); and that every department should have a normal school, (school for the instruction of schoolmasters,) either by itself, or by uniting with some other department. These schools are supported partly by private foundations, donations, and legacies; partly by the communal, departmental, or general government.

The state of education in 1836 was as follows:—

36,000 elementary schools for boys.
11,000 elementary schools for girls.

47,000: containing { in winter, 2,170,000 scholars.
in summer, 1,300,000 „

73 normal schools for training teachers for the elementary schools.
873 boarding-schools.
94 schools for superior instruction.
322 *Collèges Communaux*, or district high-schools, with 27,000 scholars.
41 *Collèges Royaux*, or royal high-schools, with about 15,900 scholars.

All the poor who are incapable of paying for the instruction of their children are to have them educated gratis at the schools of elementary instruction; and a certain number selected after an examination, are educated gratis at the schools of superior instruction. The masters of the elementary schools have a residence, and receive 200 francs, or little more than 8*l.* yearly salary; the masters of the superior schools have a residence and a salary of 400 francs, or above 16*l.* The whole charge to the state of the department of public instruction, according to the budget of 1838, is 19,005,673 francs, or nearly 800,000*l.*; which is thus distributed:—

	francs.
Central administration	696,623
General services	298,000
Departmental and academic administration	919,900
Superior instruction—faculties	1,972,050
Secondary instruction	1,655,000
Elementary instruction general fund	1,000,000
„ „ additional	3,500,000
Primary normal school	200,000
Literary and scientific establishments	7,676,500
Subscriptions to literary works, encouragements, indemnities collected, and publication of unedited works	557,000
Total . .	19,005,673

The subjoined table of the comparative state of education in France is quoted by Mr. Bulwer in his *France—Social, Literary, Political*. It states the number of those who could read and write out of 100 of the young men enrolled in 1828-29, in the military census. It furnishes data for estimating, not the present means of instruction, but the present state of knowledge among the younger part of the adult male population of France. The departments are given in the order of enlightenment.

Proportion of those who can read and write in every 100 enrolled.

1	Meuse	74	44	Gers . .	38
2	Doubs . .	73	45	Vaucluse .	37
3	Jura .	73	46	Ain . . .	37
4	Haute Marne .	72	47	Charente .	36
5	Haut Rhin	71	48	Aude . . .	34
6	Seine .	71	49	Saône et Loire .	32
7	Haute Alpes	69	50	Lot et Garonne .	31
8	Meurthe . .	68	51	Cantal . .	31
9	Ardennes . .	67	52	Pyrénées Orientales	31
10	Marne . .	63	53	Haute Garonne	31
11	Vosges . .	62	54	Aveyron . .	31
12	Bas Rhin .	62	55	Sarthe .	30
13	Côte d'Or . .	60	56	Loire . . .	29
14	Haute Saône .	59	57	Isère . . .	29
15	Aube . .	59	58	Landes . . .	28
16	Moselle . .	57	59	Vendée . .	28
17	Seine et Oise	56	60	Lozère . .	27
18	Eure et Loir .	54	61	Loir et Cher .	27
19	Seine et Marne .	54	62	Ardèche . .	27
20	Oise . .	54	63	Indre et Loire .	27
21	Hautes Pyrénées .	53	64	Tarn et Garonne	25
22	Calvados . .	52	65	Vienne . .	25
23	Eure . .	51	66	Ille et Vilaine .	25
24	Aisne . .	51	67	Loire Inférieure	24
25	Corse . . .	49	68	Lot . . .	24
26	Pas de Calais .	49	69	Var . .	23
27	Yonne . .	47	70	Maine et Loire .	23
28	Basses Pyrénées	47	71	Creux . .	23
29	Basses Alpes .	46	72	Haute Loire .	21
30	Nord . .	45	73	Tarn .	20
31	Rhône . .	45	74	Nièvre . .	20
32	Hérault . .	45	75	Mayenne .	19
33	Orne . . .	45	76	Puy de Dôme .	19
34	Somme . .	44	77	Arriège . .	18
35	Seine Inférieure .	43	78	Dordogne . .	18
36	Manche . .	43	79	Indre . .	17
37	Loiret . .	42	80	Côtes du Nord .	16
38	Drôme . .	42	81	Finistère .	15
39	Deux Sèvres .	41	82	Morbihan . .	14
40	Gard . .	40	83	Cher . .	13
41	Gironde . .	40	84	Haute Vienne .	12
42	Charente Inférieure	39	85	Allier . .	13
43	Bouches du Rhône	38	86	Corrèze . .	12

From the above table it will appear that the north and east of France are the parts in which elementary instruction is most widely diffused; and the central and western those in which there is least.

The efforts made since 1833 to instruct the people go far to redeem France from the reproach of indifference on this head. The state of education previous to that epoch was indeed far from commensurate with the high rank held by the country in the social scale. The proportion of children at school in France was only about two-thirds of the proportion in Austria, one-half the proportion in England and Bavaria, one-third of the proportion in Prussia, the Pays de Vaud, and Wirtemberg, and one-fifth of the proportion in the United States of America. At present the proportion of scholars in France is about one-third greater than before 1833; but France is in this particular still behind Austria.

Of the extent of crime an estimate may be formed from the following data, which we borrow from the official returns for the year 1834. The number of charges in that year was 5125, viz. 1557 for crimes against the person, and 3568 for crimes against property. The number of persons accused before the Cours d'Assises, which have jurisdiction in the more important criminal cases, was 6869, being in the proportion of 1 person accused to 4676, as compared with the whole population of the country. Of the 6869 persons accused, 77 were tried twice, and 3 three times, making the apparent number of accused 6952: of whom 2216 were charged with crimes against the person, and 4736 with crimes against property. The number convicted was 4164, viz. 1006 of crimes against the person, and 3158 of crimes against property: of the convicts, 25 were capitally condemned, viz. treason, 1; murder, 1; assassination, 18; parricide, 1; infanticide, 1; poisoning, 1; arson, 2; total, 25.

The number of persons accused, from the year 1828 to 1834, was as follows:—

Crimes against the person.				*Crimes against property.*			
	Accused.	Acquitted.	Convicted.		Accused.	Acquitted.	Convicted.
1828	1765	934	831	1828	5157	1739	3418
1829	1790	956	834	1829	5579	1941	3638
1830	1666	900	766	1830	5296	1932	3364
1831	2044	1301	743	1831	5560	2205	3355
1832	1972	1041	931	1832	5593	2076	3517
1833	2136	1178	958	1833	4828	1681	3147
1834	2216	1210	1006	1834	4736	1578	3158

In fifty-seven of the departments the amount of crime was below the average of the whole kingdom: in the department of Creuse the proportion of those accused to the whole population was only as 1 to 11,538, in that of Meuse 1 to 11,235, in that of Lot et Garonne 1 to 10,202, and in that of Corrèze 1 to 10,167. The departments of the Seine (which include Paris), Pyrénées Orientales, and Corsica were those which presented the greatest proportion of accused persons: in the first the proportion was as 1 to 1191; in the second 1 to 1619; and in the third 1843. The number of men among those accused was 5793; of women 1159, being about 5 men to 1 woman: of the accused 107 were under sixteen, and 1239 between sixteen and twenty-one. There were 4080 who were unable to read or write, 2061 could read or write imperfectly, 608 could read and write well, and 203 had received instruction beyond reading and writing. The Tribunaux de Police Correctionelle, or subordinate criminal courts, took cognizance the same year of 120,108 cases, in which 172,862 persons were implicated, of whom 36,859 were women.

It is observable that the amount of crime in France is much less than in England and Wales, though the latter have not half its population; yet in the crimes of murder and rape France very far exceeds England. 'There is not,' says Mr. Bulwer, 'more than one rape or attempt to commit rape in England to every three offences of a similar description in France. There is not more than one murder or attempt to commit murder in England to every six murders or attempts to commit murder in France.' On the other hand, crimes against property are much rarer than in England.

Commercial and Manufacturing Industry.—Means of Communication, &c.—Every branch of industry in France has undergone vast improvement since the peace of 1815. The energies of the nation being turned from war to domestic employments, speedily repaired the evils which France had suffered from so long a struggle. Agriculture advanced so rapidly, that the apprehension of famine was in a few years succeeded by the cry of over-production: the race of various domestic animals which had been considerably diminished was replenished; and the manufactures were extended. These results were hastened by the disbanding of the army and the return of the prisoners of war from all quarters. From these two sources the productive population of France was augmented by 700,000 men. (Dupin's *Forces Productives de la France.*)

The woollen manufacture has increased materially: the increased quantity of wool used is partly furnished by the increased number of sheep bred, partly by the importation of foreign wool. The quality of the home-grown wool has been improved by the introduction of foreign breeds, and the Cachemire goat has been naturalised on the slopes of the Pyrenees. The principal localities of the different branches of the woollen manufacture are as follow: broadcloths are made at Elbœuf, Louviers, and Vire in Normandie; at Abbeville; at Sedan, in the ex-duchy of Bouillon; and in the south at Carcassonne, Lodève, and Castres: light woollen fabrics at Paris, Reims, Amiens, and Beauvais. hosiery at Paris, Troyes, Orléans, and at different places in Picardie, in the north of France; and in the south at Nîmes, Lyon, and Marseille: and carpets at Paris, (La Savonnerie and les Gobelins,) Abbeville. Beauvais; and at Aubusson and Felletin, (Department of Creux,) in central France: shawls are made at Paris, (the cachemire,) Lyon, Nîmes, and St. Quentin. The consumption of wool in these manufactures is probably above 50,000,000 kilogrammes or more than 1,000,000 cwts.

The cotton manufacture has increased since 1812 in greater proportion than that of wool, and has probably tripled: the annual consumption of cotton in the different branches of this manufacture is about 30,000,000 kilogrammes, or 600,000 cwts.: and the process of manufacture and the fineness and excellence of the fabrics have undergone great improvements. The north and east of France are the chief seats of this manufacture. Rouen may be considered the Manchester of France; and Paris, Troyes, St. Quentin, and the towns of the department of the Nord, also participate largely in this manufacture. Printed calicoes are made at Rouen and Beauvais; but especially at Colmar, Mühlhausen, and other places in the department of Haut Rhin, the printed cottons of which are much approved in the German markets for the vividness of their colours (especially the Turkey-red), and their other qualities.

The silk manufacture is carried on chiefly in the south. The population of Lyon, its principal seat, had been reduced by the disasters of the Revolution and the commercial inactivity of the empire from 140,000 to about 110,000. The improvement of the silk manufacture had raised it in 1831-2 to 133,000, and it is now 150,000. The other chief seats of the silk manufacture are Nîmes, Avignon, Annonay, and Tours. Ribands are made at St. Etienne and St. Chamond, towns to the westward of Lyon. The brilliancy of the French silks has been increased by the substitution of Prussian-blue for indigo as a dye. A part of the raw silk required for these various fabrics is grown in France. The quantity of mulberry trees for the silk-worms had increased from 9,631,674 in 1820, to 14,879,404 in 1834, or more than 50 per cent. in 14 years. They are chiefly grown in the departments of Gard, Drôme, Vaucluse, and Ardèche.

Linens of the finer sort are made in Flanders, at St. Quentin, Cambrai, Valenciennes, Douai, &c.: the damask linens of St. Quentin rival those of Saxony and Silesia. Coarser linens and sail-cloth are made in Bretagne. The linen manufacture is also carried on in Dauphiné. Lace is made at Caen, Alençon, and Bayeux, in Normandie; also at Valenciennes and Douai; and in some other places.

The working of the metals has much increased, especially iron. The quantity of iron smelted in 1814 was about 100,000 tons; since 1825 it has amounted to 160,000 tons, and various utensils of this useful metal, for which France was formerly dependent on foreigners, are now produced at home. The quality and appearance of the steel and wrought-iron goods have much improved; yet the quality of the French iron is inferior, and it maintains its ground against the Russian and Swedish iron only by means of protecting duties. The principal iron-works are in the departments of the valley of the Loire, especially about Nevers, and the district of Forez about St. Etienne.

In the manufacture of clocks and watches France is almost equal to Switzerland; and for chronometers and instruments for scientific purposes it is not surpassed by any country. The inventions of the French chemists and the improvement of chemical science have done much in producing with economy and expedition the many chemical agents employed in the various branches of manufacture, and particularly dyeing.

The commoner sort of French earthenware has much improved in beauty of design. Fine porcelain is made at Sèvres, Paris, and Limoges. The cut-glass is nearly equal to that of England in beauty of workmanship, and it is perhaps superior in elegance of form.

The commerce of France is considerable: the value in round numbers of the imports for two years, the returns of which are before us, was—

	Francs.
1834	715,000,000, or 30,000,000

Imported.

	Raw materials for manufacture.	Fit for use.		
		Unmanufactured.	Manufactured.	Total.
	£.	£.	£.	£.
1834	18,187,968	5,820,377	4,799,427	28,807,771
1835	18,643,639	5,153,153	6,632,274	30,429,066

Entered for consumption.

	Raw materials for manufacture. £.	Fit for use. Unmanufactured. £.	Manufactured. £.	Total. £.
1834 .	14,401,478	4,267,558	1,488,284	70,157,320
1835 .	15,131,950	4,052,187	1,626,684	70,810,821

Specie imported.

	£.
1834	7,696,355
1835	5,503,933

The countries from which these imports chiefly come are the United States of America, the kingdoms of Sardinia and Belgium, the United Kingdom and the British European possessions, Switzerland, the Austrian dominions, British India, Germany, Spain, and Russia. The imports from all the French colonies are not equal to those from the United States, but exceed those from any other country. The imports from England, which have much increased within these last few years, consist of linens and linen yarn; cotton goods and cotton yarn; wool, woollen yarn, and woollen goods; brass and copper goods; iron, steel, and hardwares; coals, culm, and cinders; tin, tin-plate, and tin wares; machinery and mill-work; lead, &c.

The exports at the same periods were as follow:—French merchandise alone,

	Raw Produce.	Manufactures.	Total.
1834 .	5,874,582	14,525,113	20,399,695
1835 .	6,086,603	17,009,941	23,096,544

Total Merchandise, French and Foreign.

	Raw Produce.	Manufactures.	Total.
1834 .	9,528,629	19,059,571	28,588,200
1835 .	11,233,985	22,142,202	33,376,887

Specie exported.

1834 . . .	3,891,469
1835	3,304,864

The countries to which these exports are chiefly made are the United States, the British possessions in Europe, Switzerland, the Sardinian dominions, Spain, Germany, and Belgium. The exports to the French colonies are not so great as those to the United States, to the British dominions, and to some other of the European states.

The chief articles of import are:—

Raw Materials for the Manufacturer.—Raw silk, wool, raw and dressed hemp, raw and dressed flax, cotton.

(The export of flax is nearly equal to the import.)

Manufactured Goods.—Flax and hemp, hardwares.

Metals.—Iron and steel, lead, copper, tin, gold, coined and uncoined; silver, coined and uncoined.

Colonial.—Tobacco in leaf, sugar, coffee.

Of the sugar about one-seventh is re-exported, and of the coffee and tobacco about one-half. A portion of the cotton imported is colonial produce.

Miscellaneous.—Raw hides, tallow, bones and horns, olive oil, hard woods for cabinet-ware, cheese, sulphur, wax.

The export of wax is about half the import; that of raw hides one-fourth to one-third.

The chief articles of export are as follow:—

Wine, brandy and liqueurs, salt.

Besides raw silk, wax, tallow, raw hides, wool, olive, rape, linseed, and other oil, tobacco, flax, iron, and steel and colonial produce re-exported.

Manufactured Goods.—Linens and hempen cloth, woollens, silks, cottons, hardwares, articles of fashion, besides hats, jewellery, and household furniture.

The number of ships entered inwards at ports in France in 1834—35, was as follows:—

1834.	Ships.	Tons.
French, exclusive of coasters .	3965	394,486
Foreign, in direct trade to the country to which they belong	5,171	604,170
In carrying trade .	953	132,748
	10,089	1,131,404
1835.		
Same classes as above.	4001	407,999
	5552	650,452
	808	115,581
	10,361	174,032

The number of ships cleared outwards was:—

	1834.		1835.	
French ships, &c. .	4221	370,217	4292	387,139
Foreign, in direct, &c.	4217	376,503	4356	352,583
In carrying, &c.	866	141,713	838	132,224
	9304	888,433	9486	871,946

The cod fishery employed in 1836, 406 vessels of 51,915 aggregate tonnage, and 10,172 men: the whale fishery 35 vessels of 14,813 aggregate tonnage, and 1183 men. The French whale fishery has been rapidly increasing for many years past.

The means of internal communication in France are much inferior to those of Great Britain. The roads are divisible into those maintained by the central government, and designated *Routes Royales*, and those which are kept up at the cost of the several departments to which they belong, and designated Routes Départementales. Besides these there are *chemins vicinaux*, or bye-roads. The *Routes Royales* are divided into three classes. They are commonly straight, wider than our English roads; those of the first class are from 43 to 65 feet wide, and frequently planted on each side with chestnut or other large trees, forming long avenues. About one-eighth of all the *Routes Royales* are paved like a street. With the exception of a few which are carefully kept up, they are in a very bad condition, and a large outlay is required to prevent their being ruined; and in some directions the road has never been carried to its proposed termination. Those of the first class have a common point of departure, and the distances are measured from the cathedral of Notre Dame, in the heart of Paris. According to the official report, the total length of the *Routes Royales*, on January 1, 1837, was about 22,000 miles: about one-third or one-fourth are out of repair or unfinished.

Posting along the Routes Royales is strictly regulated by the government. Stations at which post-horses are kept are fixed at convenient distances. The roads are measured by distances called 'postes,' each consisting of two *lieues de poste* (post-leagues)—rather less than five English miles. The postmasters are licensed by government, and none can let post-horses without a license. The charges for posting are fixed by government. The mails are conveyed by a vehicle which is designated *malle-poste*, it carries four passengers, and is supplied with horses at the post-stations. *Diligences*, vehicles for which England supplies neither name nor resemblance, run with passengers on all the great roads. There are no tolls. The condition of the Routes Départementales, in number 1381, the aggregate length of which, on 1 January, 1837, was 23,000 miles in all states of completeness and repair, is wretched in the extreme.

The inland water communication is carried on by means of the great rivers and by the canals which have been formed. The Scheide or Escaut, the Scarpe, the Sambre and the Aas, with the canal of Deule, 66 kilomètres, or 41 miles long, and several other canals, abundantly supply the department of Nord with the means of water communication. The canal of the Somme, 97 miles long, and the canal of St. Quentin, 58 miles long, including the former canal of Crozat, connect the port of St. Valery, at the mouth of the Somme, with the Escaut and the Oise. The navigation of the Seine commences at Troyes; that of the Aube at Arcis-sur-Aube; that of the Yonne at Auxerre; that of the Marne at St. Dizier; that of the Oise at Chauny; that of the Aisne, a feeder of the Oise, at Neufchâtel, between Rethel and Soissons; and that of the Eure at Pacy. Several canals connect the navigation of this important river system with other parts of France. The canal of St. Quentin connects the Oise with the Somme and the Escaut; the canals of Briare, 34 miles long, and of the Loing, 33 miles long, connect the Seine just below the junction of the Yonne with the Loire at Briare; and the canal of Orléans, 45 miles long, branching from the canal of the Loing, opens another communication with the Loire lower down, at Orléans. These canals were constructed 150 to 200 years since. The canal of Bourgogne connects the navigation of the Yonne, between Auxerre and Joigny, with that of the Saône at St. Jean de Lôsne, and being continued by another system of inland navigation, ultimately communicates with the Rhine; the canal of Bourgogne, which is not yet finished, though open for navigation in all its length, is 150 miles long: it follows for a greater part of its course the valleys of the Armançon and the Ouche, feeders respectively of the Yonne and the Saône. The canal of the Ourcq, near Paris, is 58 miles long. The canal of Nivernois, connecting the Yonne with the Loire, at some point above Briare, 109 miles long, is in course of execution, and nearly finished. Le Hâvre is the chief port of export and import for the basin of the Seine.

The water communication of the western part of France consists chiefly of the navigation of the river Vilaine from Rennes, and of some smaller rivers which are navigable only for a few miles, and of three canals. The canal of the Ille and the Rance connects the Rance, a small stream which falls into the bay of St. Malo, at St. Malo, with the Vilaine, at the junction of the Ille, one of its feeders, at Rennes, and saves a tedious and dangerous navigation round the whole peninsula of Bretagne. This canal is 53 miles long: it was commenced above thirty years ago, but is only just completed. The canal of the Blavet renders the river Blavet navigable up to Pontivy. Another canal, yet unfinished, but open in part for navigation, is designed to connect Brest with Nantes, avoiding the navigation of a dangerous coast, and affording secure communication in case of a war with England or any maritime power. Its length will be 374 kilomètres or 232 miles.

The navigation of the Loire commences at Roanne in Forez; that of the Arroux below the little town of Toulon; that of the Allier above Vichy; that of the Cher at St. Aignan; that of the Indre at Loches; that of the Vienne at Châtellerault: that of the Sarthe at Le Mâns; that of the Mayenne at Laval; and that of the Loir at Château du Loir. This noble river system might be made to furnish a much more effectual outlet than it does to the produce of central France; the navigation of the great arms of the Loire is very short, (except perhaps of the Arroux, and of the Mayenne and its connected stream,) compared with their whole length. The canals connecting the Loire with the Seine have been noticed. The canal of the Centre or of the Charollois opens a communication between the Loire, near the junction of the Arroux, and the Saône at Chalons-sur-Saône. It was opened in 1791: the length is about 73 miles. A canal of the length of 199 miles is in course of execution, intended to shorten the navigation of the Loire, by avoiding the great bend which that river makes between the junction of the Allier and that of the Indre, called the Canal of Berri. Nantes is the port of the district watered by the Loire and its affluents.

The navigation of the Garonne commences at Cazères, several miles above Toulouse; that of the Arriège at Auterive; that of the Tarn at Gaillac; that of the Baise at Nérac; that of the Lot at Entraygues; that of the Dordogne at Mayronne, near Souillac; that of the Vezère, its tributary, at Montignac. The only navigable canal connected with this system is the Great Canal of Languedoc, the most important in France. It connects the Garonne, at or near Toulouse, with the Mediterranean. It follows for some distance the valley of the Lers, a feeder of the Garonne, and passing through a depression between the Cévennes and the Pyrenees follows the valley of the Aude, and the line of the coast to the sea at the port of Cette. Its length is more than 151 miles, and its large dimensions, its immense reservoir, and its numerous sluices, bridges, and aqueducts, render it one of the most magnificent canals in the world. It was opened in the reign of Louis XIV., A.D. 1681.

The navigation of the Adour commences at St. Sever; that of the Midouze, its tributary, at Mont de Marsan. The port of Bayonne is the channel for the exports and imports of the territory watered by the Adour and its tributaries.

The navigation of the Rhône is liable to interruption after it leaves the lake of Geneva: it recommences a little above Seyssel, on the frontier toward Savoy, and remains open throughout the rest of the course of the river: the navigation of the Saône begins at Seveux, between Gray and Vesoul. The canal of the Centre, which unites the navigation of the Saône with that of the Loire, and the canal of Bourgogne, which unites the Saône with the Yonne, have been noticed. The canal of Monsieur, or the canal from the Rhône to the Rhine, unites the Saône near St. Jean de Losne with the Ille, a feeder of the Rhine, just above Strasbourg. It consists of four parts: the first is from the Saône to the Doubs, above Dôle; the second consists of the navigation of the Doubs and the various cuts by which it is shortened; the third extends from the Doubs, near Montbéliard, to the Ille: the fourth part branches off from the main line near Mühlhausen, and enters the Rhine at Huningue. The length of the canal is about 217 miles. The first part was finished in 1806, the second in 1820, the fourth within the last few years. There are several canals in the flats near the mouth of the Rhône, as that of Beaucaire, 31 miles long, from the Rhône at Beaucaire by Aigues Mortes to the Sea; that of the étangs, 17 miles long, from the last mentioned canal at Aigues Mortes through the étangs or pools of Mauguio and Thau to the port of Cette, on the Mediterranean; that from the Rhône at Arles, 29 miles long, to the Port de Bouc, where the Etang de Berre opens into the sea.

Several other canals are in course of construction, of which the most important are the canal from Roanne to Digoin on the Loire, 34 miles long; that from the Sambre to the Oise, 43 miles long; that of Ardennes, 25 miles long, to connect the Meuse with the Aisne, and so with the Oise and Seine; the lateral canal of the Loire, extending along the valley of the Loire from Digoin to Briare; the lateral canal of the Oise, 20 miles long; and the canal from the Sèvre of Niort to La Rochellet, 48 miles long.

History.—Gallia, or, as we have Englished it, Gaul, was the general term by which this country was designated by the Romans. Little was known of it either to the Greeks or Romans till the time of Cæsar, who found in it the three races of Aquitani, Celts, and Belgæ, with an intermixture of some Germans, Ligurians, and Greeks: of these the Belgæ occupied the north and north-east, the Celts the western, central, and south, the Aquitani the south-western part. The Celts, who were probably the oldest race, must have settled in Gaul at an early period, as the wants of an increasing population led them, in the reign of the elder Tarquin of Rome, about B.C. 600, to send out two vast emigrating bodies, one into Italy, the northern part of which was subdued and peopled by them, and the other eastward, into Germany and Hungary. [BOURGES.] Two great countries of Germany, Bohemia (Boihemum) and Bavaria (Boioaria), derive their names from one of the tribes (the Boians) engaged in this early migration. The part of Gaul with which the Greeks formed the earliest acquaintance was the Mediterranean coast, on which they established colonies. The earliest and most important of these colonies was *Μασσαλία*, or Massilia (now Marseille), founded by the people of Phocæa (itself a Greek colony of Asia Minor) B.C. 600, and augmented by the emigration of the main body of the Phocæans when they sought refuge, B.C. 546, from the pressure of the Persian monarchy. The power or influence of Massilia extended over the neighbouring districts, and several colonies were founded on the coasts of Gaul, Italy, Spain, or Corsica, by its inhabitants, such as Agatha (Agde), Antipolis (Antibes), Nicæa (Nice), &c.

At the commencement of the second Punic war Hannibal marched through Gaul in his route from Spain into Italy; and Scipio, the Roman consul, who had conveyed his army by sea to Massilia to intercept him, sent a small body of cavalry up the banks of the Rhodanus (Rhône) to reconnoitre, and these had a smart skirmish with a body of Hannibal's Numidians. Hannibal however marched onward into Italy, to which country Scipio also returned, sending his army forward under his brother Cnæus into Spain.

After the close of the Punic wars the Romans gradually extended their power in Gaul. Fulvius Flaccus and his successor, Sextius Calvinus, conquered the Salyes, Vocontii, and some other tribes. The coast of the Mediterranean was now secured by the foundation of the Roman colony of Aquæ Sextiæ (Aix), B.C. 122; and that portion of Transalpine Gaul which the Romans had subdued was shortly after formed into a prætorian province (B.C. 118), of which Narbo Martius (Narbonne), colonised the following year, (B.C. 117) became the capital. Massilia, nominally in alliance with, but really in subjection to Rome, was within the province. In the migratory invasion of the Cimbri, Teutones, and Ambrones, the Roman province of Gaul was for several years the seat of war: the Roman armies were repeatedly defeated; in one dreadful battle (B.C. 104) they are said to have lost 80,000 men. The province was however rescued from the invaders by the great victory obtained by Marius (B.C. 101) over the Teutones and Ambrones near Aix. The Cimbri had marched into Italy.

The conquests of Cæsar [CÆSAR] nearly reduced the whole country between the Rhenus (Rhine), the Alps, the

Mediterranean, the Pyrenees and the ocean, into subjection to Rome. The Aquitani and the tribes who inhabited the Alps were not subdued till afterwards; the former were conquered by Messala: some of the Alpine tribes retained their independence till the time of Nero.

Under Augustus, Gaul was divided into four provinces—Narbonensis, Celtica or Lugdunensis, from the colony of Lugdunum (Lyon), founded a little before by Munatius Plancus, Belgica, and Aquitania: the limits of the last extended beyond the limits of the country of the Aquitani, being augmented by the addition of the country between the Garumna (the Garonne) and the Ligeris (the Loire). Shortly afterwards the province of Belgica was dismembered by two provinces being formed out of the districts along the Rhenus (Rhine), to which the names of provinces of Germania Prima and Germania Secunda, or of the First and Second Germany, were given: and at a subsequent period the number of provinces reached, by successive dismemberments of the larger provinces, its maximum, seventeen. We subjoin a table of the principal Gallic nations, mentioning the stock to which they belonged, and the Roman province in which they were included; adding the name of the capital of the tribe, or some remarkable town within its limits, with its modern name, which, in the case of the capital, is commonly derived from the name of the tribe rather than the original name of the town itself. This will enable the reader to identify the locality of many of the tribes.

TRIBE OR NATION.	Capital, or other Important Town.	Province in later Division.	Province according to Div. of Augustus.
I. CELTIC and LIGURIAN Tribes.			
Volcæ—including		Narbonensis Prima.	Narbonensis.
Volcæ Tectosages	Carcaso (Carcassonne)		
Tolosates, a subdivision of the Volcæ.	Tolosa (Toulouse)		
Volcæ Arecomici	Narbo Martius (Narbonne)		
Tasconi			
Atacini (people on the river Atax, or Aude)			
Sardones	Illiberis (Elne) Ruscino (Tour de Roussillon, near Perpignan)		
Salyes, or Salluvii, (a Ligurian tribe) with a number of small tribes adjacent to them.	Massilia (Marseille) and Aquæ Sextiæ (Aix)	Narbonensis Secunda.	
Vocontii	Dea (Die)	Viennensis.	
Cavares	Avenio (Avignon)		
Tricastini	Augusta (St. Paul Trois Châteaux)		
Segalauni	Valentia (Valence)		
Allobroges	Vienna (Vienne)		
Helvii	Alba Augusta (Alps)		
Caturiges, and many small tribes	Ebrodunum (Embrun)	Alpes Maritimæ.	
Centrones, and many other small tribes	Darantasia (Moustier, in the Tarentaise)	Alpes Graiæ.	
Lingones	Andematunum (Langres)	Lugdunensis Prima.	
Ædui	Bibracte, afterwards Augustodunum (Autun)		
Dependants of the Ædui.			
Mandubii			
Ambarri			
Boii	Settled in the country of the Ædui in the time of Cæsar. (Vide *Cæs. de B. G.*, i. 28.)		
Segusiani	Forum Segusianorum (Feurs in Forez) and Lugdunum (Lyon)		
Insubres			
Aulerci Eburovices	Mediolanum (Evreux)	Lugdunensis Secunda, including also the Caleti and Veliocasses Belgic tribes.	Celtica, or Lugdunensis
Lexovii	Noviomagus (Lisieux)		
Viducasses	Viducasses (Vieux)		
Bajocasses	Arægenus (Bayeux)		
Unelli, or Veneli	Crociatonum (Valognes)		
Abrincatui	Ingena (Avranches)		
Saii, or Essui	Saii (Séez)		
Arvii	Vagoritum (Arve, on or near the river Erve)	Lugdunensis Tertia.	
Diablintes	Nœodunum (Jublins, near Mayenne)		
Aulerci Cenomani	Suindinum (Le Mans)		
Turones	Cæsarodunum (Tours)		
Andes, or Andecavi	Juliomagus (Angers)		
Namnetes	Condivicnum (Nantes)		
Redones	Condate (Rennes)		
Veneti	Dariorigum (Vannes)		
Osismii	Vorganium (Carhaix)		
Agnotes			
Corisopiti	——— (Quimper)		
Curiosolites	——— (Corseuil, near Dinan)		
Carnutes	Autricum (Chartres)	Lugdunensis Quarta, or Senonia.	
Aureliani	Genabum (Orléans)		
Parisii	Lutetia (Paris)		
Meldi	Iatinum (Méaux)		
Senones	Agedincum (Sens)		
Tricasses	Augustobona (Troyes)		
Sequani	Vesontio (Besançon)	Maxima Sequanorum.	
Helvetii, divided into four Cantons: of which two are known, and a third conjectured, and the other unknown, viz.:—			
Pagus Urbigenus			
„ Tigurinus			
„ Tugenus?	—— (Zug ?)		
Rauraci	Augusta Rauracorum (Augst, in Switzerland, near Bâle)		
Bituriges Cubi	Avaricum (Bourges)	Aquitania Prima.	Aquitania.
Lemovices	Augustoritum (Limoges)		
Arverni	Augustonemetum (Clermont in Auvergne)		
Vellavi	Revessio, (St. Paulien near Le Puy, in Velay)		
Gabali	Anderitum, (Javal, near Mende)		
Ruteni	Segodunum (Rodez)		
Cadurci	Divona (Cahors)		
Pictones, or Pictavi	Limonum (Poitiers)	Aquitania Secunda.	
Santones	Mediolanum (Saintes)		
Bituriges Vivisci	Burdigala (Bordeaux)		
Petrocorii	Vesunna (Perigeux)		
Nitiobriges	Aginnum (Agen)		
II. AQUITANIAN Tribes.			
Boii, or Boates	Boii, or Boates (Tête de Buch)	Novempopulana.	
Vasates	Cossio (Bazas)		
Tarbelli	Aquæ Augustæ (Aqs, or Dax)		
Cocosates	Cocosa		
Tarusates	Vicus Julii, or Atures (Aire)		
Elusates	Elusa (Eause)		
Ausci	Climberris (Auch)		
Lactorates	Lactora (Lectoure)		
Bigerrones	Turba (Tarbes)		
Convenæ	Lugdunum (near St. Bertrand)		
Consorani, or Consoranni and many smaller tribes	Consoranni (— in Couserans)		

Tribe or Nation	Capital, or other Important Town.	Province in later Division.	Province according to Div. of Augustus.
III. Belgic and German Tribes.			
Caleti	Juliobona (Lillebonne, in Caux)	Included in Lugdunensis Secunda.	Celtica, or Lugdunensis.
Velocasses	Rotomagus (Rouen)		
Treveri, or Treviri	Augusta (Trèves)	Belgica Prima.	Belgica.
Mediomatrici	Divodurum (Metz)		
Verodunenses	Verodunum (Verdun)		
Leuci	Tullum (Toul)		
Bellovaci	Cæsaromagus (Beauvais)	Belgica Secunda.	
Ambiani	Samarobriva (Amiens)		
Morini	Gesoriacum, afterwards Bononia (Boulogne)		
Atrebates	Nemetacum (Arras)		
Nervii	Bagacum (Bavay)		
Veromandui	Augusta (St. Quentin)		
Suessiones	Augusta (Soissons)		
Silvanectes	Augustomagus (Senlis)		
Remi	Durocortorum (Reims)		
Catalauni	Durocatalaunum (Chalons sur Marne)		
Nemetes	Noviomagus	Germania Prima, or Superior.	
Tribocci	Argentoratum (Strasbourg)		
Vangiones, and many smaller tribes	Mogontiacum (Mayence)		
Menapii		Germania Secunda, or Inferior.	
Batavi	Lugdunum Batavorum (Leyden)		
Eburones, in whose country settled the			
Tungri	Atuatuca (Tongres)		
Toxandri			
Ubii, and many other tribes.	Colonia Agrippina (Cologne)		

In the decline of the Roman power Gaul was ravaged by the Franks, the Burgundians, and the Lygians (who had been all driven out by Probus, A.D. 277); by the Bagauds, a body of peasants, themselves Gauls, driven into rebellion A.D. 284, 285, by the weight of their oppressions, and the distress consequent on the ravage of the barbarians and the civil dissensions of the empire; again by the Franks and the Allemans, who were repulsed by the emperors Julian (A.D. 355 to 361) and Valentinian (A.D. 365 to 375), and by the piratical Saxons who ravaged the coasts. The Roman power still sufficed to keep these barbarians from settling in Gaul; it could not however abate the constant pressure on the frontier; and the decaying strength of the empire only protracted, but could not avert the final catastrophe.

The Franks (*i. e.* the freemen) were a confederacy of German nations, the Salians, the Bructerans, the Ripuarians, the Cauci, the Cherusci, the Chamavi, the Catti, the Tencteri, and the Angrivarians. These tribes preserved their independence while confederated, and each had its king. Like the Saxon chieftains who professed all to derive their lineage from Woden, the Frankish princes claimed a common ancestor, Meroveus, (*Meer wig*, warrior of the sea,) from whom they bore the title Merovingians. The æra of Meroveus is not ascertainable. In the fourth century the Franks were settled on the right bank of the Rhine from the junction of the Mein or Mayn to the sea, and in the latter part of that century and during a considerable part of the next appear to have been in alliance with the empire. The Allemans dwelt on the same bank of the Rhine from the Mayn upwards.

Upon the downfal of the Roman empire, Gaul became a prey to the barbarous nations by which the empire was dismembered. There was no revival of national independence as in Britain. The nationality of the Gauls had been lost, when the extension of the right of Roman citizenship to all the natives of the provinces by Caracalla, A.D. 212, merged the distinction previously maintained between the conquerors of the world and their subjects; and the national religion, Druidism, had sunk beneath the edicts of the emperors and the growing influence of Christianity.

On the last day of the year 406, the Rhine was crossed by a host of barbarians who never repassed that frontier stream. They consisted of Vandals, Alans, Suevians, Burgundians, and other nations. The Vandals, who first reached the bank, were defeated by the Franks who defended, as the allies of the empire, the approach to the frontier; but on the arrival of the Alans, the Franks in their turn were overcome, and the passage was effected. The devastation of Gaul by this horde of invaders was terrible: the inhabitants of many towns were slaughtered or carried into captivity, the sanctity of the churches was violated and the open country laid waste. Armorica (the present Bretagne), into which the settlement of the British soldiers who had followed Maximus the usurper into Gaul [Bretagne] had infused a military spirit, assumed and established its independence; but the rest of Gaul became a prey. The Suevians, the Alans, and the Vandals crossed the Pyrenees into Spain: the Burgundians settled, with the sanction of the Roman government, in the east of Gaul, on both sides of the Jura, and on the west bank of the Rhine, from the lake of Geneva to the confluence of the Rhine and the Moselle; and the Visigoths, who had been long ravaging both the eastern and western Empires, were induced, just before the settlement of the Burgundians (A.D. 412 to 414), to accept the cession of that part of Gaul which lies to the south and west of the Loire. Toulouse was their capital. Both Burgundians and Visigoths took the name of Romans, and professed subjection, which was however merely nominal, to the emperor of the West. The lands in the districts ceded to them were divided between the original possessors and the new comers, who gave up their unsettled migratory course of life upon receiving a permanent interest in the soil.

Hostilities were before long renewed between the troops of the Empire and these new-settled nations; but their settlement opportunely supplied Gaul with the means of defence against a fresh invasion. In A.D. 451, Attila, king of the Huns, with an immense host of barbarians, passed the Rhine at or near the confluence of the Neckar, destroyed Divodurum or Mediomatrici (Metz), and Atuatuca or Tungri (Tongres), and besieged Genabum or Aureliani (Orléans). Ætius, the Roman general, supported by the Visigoths and the Burgundians, and numbering in his ranks Franks, Saxons, Alans, and other barbarians, advanced against Attila and obliged him to raise the siege and retire towards the frontier. At Durocatalaunum, or Catalauni (Chalons-sur-Marne), a battle was fought in which victory was doubtful, but which was attended with a dreadful slaughter of his forces, and induced Attila to evacuate Gaul.

During these events, the Franks had attracted little notice: their subdivision into tribes weakened their power, and perhaps their fidelity to the Empire restrained them from pressing it with their attacks. They retained their possessions on the right bank of the Rhine; but had obtained by concession or conquest some settlements on the left bank or along the banks of the Escaut or Schelde and the Meuse. In the invasion of Attila some of their tribes marched under the banners of Ætius, while others attached themselves to the invading host.

It was not until the reign of Clovis, who commenced his career as king of the Salians, one of the Frankish tribes settled at Tournay, about A.D. 481, that the Franks assumed a commanding position. The Empire of the West had now fallen, and Italy was under the government of the Ostrogoths; but a relic of the Empire remained in Gaul; and the territory in which the patricians Ægidius and his son Syagrius upheld the name of Rome was between the possessions of the Visigoths and Burgundians and the settlements of the Franks. This territory was among the early conquests of Clovis (A.D. 486). He then defeated the people of Tongres, and (in A.D. 496) subdued a portion of the Allemans, who had made an inroad into Gaul: the conquered people recognised Clovis as their king; his opportune conversion to Christianity advanced his popularity and his power in Gaul, as well as his profession of the faith in what was deemed an orthodox form, while all the other princes who shared among them the once extensive territories of the Empire were the supporters of Arianism or some other form of doctrine that was looked upon as heretical.

The sway of Clovis extended from the banks of the Lower

Rhine, the cradle of his power, to the Loire, the Rhône, and the Ocean, for Armorica had submitted to him. He now determined, on the pretext of uprooting Arianism, a plea which was calculated to secure him numerous supporters beyond his own confines, to attack Alaric II., king of the Visigoths, whom he defeated and slew at Vouglé in Poitou. The Burgundians hoping to share in the spoils of the conquered nation, supported Clovis; but the Ostrogoths of Italy supported the Visigoths and prevented their entire subjection. A large part of their territory, including Bordeaux and Toulouse, and extending perhaps to the foot of the Pyrenees, fell into the hands of Clovis; but the Visigoths preserved the coast of the Mediterranean, together with Spain, which they had conquered: the Ostrogoths had Provence, and their king Theodoric held the sovereignty of the Visigoths also as guardian of their king, his grandson Amalric. The assassination of the various Frankish kings by Clovis rendered him undisputed head of the tribes of his own nation, and his sovereignty extended over Gaul, with the exception of the parts retained by the Ostrogoths, Visigoths, and Burgundians. Clovis may be considered the real founder of the French monarchy: he died A.D. 511.

The death of Clovis brought on the dismemberment of a monarchy which had been established too short a time for consolidation. The four sons of Clovis had each his share of the regal inheritance. Thierri became king of Austrasia (Champagne, Lorraine, Luxembourg, and the left bank of the Rhine as low as Cologne); Clodomir, king of Orléans (Maine, Anjou, Touraine, Orléanois, Nivernois); Clotaire, king of Soissons (Picardie, the Netherlands, and part of the Ile de France); and Childebert, king of Paris (comprising the rest of the monarchy). But though the sovereignty was divided, the nation was regarded as one, and all the kings claimed their thrones by virtue of descent from Clovis. The Franks now first invaded Italy, though without success; but their power was increased by the subjection of the Burgundians and the cession of Provence to them by the Ostrogoths: and ultimately the dismembered monarchy of Clovis was reunited, together with these accessions, under Clotaire, the youngest of his sons. Under the successors of Clotaire, France was again repeatedly divided and reunited: it is needless to describe changes which it is difficult to trace and to remember, and which left no other permanent effects than the weakness of the nation and the decline of the kingly power. The various divisions bore the names of Austrasia, which comprehended the eastern and north-eastern parts of France, Flanders, the Rhenish provinces, and part of Switzerland; Neustria, which comprehended the north-western parts of France; Aquitaine, the country south and west of the Loire; and Bourgogne, the remainder of France and Switzerland, with some parts of Savoy. The Merovingian kings, the descendants of Clovis, ceased with Childeric III., who was deposed A.D. 752; but the kingly power had already come into the hands of the hereditary dukes of Austrasia, Pepin l'Heristal, Charles Martel, and Pepin le Bref; while the governors of provinces had acquired all but absolute independence of the crown.

The accession of Pepin le Bref to the crown, upon the deposition of Childeric III., reanimated the spirit and power of the Franks. Pepin waged war with the Saxons and with the Saracens, who had possessed themselves of the coast of the Mediterranean, which he wrested from them; and the subjugation of the duchy of Aquitaine reunited the empire of Clovis with new acquisitions in the hands of Pepin, who reigned A.D. 752—768; but the splendour of his achievements faded before the superior glory of his son Charlemagne, who extended his power over Italy, except the southern part, then held by the Greek emperors, and over the greater part of Germany. His reign (in conjunction with his brother Carloman, A.D. 768-771; alone, 771-814) was distinguished by the attention which he paid to the revival of letters. [CHARLEMAGNE.] But the fabric of empire which he had raised fell to pieces under the less vigorous sway of his son and successor (A.D. 814-840) Louis le Débonnaire.

In the confused history of the Carlovingian princes, successors of Charlemagne, it is difficult to trace the events which belong to France, or to separate its annals from those of Italy and Germany. [CHARLES II., *Le Chauve;* CHARLES III., *Le Gros;* CHARLES III., *Le Simple.*] Divisions and subdivisions of the Frankish empire took place; and the wars of rival princes and the degeneracy of the descendants of Charlemagne delivered up France a prey to the ravages of the Northmen or Normans, who acquired possession as a fief of the crown, by cession from Charles le Simple (A.D. 911), of the territory subsequently known as the Duchy of Normandie. The governors of provinces established an hereditary authority in their several governments: the cities, destitute of protection from the government, declined in wealth and population, and in many cases lost their municipal rights and privileges; the number of serfs or villains increased, and the mechanic arts were exercised by the slaves of the great lords. The power of Hugues le Grand, count of Paris, surpassed that of the later Carlovingian kings, and on the death of Louis V. the Carlovingian dynasty expired, and a new family was called to a sovereignty little more than nominal, in the person of Hugues Capet, son of Hugues le Grand, who was elected by his army and consecrated at Reims, A.D. 987.

From the time of Hugues Capet the history of France is less involved: the crown descended with tolerable regularity to the son or other successor of each deceased king, and the divisions and reunions of the parts of the kingdom ceased. The kingly power was indeed feeble; but it gradually acquired strength, and the royal domain (as distinguished from the domains of the great feudal lords) was progressively enlarged by the conquest, forfeiture, inheritance, or acquisition by other means of the greater fiefs.

The following chronological table of the kings marks the principal extensions or diminutions both of the regal domains and of the kingdom at large; and those changes which form the characteristics of the periods in which they occurred. For particulars the reader is referred to the articles on the several kings. [CHARLES; PHILIPPE; LOUIS; &c.]

(987.*) HUGUES *Capet*, son of Hugues le Grand, count of Paris.

The condition of the kingdom at the accession of Hugues is thus described by Sismondi: 'We have designated two long periods of the history of the French by the names of the two races of kings, the Merovingians and the Carlovingians, who first held the government of France. A third period begins with the consecration of Hugues Capet at Reims, the 3rd July, 987; a period which cannot, without impropriety, take its name from the new race of the Capetians: it is a period in which royalty was, as it were, annihilated in France, in which the bond of society was broken, and the country which extends from the Rhine to the Pyrenees and from the channel of the Manche (the English Channel) to the Gulf of Lions was governed by a confederation of princes rarely under the direction of one common will, and only kept together by the feudal system.

'While France was confederated under the feudal regime, the legislative power was suspended in it. Hugues Capet and his successors, to the accession of St. Louis, had not the right of making laws; the nation had no diet, no regularly constituted assemblies the authority of which was recognised by it. The feudal system, silently adopted, and obtaining consistency and extension by custom, was the only system recognised by the numerous potentates who divided the provinces among themselves. It held with them the place of the social bond of the monarchical and legislative power.'

The accession of Hugues however increased the power and domain of the crown by the addition of that domain which he had possessed while yet a subject. He was duke of France, count of Paris and Orléans, and abbot of several rich monasteries: a number of lords held their possessions under him by the feudal tenure; and he had the support of the duke of Bourgogne, his brother, and of the duke of Normandie, his brother-in-law. Yet he was not acknowledged as king in Guienne till A.D. 990; and Limousin did not acknowledge his right till the reign of his successor.

These two nobles, the dukes of Bourgogne and Normandie, the latter especially, were among the most powerful of the French lords: and of the rest the principal were, the count of Champagne, the count of Vermandois, (part of whose inheritance passed to the counts of Blois, and elevated them to a degree of consideration which they had not previously possessed,) the count of Flanders, the count of Anjou, the count of Poitou and duke of Aquitaine, the count of Toulouse; and, though at a somewhat later period, the duke of Bretagne. The six paramount feudatories, who afterwards became exclusively peers of France, were, the dukes of Bourgogne, Normandie, and Aquitaine, the counts of Flanders, Champagne, and

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* The figures within parentheses are the years of accession.

Toulouse. The vassals of Hugues, as count of Paris and Orléans, made such approaches to independence, that, at his death, the authority of his successor extended little beyond the walls of Paris and Orléans.

(996.) Robert, son of Hugues Capet, born A.D. 970.

(1031.) Henri I., son of Robert, born A.D. 1005.

(1060.) Philippe I., son of Henri I., born A.D. 1053.

The power of the first four Capetian kings was very small, and the kingdom over which their nominal sovereignty extended was not co-extensive with modern France; Lorraine Transjurane Bourgogne, and Provence were subject to the imperial crown. Their reigns constitute the æra of the rise of chivalry. The reign of Philippe I. was marked by the conquest of England by William of Normandie. The communes or municipalities of France originated in leagues of the inhabitants of towns for defence against baronial oppression, formed in the reign of Philippe, though commonly ascribed to the reign of his successor. Philippe was engaged repeatedly in hostilities with the Anglo-Norman kings, William I. and William II. The first crusade took place in Philippe's reign, and by exhausting the power of the nobles prepared for the emerging of the regal authority from its depressed condition.

(1108.) Louis VI., *Le Gros*, son of Philippe I., born A.D. 1078.

The reign comprehends an important period in the history of the French, whether by the progress of the people in the communes, the rights of which had scarcely received at this epoch their first legal sanction; or by the progress, not less marked, of the central authority in the power of the crown, which, instead of remaining unnoticed, as under Philippe I., between the Seine and the Oise, began really to make itself felt from the Meuse to the Pyrenees; or, lastly, by the development in the same interval of the feudal system. This system profiting by the progress of intelligence and the study of other systems of legislation, acquired a regularity and authority which no one dared any longer to dispute with it. The activity of Louis vindicated his authority in his own domains, which had by this time been considerably extended, and enabled him to struggle with the Anglo-Norman and other great princes of his kingdom, and to extend the jurisdiction of the crown.

(1137.) Louis VII., *Le Jeune*, son of Louis *Le Gros*, born A.D. 1120.

The king carried on the policy of his father, of establishing his authority in his own domains. He married Eléonore of Guienne, from whom he was afterwards divorced. She subsequently married Henry Plantagenet, afterwards Henry II. of England: this marriage made the power of Henry superior to that of Louis: he had Normandie, Anjou, Maine, Touraine, Poitou, Limousin, Angoumois, Saintonge, Berri, Marche, part of Auvergne, Guienne, and Gascogne; but his quarrels with Becket and with his sons prevented his availing himself of his superiority. Louis *Le Jeune* was personally engaged in the second Crusade, but he met with no success.

(1180.) Philippe II. *Auguste*, son of Louis VII., *Le Jeune:* born A.D. 1165.

The predominance of the Anglo-Norman power united the other great vassals of Philippe more closely in alliance with the crown; and the exhaustion of the Anglo-Normans from their civil dissensions, from the Crusades, the heavy ransom of Richard I., *Cœur de Lion*, and the weakness of John, enabled Philippe to raise the power of the crown above that of his puissant vassals. Philippe displayed considerable warlike activity: he was engaged in the third crusade 1189—91, in conjunction with Richard *Cœur de Lion*, and in hostilities with Richard and John, and with the emperor Otho, whom he defeated at Bouvines, near Lille, A.D. 1214. He united Normandie, Maine, Anjou, Touraine, and Berri, to the domain of the crown; increased the previously small domain of the crown in Auvergne, and other parts of the south of France; and consolidated the regal power by substituting constitutional forms for individual caprice. This reign was marked by the blood-stained Crusades against the Albigéois [Albigenses] in the south of France, which weakened the power of the count of Toulouse who protected the Albigéois. France, in its present extent, was at this time divided between four sovereign princes—the king of France; the Emperor, who held the provinces of the east and south-east; the king of England; and the king of Aragon, who had considerable territories near the Pyrenees and the Mediterranean

(1223.) Louis VIII., *Cœur de Lion*, son of Philippe Auguste, born A.D. 1187.

Louis conquered Poitou, and engaged in the crusade against the Albigéois.

(1226.) Louis IX., (*St. Louis*,) son of Louis VIII., born 1215.

(1270.) Philippe III., *Le Hardi*, son of St. Louis, born A.D. 1245.

(1285.) Philippe IV., *Le Bel*, son of Philippe *Le Hardi*, born A.D. 1268.

(1314.) Louis X., *Le Hutin*, son of Philippe *Le Bel*, born A.D. 1289.

(1316.) Jean I., a posthumous son of Louis *Hutin*, lived only three or four days.

(1316.) Philippe V., *Le Long*, second son of Philippe *Le Bel*, born A.D. 1294.

The accession of Philippe established the Salic law: he was preferred to the daughter and heiress of his elder brother, Louis *Le Hutin*.

(1322.) Charles IV., *Le Bel*, third son of Philippe *Le Bel*, born A.D. 1295.

The direct line of the Capetian kings ended with Charles IV.

The reign of St. Louis, one of the most equitable and virtuous of princes, and the reigns of his successors, some of them as remarkable for the opposite qualities, are marked by the consolidation of the power of the law as distinguished from that of arms. This beneficial change was however accompanied under the successors of Louis with the most revolting acts of injustice under the forms of law. Many of the nobles were despoiled of their fiefs; the order of the Templars was extinguished in the blood of its members; the Jews and Lombards grievously oppressed; and trade ruined by the abasing of the coinage. Persecution assumed a more systematic form by the establishment of the inquisition at Toulouse. In this period the greater part of Languedoc was added to the domains of the crown, which were considerably augmented in other places.

Collateral Branch of Valois.

(1328.) Philippe VI., *de Valois*, born A.D. 1293, grandson of Philippe *Le Hardi*, by his third son Charles of Valois.

(1350.) Jean II., *Le Bon*, son of Philippe *de Valois*, born A.D. 1319.

(1364.) Charles V., *Le Sage*, son of Jean II. *Le Bon*, born A.D. 1337.

The reigns of these three kings are marked by the wars of the English in France under Edward III., who claimed the throne of France in the right of his mother, and his son the Black Prince. The French were defeated in the great battles of Sluys (naval) A.D. 1340, Crécy, A.D. 1346, and Poitiers 1356. But the premature infirmity of Edward III. and the death of his son, who had at one time received the cession of a large territory in the south-west of France, under the title of the principality of Aquitaine [Bordeaux], caused the downfal of the English power, and tended ultimately to the extension of the domains of the French crown.

(1380.) Charles VI., *Le Bien Aimé*, son of Charles *Le Sage*, born A.D. 1368.

(1422.) Charles VII., *Le Victorieux*, son of Charles VI., born A.D. 1403.

The reigns of these two kings were marked by another desperate struggle with the English under Henry V. and his successor Henry VI. At one time the success of the English was so decided that Henry V. was recognized as heir to the throne of France, to succeed on the death of Charles VI.: but the perseverance and spirit of the French ultimately triumphed, and of all their splendid domains in France the English monarchs retained only Calais. This was a period not only of foreign invasion, but of civil dissensions and of the most frightful massacres and assassinations. The dukes of Bourgogne, who descended from a younger son of Jean II., were acquiring a vast territory and great power.

Charles VII. was the first to substitute a standing army for the military service of the feudal vassals.

(1461.) Louis XI., the first entitled *Le Roi Tres Chrétien*, son of Charles VII., born A.D. 1423.

Louis, a crafty and intriguing prince, did for France what Henry VII. did for England in breaking down the feudal system. Upon the death of Charles *Le Téméraire* duke of Bourgogne, he seized a portion of his inheritance [Bourgogne.] The domain of the crown was now become very extensive, though parts of Picardie in the north, Bretagne in the west, several parts of Gascogne in the south, Limousin, Perigord, Auvergne, Bourbonnois, Orléanois, and several districts of the centre were not included.

(1483.) **Charles** VIII., son of Louis XI., born A.D. 1470.

In him ended the direct succession of the house of Valois.

Branch of Valois Orleans.

(1498.) **Louis** XII., *Le Père du Peuple*, born 1462, descended from a younger son of Charles V., *Le Sage*.

Branch of Valois Angoulême.

(1515.) **François** I., *Le Père des Lettres*, descended from the same stock, born 1494.

In the reign of this prince the arts, commerce, and literature began to revive. The domains of the crown were augmented by several additions, as of Auvergne and Bourbonnois in the centre, parts of Picardie in the north, and parts of Gascogne in the south; and virtually of Bretagne in the west; if indeed we may not rather ascribe this last acquisition to the reign of Louis XII.

(1547.) **Henri** II., son of François I., born A.D. 1519.

In this reign the French reconquered Calais and its territory, the last relic of the English possessions in France. [Calais.]

(1559.) **François** II., eldest son of Henri II., born A.D. 1544.

(1560.) **Charles** IX., second son of Henri II., born A.D. 1550.

(1574.) **Henri** III., third son of Henri II., born A.D. 1551.

The reigns of the last two princes were distinguished by the religious wars of the Catholics, at the head of whom were the dukes of Guise, of the family of Lorraine, and the Huguenots under the Prince of Condé and Admiral Coligny [Coligny], afterwards under Henri of Navarre.

The dreadful massacre of St. Barthélemi [Bartholomew Massacre, The St.] was perpetrated by the Catholics who formed the celebrated Confederation of the League, at the head of which were the Guises. The court, which had previously supported the Catholics, was driven by the fear of this powerful and ambitious family to an alliance with the protestants, and Henri III. perished by the hand of a Catholic assassin A.D. 1589. In him ended the direct succession of the branch of Valois Angoulême.

Branch of Valois Bourbon.

(1589.) **Henri** IV., *Le Grand*, born A.D. 1553, descended from Robert, count of Clermont, younger son of St. Louis, and brother of Philippe III., *Le Hardi*.

In the reign of Henri IV. the resources of France were so far developed that the country began to assume that station in European politics to which its territorial extent, population, and social improvement entitled it. A fairer prospect seemed to be opening to the rulers of that country. The earlier kings had to struggle with the spirit and the institutions of feudalism; and when, at the close of the direct line of the Capetians, the predominance of the law over the armed violence of feudalism seemed to be gaining consistency and strength, the accession of the house of Valois brought on the struggle between the kings of France and England for the right and possession of the crown. The excesses of the disbanded soldiery, the struggles of the contending factions (the Bourguignons and the Armagnacs), and the rising of the commons of Paris and of the peasantry or *jacquerie*, as they were termed, were added to the ravages of the enemy; and when, after more than a century, the contest terminated in the almost entire expulsion of the English, the kings of France had to watch or struggle with rivals of almost equal strength in the dukes of Bourgogne, and the other nobles whose power, the result of the feudal system, still survived when the spirit of the system was gone. The reviving strength of the crown and the kingdom under Charles VIII., Louis XII., and Francis I., was repressed by the rising power of Spain and the ascendency of the imperial house of Austria, and exhausted by the unsuccessful attempts made to gain possession of Italy. Then came the ascendency of the house of Lorraine, and the wars of religion which desolated France for thirty years. At length however the exhaustion of the Lorraine party, or 'The League,' and the opportune conversion of Henri IV. to the Catholic faith, restored peace. The French frontier was now advanced to the Pyrenees, except on the side of Roussillon which alone remained to the Spaniards of their possessions in Languedoc, and the districts, such as the Nivernois and Auvergne, over which any of the nobility retained territorial sovereignty, were of little importance when compared with the royal domain, now augmented by Bearn, and the other portions of Henri's patrimony. The generous disposition and popular manners of Henri acquired for him the love of his people; and the wisdom of Sully, his chief minister, promoted the prosperity and husbanded the resources of the country. Henri granted to the Protestants the enjoyment of many important rights and privileges by the edict of Nantes, A.D. 1598, and was more desirous of improving the condition of his people than of extending his frontier by foreign conquest.

(1610.) **Louis** XIII., *Le Juste*, son of Henri IV., *Le Grand*, born A.D. 1601.

Cardinal Richelieu, the minister of this prince, had in view to crush the nobility, to humble the Protestants, and to set bounds to the power of the house of Austria. His attempts to humble the Protestants led to a renewal of the religious wars: the duke of Rohan and his brother, the prince of Soubise, were at the head of the Protestant party but their talents were exerted without success: the court triumphed, and the Protestants lost the towns which they held as securities: the edict of Nantes was not however revoked. To abase the house of Austria, Richelieu supported the Protestants of Germany in the 'Thirty Years' War;' but however his talents may have animated and directed the allies, the French armies obtained little distinction until the next reign.

(1643.) **Louis** XIV., *Le Grand*, son of Louis XIII., *Le Juste*, born A.D. 1638.

The minority of this prince was marked by the dissensions and hostilities of the courtiers and powerful nobles, and by the splendid success of the French armies under the prince of Condé and the marshal Turenne. The dissensions of the nobles so weakened their power, that the king was enabled to assume and exercise a more despotic power than any of his predecessors had possessed. The nobility were reduced to be the mere dependents on the court: their titles descended to all their children, and a noble held the pursuit of commerce, and even of the liberal professions, to be a degradation: the country was burdened by the expenses of a court which had such a body of retainers, and the privileges and exemptions from taxation, which the nobility possessed, and other relics of the feudal system were among the principal causes of the French Revolution. The despotism of Louis XIV. then, however splendid in appearance, prepared the way for the overthrow of the crown in the person of his descendant, next but one to himself in the possession of the throne

The military successes of the French in this reign were splendid, except near the close, when the arms of the coalition against France, under the guidance of Marlborough and Eugene, gained the ascendant. The boundaries of France were however considerably enlarged in this and the preceding reigns by the addition of Roussillon, Artois, part of Flanders, Franche Comté, and Alsace: the boundaries of France thus became nearly what they are at present. The manufactures and trade of France made considerable progress in this reign under the able management of Colbert.

(1715.) **Louis** XV., *Le Bien Aimé*, great-grandson of Louis XIV., *Le Grand*, born A.D. 1710.

The long reign of Louis XV. presents little worthy of notice except the changes in the public mind which were preparing the overthrow of all the antient institutions of the kingdom; and the increasing dilapidation of the finances. These circumstances, with the gross sensuality of the king, and the disputes of the Jesuits with the Jansenists, and of the clergy and the crown with the parliaments or courts of justice, all tended more or less to prepare the way for great changes.

In this reign Corsica was added to France; the last relics of the feudal sovereignties, the Duchies of Lorraine and Bar, and the principality of Dombes, were added to the domain of the crown. Le Comtat d'Avignon and le Comtat Venaissin remained in the hands of the pope.

(1774.) **Louis** XVI., grandson of Louis XV., *Le Bien Aimé*, born A.D. 1754.

In this reign the catastrophe, which had been long preparing, took place. The French Revolution is an event too complicated for us to attempt to trace its history; all we can do is to mark some of the chief organic changes, and the principal accessions to or diminutions of the territory of France. Among the more immediate causes of the Revolution were the financial embarrassments of the government, and the enthusiasm for liberty inspired by the alliance of France with the United States, in the struggle of the latter for independence against the power of Great Britain.

1787. *The Meeting of the Notables*, a number of persons from different parts of the kingdom, chiefly selected by the king. The *Notables* were dissolved the same year.

1789. *The States General*, the antient assembly of the kingdom, consisting of the deputies of the nobles, clergy, and of the *Tiers Etat* (third estate) or commons, assembled.

The deputies of the *Tiers Etat*, with such deputies of the clergy as chose to join them, (none of those of the nobility accepted the invitation) voted themselves the supreme legislative body, under the title of the National Assembly.

In this year the division of the kingdom into departments was introduced.

1790. Hereditary nobility and titles of nobility were abolished.

1791. A new constitution was promulgated by the Assembly;—France was declared a limited monarchy.

1791. The Legislative or National Assembly assembled according to the new constitution.

1792. The royal authority was suspended by the National Assembly: the nation was invited to elect a national convention, and determine on the form of the government. The convention assembled and proclaimed a republic.

1793. Louis XVI. was executed: the nominal reign of his son Louis XVII. (born 1785) commenced.

1793. The constitution of the republic was completed; but it was determined that the Convention should continue in power till the end of the war.

1795. A new constitution was substituted for that of 1793, which was found to be impracticable. The executive power was confided to a body of five, called the Directory. Two legislative bodies, the Council of Antients and the Council of Five Hundred, were constituted. The nominal king, Louis XVII., died.

1799. The Constitution was remodelled: the Directory was overthrown: consuls for a term of years were appointed; Bonaparte, Sièyes, and Ducos, provisionally: then Bonaparte, Cambacères, and Le Brun.

1802. Consuls for life were appointed—Bonaparte, Camoacères, and Le Brun.

1804. **Napoleon** assumed the sovereign power as Emperor.

During these changes the boundaries of France were continually extonding.

The chief acquisitions, with the dates at which they were made, and the departments into which they were formed, are as follow:—

When acquired.	Departments and Capital.
1789. Le Comtat d'Avignon and Le Comtat Venaissin.	Vaucluse. *Avignon.*
This acqusition is still retained.	
1796. Principality of Montbéliard,—incorporated with	Doubs.
1798. Free territory of Mülhausen,—incorporated with	Haut Rhin.
These acquisitions are still retained.	
1801. The Austrian Netherlands and all that part of Germany which is on the left bank of the Rhine.	Mont Tonnere. *Mayence.* Sarre. *Trèves.* Forêts. *Luxembourg.* Rhin et Moselle. *Coblenz.* Sambre et Meuse. *Namur.* Ourthe. *Liège.* Roer. *Aix la Chapelle.* Meuse Inférieure. *Maestricht.* Jemmapes. *Mons.* Dyle. *Bruxelles.* Deux Nethes. *Anvers.* Escaut. *Gand.* Lys. *Bruges.*
1801. Porentruy (Switzerland)—incorporated with	Haut Rhin.
„ Geneva and Chambéry, with the surrounding districts.	Mont Blanc. *Chambéry* Léman. *Genève.*
„ County of Nice.	Alpes Maritimes. *Nice.*
1804. Piedmont and Liguria.	Doire. *Ivrée.* Sésia. *Verceil.* Marengo. *Alexandrie.* Po. *Turin.* Stura. *Coni.* Montenotte. *Savone.* Gênes. *Gênes (Genoa).* Apenins. *Chiavari.*
1807 to 1811. The Ionian Isles.	
Territories on the right bank of the Rhine.	Bouches de l'Elbe. *Hambourg.* Bouches du Weser. *Brême.* Ems Supérieure. *Osnabruck.* Ems Orientale. *Auric.*
Holland, or the United Provinces.	Ems Occidentale. *Groningue.* Lippe. *Münster.* Frise. *Lewarde.* Yssel Supérieure. *Arnheim.* Bouches de l'Yssel. *Zwol.* Zuyderzée. *Amsterdam.* Bouches de la Meuse. *La Haye.* Bouches du Rhin. *Bois le Duc.* Bouches de l'Escaut. *Middlebourg.*
Duchy of Parma.	Taro. *Parme.*
Tuscany.	Méditerranée. *Livourne (Leghorn).* Arno. *Florence.* Ombrone. *Sienne.*
Part of the States of the Church and other districts in Italy.	Rome. *Rome.* Trasimène. *Spoleto.*

But these acquisitions were lost upon the overthrow of Napoleon, with the few exceptions which we have marked in the course of our enumeration.

(1814.) **Louis XVIII.**, brother of Louis XVI., born A.D. 1755.

The Charter was granted in 1814 by this king.

(1824.) **Charles X.**, brother of Louis XVIII., born A.D. 1757.

The second Revolution broke out A.D. 1830.

COLLATERAL BRANCH OF ORLEANS.

(1830.) **Louis Philippe**, previously duke of Orléans, descended from a younger brother of Louis XIV., born A.D. 1773.

State of France before the Revolution.—The population of France previously to the Revolution was politically divided into three classes, called *états*, or states—the clergy, the nobility, and the commons, or *tiers état*.

The clergy, as a political body, was divided into the old French clergy, and the foreign, that is, those belonging to the provinces which had been united with France since the reign of Henry the Second. The income of the whole clerical body was estimated by Necker, in his 'Administration des Finances,' at 130 millions of livres, and the proportion of their real property to that of the other landowners as 1 to 5¾. The share of the parish clergy in this income was estimated by the same author at from 40 to 45 millions of livres. The abbeys, except those which were the chief seats of some monastic orders, as, for instance, the Grande Chartreuse, near Grenoble, and the Great Cistertian Convent at Citeaux, near Dijon, were in the gift of the king, and part of them were granted to real ecclesiastics and part to the *Abbés commendataires*. Of these latter there were 225, and some of them very rich. The *Abbés commenda-*

taires received the third part of the income, but were under no obligation either to reside in or to submit to the regulations of the convent, the duties of which devolved on the prior. These ecclesiastical benefices were employed as sinecures for the younger sons of the nobility, and only the poorer of them were occasionally bestowed on learned and deserving clergymen who were not born among the privileged classes. The number of regular abbeys or monastic establishments was 368, of which 115 were convents and 253 nunneries. The contribution of the clergy to the general revenue of the country was the tithe established under Francis the First, and called from the first revising commissioner, Paschal, *Décime Paschaline*. But as this contribution, as compared with the wealth of the clergy, was very small, that body granted regularly every five years the so-called *dons gratuits ordinaires*, amounting from 15 to 18 millions of livres; and occasionally also *dons gratuits extraordinaires*. These latter however were not donations, but only loans without interest, which were repaid after a long time. The so-called foreign clergy were in some provinces subject to the general taxes. There was a good deal of relaxation of discipline and corruption of manners among the clergy, which, united with the anti-religious spirit which at that time pervaded all France, had rendered the clergy an object of hostility to the other classes of society. Still it is only fair to state that many French priests, particularly among the parish clergy, exhibited the most perfect examples of the Christian virtues, and bore the severe trials to which they were exposed by the French Revolution with a fortitude worthy of their profession, although sometimes not without a tinge of fanaticism and superstition.

The nobility of France was quite differently constituted from that of this country, where the eldest son inherits the title of his father, and the other children fall into the general class of commoners, and become merged in the great mass of the population. The French noblesse was exceedingly numerous,* for not only all the children of a noble belonged to the class of their father, but that class was continually increased by the creation of new nobles. There were about 4000 offices or places in the country which conferred nobility, either simply by being obtained, or by being held for the space of twenty years. Almost all these places were acquired by purchase. Besides, there were frequent creations of nobles by royal patent. The nobility possessed great privileges: they were exempted from the land-tax (*taille*), the military service, the statute labour for the maintenance of roads (corvée), and many other duties and taxes. They were subject, it is true, to the capitation tax; but this tax, when compared with the land-tax imposed on the unprivileged class, was a mere trifle. The nobility, the clergy, and some orders, as, for instance, that of the knights of Malta and of St. Lazarus, possessed by far the greatest portion of the landed property in France, and enjoyed in their domains many feudal rights, some of which, although trifling in their object, as, for instance, the exclusive right to keep pigeons and rabbits, were the source of great vexation to the peasants. Personal servitude was finally abolished in many parts of France only a few years before the Revolution. Although the nobility enjoyed all the above-mentioned privileges as a body, there was a great difference between the old and new nobles, the latter being held in a very slight estimation by the former. Only such nobles as could prove that their families had been ennobled for 300 years, or at least 200, had any consideration.

The highest class, as we might suppose, consisted of those whose origin was lost in the darkness of past ages. Only those who belonged to the old noblesse had access to the court as a birthright; and even in the reign of Louis XVI. there appeared an *ordonnance* which required a man to prove four generations of nobility in order to become an under-lieutenant. Every regiment had a colonelship *en second*, which was reserved for young noblemen of the first families, who thus began their military career with a grade which others could attain only after long service. Many ecclesiastical benefices were exclusively reserved for the younger sons of nobles. Besides the great mass of untitled noblesse, there were dukes, marquises, counts, viscounts, and barons; but except those who bore the first of those titles, they were not distinguished among themselves by any special privileges. Only the dukes had peculiar privileges at court, of which the principal was that their wives were allowed to sit on a tabouret in the presence of the queen.

The third class of the inhabitants of France comprehended the whole population, except the nobility and clergy, and constituted somewhat more than $\frac{98}{99}$ parts of the whole. Sièyes stated in 1789, in a few words, the condition of the *tiers état* and its claims: 'Qu'est ce que le tiers état? Tout! Qu'a-t-il été jusqu'à present? Rien! Que demande-t-il à être? Quelque chose!' This definition contains all the secret of the French Revolution. The *tiers état* included before the Revolution all the inhabitants, from the richest merchant and the most eminent scholar, to the poorest peasant and the meanest artizan. The lower part of the *tiers état* were crushed by the burden of a most injudicious taxation, the weight of which pressed almost exclusively on them. This was rendered still more intolerable by the oppression of the land-owners or their agents, and by the grossest abuses of the manorial jurisdiction. A consequence of all this was the greatest misery among the people, and a deeply-rooted hatred towards the higher classes, which manifested itself in the terrible acts of revenge and bloodshed which accompanied the Revolution in France. While the lower part of the *tiers état* was ground down by what we may term physical oppression, the higher part of that class was suffering under a moral depression no less galling to their feelings. Wealth and intellect, the two most natural means towards attaining distinction, were unavailing to a man who had not the advantage of birth, and the road to honours and preferment was closed against him. Even a great number of the new nobles were in the same situation, for although they legally possessed the same rights with the other nobles, they were virtually prevented from enjoying them by the old families, who carefully excluded the new intruders upon their privileged class from all honours and preferments.

The revenue was derived from direct and indirect taxation. The direct taxation consisted—1st, of a land tax called *taille*, levied only on the lands belonging to the non-privileged classes; 2nd, the capitation, to which all classes were equally subject; 3rd, a property tax, principally assessed on lands which being originally one-twentieth of the net income, was called *vingtième;* it was afterwards doubled, and called *les deux vingtièmes*. This tax was augmented by a third vingtième, which was imposed not as a permanent but only as a war-tax. The nobility were not legally exempt from the above-mentioned property-tax, but by their influence they contrived to have it assessed in such a way that they were very slightly affected by it. The whole amount of revenue derived from direct taxation immediately before the Revolution was 210,000,000 of livres, of which the non-privileged class contributed three-fourth parts, although they owned scarcely one-third part of the soil of France. Besides these unequally assessed taxes, the peasants were exclusively subject to a statute labour for the maintenance of public roads called *corvée*, the value of which Necker estimated at 20,000,000 livres annually. Another heavy burthen on the non-privileged classes was military quarters: they were obliged to furnish the soldiers gratuitously not only with lodgings, but also with fire, candles, salt, and washing; and wherever the cavalry was quartered in the country, the inhabitants were also obliged to furnish the horses with forage. This class was also exclusively subject to compulsory military service, and 60,000 men were drawn by lot for the army every year.

The indirect taxes were still more oppressive than the direct, and their assessment was of the most preposterous character. They consisted—1st, of customs levied not only on goods imported from abroad, but on those which passed from one part of France to another, the country being divided into three compartments on account of many provinces enjoying privileges and exemptions which the others did not; 2nd, of the monopoly of snuff and tobacco; and 3rd, the monopoly of salt. This last gave birth to a kind of oppression unparalleled in the annals of fiscal tyranny, and it ought to be recorded for its monstrosity. All France was divided, with respect to the salt trade, into six districts:—1. The *Provinces Franches* (Bretagne and a part of Poitou), where salt was not taxed, and could be purchased for its market price, about two livres for the quintal. 2. The *Provinces Redimées*, comprehending the rest of Poitou, Guienne, and Auvergne, which had purchased their exemption from the salt monopoly in the reign of Henry II. for 1,700,000 livres. These provinces supplied themselves from the sea salt-works of Saintonge and Poitou, and although they paid an import duty, they could get the quintal of salt for a price varying from 6 to 10 livres. 3. The Lower Normandie, which produced sea-salt, of which it had formerly given the fourth part to the government, and was called on that account *Pays du Quart Bouillon*. This salt-tax in kind being afterwards converted into a pecuniary tax, raised the price of that commodity to 13 or 15 livres for the quintal. 4. The *Pays des Salines*, which were furnished from the salt-mines of the interior, and which comprehended Alsace, Lorraine, Franche Comté, and the bishoprics of Toul, Metz, and Verdun. These districts got salt at the unequal prices of 12, 15, 27, and 36 livres for a quintal. 5. The *Pays des Petites Gabelles*, or Provence, Languedoc, Lyonnais, and Dauphiné, which received salt from the salt-works on the sea-coast, and paid for the quintal from 22 to 40 livres. 6. The *Pays des Grandes Gabelles*, comprehending almost all the inland provinces of Northern France, or about one-third of the whole country. These districts paid the heaviest duties on salt, and two-thirds of the whole revenue from that source was raised from them. In these districts the price of salt varied from 54 to 62 livres the quintal.

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* It is generally supposed that there was one noble in every 250 persons.

A consequence of this oppressive and unequal taxation on salt was a general contraband trade in that indispensable commodity, which could not be put down either by a numerous preventive service, or by the heavy punishments inflicted on the smugglers. There were generally about 1800 individuals in prison for such offences, and a year was considered fortunate when there were no more than 300 persons sent to the galleys for smuggling salt. All these severities proved useless against so lucrative a business as salt smuggling; for it was calculated that an individual could gain in one hour, by transporting over the frontier of a province two pounds of salt in his pocket, more than a hard-working labourer could earn in a day. The oppression caused by this system of taxation was increased by the custom of farming out the indirect taxes to individuals or companies, who paid the government a stipulated sum, which they endeavoured to get back with a profit from the inhabitants, whom they oppressed in the most unsparing manner.

Besides the above-mentioned taxes, the country suffered greatly by the absurd policy which prohibited the exportation of corn not only from France, but even in many cases from one part to another. This restriction was introduced by Colbert as a means of favouring manufactures by ensuring cheap provisions; but what was only a financial error of that statesman became the source of the greatest abuses under his successors. The intendants, without whose permission corn could not be exported from their respective districts, sold that permission to capitalists, who raised the price of corn and resold it at an enormous profit to the government, which endeavoured to maintain an equal price of bread all through the country. It is no wonder that agriculture suffered under such a bad system, and that great dearths often occurred. Turgot succeeded in partly abolishing the barriers which obstructed the corn trade, and after the year 1774 it was free, at least in the interior of the country. But agriculture could not be easily raised from its depressed state; and as the regular supply of the metropolis always remained an object of considerable difficulty it was easy to alarm the inhabitants of Paris with a dearth; a measure which was employed in bringing about the first scenes of horror in the Revolution, and exciting the Parisian mobs against the royal family.

The revenue extorted from the people by this system of taxation was squandered in the most profligate manner. The wars of Louis XIV., the splendid edifices erected by him, and the pomp of his magnificent court, although supported by oppressive taxation, had at least the advantage of flattering the national vanity; but the wanton prodigality of Louis XV. and of his favourites, Madame Pompadour and Madame Dubarri, was without the same excuse. It was under the reign of Louis XV. that a new custom was introduced into the public accounts, which became the source of and the pretext for the grossest abuses. We allude to the *acquits à comptant*, or receipts signed by the king himself for monies received by him: these sums were never actually received by the king; and the receipts were only used as the means of concealing in the official accounts the real employment of the revenues. Louis XVI. was by no means a spendthrift, and the memory of the unfortunate Marie Antoinette has been recently vindicated against the reproach of prodigality; but the habit of lavishing public money was too deeply fixed in the court and the system of government to be eradicated. The *acquits à comptant*, or, as they were afterwards called, *ordonnances au porteur*, were continued under the reign of Louis XVI. The sums drawn by these means from the public treasury amounted, from 1779 till 1787, to 860 millions of livres; the whole of which, with the exception of secret service money for foreign affairs, was given in pensions or expended in grants to the court noblesse. These favours were lavished without any discrimination, and the courtiers, who could not invent a pretext for asking a grant or a pension, used to propose to sell to the king some property or privilege, for which they received the desired sum. Sixteen millions of livres were expended in two years in paying the debts of a prince of the royal family; and the notorious Beaumarchais received for secret services a million livres at once.

The royal power which had been long limited by the feudal institutions gradually became absolute. The meeting of the states general (*états généraux*) had been discontinued since 1614. Some provinces, as Artois, Bretagne, Languedoc, &c., had their provincial states, which were composed of the deputies of the nobility, clergy, and *tiers états;* all their powers however consisted in making the assessment of the taxes in order to raise the quota of the general revenue which was required of these provinces. This circumstance was the cause of the different systems of taxation in the several provinces, which were particularly injurious by having produced the various customs to which we have already alluded. The provinces were governed by royal intendants, of whom there were 32 possessed of extensive powers. The municipal institutions, which were flourishing in France during the middle ages, were almost entirely abolished, and the offices of towns were generally either hereditary or acquired by purchase. A few towns preserved their antient institutions by paying to the treasury the sum which would have been derived by the sale of the municipal offices in each city, and elected their magistrates and public functionaries. At Paris the king nominated the *prévost de marchands*, who was the chief municipal officer of the town; the city elected 4 aldermen (*échevins*), and the places of 26 municipal counsellors and of 16 chiefs of quarters of the town were hereditary.

The central administration of the country was conducted by the chancellor of France and the secretaries of state for foreign affairs, war, marine, and the royal household, and the comptroller general or general director of the finances. Each of these functionaries, although not always enjoying the rank of a real minister or having access to the council of state, had uncontrolled power in his own department. Their orders were issued in the name of the king, and with the royal signature; the king however did not sign himself, but the minister stamped the royal signature and countersigned it with his own name. The *lettres de cachets*, or arbitrary orders by which the ordinary course of justice was interfered with, were issued only by the ministers of the royal household. The ministers were not appointed by any written document, but became invested with their powers by a simple invitation from the king to assist at the council of state. They could not be deprived of their places without a formal condemnation, and it was therefore almost indispensable to exile a minister from the capital in order to dismiss him. The king himself presided in the council of state, and the ministers delivered their reports to him. There was also a council of dispatches for foreign affairs, a council of finance, and a privy council of war: all the ministers and secretaries of state sat in those councils. There was another council of state composed of *conseillers d'état* and *maîtres des requêtes*, in which the chancellor of France, or the keeper of the seals, presided. This was a kind of judicial body which decided on appeals from the supreme courts. There was also a tribunal called *grand conseil*, composed of 5 presidents, 54 counsellors, and some other minor functionaries, which decided questions about ecclesiastical benefices, bankruptcy, and various other matters The chancery, or *grande chancellerie*, was composed of the chancellor, two *grands rapporteurs*, two *grands audienciers*, and several minor officers. It prepared the appointments to public places, patents of nobility, legitimations, naturalizations, &c. The number of functionaries, high and low, employed in the various branches of administration was enormous. Necker states that tne number of officers employed only in the collection of the property and land-tax, and of the customs, was 250,000.

The inferior courts of justice were the manorial courts, *justices seigneuriales*. The manorial or seignorial jurisdiction was divided into the high, middle, and low, the first of which had jurisdiction in criminal cases. An appeal was sometimes allowed from the *seigneur bas justicier* to the *seigneur haut justicier*, but generally it was made to the royal tribunals called *baillages* and *sénéchaussées*, whose authority extended not only over the royal demesnes, but also in certain extraordinary cases, called *cas royaux*, which the manorial courts were not competent to decide, over private estates. The tribunals of some large cities were called *présidials*, and were composed of a president and at least six counsellors, who all acquired their places by purchase. The supreme courts of justice were called parliaments. The highest was that of Paris, being the most antient (established in 1302), and having the largest district subject to its jurisdiction, which comprehended almost half of France. It was composed of the first president, 9 presidents of the *grande chambre*, 8 presidents of the other 4 chambers, and 116 *conseillers*. It had attached to it a host of subalterns, procurators, advocates, &c. The nine presidents of the *grande chambre* wore a kind of round cap, whence they were generally called *présidents à mortier*. The other parliaments were at Toulouse (established 1444), Grenoble (1453), Bordeaux (1462), Dijon (1476), Rouen (1499), Aix (1501), Rennes (1553), Pau 1620), Metz (1632), Besançon (1674), Douay (1686), Nancy 1753). All these parliaments claimed to be considered as forming one body; but the government never acknowledged that claim: as the parliaments decided in the last resort, they assumed the appellation of *Cours Souveraines*, and in consequence of that sovereignty claimed some peculiar rights. The government had no direct influence over the parliaments; it could neither nominate nor dismiss any of their members, all offices in the parliaments being acquired by purchase, and considered by those who were invested with them as their lawful property which they could sell to others. This notion of property was so strong that even those magistrates who forfeited their places by any malpractices retained the right of selling them. These judicial functions became in progress of time vested in a certain number of families, which formed a separate class of nobility called *Noblesse de Robe*, or nobility of the gown. The parliaments presented a most perfect specimen of a close self-elected corporation, which exercised a terrible despotism over the country, and from which it was almost impossible to obtain redress. They often deviated from the letter of the law, and decided according to what they called the rules of equity—a mode of proceeding however which seems not to have been much relished by the public, as it gave rise to frequent protestations in the provinces and to the French proverb—*Dieu nous garde de l'équité du parlement*. The parliaments were invested with great power in criminal cases, and the punishment of death could be inflicted by them on very slight proofs of guilt; indeed there are many well-known cases of most iniquitous sentences by them, as for instance that of Calas, of Lally, &c. Civil process before the parliaments was slow, overloaded with useless forms, and very expensive. The salaries of the judges were trifling, but they received fees. Their pay was determined by the number of daily attendances (*vacations*) employed on any case. For each *vacation* there were paid to a conseiller 19¼ livres; and he frequently claimed for 200 or 300 such *vacations*. The first president was supposed by a legal fiction to be present at every transaction of the parliament, and he accordingly received his *vacations*, or daily fees. It was reckoned that the last president but one of the parliament of Paris, M. d'Aligre, a greedy man, contrived to receive, from 1768 to 1783, the daily fees of 400 years. Such incomes, united with the advantage of high consideration, and all the privileges of nobility, rendered places in the parliament very desirable: the office of a counsellor generally cost 60,000 livres, and that of the first president of the parliament of Paris 500,000 livres.

Tho edicts of the government were formaliy registered in the parliamentary records; but this was a mere formality, and the parliaments could not prevent a royal edict from being carried into effect by their remonstrances.

The decrees of the parliament were frequently annulled by the council of state, in which the chancellor presided. The government also frequently interfered with the ordinary course of justice by the *lettres de cachets*, by which people were arbitrarily imprisoned, exiled, and sometimes screened from the arm of justice.

There were at Paris, as well as in many parts of France, tribunals for auditing the public accounts, which were called *cours de comptes*. Other tribunals, called *cours des aides*, decided in all cases of financial administration; and that of Paris enjoyed great popularity, as it constantly took the part of the people against the extortions of the farmers of the revenue and treasury officers. All the places in the above-mentioned tribunals were purchased like those in the parliaments.

For further particulars about the state of France before the Revolution, see *Considérations sur le Gouvernement de la France*, par le Marquis D'Argens; and *Histoire des Français des divers Etâts aux Cinq derniers Siècles*, par Monteil; also *Histoire de la France pendant le* 18*me Siècle*, par Lacretelle.

Historical Sketch of the French Language and Literature. First period—From the establishment of the French monarchy to Francis I.—The dominion established in Gaul by the Romans ultimately destroyed the antient languages of the country. It is also probable that the Greek colony of Massilia (Marseilles), established about six centuries before our æra, had diffused in some parts of southern France the use of the Greek tongue. No monuments of the poetry of the Celts of Gaul have reached us, although we may conjecture that they had one similar to that of the Scottish Gaels. Under the Roman dominion Latin became the general language of the country, which produced many writers in that tongue, such as Ausonius, Sidonius Appollinaris, Salvianus, Sulpicius Severus, &c., &c.

The invasion and settlement of Germanic nations in Gaul produced a corruption of the Latin by the admixture of foreign idioms. The influence of the Visigoths, who established themselves in the southern provinces, was however, in respect to language, not considerable, and their northern idiom was soon absorbed by the Latin. Yet this Latin, which, except among the educated, had probably never been spoken with great purity by the population of Gaul, became still more corrupted by the admixture of a foreign race, and degenerated into a peculiar idiom called the *Romanzo*, or *Lingua Romana Rustica*. This idiom became not only the language of France, but of many other parts of southern Europe, where the barbarians of the north established their dominion on the ruins of the Roman empire.

The conquest of Gaul by the Franks hastened the corruption of the Latin tongue. The conquerors however seem for a long time to have preserved their native tongue; as the council of Tours, held in 813, recommends the bishops to translate their homilies into two languages, the Roman and the Theotisk, or German. The same injunction was repeated at the council of Arles in 851.

It appears that the separation of the German from the Roman language dates from the division of Charlemagne's empire among the sons of Louis the Débonnaire, when the German part of it became separated from France. The most antient monument of the French Romanzo is the oath of Louis the Germanic, son of Louis the Débonnaire, on the occasion of a treaty with his brother Charles the Bald of France, concluded at Strasburg in 847. The German monarch took the oath in Roman, and the French in Teutonic.

The Romanzo of France had a variety of idioms, according to the provinces where the influence of the invaders was more or less exercised. These were however but shades, and the language of France in general could be divided into two principal idioms, separated by the Loire. These were called respectively from their affirmatives, the southern the *Langue d'Oc*, and the northern the *Langue d'Oïl* or *d'Oui*.

The *Langue d'Oc*, or as it was frequently called the *Occitanian language*, is better known under the appellation of the *Provençal*, as the rulers of Provence united at the beginning of the twelfth century under their dominion the greatest part of southern France.

The Provençal language was rather formed by a modification of Latin words, than by the admixture of foreign words and idioms. Many favourable circumstances united with the beautiful climate of those countries to promote the early development of a poetical literature in the Occitanian language. The poetry of Provence was not like the northern, of a melancholy and meditative character, but rather of a sprightly and animated tone; and it bore the appropriate name of the merry science, *Gaya Ciencia*. It was cultivated by the Troubadours, who spread its glory over all Europe. [TROUBADOURS.] (Sismondi, *Histoire de la Littérature du Midi de l'Europe;* and Raynouard *on the Language and Poetry of Provence*.) The dialect of northern France, or the *Langue d'Oui*, although formed like the *Langue d'Oc* from the Latin, had a greater admixture of the Germanic element. It underwent still greater changes, owing to the establishment of the Normans in France at the beginning of the tenth century. The first authors who wrote in the *Langue d'Oui* were descendants of Normans, who introduced the romance of chivalry. This kind of composition was originally a versified chronicle, which though often founded on facts was disfigured by the most extravagant fictions. Robert Wace, an Englishman educated in Normandy, who lived at the court of Eleanor of Aquitain, mother of Richard Cœur de Lion, wrote the *Brut d'Angleterre* about the middle of the twelfth century. He is also the author of the celebrated *Roman de Rou*. Many other romances were written about that time. Their principal theme was king Arthur, and his Knights of the Round Table. The exploits of Charlemagne and the Crusades are also the subject of many romances; and some of them are founded on antient history, for instance the romance of 'Troy,' written about 1170, by Benoit St. More; and the celebrated romance of 'Alexander,' written in the beginning of the thirteenth century, which is the origin of the Alexandrine verses of twelve syllables which are still used by modern French writers. (*Corps d'Extraits de Romans de la Chevalerie*, par Tressan; Dunlop's *History of Fiction;* and Huet, *de l'Origine des Romans*.)

The poets who wrote in the Langue d'Oui were called *Trouveres*, and like their namesakes of Provence, the Troubadours, reckoned among their body several persons of high rank, such as Thiebaut, count of Champagne, and king of Navarre (1201-53), who imitated with great success the poets of Provence. His poems were published in 1742 at Paris, under the title 'Poesies du Roi de Navarre,' 2nd edit. 1824. Another kind of poetry which belongs to this period is the Fabliaux, or tales, which are partly of oriental origin, and were imported by the Crusaders into Europe. They are generally written in verse, and sometimes alternately in verse and prose. They often contain a great deal of wit and fun, but are also frequently disfigured by a coarse licentiousness. The poets of other countries have borrowed from them, and Boccaccio has largely drawn from this source. A fine edition of the Fabliaux, printed from the manuscripts of the Royal Library, was published by Barbazan in 1756, 3 vols.; and a new edition of the same collection in 4 vols., by Meon, 1808, and in 2 vols. 1823. The most entertaining of these Fabliaux were translated into modern French by Legrand d'Aussy, and published in 1779 under the title of 'Fabliaux, ou Contes du 12me et 13me Siècles; a new edition by Raynouard appeared in 1829.

The persecution of the Albigenses, whose tenets were embraced by many of the Troubadours, plunged the south of France during the thirteenth century into an abyss of misery, and destroyed the literature of Provence. The Troubadours, who had spread the glory of the language of Provence disappeared for ever, and the language itself sunk to the condition of a patois, or country dialect. Divided into many dialects, it is still spoken over all the south of France, and is the idiom of a part of western Spain, extending from Figueras to Murcia, as well as of the populations of Sardinia and the Balearic Islands; but in all those countries the educated classes have adopted the Castilian, Italian, and French. This decline of the Occitanian language on the one hand, and on the other the establishment of the seat of government for France and of a university at Paris, rendered the northern dialect, or the *Langue d'Oui*, the predominant language of all France.

The 15th century gave birth in France to a kind of allegorical and satirical poetry, of which the most remarkable specimens are the *Roman de Renart* and the *Roman de la Rose*. The former is the well-known story of 'Reinard the Fox,' and is the same popular tale as the German *Reinecke der Fuchs*. It is still a matter of discussion among the learned whether the original of this story belongs to the German or the French. This subject was treated by different French authors of that period; by Pierre de St. Cloud about 1233, and by Jacquinard Gielée of Lille about 1290, in the *Roman du Nouvel Reynart*. The appellation of *Roman* was then given to every book written in the Roman or common idiom instead of Latin, which was at that time the learned language. The *Roman de la Rose* is perhaps the most celebrated French production of the middle ages. It is a kind of didactic allegorical poem, which professes to teach the art of love, and embraces the most varied subjects. It is a very extraordinary mixture of divinity and profane science. It contains passages of St. Thomas Aquinas and Ovid's 'De Arte Amandi.' There are Nero, Virgil, Samson, Dalila, Zeuxis, Jason, Pygmalion, and many other personages biblical, historical, and mythological, intermingled with allegorical beings, as lady nature, false appearance, &c. This work was begun by Guillaume de Lorris, who wrote the first 4150 verses, and it was completed in 1280 by Jean de Mean or Mehan. It contains 22,000 verses, and was considered in France for three centuries as a masterpiece; and even as late as the beginning of the 17th century there were persons in France who compared it with the *Divina Commedia* of Dante. It created two parties, one of which attacked it as violently as it was defended by the other. The *Roman de la Rose* has gone through many editions, the last of which by Meon appeared at Paris, 1814, in 4 vols. There appeared about the same time many other allegorical poems of minor importance; the principal writers were Dans Helynaud, Guillaume Deguilleville, Jean du Pin, and Gaston Count de Foix.

Among the poets of the fourteenth and fifteenth centuries are the celebrated annalist Froissart and Charles duke of Orleans (died in 1466), whose poems excel those of his contemporaries in tenderness and depth of feeling. Being taken prisoner at the battle of Azincourt, he remained a captive in England for twenty-five years—a circumstance which will account for the melancholy strain of his poems; they were published at Grenoble in 1805. Clotilde de Surville, whose works were published for the first time in 1803, has produced a good deal of controversy among the critics of France, and may be considered as the greatest poet of that period. Olivier Basselin (1350—1418), the merriest poet of his day, was by profession a fuller in Lower Normandy: the almost unvarying theme of his songs is wine and cider. As he lived in the valley of Vire, called *Val* or *Vau de Vire*, where a mill called Basselin is still in existence, his songs received the appellation of *Vau de Vires*, which is the origin of the term *vaudeville*. Alain Chartier, secretary of Charles VI. and Charles VII., was an insipid poet, but he enjoyed in his time a considerable reputation. Villon, a man of low birth, who spent his life with robbers and thieves, created a popular poetry in France. We may also mention Charles Bordignée, author of the 'Légende de Pierre Faifeu,' or French 'Owl Glass;' Pierre Michault, and Martial D'Auvergne.

The subject of the FRENCH DRAMA is discussed under ENGLISH DRAMA. Poetry preceded prose composition in France as it did everywhere else. The poetical productions designed for the amusement of the people were written in the vulgar idiom; but prose works, being of a more serious nature, as legends of the saints, chronicles, legal enactments, ordinances of the church, &c. were written in Latin. There were, however, at an early date some rude attempts at writing French prose. The clergy composed works in French on religious subjects; nobles wrote upon the chase and tournaments, &c. The versified Romans of chivalry were also sometimes rendered into prose. The most remarkable productions in prose of this period are 'Memoirs,' a kind of literature peculiar to the French, and the commencement of which dates from the thirteenth century. These first historical productions in the French language were written by men engaged in active life, who related what they had themselves experienced and observed; and they therefore felt the necessity of abandoning the language of poetry to express themselves in that of common life. The poetical language of France, owing to the continued imitation of the Troubadours, remained stationary for several centuries, while the common language advanced with the progress of the national civilization. This circumstance established a considerable difference between the poetical and prose languages of France; and it explains the fact of romances which were originally written in verse being afterwards frequently reduced to prose. For the same reason too the prose of the thirteenth century is nearer to the present French than the poetry of the fifteenth. The characteristics of these old memoirs are simplicity united with piety and a ceremonious courtesy. The first of these memoir-writers was Geoffroy de Ville Hardouin, who left a remarkable description of the capture of Constantinople by the French and the Venetians, in which he had himself a share. He was surpassed by Jean de Joinville, senechal of Champagne, who accompanied St. Louis in his first crusade, 1248. He describes the events of that crusade with great talent in his 'Histoire de St. Louis.' Christine de Pisau, daughter of the astrologer of the court of Charles V., wrote her memoirs about 1400. Olivier de la Marche described under the reign of Louis XI. what had befallen him during the troubles under Charles VII.

The best historian of France during the middle ages is Philippe de Comines, and the most entertaining is Froissart. Guizot has published an excellent collection of French memoirs, entitled 'Mémoires relatifs à l'Histoire de France jusqu'au 13me Siècle,' 29 vols., Paris, 1823. A continuation of Guizot's collection was published by Petitot under the title 'Collection complète de Mémoires relatifs à l'Histoire de France depuis le Règne de Philippe Auguste jusqu'au Commencement du 17me Siècle' (First Series, 52 vols., Paris, 1819). The second series of this collection appeared in 56 vols., Paris, 1820, under the title 'Collection des Mémoires relatifs à l'Histoire de France depuis l'Avénement de Henri IV. jusqu'à la Paix de Paris conclue 1763.' Both these collections were completed by the chronicles published by Buchon, in 46 vols., Paris, 1824, under the title 'Collection des Chroniques nationales Françaises écrites en Langue vulgaire du 13me au 16me Siècle.'

Period 2nd, from Francis I. to Louis XIV. (1515—1643.) The French literature of the middle ages, although rude, has the merit of being truly national; it bears the stamp of the French character, and gives an image of the civilization of those times. It certainly contained the seeds of a great development; and had the French writers of the sixteenth century followed the track of their predecessors, the literature of their country would have been really a national one, and something very different from what it is now. Under Francis I. the study of the Greek and Roman authors began to spread in France; and the French writers, dazzled with the hitherto unknown beauties of the classical writers, despised the works of their forefathers and attached themselves to the imitation of the antients. The national recollections, as well as the ideas introduced by Christianity, were replaced by the history and mythology of antient Rome and Greece; and thus arose the so-called modern Classical school—that which, instead of imitating the antients, derived its materials from national elements, has been designated by the appellation of Romantic. Besides a slavish imitation of the antients—which in fact was a false rather than a true imitation of them—another still greater defect corrupted the French literature under Francis I., but produced its most debasing effects under Louis XIV.: we mean that degrading flattery manifested more particularly by the poets towards the court and the great, and which they probably acquired by studying the base adulations of the writers of the Augustan age. Until the time of Louis XIV. this new kind of literature encountered some resistance from the national opinion and even from some writers; and the political and religious struggle which disturbed France during that period—from 1515 to 1643—had its counterpart in the literature of the same time.

Among the poets of this period is Francis I., who, notwithstanding his numerous faults, possessed the undoubted merit of promoting the literature of his country. He wrote poetry of a light description, which is by no means devoid of ease and grace. Francis's sister Marguerite of Valois, queen of Navarre, is well known by her attainments and literary labours. Mary queen of Scotland, who was educated in France and married to Francis II., composed some beautiful verses; and Henry IV. indulged himself, not unsuccessfully, in poetical effusions.

Among the authors of the reign of Francis I. Clement Marot deserves the first place, and next to him the learned Etienne Dolet of Orleans, who was burnt as a heretic. Louisa Labé was a skilful writer of elegies. The influence of the classical literature produced a new poetical school in France, whose leader was Ronsard, an author long extolled far above his merits, but now perhaps too much despised. The other principal writers of the same school were Jodelle [ENGLISH DRAMA], Etienne Baif, Joachim Dubellay, and Guillaume Du Bartas. Maturin Regnier wrote satire with considerable success; and Passerat obtained distinction by the satire 'Menippé,' which he wrote in conjunction with the learned lawyer Rapin against the Ligue. French poetry began to be purified from the admixture of Græcisms and Latinisms, with which the school of Ronsard, and particularly Du Bartas, had infected the language, by Des Roches, Jean Bertaut, and Desportes. But the merit of creating a new epoch in French poetry, particularly in improving its versification, undoubtedly belongs to Malherbe, of whom Boileau says with justice,—

> 'Enfin Malherbe vint, et le premier en France
> Fit sentir dans les vers une juste cadence.
> D'un mot mis en sa place enseigna le pouvoir,
> Et reduisit la muse aux règles du devoir.
> Par ce sage écrivain la langue reparée,
> N'offrit plus rien de rude à l'oreille épurée.
> Les stances avec grace apprirent à tomber,
> Et le vers sur le vers n'osa plus enjamber.
> Tout reconnut ses lois; et ce guide fidèle
> Aux auteurs de ce temps sert encore de modèle.

Racan (1589—1670), one of the first members of the French Academy, which was founded in 1635 by Richelieu, and a pupil of Malherbe, is still considered the best bucolic writer of France. Jean Ogier de Gombauld distinguished himself by his witty epigrams; and Pierre de Gadolin of Toulouse (1579—1649) made a successful attempt to imitate the antient poets of Provence in their own language.

The predilections of Francis the First brought the romance of chivalry again into fashion; but it could not long maintain its ground against the fast-spreading taste for classical literature and its imitations. The romance of chivalry however did not disappear altogether, but it lost its primitive character and degenerated into politico-historical romances and tales of love intrigues. The two French queens Catherine and Maria de' Medici introduced into France a taste for Italian literature, which created the sonnet and the novel; but except the Heptameron, or novels of the queen of Navarre, few compositions of that kind appeared in France. Under queen Anne of Austria the knowledge of the language and literature of Spain was spread in France. The Diana of Montemayor became the general favourite, and it was imitated by d'Urfé in his 'Astrea,' 5 vols., Paris, 1610. But the most important of these productions is the satirical romance of 'Rabelais. We may refer to this epoch, Balsac and Voiture, who formed the epistolary style, which the French have brought to perfection.

Among the historical writers of this period, Thuanus although he wrote in Latin, occupies the first place, and still maintains his reputation. Theodore Agrippa D'Aubigné wrote a history of his own times. The 'Histoire du Chevalier Bayard, et des plusieurs Choses qui sont advenues sous les Régnes de Charles VIII., Louis XII., et François Premier,' is written with the simplicity and candour of the Memoirs of Joinville. Blaise de Monluc, Marshal of France, wrote memoirs of his military career, which attracted general notice not only in France, but in other countries, and were translated into English by Charles Cotton (of angling memory), and published in 1674, London. The memoirs of Michel de Castelnau are distinguished by their manly style. The first queen of Henry IV., Marguerite of Valois, described in a very attractive manner the French court. Brantome's Memoirs are the most remarkable of this period. La Popelinière wrote a history of France, and Theodore Beza a history of the reformed churches. Perefixe wrote the life of Henry IV., and Sully left his interesting memoirs of the events of his time, and the part which he had taken in them. Henry duke of Rohan (died 1638) has described in a masterly manner the civil wars in which he was the principal leader.

Jean Serran, or Serranus, wrote several historical works chiefly relating to the affairs of the French protestants, to which body he himself belonged. Bodin (Jean) may be considered the first French political writer: his work, 'De la République,' had great celebrity, and was translated into many languages. It was for some time very popular in this country, and was translated into English: Jean Bodin's 'Six Bookes of a Commonweale, out of the French and Latine copies, done into English by Richard Knolles.' London, 1606. Gifford says that it was once read in our universities.

In concluding our rapid sketch of this period we must not omit mentioning the moral writers who have added lustre to French literature, and whose works still enjoy a high and well-deserved reputation. Montaigne was one of the shrewdest observers of human character. His free

Etienne de la Boetie expressed in energetic language the principles of antient freedom, and his little work, 'Discours de la Servitude Volontaire,' written, as Montaigne says, 'in honour of liberty against tyrants,' is perhaps the first vindication of political liberty in a modern language. Pierre Charron, also a friend of Montaigne, became celebrated by his 'Livre de la Sagesse,' which was much attacked on account of some sceptical passages, although the writer showed by his other works that he was an orthodox Roman Catholic clergyman.

Ramus (died in 1572) promoted the study of geometry. Vieta introduced algebra into France: he published his 'Canon Mathématique' at Paris, 1579. Albert Givard published in 1629 'Invention Nouvelle en Algêbre.' Belon, who travelled in Egypt, Greece, and many parts of Asia, published, in 1555, a description of birds, and introduced a classification of them, which is still esteemed. Rondelet wrote a description of fishes. Tagant, Ambroise Paré, Jaques Guillomeau, distinguished themselves as surgical writers; Olivier de Serres, Seigneur de Pradel, published numerous works on various branches of rural economy.

This period produced also many eminent scholars whose labours contributed to elucidate the works of the Greek and Latin authors, and to advance the knowledge of antiquity. Amongst these scholars the first place belongs to Guillaume Budé, better known by his Latinized name of Budæus (died in 1540), who is justly considered as the founder of the study of Greek in his country. Robert and his son Henry Etienne, or Stephens, greatly promoted the knowledge of the Greek and Latin by their lexicographical and other labours. The knowledge of antiquity in general was greatly furthered by the learned researches of Scaliger, Casaubon, Salmasius, &c. The rules of literary composition were laid down about 1500 by Jean Jourdain in his 'Jardin de Plaisance et Fleurs de Rhetorique.' Lihilet published in 1548 his 'Art Poetique;' but the best work on that subject during this period is 'De l'Eloquence Française,' by bishop Duvair, published in the sixteenth century. We may add to the above-mentioned works R. Etienne's 'Grammatica Gallica,' 1582, and J. Garnier's 'Institutio Gallicæ Linguæ.'

3. We now come to the age of Louis XIV., which the French call the golden age of their literature, and compare with that of Pericles, Augustus, and the Medici. No doubt much was done during this reign to promote science and literature in France. The language became a universal idiom among the higher ranks of society all over Europe, and the French prose acquired that degree of ease, clearness, and precision which justly entitle it to be considered in those respects as the first language in Europe. The French Academy greatly contributed to purify and refine the language, but at the same time put upon it heavy trammels by injudiciously proscribing every innovation, as if a language ever could remain stationary while a nation is progressive. It severely condemned all expressions and turns which were not tolerated at court, and the precept established by an eminent writer of that period, 'Etudiez la cour et connaissez la ville,' became the general rule of the French writers. This circumstance has certainly given to the French language that refinement and elegance which have rendered it the medium of conversation and epistolary intercourse in the courts and in the diplomacy of Europe; but it had also the effect of emasculating its vigour, and of introducing a glitter and a mannerism into the style of many French writers who have sacrificed the matter to the form.

The French drama rose to a high degree of eminence during this period, but we refer to another article on that subject. [English Drama.] Among the other poets we may reckon as the most eminent the fabulist Lafontaine, and the satirist and didactic poet Boileau: the works of the latter are certainly the best specimen of the literary taste of that epoch. The epic poem, which had been unsuccessfully attempted by Ronsard, did not succeed better now. Chapelain's 'Pucelle d'Orleans, was well defined by a contemporary epigram, to be born an old woman. De la Motte Houdard's translation of the 'Iliad' is an exceedingly poor production: 'Alaric, ou Rome vaincue,' by George Scudéri, is now entirely forgotten; and 'Clovis' by St. Sorlin, and 'St. Louis' by Lemoine, are hardly remembered.

Such poetry as requires genuine feeling and a truly poetical imagination could not succeed in this artificial age, and not only all attempts at heroic poetry proved a complete failure, but the essays of the lyrical and pastoral kind were not very successful. Madame Deshoulières and Fontenelle wrote eclogues which were once admired, but their shepherds and shepherdesses are nothing more than courtiers in disguise. Segrais is somewhat better, although he does not merit the eulogy of Boileau, who says:—*Segrais dans l'eclogue enchante les forêts.*

The only lyric poet of this period worth mentioning is J. B. Rousseau. The writers of this age endeavoured to make amends for deficiency of genius by a refined art and an elaborate versification, which gave rise to the light poetry, *poesie folâtre, legère badine*, a kind of composition which rapidly developed itself with the fast-growing corruption of manners among the higher classes in France. The most celebrated writers of this libertine school are Chapelle, Chaulieu, &c.

Novels form an important part of the literature of every nation, and they may be considered as a fair criterion of the civilization and taste of the majority of readers. Productions of this kind were very numerous during the age of Louis XIV., and give us a pretty good insight into the intellectual state of the French public at that time. The mythological inspirations, and the inanimate correctness of the poets, who, strictly adhering to the rules laid down by Boileau, seemed to write only for the court, the nobles, and certain fashionable critics, were not shared by the novelists who wrote for the public at large. We must except from the number of novels Fenelon's 'Telemachus,' as it is rather a poem in prose than a novel. The most remarkable of the novel-writers of this period is Calpunede (died in 1663), a man endowed with a bold poetical imagination, though without taste: he took his subjects from Greek and Roman history, but he worked his classical elements into the form of a romance of chivalry, so that there was nothing either Greek or Roman except the names of the heroes; the characters, situations, and adventures, belonged entirely to knight errantry. Calpunede found an imitator in Mademoiselle de Scudéri, whose novels equalled those of Calpunede only in length. The romance of chivalry changed entirely into the historical novel, if this term be applicable to tales which contained scarcely anything historical except the names of the principal heroes.

Many ladies wrote works of this description, of which those of the Countess Lafayette are still read; those of Mesdames Caumont de la Force, Villedieu, &c., are known only to the learned. The scandalous work of Bussy de Rabutin, 'L'Histoire Amoureuse de Gaule, 'obtained great notoriety. Fairy tales also became very fashionable, of which the first impulse seems to have been given by Charles Perrault (died in 1713), in his 'Contes de ma mère l'Oye.' Fenelon wrote some for the use of his pupil, the duke of Burgundy. Antoine Galland (1646—1715) translated from the Arabic the 'Thousand and One Nights,' and Petit de la Croix from the Persian the 'Thousand and One Days.' The fairy tales of Count Hamilton had great vogue. To the literature of this description we must add the novel, the most distinguished writers of which are Scarron and Lesage.

The art of elegant letter-writing, which was introduced by Balsac and Voiture, became in France an almost indispensable accomplishment of well educated persons; and many authors, as well as other eminent persons of this period, have left admirable specimens of the epistolary style. Mme. de Maintenon wrote with remarkable talent, and the letters of the Marquise de Sevigné are numbered among the French classics. The letters of the Countess de Staal (1693—1750) derive their charm from their great ease and complete absence of all pretension. It is very doubtful if the letters published under the name of Ninon de l'Enclos are really written by her. The *lettres galantes* of Fontenelle are, like his eclogues, full of mannerism.

Among the philosophic writers of this period are La Bruyère and the physician Cureau de la Chambre, who wrote two excellent works; 1. 'Caractère des Passions,' and 2. 'L'Art de Connoître les Hommes.' We may add to them the witty and biting observations on human life, 'Maximes et Reflexions' of the Duke de Rochefoucauld.

The eloquence of the pulpit reached its acmé in France during this period, and the sermons of Bossuet, Bourdaloue, Fléchier, and Massillon, among the Roman Catholics, and of Saurin among the Protestants, are still regarded as models of sacred eloquence. Controversy, or polemical divinity, also employed some able writers, there being, in addition to the subject matter of dispute between the Protestants and Roman Catholics, disputes also among the parties of Jansenists and Molinists, which divided the Catholics themselves. The most distinguished writers on that subject were Arnauld, Nicolle, and Pascal.

The historical writers are generally more distinguished by the perfection of their style than by critical skill. The works of Mezeray, though savouring more of a chronicle than of a history, are characterised by a love of truth and candour. The Jesuit Daniel wrote a history of France. Vertot, St. Real, Rollin, Bossuet, Basnage, Fleury belong to this period. Bougeant's 'Histoire de Négotiations qui ont précédé le Traité de Westphalie,' as well as his 'Histoire du traité de Westphalie,' are important for the diplomatical student. Amongst the numerous memoirs, the most remarkable are those of Cardinal de Retz and of the Duke de St. Simon. Charles du Fresne, Sieur du Cange, greatly contributed, by his learned researches, to the knowledge of the Byzantine writers and of the middle ages. Jean Foy Vaillant's numismatical researches are also much esteemed.

The age of Louis XIV. produced many good metaphysicians, as Descartes, Malebranche, and Gassendi, but the most acute critic on all subjects was Bayle.

The art of literary composition and criticism occupied many distinguished authors. The chief works are, 'L'Art Poétique,' by Boileau; 'Dialogues sur l'Eloquence,' by Fenelon; 'Traité sur la manière d'enseigner et d'étudier les Belles Lettres,' by Rollin; and 'Sur le Choix d'Etudes,' by Fleury.

The Academy of Sciences, founded by Colbert in 1666, greatly contributed to the progress of mathematics and natural philosophy in France. The labours of Pascal and Fermat did something, and Descartes still more to the progress of mathematical science. Fr. A. de l'Hôpital published many valuable works on different branches of mathematics. Ozanam wrote several elementary mathematical works, and his treatise on algebra was much valued. Carré published, in 1700, his 'Theorie de Mesurer les Surfaces.' Vauban justly acquired a high reputation by his improvements in the art of fortification, and by his numerous works on military subjects. The Chevalier Folard is well known by his works on Tactics. Tournefort, who made a scientific voyage in the East, added considerably to botanical knowledge and to our general acquaintance with the countries which he visited.

The corruption of manners which infected France in the latter part of the reign of Louis XIV. was increased under the regency of the unprincipled Duc d'Orléans, and pervaded all ranks during the wretched reign of the profligate Louis XV. The eighteenth century in France, which the writers of that period chose to call the age of philosophy, is characterised by hostility to religion in the philosophic writers, intolerance and superstition in the clergy and people, weakness of the government and oppression of the people, and a general absence of the higher considerations of morality and virtue. There were honourable exceptions, but this description is on the whole, applicable, particularly to the higher ranks. The literature of that period is a faithful mirror of the prevalent tendency of the age.

The principal writer of the eighteenth century, who may be considered as the representative and the personification of the age, on which he exercised a most extraordinary influence, is undoubtedly Voltaire. He was the leader of the so-called philosophers of France, and was regarded as an infallible oracle in literature. His character was wavering and full of contradictions: he alternately displayed great virtues and vices, but the leading and unalterable feature of his mind was an excessive vanity, which was fostered by the flattery of kings and princes, his companions or correspondents. His hatred of Christianity became fanaticism. Ridicule was the formidable weapon which he employed with wonderful effect in demolishing absurd prejudices, and sometimes sound principles. Voltaire's ridicule varied according to the occasion, from the light *badinage* of a refined courtier to the bitter derision of contempt, which at times degenerated into low buffoonery. If Voltaire may be justly termed the Democritus of his age, the appellation of Heraclitus may be no less justly applied to his rival in celebrity, J. J. Rousseau, whose influence was scarcely inferior to that of Voltaire. Though Rousseau diffused much error and maintained the most paradoxical opinions, he felt warmly for the happiness of mankind, whose rights he advocated in the most glowing language, which bears the stamp of deep conviction. Voltaire too had a noble and generous feeling for the happiness of mankind, and was the determined enemy of oppression and injustice, as his efforts in the case of Calas and others sufficiently attest: yet carried away by the impetuosity of his temper and his uncompromising hostility to what he considered existing abuses and follies, he seems to have had no other object than to destroy the social edifice, without constructing any thing better in its place. Rousseau, on the contrary, sought to establish a new political and social order, which should ensure the happiness of the human race, and hence his works are still read by philosophic inquirers; while the witty sayings of Voltaire, directed against an order of things which no longer exists, but to the destruction of which, whether it be a praise or a censure, no one man more largely contributed, are either forgotten or known only to those who make literature a pursuit. Next to Voltaire and Rousseau, the most distinguished writer of that time is Montesquieu, the author of the 'Esprit de Loix,' whose works have at least the merit of having rendered political science the favourite study of the French.

Among the metaphysical writers we may name, in the first place, Condillac. The chief propagators of the philosophy of the eighteenth century were the encyclopedists or editors of the French Encyclopædia, of whom the leaders were Diderot and d'Alembert. Next to them in celebrity is Helvetius. The name of Holbach has become notorious by his 'Système de la Nature;' and that of Lametterie by his works, 'L'Homme machine,' and 'La Vie heureuse de Seneque.' The atheistic principles advocated by the two last-mentioned writers were not to the taste of Voltaire, who strenuously maintained pure deism, and received from the atheistic party in return a share of that ridicule which he dispensed so freely to others.

Among the few defenders of revealed religion during this period we may enumerate the accomplished J. Vernet.

Charles Bonnet, of Geneva, occupies a conspicuous place among the metaphysicians of his age. His 'Essai sur la Psychologie, ou Considerations sur les Operations de l'Ame,' and his 'Essai analytique sur les Facultés de l'Ame,' are considered by some as having a tendency towards materialism; but the religious opinions which he constantly expressed at a time when irreligion was the fashion, as well as his work, 'Idées sur l'Etat futur des Etres vivans, ou Palingenesie philosophique,' in which he defended the immortality of the soul and the truth of Christian revelation, must be considered as decisive of his real sentiments.

The historical works of Voltaire, who, though careless in the verification of facts, displayed an unusual degree of critical acuteness, and the productions of Montesquieu, had a marked influence on the study of history. The philosophy of history is indeed a creation of the eighteenth century; but although the writers of that period did much for its advancement, their indiscriminate hostility towards every thing which had for ages been considered as true or sacred, frequently operated most prejudicially to historic truth. One of the most learned historians of that period is Mably. Charles de Brosses, president of the parliament of Dijon, acquired a well-merited reputation by his various historical works, which display deep research and a most diversified erudition. Goguet, in his work 'Recherches sur l'Origine des Loix, &c.,' investigated with great learning and acuteness the history of laws, arts, sciences, and customs. The reputation of Barthélemy, who was really a learned man, must not be measured by his 'Voyage d'Anacharsis:' this work, which long enjoyed and still has some celebrity, may serve as a measure of the spirit in which antiquity was studied and understood at that time. Raynal's 'Philosophical History of the Discoveries and Settlements of the Europeans in India and America,' also a work of considerable reputation, does not maintain the same rank at the present day. De Mehegan published a work entitled 'Tableau de l'Histoire moderne depuis la Chute de l'Empire d'Occident jusqu'à la Paix de Westphalie.' Velly is the author of a voluminous history of France, continued by Villaret, and afterwards by Garnier, a work by no means devoid of merit. Frederic II., the king of Prussia, wrote the history of his own times in French. The works of Rulhières on the troubles of Poland and the intrigues of the northern courts have all the interest of romance. Crevier continued Rollin's Roman history. The historical memoirs of this period are very abundant, but they serve rather as a picture of the state of manners than as historical materials. D'Anville advanced our knowledge of antient geography; and Montfaucon and Caylus did the same for the arts of the antients. Pellerin made valuable researches in numismatics.

The eighteenth century was still less poetical than the age of Louis XIV. The model was Voltaire, and particularly his poetical, or rather versified tales. The most successful of these imitators was Parny, who laboured to surpass his master in licentiousness. Gresset is a writer full of wit and grace. Moncrief introduced the ballad into France; and Gilbert, who distinguished himself by his satires and some lyrical pieces, would perhaps have become one of the best poets of France, if he had not been cut off in the prime of life. Madame Du Boccage attempted the heroic: her subject was the discovery of America. The Chevalier Boufflers acquired celebrity for his light and witty poems. Bernard, surnamed Le Gentil, on account of his graceful poetry, imitated Ovid in his 'Art d'Aimer.' Leonard and Berquin successfully imitated Gesner's pastoral poetry. Le Franc de Pompignan acquired deserved celebrity for some beautiful lyric poems; and Louis Racine, son of the tragedian, wrote some beautiful poems on religious subjects. Among the other poets of this period we may mention Dorat, Aubert, Colardeau, and Piron.

The novels of the eighteenth century are stamped with the characteristics of the age. Besides those of Voltaire, Rousseau, and Diderot, there is Marmontel, whose 'Contes Moraux' have nothing moral about them but the name, yet are written in an elegant and correct style. The tales of Florian have really a moral tendency, and some of them are very beautiful. The tales of Bernardin de St. Pierre, and among them his 'Paul et Virginie,' have been translated into most modern languages, and are still read with pleasure. Prevost d'Exilles translated many English novels and wrote some imitations of them himself. The age was also fertile in licentious novels, the most notorious of which are those of J. de Crebillon. The art of literary composition was treated by Dubois in his 'Reflexions Critiques sur la Poésie et la Peinture:' the Jesuit André published a treatise 'Du Beau;' Diderot also wrote on the same subject, and under the same title. Batteux is considered one of the first critics of his time, and his works, 'Les Beaux Arts reduits au même Principe,' and 'Cours de Belles Lettres, ou Principes de la Littérature,' are highly appreciated both in France and abroad. Marmontel wrote 'Poétique Française,' and 'Elémens de la Littérature.' The most celebrated work of that kind in the eighteenth century is Laharpe's 'Lycée, ou Cours de la Littérature Ancienne et Moderne.'

The mathematical and physical sciences made great progress in France during the eighteenth century. In this general sketch it is sufficient to mention the names of D'Alembert, Lagrange, Monge, La Lande, and Lacaille. Our knowledge of the figure of the earth was extended by the measurements made in Lapland by Maupertuis, Clairaut, Camus, Lemonnier, and Celsius; and by the similar operations in Peru of Condamine, Godin, and Bouguer.

At the head of the naturalists of France in the eighteenth century are Buffon and Charles Bonnot. The latter, though born at Geneva (1720), where he spent his life, belongs to France, as having written in the language of that country. He distinguished himself by his researches on the use of leaves in the vegetable economy, 'Recherches sur l'Usage des Feuilles dans les Plantes.' But the work which established Bonnet's reputation is his 'Contemplation de la Nature;' he published also 'Consideration sur les Corps Organisés.' Réaumur wrote a valuable work on insects, 'Mémoires pour servir à l'Histoire Naturelle des Insectes.' Brisson wrote a systematical work on zoology, 'Le Règne Animal,' and a great work on birds, 'Ornithologie, ou Méthode contenant la Division des Oiseaux en Ordres, Sections, Genres, Espèces, et leur variétés,' containing figures of 500 birds, of which 320 had never before been described. Vicq d'Azyr described the mammalia, &c. In botany, Jussieu immortalised himself by establishing a new system of classification of plants. The names of Deluc and Saussure are connected with the history and progress of geology.

Fifth period: from the beginning of the French Revolution to the present time.—The violent changes which the Revolution produced in the social state of France had a corresponding effect on the national character and literature, which, in France, more than in any other country, may be regarded as the true picture of the public mind. The period of the Revolution was not favourable to literature, for at such a time nothing but journals and pamphlets could succeed; but it produced a rapid development of eloquence. The Revolution also broke the trammels imposed by the French Academy on the language, which became enriched by a great quantity of new words generally formed from Greek and Latin elements. From the establishment of the Directory (1795) the Revolution changed its character; its wild movement was stopped, and a wish for repose was generally felt. As soon as the country began to enjoy internal quiet, the intellectual activity of the nation burst forth with a fresh impulse. The Polytechnic School was established in 1796, and the Institut de France was founded the same year by the reunion of the antient Academies of Sciences and of 'Inscriptions et Belles Lettres.' The consular and imperial reign did much for science, but it was not favourable to literature. Practical knowledge and the application of scientific principles were alone in demand. Every man who possessed superior talents had a splendid career opened to his ambition, either by entering the armies of the conqueror, or by devoting himself to mathematical and physical sciences, or the arts; and success ensured him imperial patronage and substantial rewards. But a severe censorship weighed heavily on letters, and suppressed all works which contained opinions contrary to the established order of things; and among the rest the licentious and anti-religious works which had been so abundant in the eighteenth century. The first years of the Restoration were almost entirely absorbed by political pamphlets. Literature however soon began to revive, and France may boast of a great number of excellent works in all branches of human knowledge, which have appeared since the Restoration.

The establishment of a constitution in France, although far from completely insuring the liberty of the nation, has still had a favourable influence on letters. It is true that a check was given to the growth of a sound literature, as well as to the progress of national education, by the unfortunate tendency of the government of the Restoration, which was constantly attempting, under the pretext of restoring Christianity, to which a large part of the nation was decidedly inclined, to undermine constitutional order, and to re-establish by jesuitical machinations the abuses which had disgraced France before the Revolution. This retrograde system produced results quite contrary to what it was intended to effect. It led to the overthrow of the elder branch of the Bourbons, and destroyed all hopes of re-establishing the monarchical and aristocratic institutions of old France; and it also threw back to the philosophy of the eighteenth century many who were gradually returning to religious opinions. The agitated state of France since the revolution of July, 1830, has not been favourable to literature. There is no lack of talent, but it seems that men who tread this volcanic ground have no other object in view than to minister to the ephemeral tastes, or rather caprice of an excited public; a circumstance far from being advantageous to the production of works of a sterling and permanent character. There are however exceptions, and we may hope that France will yet proceed with renewed vigour in its literary career.

Among the poets of this period the first place belongs to Lebrun; though the appellation of Lebrun Pindar, which his countrymen bestowed on him in his lifetime, is rather extravagant. Alphonse de La Martine (born 1790) is not only the first poet of France, but one of the first of his age. His productions, filled with poetical beauties of the highest order, breathe a spirit of religion and pure morality. He has in fact established a new school of poetry in France; and we may safely assert that the magic of his verse has done more towards restoring religious feelings in France than all the efforts of the Roman Catholic clergy, assisted by the government of the Bourbons.

The first poems of La Martine were his 'Meditations Poétiques' (1820), by which he established his reputation; the 'Nouvelles Meditations Poétiques,' 1823, met with equal success. La Martine, who is a great admirer of Byron, published in 1825, 'Le Dernier Chant de Childe Harold,' which however cannot bear any comparison with the poem of which it is a professed continuation.

Not inferior to La Martine is Victor Hugo, the leader of the romantic school. Hugo (born in 1802) is the son of a general in the imperial army, and of the daughter of a Vendean chief. His boyish years were spent in Spain and Calabria, where his father was engaged in active service; and the scenes of an exterminating warfare in which his childhood was passed may account for his early tendency to delineate the horrible. The romantic impressions of his boyhood were increased by the traditions of the Vendean war related by his mother, a woman of a superior character, who devoted herself entirely to the education of her children. These circumstances powerfully contributed to develop the natural talents of Hugo, and to give a bent to his poetical genius. In 1817 he obtained two premiums from the Académie des Jeux Floraux of Toulouse, which conferred on him in the following year the degree of a maître des jeux floraux. The first volume of his 'Lyrical Poems' appeared in 1821, but attracted little attention, although he had already published two novels and two collections of poems. He came into notice in 1827, by his 'Ode to the Column of the Place Vendôme,' which excited a general admiration. Since that time his reputation has been constantly growing. Hugo's principal poems are published under the following titles:—'Odes;' 'Odes et Ballades;' 'Les Orientales;' 'Les Feuilles d'Automne.' His works which have produced the strongest impression on the French public contain great beauties; they display an extraordinary imagination, a deep and glowing feeling, and a profound knowledge of the human heart; but they are frequently disfigured by great extravagancies. His dramatic productions have attained the same popularity, and contain the same beauties and defects as his poems. They are—'Hernani;' 'Marion Delorme;' 'Triboulet, ou le Roi s'amuse;' 'Lucrece Borgia;' and 'Marie Tudor.' His novels are—'Han d'Islande,' a wild production, which, among scenes of raving madness, contains some scattered beauties; 'Bug Jargal' is an episode on the Negro revolt of St. Domingo; 'Le Dernier Jour d'un Condamné' describes with heart-rending vividness the feelings of a man on the point of undergoing capital punishment; 'Nôtre Dame de Paris,' which is the most popular of his novels, although perhaps too much tinged with the horrible, contains an admirable picture of Paris in the 15th century.

The most popular poet of France is undoubtedly Béranger. His witty and truly national songs are in the mouth of every Frenchman, from the highest to the lowest. He was born in 1780, of poor parents, and is entirely self-educated. He is equally distinguished for his rare independence of character, and his poetical talent. He never flattered Napoleon during his reign, neither did he abuse him on his fall. Béranger's songs have attained an historical importance, having been one of the most powerful means of counteracting the retrograde policy of the Bourbons, whose government constantly prosecuted him for ridiculing, in a manner which they could never forgive, their anti-national measures. Songs have long been used in France as a means of directing public opinion: they have compensated in some degree for the want of the liberty of the press, and such has been their influence, that a witty Frenchman defined the government of France before the Revolution, as an absolute monarchy tempered by songs. And indeed Béranger's songs did more harm to Charles X. than all the arguments of the press, or the declamations of the liberal deputies. When government deprived him of a small situation which he held, he said to the minister, 'Mouseigneur, je vis maintenant pour faire des chansons, si V. m'otez ma place j'en ferai pour vivre.' Béranger took an active part in the revolution of July, but declined to accept any place under the new government. Since that time he has written little; his occupation, he says, ended with the expulsion of Charles X. Béranger's poems have been often published under the simple title of 'Chansons de Béranger.'

Casimir Delavigne has acquired his reputation chiefly by his dramatic productions: 'Paria:' 'Les Vêpres Siciliennes,' 'Marino Faliero;' 'Louis XI.;' 'Les Fils d'Edouard;' and his comedy, 'l'Ecole des Vieillards.' He excels however particularly in elegies, of which he published in 1817, 'Les Messeniennes,' which express a patriot's sorrow at the humiliation of his country. The subject of his 'Nouvelles Messeniennes,' 1822, is the struggle of the Greeks for their liberty. He has written also a beautiful elegy on Byron's death. His poems are characterised by exact versification, beautiful imagery, and noble thoughts; but in true poetic inspiration he is inferior to La Martine and Victor Hugo. Delavigne belongs to the classical school as well as Viennet, who has acquired considerable celebrity by his poetical epistles and some dramatic productions. Among the other French poets of the period, Millevoye was particularly successful in elegies, of which 'La Chute des Feuilles' is one of the finest productions of the kind in the French language. Legouvée is the author of 'Le Merite des Femmes.' Barthelemy and Mery established a kind of poetical partnership, and published in conjunction poetical satires: 'La Villeliade,' 'Rome à Paris,' 'La Peyroneyde,' 'La Corbiereyde,' which are clever, but being on subjects of only temporary interest, could only have temporary success. Their epic poem, 'Napoleon en Egypte,' contains many beautiful lines; but the success which it obtained in France, like that of 'Le Fils de l'Homme,' written on the young son of Napoleon, was chiefly owing to the popularity of the subject.

Didactic and descriptive poetry has been much cultivated in France during this period. Foremost among these poets stands Delille. The other distinguished writers of this class are—Esmenard, who wrote 'La Navigation;' Chenedolle, 'Le Génie de l'Homme;' the historian Daru, 'L'Astronomie;' Leroux, 'Les Trois Ages;' and Berihoux, the author of 'La Gastronomie,' a production full of sparkling wit and humour.

The epic has been attempted by many recent French poets, but without success. Musson described in his 'Helvétiens' the war of the Swiss against Charles the Bold; Baour Lormian, the translator of Tasso, attempted to imitate Ossian in his 'Poèmes Galliques.' Perceval de Grande Maison wrote 'Philippe Auguste,' which some critics consider the best of the epic poems of this period. Creuze de Lessert attempted a series of epic poems, founded on the romances of the middle ages: 'Les Chevaliers de la Table Ronde;' 'Amadis de Gaule;' and 'Les Pairs de Charlemagne.' Lucien Bonaparte has added to the list by his 'La Cirneide, ou Co[illegible]e Delivrée;' and 'Charlemagne, ou Rome Delivrée.' Millevoye is the author of 'Charlemagne' and 'Alfred,' both which poems, although far from attaining the elevation of the epic, are not devoid of beauty.

Among the prose writers Chateaubriand is one of the most popular, both in France and abroad. In 1790, when a very young man, he visited America, a circumstance which gave birth to his work, 'Les Natchez, ou Tableau de la vie des Tribus Indiennes,' which is a poem, though not in verse. On his return to Europe he published in England his 'Essai, historique, politique et moral, sur les Revolutions anciennes et modernes.' This work contains liberal opinions and had great success, but Chateaubriand afterwards retracted those opinions which he styled his errors, and wrote, according to his own expression, a new work with an old faith: *un ouvrage nouveau avec une foi antique.* This work, which appeared under the title of 'Génie du Christianisme,' is doubtless a brilliant production; but its popularity may be partly ascribed to its having appeared at a time when France, wearied and exhausted by the excesses of the Revolution, sought for tranquillity and repose. The chief object of his 'Martyrs,' a poem in prose, is to prove, by placing in juxtaposition the fictions of the Greek mythology and the tenets and traditions of the Christian religion, that the latter supply materials for poetry as good as, and even better than, the former. His 'Itinéraire de Paris à Jerusalem' owes its reputation more to the vividness than the correctness of his descriptions. Chateaubriand's works contain great beauties; his style is glowing, and full of brilliant imagery, and his descriptions are admirable; but his thoughts are not always profound or correct, and frequently want connexion. His language also sometimes degenerates into bombast; and there is truth in the remark, that his words are often greater than his ideas. Among his other works the most remarkable are 'Etudes ou Discours Historiques sur la Chute de l'Empire Romain, la Naissance et le Progrès du Christianisme, et l'Invasion des Barbares;' and his essay on English literature.

Next to Chateaubriand, Mme. de Stael has perhaps had the greatest influence on the literature of France.

Among the remaining French prose writers we shall mention, first, those who have treated metaphysical subjects.

The French metaphysicians are divided into three principal schools. 1. The sensual, which, being the offspring of the eighteenth century, appeared the first, and under the name of the ideological, was long the dominant school

France. Its chief representatives are Cabanis, Destutt de Tracy, and Garat. The 2nd is the school of the philosophy of Catholicism and Absolutism, founded and supported chiefly by the Comte de Maistre, Lamennais, and Bonald. The 3rd is that of an eclectic philosophy, or of a rational spiritualism; it comprehends many eminent writers, who are not however united among themselves by any positive tenet, but only by the rejection of the materialism of the first, and of the spiritualism of the second school. The characteristics of these philosophical schools may be summed up in a few words. The first, or the ideological school, establishes the faculty of feeling (*la faculté de sentir*) as the sole principle of all the operations of the human mind, and founds its system entirely on perception (*contemplation, sensation*). According to this system, there is only a sensual faculty of perception, and our thoughts are nothing but modified sensations. This philosophy limits its knowledge to the world of sense, for it does not admit the existence of any other. It has been applied with success to the mathematical and physical sciences; but its application to religion, ethics, politics, and literature, has not been accompanied with equally favourable results. A consistent philosopher of this school either does not admit the existence of a Deity, or considers that the universe is the Deity, or that every atom is Deity; and as the soul is by the same theory only a result of the activity of our organization, the belief in its immortality becomes an inconsistency, and the practical philosophy of the school is the art of rendering life agreeable. Cabanis, one of the most illustrious of this school, seems to have been terrified by his own conclusion, *Les nerfs, voilà tout l'homme;* and emphatically declares that the moral faculties are something quite different from those which result from our physical organization, and that they belong to another order of things than the physical world. (*Rapports du Physique et du Moral de l'Homme.*) This declaration was not a subterfuge in order to avoid the accusation of undisguised materialism, but a real conviction. Cabanis developed this idea in his posthumous work, 'Sur les Causes Premieres,' where he states that the soul ought not to be regarded as a part of the animal organization, but as a separate substance and a real being, which, by its presence, gives the corporeal organs the motion which constitutes their functions.

Besides Cabanis, the most eminent writers of this school are Garat, Condorcet, Destutt de Tracy, and Volney. Among the recent works of this same school, the most remarkable is Dr. Broussai's 'De l'Irritation et de la Folie, ouvrage, dans lequel les Rapports du Physique et du Moral sont établis sur la base de la Médecine Physiologique,' Paris,

The second philosophical school of France, the religious or theological, is founded on the Scriptural doctrine of original sin, and the consequent corruption of mankind. According to this system, men exist in this world merely for the purpose of expiating the original sin, and consequently they ought not to enjoy liberty, which would prevent them from doing penance. All governments must therefore be severe and absolute, and everything should be done according to the will of God, whose representative, the pope, has the supremacy over all the governments of the world. The founder of this system, the Comte de Maistre, employed the great powers of his mind and his extensive erudition in maintaining this theory, the consequence of which is unconditional submission to existing authority, however tyrannical it may be. He advocated his doctrine chiefly in his 'Soirées de St. Petersburg, ou Entretiens sur le Gouvernement Temporel de la Providence,' and in his work on the Pope. It is rather extraordinary that in this century, when the principles of political liberty have made such progress, a doctrine which preaches nothing less than the most abject slavery, should find numerous partisans. Such however is the case, and several French writers of great talent have undertaken the defence of these doctrines. Among them we may mention the Vicomte de Bonald, a man of great ability, but full of sophistry, and who frequently loses himself in his metaphysical abstractions: his work is entitled 'Théorie du Pouvoir Politique et Religieux et Législation Primitive.' L'Abbé Lamennais, who is perhaps the first prose writer in France, has advocated the same system as the Comte de Maistre, but from a more philosophical point of view, and with more ability, elegance, and success. De Maistre seeks to impose on the human mind the dogma of authority. Lamennais endeavours to persuade the adoption of the same dogma by the motives of despair. He shows that everything is a matter of doubt and uncertainty, and that men have no other guide than the authority of a universally admitted opinion (*assentiment universel*). Having laid down this proposition, he deduces with great ingenuity, by arguments from history and tradition, the consequence that the doctrines of the Roman Catholic church must be considered as the *assentiment universel*, beyond which there is no truth to be found. He maintains that whoever abandons the authority of Rome must necessarily err, not only in matters of religion, but in every other respect. Every deviation from the doctrines of the church is a punishable dissent; every resistance to the infallible decision of the pope is an impious rebellion; even the Gallican church, which claims some liberties, is a heresy. There is only one church and one doctrine, and every state which does not support that doctrine by all the means in its power, and tolerates different religions, commits a crime; and because states now tolerate several kinds of worship, human society is sinking into an abyss, and is becoming atheistical. In order to cure the evils which infect society, it is necessary to bring it back to the sole religious doctrine from which it has strayed, and the pope must become the absolute ruler of human reason.

These doctrines, which would scarcely have been taught even two centuries ago in Roman Catholic countries, were proclaimed by Lamennais in 1817 in his 'Essai sur l'Indifférence en Matière de Religion;' and owing to the magic of the style in which he clothed his opinions, he produced a powerful sensation, and gained many partizans, chiefly among young men. He continued to maintain the same opinions in some periodicals, and in his work, 'De la Religion considérée dans ses Rapports Civils et Religieux.' When the revolution of July gave another form to civil and ecclesiastical affairs in France, he appeared again before the public, and began to edit, in conjunction with l'Abbé Lacordaire and the count Montalembert, a periodical called 'l'Avenir,' in which, following up the principle of the new constitution, which acknowledges no dominant religion, he maintained with the greatest eloquence that the Roman Catholic clergy of France should now become entirely independent of the state, and neither receive any support from it nor suffer any interference of the government in their affairs. This doctrine however was not approved by the French clergy, and the pope manifested his dissent from it. In 1834 appeared the 'Paroles d'un Croyant;' this little production, which was written in the most beautiful language, and labours to establish on the basis of the gospel pure democratical principles, produced an extraordinary sensation. Such doctrines were however too much opposed to the principles of the Roman Catholic church, and the pope formally condemned them. Since that time the abbé has declared against Rome.

Among the writers of the eclectic school is De Gerando, who began his career with the ideological philosophy, and his first work, 'Des Signes et de l'Art de Penser, considérés dans leur Rapports Mutuels,' is based on that system. He gradually abandoned the ideological school, and his 'Histoire comparée des Systèmes de Philosophie relativement aux Principes des Connoissances Humaines,' has contributed to diffuse a knowledge of the German philosophy in France, and is considered the best work in French on the history of philosophy. His leading idea is that all the course of man's life should be a continued self-education, embracing all his faculties, and directing all his actions; and he has developed these principles in his work, 'Du Perfectionnement Moral, ou de l'Education de soi-même.' His work, entitled 'Visiteur du Pauvre,' was crowned by the Academy, and obtained the prix Monthyon of 10,000 francs. Laromiguière, author of the 'Analyse des Sensations,' and of the 'Leçons de Philosophie, ou Essai sur les Facultés de l'Ame,' has established a system of philosophy peculiar to himself. Maine de Biran, who began by being an ideologist, and became afterwards a spiritualist, made himself known by his works, 'Sur l'Influence de l'Habitude;' 'Sur la Décomposition de la Pensée;' and 'Examen des Leçons de M. Laromiguière.' Keratry has attacked the materialist opinions in his 'Inductions Morales et Physiologiques,' and in his 'De l'Existence de Dieu et de l'Immortalité de l'Ame.' Among the best writers of the anti-materialist school is the baron Massias, 'Rapports de la Nature à l'Homme, et de l'Homme à la Nature; ou, Essai sur l'Instinct, l'Intelligence, et la Vie,' 5 vols.; and 'Théorie du Beau et du Sublime Principes de la Littérature, de Philosophie, de la Politique, et de la Morale.' Bonstetten, of Geneva, is the author of 'Etudes sur l'Homme; ou, Recherches sur les Facultés de Sentir et de Penser;' and Droz has written 'De la Philosophie Morale; ou, des Différens Systèmes sur la Science de la Vie.' Royer Collard and Joufroy introduced the Scotch philosophy into France, and translated the works of Dugald Stewart and Reid. The most popular metaphysical writer of France is Victor Cousin, the translator of Plato. His system, which he calls 'Eclectisme Impartial appliqué aux Faits de Conscience,' is chiefly based on the German philosophy, though the Germans think that he has conceived their ideas very superficially. His contributions to the 'Journal des Savans,' and to the 'Archives Philosophiques' appeared under the title of 'Fragmens Philosophiques;' and a continuation of them under the name of 'Nouveaux Fragmens.' His lectures on philosophy have also been published, 'Cours de l'Histoire de Philosophie.' Among the important works which have recently appeared in France on metaphysical subjects, we must mention Benjamin Constant's 'De la Religion considérée dans sa Source, ses Formes, et ses Dévelopemens,' as well as his 'Principes de la Politique applicable à tous les Gouvernements Représentatifs, &c.,' and Lerminier's 'Philosophie du Droit,' and 'De l'Influence de la Philosophie du Dix-huitième Siècle sur la Legislation et la Sociabilité du Dix-neuvième,' by the same author. We recommend to those who wish to make a particular study of the French modern metaphysics, Damiron's 'Essai sur l'Histoire de la Philosophie en France pendant le Dix-neuvième Siècle.'

The French historians of this period may also be divided into three schools—1, The systematical, or national school, the present head of which is Guizot; and which seeks from a given mass to deduce certain consequences and principles; 2, the descriptive, or narrative, to which belong Barante, the two Thierrys, and Capefigue: the object of this school is to describe events, and delineate characters and manners with all possible fidelity without indulging in any reflections; 3, the fatalistic school, the chief writers of which are Mignet and Thiers. This school occupies itself only with political history: it narrates the principal events, and represents the good or evil actions of individuals as necessary consequences of them.

Guizot was born at Nîmes in 1787, of a protestant family, and studied at Geneva, where he became thoroughly acquainted with the German philosophy and literature. Guizot's political life is foreign to our subject, and we shall limit ourselves to his literary labours. He commenced as an author very early in life, having published in 1809 his 'Nouveau Dictionnaire des Synonymes de la Langue Française,' which was followed by the 'Vies des Poètes Français du Siècle de Louis XIV.,' published 1813, and 'Annales de l'Education,' 6 vols., 1811–15. He began his historical career by publishing the lectures which he had delivered on history. Those of 1821–22 were published under the title of 'Histoire du Gouvernement Représentatif.' The 'Cours d'Histoire Moderne,' delivered 1828–30, contains the 'Histoire de la Civilization en France depuis la Chute de l'Empire Romain, jusqu'en 1789,' 5 vols.; and the 'Histoire Générale de la Civilization en Europe depuis la Chute de l'Empire Romain,' &c., which is an introduction to the preceding work, and one that well deserves an attentive study; 'Histoire de la Révolution d'Angleterre depuis l'Avénement de Charles I. jusqu'à la Restauration de Charles II.' Besides his historical works Guizot is the author of several valuable essays on political subjects: 'Quelques Idées sur la Liberté de la Presse,' 1814; 'Sur le Projet de Loi relatif à la Liberté de la Presse,' 1814; Du Gouvernement Représentatif, et de l'Etat Actuel de la France,' 1816; 'Essai sur l'Histoire et l'Etat Actuel de l'Instruction Publique en France,' 1816; 'Des Moyens de Gouvernement et d'Opposition dans l'Etat Actuel de la France,' 1821; 'De la Peine de Mort en Matière Politique,' 1822; 'Des Conspirations et de la Justice Politique,' 1821. Guizot has also published, in conjunction with others, a 'Collection des Mémoires relatifs à l'Histoire de France depuis la Fondation de la Monarchie jusqu'à Louis XIII.,' 31 vols., and 'Collections des Mémoires relatifs à l'Histoire de la Révolution d'Angleterre.' Sismondi of Geneva has treated of an amazing variety of subjects in his numerous historical works, which enjoy a great popularity all over Europe. His 'Histoire des Républiques Italiennes du Moyen Age,' 16 vols., he has condensed for Dr. Lardner's 'Cyclopædia' into one little volume. He has also written 'Histoire de la Renaissance de la Liberté en Italie,' 2 vols.; 'Histoire de la Chute de l'Empire Romain, et du Déclin de la Civilization de 250 à 1000.' But his chief work is 'L'Histoire des Français,' of which, though unfinished, more than twenty volumes have appeared. Sismondi has displayed a deep knowledge of philosophy in his 'Histoire de la Littérature du Midi de l'Europe,' and a thorough acquaintance with political science in his work, 'De la Richesse Commerciale; ou, Principes d'Economie Politique, appliqués à la Legislation du Commerce;' and in his 'Nouveaux Principes d'Economie Politique.'

Augustin Thierry has thrown considerable light on the history of France during the middle ages in his 'Lettres sur l'Histoire de France,' and his 'Dix Ans d'Etudes Historiques.' At the same time he has pointed out with great sagacity the defects of the existing French histories. But the work which has established his reputation is 'Histoire de la Conquête de l'Angleterre par les Normands, de ses Causes et de ses Suites jusqu'à nos Jours.' His brother Amedée Thierry evinced considerable talent in his 'Histoire des Gaulois depuis les temps les plus reculés jusqu'à l'entière soumission de la Gaule à la domination Romaine;' and in the 'Resumé de l'Histoire de Guyenne.' Thiers' 'History of the French Revolution,' in 10 vols., has obtained universal popularity; and Mignet's on the same subject, which is much more condensed, is also deservedly esteemed.

The work of the Abbé Montgaillard, entitled 'L'Histoire de France depuis le Règne de Louis XVI. jusqu'à l'An 1825,' has the merit of brilliant narration, and the introduction contains much valuable information. Depping has written 'Histoire des Expéditions Maritimes des Normands et de leur Etablissement en France au Dixième Siècle.' Barante, the author 'De la Littérature Française pendant le Dix-huitième Siècle,' has also published a voluminous but very entertaining work, which contains a faithful picture of the times in his 'Histoire des Ducs de Bourgogne,' 13 vols., with an atlas, portraits, maps, &c. Audin is the author of 'Histoire de la St. Barthelemy,' 1826; and the Comte de St. Aulaire of 'l'Histoire de la Fronde,' 3 vols., 1827.

The 'l'Histoire de la Restauration et des Causes qui ont amené la Chute de la Branche ainée des Bourbons,' 6 vols. 1832, an anonymous work, was for some time ascribed to the ex-minister Duc Decazes, but it is the production of Capefigue, one of the most learned writers of France, and also the author of the following works: 'Histoire de Philippe Auguste;' 'Histoire Constitutionelle et Administrative de la France depuis Philippe Auguste;' 'Essai sur les Invasions des Normands.' Daru's 'Histoire de la Brétagne and particularly his 'Histoire de la République de Venise, are generally admitted to be masterpieces. Roujoux's 'Histoire des Rois et des Ducs de la Brétagne,' is not devoid of merit. Dulaure has given a rather dark picture of past ages in his 'Histoire Physique, Morale, et Civile de Paris,' 10 vols. He has also published 'Histoire des Environs de Paris,' and 'Esquisses Historiques sur la Révolution Française,' 8 vols. Lacretelle obtained considerable popularity by his 'Histoire de France pendant le Dix-huitième Siècle,' and 'Histoire de la France pendant les Guerres de Religion;' but the same success has not attended his 'Histoire de la Révolution Française,' partly on account of its ultra-royalist tendency. Ferrand's 'L'Esprit de l'Histoire,' has attracted much notice, although written in favour of absolute governments. He is also the author of a valuable work, particularly viewed with reference to the excellent materials which it contains for the history of the eighteenth century, 'Histoire de Trois Démembremens de la Pologne.' Michaud's 'Histoire des Croisades' has considerable reputation, as well as his 'Histoire du Progrès de la Chute de l'Empire de Mysore sous les Règnes de Hyder Aly et de Tippo Saib.' The work entitled 'Les Ju d'Occident, ou Recherches sur l'Etat Civil, le Commer la Littérature des Juifs en France, en Italie, et en E pagne, pendant le Moyen Age,' treats a subject has seldom and only imperfectly been touched by historian, Buignot threw considerable light on middle ages by his 'Histoire du Gouvernement Féodal.' We may consider as belonging to French literature the works of the late Prussian minister for foreign affairs, Ancillon, 'Considérations générales sur l'Histoire,' and his 'Tableau des Révolutions du Système politiquo de l'Europe.'

Military history has been treated by Dumas, in his 'Précis des Evénemens Militaires, ou Essai Historiquo sur les Campagnes de 1799 à 1814,' 26 vols.; and by Jomini, 'Traité des grandes Opérations Militaires,' 18 vols. Chambray and Labaume have written the history of the campaign of Russia in 1812. Segur's work on the same subject, which has merit as a literary composition, contains little military information, and belongs to the class of poems in prose. Marshal Gouvion St. Cyr is the author of 'Mémoires sur les Campagnes depuis 1792 jusqu'à la Paix de Campo Formio,' 4 vols.; of which his 'Mémoires sur les Campagnes sous le Directoire, le Consulat, et l'Empire,' form a continuation. General Foy's 'History of the Peninsular War' is a work of merit; but the most remarkable work on the subject is undoubtedly that which Napoleon dictated at St. Helena: 'Mémoires pour servir à l'Histoire de France sous Napoléon, écrites à St. Helène, sous la dictée de l'Empereur, par les Généraux qui ont partagé sa Captivité, et publiés sur les Manuscrits entièrement corrigés de sa main;' 8 vols. The work of the same great man on the wars of Cæsar, which has been recently published, is not less valuable and interesting.

There is an extraordinary abundance of historical memoirs relating to this period. J. F. Banière and St. Albin Berville have published, 'Collection des Mémoires relatifs à l'Histoire de la Révolution Françoise;' 'Mémoires particuliers pour servir à l'Histoire de la Révolution;' and 'Collection des Mémoires Historiques des Dames Françaises.' Of the Mémoires relating to Napoleon, the most important are those of Lascazas, who accompanied Napoleon to St. Helena, Bourienne, B. Fain, Constant, &c. Those of Madame Campan (femme de chambre of the unfortunate Marie Antoinette), Carnot, Fouché, Louis XVIII., Mirabeau, M. de Roland, &c., are all works of great interest, inasmuch as they relate to the most eventful period in the history of the world. The most entertaining of this class of productions are the 'Mémoires de Madame de la Roche Jaquelain,' who describes in an admirable manner the scenes of the Vendean war, of which she was an eye-witness herself. The French have done much for biography during this period; and the 'Biographie Universelle, Ancienne et Moderne,' 60 vols., although very unequal in point of merit, is still the best work of the kind in the compass of European literature. The 'Biographie des Hommes Vivans,' 5 vols., 1814-16, and the 'Biographie Nouvelle des Contemporains,' 25 vols., 1820, are written rather in a party spirit, and not entitled to any great praise. The 'Biographie Universelle et Portative dès Contemporains,' 1826, is considered to be more impartial than the two works just mentioned. The 'Dictionnaire Historique par Bauvais, révu par Barbier,' 1826, and the 'Biographie Médicale,' also deserve notice. Villemain has written a 'Life of Cromwell.' An important service has been rendered to chronology by St. Allais in the 'Art de vérifier les Dates;' and by Courcelles' 'L'Art de vérifier les Dates depuis 1770 jusqu'à nos Jours.' The 'Tableaux de la Littérature au Seizième Siècle,' by St. Marc Girardin; Villemain's 'Cours de la Littérature,' and his 'Mélanges Historiques et Littéraires;' and Ginguené's 'History of the Literature of Italy,' are valuable additions to literature.

Parliamentary eloquence sprung up in France during this period. The best speeches of the public men are collected in the 'Choix de Rapports, Opinions, et Discours prononcés à la Tribuno Nationale depuis 1789 jusqu'à ce jour,' 20 vols., 1818-22; and 'Collection des principaux Discours et Choix des Rapports et Opinions prononcés à la Chambre des Pairs et à la Chambre des Députes depuis la Session de 1815,' &c. Those who wish to become acquainted with the eloquence of the French bar may consult *Le Barreau Français, Collection des Chefs d'Œuvres de l'Eloquence judiciaire en France*, 16 vols., Paris, 1823, by Clair and Clopier; and the *Annales du Barreau Français;* also Dupin's *Choix de Plaidoyers et de Mémoires;* and Bonnet's *Discours et Plaidoyers.*

Amongst the other writers of this period we may mention Madame de Genlis; Jouy, who is a masterly painter of contemporary manners; Nodier, author of many novels and works on literary criticism, &c. Novels are exceedingly abundant, but most of them seem to delight in scenes of horror and profligacy. We must except from this censure 'Cinqmars,' by Alfred de Vigny, which is perhaps the most successful imitation of the kind of novel created by Scott, and 'Tristan le Voyageur,' by Marchangy, which exhibits a most interesting picture of France during the fourteenth century.

The mathematical and physical sciences have been cultivated in France during this period with great success; and a mere catalogue of the works would not only carry us far beyond our limits, but would be foreign to the purpose of this sketch, which is to exhibit the literary character of the age.

Those who wish to make a particular study of the history of the French language and literature may find ample materials in the following works:—*Histoire de la Langue Française*, par Henry, 2 vols., Paris, 1812; *Nouvelles Recherches sur les Patois*, par Champollion Figeac, Paris, 1809; *Examen critique des Dictionnaires de la Langue Française*, par Nodier, Paris, 1828; *Essai d'un Glossaire Occetanien*, par Rochegude, Toulouse, 1819; Raynouard's *Grammaire comparée des Langues de l'Europe Latine, dans leurs Rapports avec la Langue des Troubadours*, *Recherches sur l'Ancienneté de la Langue Romane; Elémens de la Grammaire de la Langue Romane avant l'année* 1000, and his *Grammaire Romane*, are exceedingly valuable for the study of the *Langue d'Oc*, or the southern French. Not less important for the history of the *Langue d'Oil*, or northern French, is the work of the last-named author, entitled *Observations Philologiques et Grammaticales sur le Roman de Rou;* and Roquefort's *Glossaire de la Langue Romane.* A great deal of curious research on the history of the French language is contained in the *Archéologie Française, ou Vocabulaire des Mots anciens tombes en désuétude et propres à être restitués au Langage moderne*, by Pougens, 2 vols., Paris, 1825; *Trésor des Recherches et Antiquités Gauloise et Françoise*, by Borel, 1665; and Lacombe's *Dictionnaire du vieux Langage François*, Paris, 1767. Mercier has published a *Dictionnaire du bas Langage*, 2 vols., Paris, 1808. For the study of the modern French, the Dictionary of the French Academy may be consulted, which has gone through many editions, and *Supplement au Dictionnaire de l'Académie, contenant les Termes appropriés aux Arts et aux Sciences, et les Mots nouveaux consacrés par l'usage*, Paris, 1825, *Dictionnaire de l'Academie Franç., Supl., contenant environs* 11,000 *Mots nouveaux, rédigé par une Société de Grammairiens*, Paris, 1831; *Dictionnaire Raisonné de Difficultés de la Langue Française*, Paris, 1822; *Dictionnaire Etymologique de la Langue Franç.*, par Roquefort, Paris, 1829; *Philologie Française*, par Noel Carpentras, Paris, 1831; *Nouveau Dict. Universelle des Synonymes Françaises*, par Girard, Bauzée, Roubaud, and Guizot; *Dictionnaire des Proverbes Franç.*, par De la Mesanges, Paris, 1821. For the study of the French literature, the works of Laharpe, Barante, Guizot, and others which have been already mentioned, as well as the articles relating to French writers in the *Biographie Universelle* and the *Biogr. Univ. Portative des Cotemporaines* may be consulted.

FRANCE, ISLE OF. [Mauritius.]

FRANCHE COMTÉ, a province of France, and one of the thirty-two military governments into which, under the old regime, that kingdom was divided. It is of an irregular oblong form, having its greatest length from north-north-east, near the head of the river Saône, to south-south-west, near the town of St. Julien, on the Sarrand, a feeder of the Ain, above 130 miles, and its greatest breadth at right angles to the above, from near the river Vingeane, to the banks of the Doubs, more than 90 miles. It was bounded on the north by Lorraine, on the north-east by the principality of Montbéliard (which has, since the French Revolution, been incorporated with France), on the east by Switzerland, from which it was separated by the Jura, on the south by Bresse, and on the west by the province of Bourgogne, and on the north-west by Champagne. Its principal subdivisions and towns were as follow. The population of the towns is from the census of 1836.

Bailliage d'Amont—Vesoul (capital of the bailliage), 5887; Faucogney; Luxueil; Jussey; Grav, 6535; Lure, 2950; Baume les Dames, 2519.—Bailliage du Milieu—Besançon, capital of the bailliage and of the whole province 29,718; Ornans; Quingey; Dôle, 10,137.—Bailliage d'Aval — Lons-le-Saulnier, capital of the bailliage, 7684; Salins; Arbois; Poligny, 6492; Orgelet; Sainte Claude, 5238; Pontarlier, 4890.

The province is wholly in the basin of the Rhône: it is watered by the Saône and the Ain, feeders of the Rhône, the Doubs, and Oignon, feeders of the Saône, and several other streams belonging to the same system. The lower and more level parts of the province are fruitful in grain: the upper parts produce pasturage for a vast number of cattle. The province is now divided into the departments of Doubs, Jura, and Saône Haute.

La Franche Comté was, in the time of Cæsar, inhabited by the Sequani, a Celtic people, one of the most powerful in Gaul. Their contentions with the Ædui led them to call in the Germans, under their king Ariovistus, by whose aid they effectually humbled their opponents; but the warlike strangers whom they had introduced became the tyrants of that part of Gaul, and especially of the unhappy Sequani. Cæsar drove out the Germans (45 B.C.); but it was for the natives only a change of masters, and the Sequani, with the rest of Gaul, passed under the yoke of Rome. [Bourgogne.] Under the Roman dominion Franche Comté, with Switzerland and part of Bourgogne, constituted the province of Maxima Sequanorum.

Upon the downfal of the Roman empire Franche Comté was comprehended in the kingdom of the Burgundians, upon the overthrow of which it became subject to the Franks. In the division of the territories of Clovis among his sons and descendants, it formed part of the kingdom of Austrasia, and afterwards of Lotharingia, or Lorraine. In the reign of Charles le Simple, king of France, to whom, after several changes, this district, then called Haute Bourgogne (Upper Burgundy), or the principality Outre Saône (beyond the Saône) had fallen, Besançon, with the surrounding districts, was formed into a county, called the county of Bourgogne, in favour of Hugues, the first count (A.D. 915). Some writers however represent Franche Comté to have been part of the kingdom of Bourgogne Transjurane, and postpone the erection of the county of Bourgogne till A.D. 995. (See *L'Art de vérifier les Dates.*)

Renaud III. (A.D. 1127-1148), count of Bourgogne, whose dominions had acquired great extent, reaching from Bâle to the Isère, refused homage on various pleas to Lothaire, emperor of Germany, to whose predecessors the counts of Bourgogne had paid homage, and maintained his refusal during his life. It is supposed that the county derived from this circumstance its designation of La Franche Comté. The marriage of his daughter to the emperor Frederick Barbarossa brought the county into the hands of that prince, who made Besançon a free imperial city. He resigned the county to his son Otton, by the marriage of whose descendants the county passed into various hands, as of the kings of France and the dukes of Bourgogne of the first and second race of the blood royal of France. On the death of Charles le Hardi, last duke of Bourgogne of the second race [Bourgogne], the county passed, with a considerable portion of his inheritance, to the archduke Maximilian, from him to his grandson Charles V., and so to the Spanish branch of the Austrian family. In 1668 Louis XIV. of France conquered Franche Comté from the Spaniards, but restored it by the peace of Aix-la-Chapelle in the same year. He again conquered it in 1674, and it was ceded by Spain to France at the peace of Nimeguen in 1678.

FRANCHISE, a species of incorporeal hereditament. Franchise and liberty are used as synonymous terms, and their definition is a royal privilege, or branch of the king's prerogative, subsisting in the hands of a subject. Being therefore derived from the crown, such privileges must arise from the king's grant, though in some cases they may be held by prescription, which presupposes a grant. [Prescription.] The kinds of them are various, and almost infinite, and may subsist in corporations, in one man, or in many, as co-tenants. (2 Bl. *Com.* 37.) A few instances may be mentioned: thus a county palatine is a franchise, and so are privileges given to corporate bodies, forests, chases, the right to wreck [Flotsam], deodands, estrays, &c. [Deodand; Estray.] Franchises may be lost or forfeited by the parties who enjoy them, if they misuse their privilege or neglect to perform the requisite duties in respect of them [Ferry]; and if the owners are disturbed or incommoded in the proper exercise of their franchise, which is an injury known to the law as a disturbance of franchise, they may have remedy in a special action on the case; or where the franchise is to levy a toll, they may distrain for the amount alleged to be due. [Distress.] (3 Bl. *Com.* 236.)

FRANCIS I. of France was, like Louis XII., descended from Charles the Wise through Louis I. duke of Orleans. This unfortunate prince was assassinated by John duke of Burgundy, and his two sons were for a long period prisoners to the English. The younger of the two, John count of Angoulême, was succeeded by his son Charles. During the life of Louis XI. the count of Angoulême had some difficulty in guarding against the jealousy of the king, and by his command married Louisa of Savoy, who, on the 12th of September, 1494, became the mother of Francis I. Louis XII. took charge of the infant heir of Angoulême at the death of his father, and afterwards gave him his daughter Claude in marriage. Francis distinguished himself in the defence of the frontiers on the side of Spain and Flanders, and succeeded to the throne at the age of twenty-one, in January, 1515.

One of his first endeavours was to prosecute the claim on the duchy of Milan, which he derived from his grandmother Valentine. Against this expedition the Swiss had already combined with Pope Leo X. and with the king of Spain; but Francis having passed the Alps unexpectedly, a battle took place at Marignano, in which the Swiss infantry fought with even more than their usual obstinacy and courage. The combat lasted two days, and from 10,000 to 15,000 Swiss are said to have fallen in it. The victorious French entered Milan on the 23rd of October, 1515, and a peace was shortly after concluded with the pope.

In January, 1516, the prince (afterwards Charles V.) who was destined to be the rival of Francis throughout his whole career, succeeded to the kingdom of Castile, notwithstanding his mother Joan was still alive. The frontier states to France on the side of Flanders and of the Pyrenees were thus in the hands of one and the same monarch. The treaty of Noyon (1516) re-established for a short time the peace of Europe; and the king of France endeavoured to prepare himself against future wars by securing the friendship of the Swiss, whom he had learnt to appreciate as enemies. The Venetians and the Pope also became his allies.

On the death of Maximilian, emperor of Germany (1519), Charles and Francis declared themselves candidates for the imperial crown. The former urged his claims as one of the house of Austria and as the only prince in Europe who, by uniting the wealth of the New World and the arms of the Old, could arrest the progress of the Sultan Selim II. The latter put forward his greater experience in war, and dwelt on the impolicy of placing the joint power of Spain, Flanders, Naples, and the empire in the hands of an Austrian prince. Henry of England was inclined to become a competitor himself, while Leo X. would gladly have seen on the German throne some prince of less importance than Charles or Francis, and one who had no power or claim in Italy. It is said that the crown was offered to the elector of Saxony, who declined it and secured the election of Charles. Francis had an interview with the king of England between Guines and Ardres, and Charles landed at Dover on his voyage from Corunna to the Netherlands (1520).

In 1521 Francis made an attempt to recover Navarre for the family of Jean D'Albret; but after the capture of Pampeluna the French were repulsed from before Logroño, and finally lost all they had previously gained. Another cause of quarrel arose from Robert de la Mark, lord of Bouillon, declaring war against the emperor and throwing himself on France. Mézieres was defended by Bayard against the imperial army, and a pretended attempt at mediation having been made by Wolsey, who was intriguing for the papal crown, a league was concluded against Francis by the emperor, the king of England, and the pope. Lautrec, the general of Francis, being deserted by his Swiss auxiliaries, was driven from the Milanese by Prosper Colonna; Parma and Placentia were united to the ecclesiastical states; and the death of Leo X. is said to have been accelerated by joy at the successes of his allies (1521). The French, although reinforced by 10,000 Swiss, were defeated at Bicocca, and while Milan and Genoa were being lost in Italy, Henry of England attacked Picardy and Normandy. In 1523 the Venetians, hitherto friendly to Francis, joined the pope and the emperor against him; and his own subject, the constable of Bourbon, exposed to the vengeance of slighted love on the part of the king's mother, fled to his enemies. The French under Bonnivet, however, passed the Ticino in spite of the veteran Prosper Colonna; and the failure of three attacks on the side of Gascony, Burgundy, and Picardy left Francis in as good a position as the strength of his adversaries could allow him to hope for. In the spring of 1524 Pescara and Bourbon defeated the French on the Sesia; and in this battle fell Bayard, 'the knight without fear and without reproach.' An attempt on the part of the imperialists to maintain the war in Provence was frustrated by the king, who passed the Cenis and advanced on Milan. Of that city he obtained possession; but by laying siege to Pavia, which was gallantly defended by Antonio de Leyva, he gave time for the imperial generals to reorganise their forces. This they did with such effect, that on the 24th of February, 1525, they utterly defeated the French troops, and Francis himself remained a prisoner in the hands of Lannoy, vice-king of Naples. He announced the result of the battle of Pavia to his mother in the celebrated words, 'Tout est perdu fors l'honneur!' Robertson says, 'On that occasion the great abilities of Louisa the regent saved the kingdom, which the violence of her passions had more than once exposed to the greatest danger.' Henry of England and his minister Wolsey were inclined to listen to her overtures; the former because he was alarmed at the growing power of Charles, the latter because he had been a second time disappointed of the papal crown by the election of Clement VII.

Charles demanded, as the ransom of the French king, Burgundy for himself, Provence and Dauphiny for Bourbon, and the renunciation of all claims on the Italian states. He caused his prisoner to be conveyed by sea from Genoa to Barcelona, and thence to Madrid, where he detained him in rigorous confinement, until the alteration in his health made the emperor fear the loss of all the advantages which he had anticipated. At length the treaty of Madrid was arranged (1526). Francis was to cede Burgundy, to give up all claims on Italy or on the sovereignty of Flanders and Artois, to restore Bourbon to his dignities and estates, to marry Eleanor queen dowager of Portugal, sister to the emperor, and finally to deliver his eldest and second sons as hostages for the fulfilment of these stipulations. While he pledged his oath and honour for the observance of the conditions of the treaty, he caused a secret protest against the validity of his promise to be prepared. He set foot on France a little more than a year after the battle of Pavia, and mounting his horse, put him into a gallop, exclaiming, 'I am yet a king!'

It very soon became obvious that the French king did not intend to adhere to the treaty of Madrid. While Charles in vain demanded the fulfilment of his oath, from which the pope had absolved him, Francis entered into a league with the Venetians, Clement, and Henry of England. The imperial generals, taking advantage of a delay on the part of the French, reduced the castle of Milan, though obstinately defended by Sforza, whom Charles had already declared to have forfeited his duchy. In 1527 Bourbon advanced upon Rome: he himself fell in the assault of that city, which suffered more from the army of a Christian emperor, the especial patron of the Roman see, than it had ever done from the most barbarous of its heathen invaders. Clement himself, shut up in the castle of St. Angelo, was at length obliged to surrender, and was only released for a heavy ransom at the termination of six months.

Notwithstanding some disposition on the part of the emperor to relax the terms of the treaty of Madrid, the negotiations terminated in a declaration of war on the part of France and England. Charles accused his rival of perjury, to which Francis replied by a challenge to single combat.

In February, 1528, the imperial army, wasted by the disease consequent on its excesses, was with difficulty dragged off from the miserable city on which it had preyed for ten months. Lautrec followed them, and sat down before Naples; but the French army were in their turn attacked by disease, and finally reduced to a wretched remnant, which surrendered to the prince of Orange at Aversa. Andrew Doria, disgusted with the conduct of the French, renounced their alliance and liberated Genoa, while Antonio de Leyva ruined the French army in the Milanese as completely as the prince of Orange had ruined that which besieged Naples. The success of the Turk in Hungary, and the progress of the Reformation, inclined the emperor to peace, and the treaty of Cambray was concluded by the negotiations of Margaret of Austria and Louisa of Savoy (August 5, 1529). Charles agreed not to urge his claim on Burgundy, while Francis renounced the sovereignty of Flanders, abandoned Italy, and bound himself to pay 2,000,000 crowns as the ransom of his sons. In consequence of a treaty between the pope and the emperor, Florence was restored to the Medici, and Clement allowed himself to be guided by the wishes of Charles as to the divorce of Catherine of Aragon from Henry VIII. He met however with eagerness a proposal on the part of Francis for the marriage of his niece, Catherine de' Medici, to the duke of Orleans, afterwards Henry II.

The dissensions in the empire manifested by the diet of Augsburg (1530) and the league of Schmalkalden, induced the French king to encourage that religious party in Germany which he persecuted in his own dominions. During the absence of Charles in Africa (1535) he advanced into Italy under pretext of punishing Sforza, now returned to his duchy, for the execution of his ambassador, and seized the territory of Savoy. It was not until the spring of 1536 that the emperor was able to take active measures against him. Sforza died, and the imperial troops drove the French out of Savoy and advanced to the frontiers of Provence. The French had laid waste the whole of Dauphiny; and although Arles and Marseilles were besieged, Montmorency, a second Fabius, kept his troops under the walls of Avignon and refused to risk a battle. This policy succeeded so well, that at the end of two months the imperial army was compelled to retreat in a miserable state. After an attack by the French on the side of Flanders, a cessation of arms was at length agreed on through the mediation of the two sisters, the queens of Hungary and France. The exhausted state of his treasury, and the fear of an alliance between Francis and the Turk, induced Charles to consent to a cessation of arms in Piedmont also, which was followed by a truce for ten years, concluded at Nice.

Charles then embarked for Barcelona, but being detained by contrary winds on the coast of Provence, Francis proposed a personal interview. The French king went on board the emperor's galley, and the latter returned his visit at Aigues Mortes. Thus after years of the bitterest hostility and enmity, after accusations of perjury on the one hand and of murder on the other, and after a challenge to mortal combat, these two princes presented the singular spectacle of apparent reliance on each other's good faith and honour. The marriage of James V. of Scotland with Magdalen of France, and afterwards with Mary of Guise, tended greatly to estrange Henry of England from the French court, while a better understanding seems to have followed the interview of Charles and Francis. A proposal made by the citizens of Ghent to deliver their town into the hands of the latter, was not only rejected, but the designs of the malcontents were betrayed to the emperor (1539). Charles put the sincerity of his new friendship to a more severe test, by asking permission to pass through France on his way from Spain to the Low Countries. Francis met him at Chatelleraut and received him as his guest in Paris. A promise was made of investing the duke of Orleans with the duchy of Milan; but all demands for its fulfilment on the part of the ambassadors of Francis were evaded by the emperor.

While the latter was preparing his expedition to Algiers the king of France sent to demand satisfaction for the murder of his ambassador to the Porte, Rincon, who was assassinated, if not by the orders, at least with the connivance of the Marquis del Vasto, the governor of Milan. On the ground of this outrage war was again declared (1542), but the king of England and the Protestant princes remained firm to the emperor. The subsequent operations in Roussillon, Flanders, and Piedmont, produced no events of importance until the battle of Cerisoles (April 11, 1544), in which the French were completely victorious. On the other hand, Charles advanced into Champagne with a large and well-appointed army, and Henry VIII. besieged Boulogne. On the 11th September, 1544, a peace was concluded at Crespi, which the emperor consented to, principally from fear of the Turk and from the increasing strength of the Protestants. Francis did his utmost to animate these two parties; but in 1547, on the last day of March, the death of the French king relieved his opponent from many of the apprehensions which he had entertained.

In reviewing the position of Francis during his whole struggle with the emperor, we are struck with the enormous force against which he had to contend. France, in his reign, sustained the same character in which she appeared again in the following century. As in the time of the thirty years' war, she, a Catholic power, aided the Protestant cause; so in the early part of the sixteenth century, when the danger was the more imminent, from the whole strength being concentrated in the hands of Charles V., the French king was the only efficient hindrance to the universal monarchy of the house of Austria. It was Francis I. who favoured the revolt of Geneva from the duke of Savoy, and enabled that city to found an independence which was afterwards to become one of the main props of the reformed faith. While however he fostered religious rebellion in Germany, he proved his orthodoxy in Paris by the utmost cruelty to the heretics. The gallant manner in which he struggled against his formidable rival, and grappled with him again and again after the heaviest blows, excites our sympathy in his favour: his personal courage was undoubted, and his generosity on the two occasions in which Charles put himself in his power, more chivalrous than his conduct with reference to the treaty of Madrid. The author of his life, in the 'Biographie Universelle,' says, 'If it was perjury, every Frenchman was his accomplice.' The hard nature of the conditions however cannot justify an open and deliberate oath, accompanied by a secret protest as its antidote. He is said to have requested knighthood from the sword of Bayard, and his usual mode of affirming what he said was—'Foi de Gentilhomme.' In his family Francis was far from happy: by his first wife Claude of France, daughter of Louis XII., he had three sons and four daughters; his eldest, the Dauphin, was said to have been poisoned by his cup-bearer, Montecuculi: whether such was the fact is very doubtful, and there is certainly no reason to suppose that the crime was instigated by Charles V. The second son succeeded to the throne by the title of Henry II. His second wife, Eleanor of Portugal, bore him no children. His private life is not entitled to much praise. Madame de Chateaubriand, sister of Lautrec, the duchesse d'Etampes, and la belle Féronière, were successively his mistresses: to vengeance on the part of the husband of the last he is said to have owed his death. In his reign ladies for the first time became constant attendants at the French court, and the foundation was laid for those profligate manners so fully developed in the succeeding reigns.

As the patron of art and literature, Francis the First ranks deservedly high. He reigned at the moment when sounder learning and higher principles of art were spreading from Italy to the rest of Europe. Budé, Lascaris, Erasmus, the Stephens, and Marot, were enabled to boast of his countenance to letters: he is well known as the patron of Primaticcio and Cellini; while a greater than either, Leonardo da Vinci, is said to have died in his arms. (Robertson's *Charles V.*; Père Daniel, *Histoire de France; Dictionnaire de Bayle; Biographie Universelle;* Leopold Ranke, *Geschichte der Päpste.*)

FRANCIS II. of France, born in 1543, was the eldest son of Henri II. and of Catherine de' Medici. He married, in 1558, Mary Stuart, only daughter of James V. of Scotland. On the death of his father, 10th July, 1559, Francis became king, being then sixteen years of age. He entrusted the government to Francis duke of Guise and his brother the cardinal of Lorraine, uncles of Mary Stuart. This was the beginning of the civil and religious wars which desolated France for half a century. Anthony of Bourbon, king of Navarre, and Louis his brother, prince of Condé, with the other princes of the blood, and the great officers of the state, being indignant at seeing all the power of the state in the hands of two strangers, conspired against the Guises, and joined the Protestants for that purpose, as the Guises were the zealous supporters of Catholicism. In March, 1560, the Guises having been informed of a conspiracy against them, removed the king and court to the castle of Amboise: the king named the duke of Guise lieutenant-general of the kingdom, and a number of persons were arrested and executed. Soon after the edict of Romorantin was issued, which constituted the bishops judges of heresy, and took the cognizance of this offence from the parliaments. It was said that the chancellor De l'Hôpital consented to this edict in order to avoid a greater evil, namely, the establishment of the Inquisition in France, which was proposed by the cardinal de Lorraine, and in hopes that the bishops would prove more humane than the parliaments, who had put a great number of Protestants to death.

By a former edict, issued at Escouen by Henri II. in June, 1559, all the Lutherans were declared punishable by death. The name of Huguenots, to denote the Calvinists as a distinct sect, was introduced soon after. The admiral de Coligni having presented to the king a memorial in their favour, it was resolved, at the suggestion of the chancellor De l'Hôpital, to leave them in peace, until the general council should decide, and that if the pope did not assemble a general council, a national council should be convoked in France. The king assembled the states-general at Orleans, when the prince of Condé, on his arrival, was arrested on the charge of a conspiracy, and condemned to lose his head; but he was saved by the death of the king, 5th December, 1560, after a reign of only seventeen months. He was succeeded by his brother Charles IX., then a minor. Francis II died of an abscess in his ear; and the rumours of poison which were spread at the time seem, according to De Thou and other historians, without foundation.

FRANCIS I., emperor of Germany, born in 1708, was the son of Leopold duke of Lorraine, who was the son of Charles V. of Lorraine, and of Eleonora Maria, daughter of the emperor Ferdinand III. Francis's mother was the princess of Orleans, niece of Louis XIV. On the death of his father in 1729, Francis succeeded him as duke of Lorraine and Bar. In consequence of the war of the Polish succession, Lorraine was ceded to Stanislaus Leczinski, father-in-law of Louis XV., to revert after his death to the crown of France, and Francis received Tuscany in exchange, which duchy became vacant by the extinction of the house of Medici. Francis married in 1736 Maria Theresa of Austria, the only daughter and heiress of the emperor Charles VI. In January, 1739, he went to reside at Florence with his consort. In 1740 Charles VI. died, and Maria Theresa succeeding him in the hereditary dominions of the house of Austria, she made her husband co-regent with herself, but gave him little share in the administration. He however commanded her armies in the war which she had to sustain in order to secure her inheritance. [MARIA THERESA.] After the death of the emperor Charles VII. in 1745, Francis was elected his successor on the imperial throne. In 1748 the peace of Aix-la-Chapelle restored peace to Germany and to Europe; but in 1756 a new war broke out between Prussia and Austria, known by the name of the Seven Years' War, which was terminated by the peace of Hubertsburg, in February, 1763. The following year Joseph, the eldest son of Francis, was elected king of the Romans, and in 1765 Francis died at Innsbruck, and Joseph succeeded him as emperor of Germany; his mother however retaining in her hands the sovereignty of the Austrian dominions till her death. As emperor of Germany and grand-duke of Tuscany, Francis left behind him the reputation of a good prince, though he was involved in long wars against his inclination.

FRANCIS II., emperor of Germany, and I. of Austria, the eldest son of Leopold II. and of Maria Louisa of Spain, was born at Florence in February, 1768. At an early age he was sent to Vienna to be brought up under the eyes of his uncle, Joseph II., who gave him the best preceptors in that capital. He was particularly well instructed in the science of administration, and he made himself master of all its details. He was also engaged in several campaigns against the Turks, and was present at the taking of Belgrade, by General Laudon, in 1789. When Joseph II. died, in 1790, Francis took the direction of the government till the arrival of his father from Florence. Two years afterwards Leopold himself died, in 1792, and Francis, who succeeded to his vast dominions, was likewise elected his successor to the imperial crown. He came to the throne at a very anxious moment. The rash or premature, though well-meant reforms of Joseph II., had sown deep discontent in several parts of the hereditary states of Austria, which the conciliatory measures of Leopold had not had time to allay; the Belgians were in open revolt, and Francis himself was on the eve of a war with France. In April, 1792, Louis XVI. was obliged, by the legislative assembly, to declare war against him. The Austrian armies on the Rhine carried on the war for some years with varied success, and without any definite result; but the successes of Bonaparte in Italy, in 1796-7, decided the fate of the war. [BONAPARTE.] By the treaty of Campoformio, Francis gave up Belgium and the duchy of Milan, receiving in exchange Venice and

Dalmatia. In 1799 a new coalition took place between Austria, Russia, and England, and the allied armies were eminently successful, both in Italy and Germany; but a misunderstanding between the Austrian and Russian commanders led to the defeat of the Russians in Switzerland. In 1800, Bonaparte having won the battle of Marengo and re-conquered Lombardy, negotiations of peace followed; but Francis refused to treat separately from his ally, England, and hostilities began afresh. The French under Moreau having gained the battle of Hohenlinden, advanced owards Vienna, when Francis proposed peace, and the reaty of Luneville followed in 1801, by which Ferdinand, the emperor's brother, was obliged to give up Tuscany, and his uncle to renounce Modena. In December, 1804, while Napoleon crowned himself emperor of France at Paris, Francis foreseeing the approaching dissolution of the German empire, declared himself hereditary emperor of Austria. In 1805, feeling jealous of the new encroachments of Napoleon in Italy and Holland, the Austrian cabinet formed a new coalition with Russia and England. The campaign was unfavourable to Austria, the French entered Vienna, and the battle of Austerlitz finished the war. By the following peace of Presburg, December, 1805, Austria gave up the Venetian states and the Tyrol. The old German empire was now dissolved after a thousand years' duration; and in August, 1806, Francis renounced the title of emperor of Germany, and assumed that of Francis I., emperor of Austria, king of Bohemia and Hungary, &c. He now availed himself of some years of peace to repair the calamities of the former wars, to make reductions, enforce a strict economy, and support the credit of the state. In the war of Napoleon against Prussia, 1806-7, Austria maintained a strict neutrality. After the peace of Tilsit and the conferences of Erfurt between Napoleon and Alexander, the occupation of North Germany by the French, and the invasion of Spain, the emperor Francis felt alarmed, and prepared for a fresh struggle, which he saw must take place sooner or later for the independence of his crown. Availing himself of Napoleon's embarrassments in Spain, at the beginning of 1809, he began alone a fourth war against France, with a force of 400,000 men. The archduke Charles commanded the army of Germany, and the archduke John that of Italy, whilst a force under General Chasteler entered the Tyrol, where the people rose to a man for their former sovereign. This war had a different character from the preceding, inasmuch as the people of Germany began now to take part against the French; corps of partisans were formed under Schill, the duke of Brunswick Oels, and others who annoyed the French, and a general spirit of insurrection manifested itself against the foreign yoke. The operations of the war were also conducted on a different plan from the former wars of Marengo, Austerlitz, and Jena, when a single battle had decided the fate of the war. The Austrians now fought detached engagements with various success, and although obliged to retire, and even to abandon Vienna, the archduke Charles kept his army together in good order. The battle of Aspern was fought with a tremendous loss on both sides, and Napoleon was obliged to retire across the Danube. After some time the battle of Wagram took place, and although lost by the Austrians, yet the archduke retired in good order towards Bohemia. He proposed an armistice, which Napoleon accepted, and after long negotiations the peace of Schönbrunn took place in October, 1809. Austria gave up Trieste, Fiume and Croatia, Salzburg, and part of Gallicia.

In 1810 Napoleon married a daughter of the emperor Francis. In 1812, during the Russian campaign, an auxiliary Austrian corps, under Schwartzenberg, acted in Poland against Russia, but it effected little. In 1813 Austria resumed its neutrality, and offered its mediation between Russia and France on condition that both powers should evacuate Germany. On Napoleon's refusal, Austria joined the allies, and its army contributed mainly to the great battle of Leipzig, which decided that campaign. In the following year the Austrian armies entered France by the way of Switzerland, and occupied Burgundy and Lyon. The emperor Francis followed the movements of his troops, and after the Russians and Prussians had entered Paris, in April, 1814, he proceeded to that capital, where he remained two months. In June, 1814, he returned to Vienna, where the congress of the European powers opened its sittings. In 1815, after Bonaparte's return from Elba, the Austrian troops advanced again by the Simplon road and occupied Lyon. Meantime another Austrian army had driven Murat from Naples and re-established the old King Ferdinand. From that epoch till his death the emperor Francis remained at peace, with the exception of a short campaign against the constitutional party at Naples in 1821, when his troops appeared as auxiliaries to King Ferdinand. When the events of July, 1830, were known at Vienna, Francis and his minister, Prince Metternich, withstood the suggestions of the more violent legitimists, and determined not to interfere in the internal affairs of France provided that power respected the existing treaties with regard to its foreign policy. Prussia and England followed the same course, and thus Europe was saved from another general war. Francis died at Vienna on the 2nd of March, 1835, in his sixty-seventh year, and was succeeded by his eldest son Ferdinand.

The personal character of the emperor Francis has been spoken of favourably even by his enemies. In Austria and his other German states he was decidedly popular, and personally loved, especially by the middling and lower classes. He was accessible to all; kind and plain spoken, simple and regular in his habits, assiduous to business, and his moral conduct was unexceptionable. His policy and administration have been differently judged by writers, according to their respective opinions. He was decidedly and openly averse to political innovation; having suffered much from the French revolution and its consequences, he had conceived a horror of revolutions, and of every movement that partook of a democratic spirit. The ruling principles of his administration were love of order, minuteness of detail, economy, and strict subordination. These principles, which agreed pretty well with the character of his German subjects, clashed with the temper of the people of Italy, whose activity, love of pleasure, military ambition, and national spirit, had been stimulated during twenty years of French dominion. The people of Lombardy, especially the educated classes, felt dissatisfied at being reduced to the condition of an Austrian dependency. Conspiracies were hatched, which all failed, and only served to render the Austrian government suspicious and severe. Of the persons implicated some escaped, others were tried and condemned to death, which sentence the emperor commuted to imprisonment for various periods in several fortresses, but mostly in the castle of Spielberg, in Moravia. In other respects Francis's administration was mild and temperate. He promoted material improvements, roads, canals, and manufactures. His views of commercial policy were of the old or Colbert school. In one particular he deserves unqualified praise, as the promoter of popular education: he established elementary schools throughout all his dominions, and superintended himself all the details and working of the system. An account of the system is given in an article in No. VI. of the 'Quarterly Journal of Education,' entitled 'Italian Education.' With regard to religious tolerance, Francis followed the principles of his predecessors, Joseph and Leopold. He also completed the code of laws begun by them, which is called by his name. Further details concerning the emperor Francis, his court, and cabinet, may be found in the following works among others: Russel's *Tour in Germany; Austria as it is*, London, 1827; Menzel, *Reise-nach Oesterreich*, 1831; and a book published at Paris in Italian, called *Semplice verità opposta alle menzogne di Enrico Mislei*, 1834, in which many exaggerated or unfounded charges against the emperor Francis are refuted by means of authentic facts and figures. Although the policy of Austria has been guided by its ministers, who have generally been very able men, yet there is no doubt that the personal character and principles of the emperor Francis have had very considerable influence.

FRANCIS (SAINT), and FRANCISCANS. St. Francis, the founder of one of the four orders of mendicant friars, called Franciscans, was born at Assisi, in Umbria, in 1182. He was the son of Peter de Bernardino, a wealthy merchant, and his mother's name was Pica. His mother christened him John, but his father, who was absent at the time of his birth, changed his name to Francis. Wadding, in the 'Annales Minorum,' says, because he learned French early, to qualify himself for his father's profession, Jacobus de Voragine turns it into a miracle; 'Primò ratione miraculi connotandi· linguam enim Gallicam miraculosè a Deo recepisse cognoscitur.' (*Acta Sanctor.* Octob., tom. ii.

D. 559.) St. Francis was at first a young man of dissolute manners, but in consequence of a fit of sickness about the year 1206, he became so strongly affected with religious zeal as to take a resolution to retire from the world. He now devoted himself to solitude, and mortified himself to so great a degree that the inhabitants of Assisi judged him to be distracted. His father, thinking to make him resume the habits of ordinary life, threw him into prison; but finding that this made no impression upon him, he carried him before the bishop of Assisi, in order to make him renounce all title to his father's temporal possessions, which he not only agreed to, but stripped off all his clothes, even to his shirt. He then prevailed with a considerable number of persons to devote themselves, as he had done, to the poverty which he considered as enjoined by the gospel, and drew up an institute, or rule, for their use, which was approved by Pope Innocent III. in 1210, as well as by the Council of Lateran held in 1215. In 1211 he obtained from the Benedictines the church of Portiuncula, near Assisi, and his Order increased so fast that when he held a chapter in 1219, near five thousand friars of it were present. He subsequently obtained a bull in favour of his Order from Pope Honorius III. About this time he went into the Holy Land, and endeavoured in vain to convert the Sultan Meledin. It is said that he offered to throw himself into the flames to prove his faith in what he taught. He returned soon after to his native country, and died at Assisi in 1226. He was canonized by Pope Gregory IX. the 6th of May, 1230, when, October 4th, the day on which his death happened, was appointed as his festival.

The followers of St. Francis were called FRANCISCANS, GREY, or MINOR FRIARS; the first name they had from their founder; the second from their grey clothing; and the third from a pretended humility. Their habit was a loose garment of a grey colour, reaching to their ancles, with a cowl of the same, and a cloak over it when they went abroad. They girded themselves with cords, and went bare-footed.

This order was divided into several bodies, some of which were more rigid than others. The most ample and circumstantial account of it is to be found in *Annales Minorum, seu Trium Ordinum à S. Francisco Institutorum, auctore Luca Waddingo Hiberno;* the second and best edition of which was published at Rome by Jos. Maria Fonseca ab Ebora, in 19 volumes in fol., 1731-1744, with a supplement, *Opus posthumum Fr. Jo. Hyacinthi Sbaraleæ*, fol., Rom., 1806. To Wadding we are indebted for the *Opuscula S. Francisci*, 4to., Antw. 1623; and the *Bibliotheca Ordinis Minorum*, 4to., Rom., 1650. The *Acta Sanctorum* of the Bollandists already quoted (*Octob.* tom. ii. p. 545-1004), contains several lives of St. Francis, including that by St. Bonaventure.

Davenport (*Hist. Fratr. Min.* p. 2) says this order came into England in 1219; but Stow, Dugdale, Leland, and others, say the Franciscans came in 1224, and that they had their first house in Canterbury, and their second at London. Tanner says (*Notit. Monast.* pref. p. 13), that at the dissolution the Conventual Franciscans had about fifty-five houses in England; but from the last edition of Dugdale's 'Monasticon,' it appears they had sixty-six. Their rule, as translated by Stevens, with several charters of Edward III. and one of Richard II. in favour of them, will be found in that work, vol. vi. p. iii., pp. 1504-1508. See also Parkinson's *Collectanea Anglo-Minoritica, or a Collection of the Antiquities of the English Franciscans, or Friars Minors, commonly called Gray Friars*, 4to., Lond. 1726.

The original of the Franciscan rule will be found in Wadding's 'Annales,' vol. i. pp. 66-79.

FRANCIS, REV. DR. PHILIP, was the son of the Rev. John Francis, dean of Lismore, and rector of St. Mary's, Dublin, in which city Philip was born in the early part of the last century. The common biographical dictionaries say that the rector of St. Mary's was expelled from his preferments at the Revolution on account of his Tory principles; but this must be a mistake, if we may rely on the dates given in a detailed memoir of Sir Philip Francis, by a personal friend in the Annual Obituary for 1820, where it is stated that the Rev. John Francis was nominated dean of Lismore in 1722. The story of the ejection, if we may trust to this authority, cannot even be true of the grandfather of the subject of the present article, whose name was also John; for he, it seems, became dean of Leighlin in 1696, and sat in convocation in 1704. Philip was educated at the university of Dublin, and then entered the church, the profession to which his progenitors for several generations had belonged. About the year 1750 he came over to England, and set up an academy at Esher in Surrey, where Gibbon was for a short time one of his pupils; but the historian in his posthumous memoirs gives no favourable account of the improvement he made. Francis, he says, 'preferred the pleasures of London to the instruction of his pupils.' While in this situation he published his poetical translation of Horace, which immediately brought him into notice, and still continues to be reprinted. It has the advantage of being the only complete modern metrical version in English of the works of that poet, but has no pretensions to be considered an adequate representation of the original. He also published in 1757 a translation of the 'Orations of Demosthenes and Æschines,' in 2 vols., 4to. Before this he had published two tragedies, 'Eugenia,' 8vo., 1752, and 'Constantine,' 8vo., 1754. 'Eugenia' was acted at Drury Lane, Garrick sustaining the principal character; but although repeated for nine nights, it was very indifferently received. It is said in the 'Biographia Dramatica' to be little more than a free translation of a French tragedy by Grasigni, called 'Cenie,' of which a literal version was published the same year under the title of 'Cenia; or, the Supposed Daughter.' 'Constantine' was produced at Covent Garden. 'It met with very bad success,' says the Biog. Dram., 'although not by many degrees the worst of the productions of that season.' These literary performances obtained for the author the acquaintance of many of the most distinguished persons of the time; but he secured a connexion more important to his worldly interests by some political pamphlets which he is said to have written, though they seem to have appeared without his name, and their titles are not given in any of the biographical notices of him that we have seen. From a passage in the Preface to his Translation of Demosthenes, it may be inferred that he took the Whig, or what is commonly called the liberal side of politics. The biographer of his son in the Annual Obituary says, that 'he is mentioned in Wilkes's Letters as being engaged in some delicate negotiations on the part of the Right Hon. Henry Fox, afterwards Lord Holland.' He was chaplain, it seems, to Lord Holland, and assisted in the education of his son Charles, afterwards the distinguished orator. Through Lord Holland's influence he was presented to the rectory of Barrow in Suffolk; in 1764 he was also appointed joint-chaplain to Chelsea College. He died in 1773.

FRANCIS, SIR PHILIP, was the son of the Rev. Dr. Philip Francis, and was born in Dublin, 22nd October, 1740. When his father came over to England in 1750, he was placed on the foundation of St. Paul's School, London, where he remained about three years. Here, it is worth observing, one of his school-fellows was Mr. Henry S. Woodfall, afterwards the printer of the 'Public Advertiser,' and the publisher of the 'Letters of Junius.' In 1756 he was appointed to a place in the office of his father's patron, Mr. Fox, then secretary of state; and when Fox was succeeded by Pitt in December of this year, young Francis had the good fortune to be recommended to, and retained by, the new secretary. In 1758, through the patronage of Mr. Pitt, he was appointed private secretary to General Bligh, when that officer was sent in command of an expedition against the French coast; and while serving in this capacity he was present at an action fought between the British and French forces in the neighbourhood of Cherbourg. In 1760, on the same recommendation, the earl of Kinnoul, on being appointed ambassador to Portugal, took Francis with him as his secretary. He returned to England in 1763, when the Right Hon. Wellebore Ellis, afterwards Lord Mendip, gave him an appointment of considerable consequence in the War Office, over which he then presided. He retained this place till March, 1772, when he resigned in consequence of a quarrel with Lord Barrington, who had by that time succeeded Mr. Ellis. The remainder of that year he spent in travelling through Flanders, Germany, Italy, and France. In June, 1773, soon after his return, he was appointed to the distinguished place of one of the civil members in council for the government of Bengal, with a salary of 10,000*l*. He is said to have owed this appointment to the influence of Lord Barrington, whose hostility therefore would appear to have been now converted into very substantial friendship, or who must be supposed to have had private reasons for such an exercise of his patronage. He set out for India in the summer of 1774, and remained in that country till December, 1780, when he resigned his situation and embarked for England, after having had a quarrel with the governor-general Mr. Hastings, which produced a duel, in which Mr. Francis was shot through the body. He had opposed Hastings, and for some time effectually, from his entrance into the council, but the sudden death of two of his colleagues by whom he had been generally supported, had latterly left him in a helpless minority in his contest against the policy of the governor-general. In 1784 Mr. Francis was returned to parliament for Yarmouth in the Isle of Wight, and soon began to take an active part in the business of the House of Commons, where, although he was not a fluent speaker, the pregnancy of his remarks and the soundness and extent of his information always commanded attention. He took his side from the first with the Whig opposition, and to that party he adhered while he lived. When it was resolved in 1786 to impeach Mr. Hastings, it was proposed that Mr. Francis should be appointed one of the managers of the impeachment; but all the eloquence of Burke, Fox, and Windham, (aided by his own) could not overcome the feeling of the House against placing in this situation a man with whom the accused had had a personal quarrel. The motion was twice negatived by large majorities. Nevertheless there was much force in what was urged in its support, and the casuistry of the question was not a little curious and perplexing. The benefit of the talents and information of Mr. Francis was eventually secured to the prosecution by a letter inviting his assistance, which was addressed to him by the unanimous vote of the committee of managers; and this business occupied his chief attention for many years. When the war with France broke out, Mr. Francis adhered to the party of Fox and Grey, and was one of the first and most active members of the famous association of the Friends of the People. At the new election in 1796 he stood candidate for Tewkesbury, but failed in being returned, and he did not sit in that parliament. In 1802, however, he was returned for Appleby, by Lord Thanet, and he continued to sit for that borough while he remained in parliament. The question of the abolition of the slave trade was that in which he took the keenest and most active part in the latter term of his parliamentary career; and it is said that in advocating the abolition, he took a course as much opposed to his private interests as it was in conformity with his public principles. On the formation of the Grenville administration, Mr. Francis was made a knight of the bath, 29th October, 1806; and it is believed that it was at first intended to send him out to India as governor-general. That appointment however never took place. He retired from parliament in 1807; and after this, the interest which he continued to take in public affairs was chiefly evinced by occasional political pamphlets and contributions to the newspapers. In 1816 great attention was drawn to Sir Philip Francis, by Mr. John Taylor's very ingenious publication, entitled 'Junius identified with a distinguished Living Character,' the object of which was to prove that he was the author of the celebrated 'Letters of Junius.' It may at least be confidently affirmed, that no case half so strong has yet been made out in favour of any one of the many other conjectures that have been started on the subject of this great literary puzzle. Sir P. Francis however, it is said, persisted to the last in rejecting the honour thus attempted to be thrust upon him. His acknowledged publications (all of them pamphlets) amount to twenty-six in number, according to a list appended to the memoir of his life in the 'Annual Obituary.' One of the most curious of them is the last, entitled 'Historical Questions, exhibited in the *Morning Chronicle* in January, 1818, enlarged, corrected, and improved,' 8vo., 1818, which originally appeared in a series of articles in the 'Morning Chronicle.' Sir Philip Francis died after a long and painful illness, occasioned by disease of the prostate gland, at his house in St. James's-square, 22nd December, 1818. He was twice married, the second time after he had reached the age of seventy, to a Miss Watkins, the daughter of a clergyman. By his first wife he left a son and two daughters.

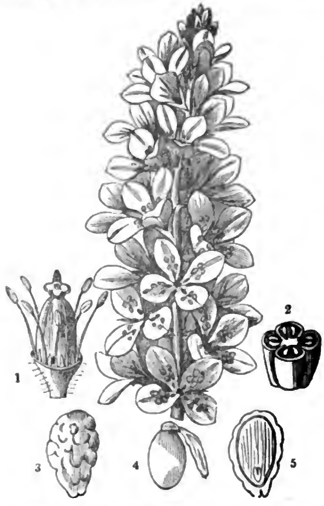
FRANCIS DE SALES. [Sales.]

FRANCIS XAVIER. [Xavier.]

FRANCISCO, RIO. [Brazil.]

FRANCKE, a celebrated German philanthropist, whose life presents a striking instance of the good which an individual may effect. Francke was born at Lubeck, in 1663. He made such rapid progress in learning that at the age of fourteen he was fit to enter the university, where he devoted himself with great application to the study of divinity and the antient as well as modern languages. In 1691 he became professor of oriental languages at the university of Halle, and soon afterwards professor of divinity and pastor of the parish of Glaucha, a suburb of Halle. The wretched state of his parishioners, who were sunk in the most abject ignorance and poverty, gave the first impulse to his philanthropic exertions. He began by teaching the children, whom he supported at the same time by small donations. He took a few orphans to educate; their number rapidly increased, and as he was assisted by the contributions of many charitable persons, he gradually extended the sphere of his beneficial activity, and formed several establishments for the education of all classes. In 1698 he laid the foundation of the orphan asylum, though he had scarcely any means of completing the edifice, but the necessary funds were constantly supplied by charitable persons. It frequently happened that all his funds were exhausted, and that he had not even sufficient money to pay the workmen, when at the very critical moment he received by post large sums from known or unknown benefactors. He was fortunate in finding not only persons who contributed money to promote his undertaking, but many who zealously assisted him in his labours. Francke was a man of mild and cheerful disposition, agreeable manners, and exceedingly laborious. He punctually attended to his academical lectures, and to his clerical duties at Halle as well as in Glaucha: his affairs and extensive correspondence engrossed all the day, and it was only late at night that he could occupy himself with his literary labours, the earnings of which he always devoted to charitable purposes. The greater part of his works were written in German, but he published also some learned works on divinity in Latin. Francke died in 1727, and the following establishments which now exist at Halle owe to him their foundation and bear his name: 1, the Orphan Asylum, in which, since its establishment, 4500 poor orphans of both sexes have been gratuitously educated; 2, the Pedagogium, an institution for the education of young men of the higher and middle classes, founded in 1696; 3, the Latin School, established for the education of children not belonging to wealthy families, and divided into nine classes; 4, German or Burgher Schools for boys and girls; 5, the East India Missionary Establishment; and 6, the Cansteinian Biblical Institution. This last establishment was the forerunner of Bible Societies. It was founded by Baron Canstein, a German nobleman, who, after having spent a part of his life in courts and camps, became by his intercourse with Francke religiously disposed, and by his exertions and the aid of subscriptions established the biblical institution of Halle, in order to promote the reading of the Scriptures among the poorer classes. This institution possesses a number of stereotype plates, from which a certain number of Bibles is continually struck off: this institution has furnished, in the above-mentioned manner, from its establishment in 1712 till 1834, more than two millions of Bibles and above six millions of New Testaments. The profits derived from the sale of those Bibles go to the support of Francke's institutions, which derive a considerable income from lands and other charitable gifts bequeathed to them, chiefly by persons who have been educated there, as well as from a bookselling, printing, and publishing establishment, which is the property of the above-mentioned institutions.

FRANCOA'CEÆ, a very small natural order of Exogens, consisting of the genera Francoa and Tetilla only. They are South American herbaceous plants with lyrate radical leaves and a scapose inflorescence. The sepals and petals are four; the stamens four times as numerous and hypogynous, half of them being rudimentary. The pistil consists of four carpels adhering by their interior angles, with a sessile four-lobed stigma. The seeds are numerous, and contain a minute embryo lying in a mass of fleshy albumen. The station of Francoaceæ in a natural arrangement is unsettled. Rosaceæ and Crassulaceæ seem to be the favourite orders to which they are approximated; but we rather regard them as a part of the albuminous subclass, serving to connect Papaveraceæ with Droseraceæ and Primulaceæ. [EXOGENS.]



A portion of the flower-stem of Francoa sonchifolia. 1, the stamens and pistil; 2, a transverse section of the ovary; 3, a seed; 4, the nucleus of the seed taken from within the spongy testa; 5, a longitudinal section of the nucleus showing the minute embryo.

FRANÇOIS, CAPE. [HISPANIOLA.]

FRANCO'LIN. [PERDICIDÆ.]

FRANCO'NIA (Franken, or Frankenland), formerly a circle of the German empire, was bordered on the south by Swabia and Bavaria, on the east by Bohemia and the Upper Palatinate, on the north by Hesse and Thuringia, and on the west by the Lower Palatinate and the circle of the Upper Rhine. Its area was about 10,290 square miles, being the smallest circle of the empire, and its population about 1,600,000. It was composed of Baireuth and Ansbach, the four ecclesiastical principalities of Würzburg, Bamberg, Eichstädt, and Deutsch-Orden; the earldoms of Henneberg, Schwarzenberg, Hohenlohe, Werthheim, Erbach, Reineck, Castell, and Limburg; the six towns of the empire, Nuremberg, Schweinfurt, Rothenburg, Weissenburg, and Windsheim; six equestrian cantons, and several villages immediately dependent on the empire. The whole of these, with the exception of the earldoms of Henneberg, Schwarzenberg, and Reineck, were transferred to the crown of Bavaria by various treaties, beginning with that of Luneville in 1801, and closing with the territorial acquisition made by a treaty with Austria in 1819. The soil of Franconia is among the most productive in Germany, yielding an abundance of grain, wine, fruit, and vegetables, and supplies large quantities of cattle. Even the northern parts, where the Thuringian and Fichtelberg mountains occupy a portion of the surface, and render them frequently unfit for agriculture, are highly productive in timber, fuel, and minerals. Those parts excepted, Franconia is a country of plains. The principal river is the Main, into which most of the minor streams discharge their waters; the Werra connects the country with the German Ocean by means of the Weser, while other rivers flow into the Elbe, Rhine, and Danube. The margrave of Brandenburg was the highest authority in the circle. The contingent which Franconia contributed to the army of the empire was 1902 foot soldiers and 980 horse, and its monthly tribute towards the expenses of the empire was 3000 guldens—about 275*l.* sterling.

FRANEKER. [FRIESLAND.]

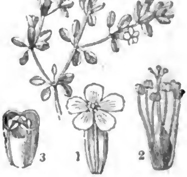
FRANKALMOIGN, a species of tenure. The word signifies 'free alms,' and the tenure is that by which a religious corporation, aggregate or sole, holds lands of the donor, to them and their successors for ever. The services which they were bound to render for their land were not clearly defined, but were only in general to pray for the souls of the donor and his heirs, dead or alive: they did no fealty, which was incident to all other tenures. [FEUDAL SYSTEM.]

The tenure by Frankalmoign was excepted by name in the stat. 12 Car. II., which abolished military tenures, and it subsists in many instances at this day. It is very distinct from all other tenures, being not in the least degree feudal, but merely spiritual; for if the services be neglected, the law gives no remedy by distress or otherwise to the lord of whom the lands are holden, but merely a complaint to the ordinary or visitor to correct it.

Donations by this tenure are now out of use; for since the statute of Quia Emptores (18 Ed. I.), as it is said by Littleton, none but the king can grant lands to be so holden. (2 Bl. *Com.*)

FRANKENBERG, in the bailiwick of Chemnitz, in the kingdom of Saxony, is an agreeable town situated on the Zschopau, and in a picturesque valley: it is well built and regularly laid out, and contains about 450 houses and 5200 inhabitants. Next to Chemnitz it has the largest factories in Saxony for printing cottons, and employs upwards of 600 hands in this branch alone: it also manufactures cottons, linens, and leather, and has extensive bleaching-grounds in the vicinity. The copper-mines near it produce but small quantities of the metal.

FRANKENIA'CEÆ, a small natural order of Exogens, allied to Silenaceæ and Linaceæ, with a procumbent habit, small leaves, and very often minute flowers half hidden among the leaves. They are all furnished with a tubular, ribbed calyx, and that, together with their having five petals, a definite number of hypogynous stamens, and a one-celled capsule bursting into valves, to whose edges the seeds adhere, gives them a distinctly limited character. The species are chiefly found in the south of Europe and north of Africa; they however occur in various other parts of the world; one species from New Holland, Frankenia pauciflora, remarkable for the size of its flowers, is a very pretty greenhouse shrub.



A twig of Frankenia pulverulenta, natural size:—1. a flower; 2. the pistil and stamens; 3, a transverse section of the ovary, all magnified.

FRANKENSTEIN, a circle of the Prussian government of Breslau, and in the province of Silesia: it is a level country, occasionally interspersed with hills, has an area of about 181 square miles, and a population of about 42,300. It is watered by the Neisse, raises much flax, together with wheat, potatoes, and fruit, and is well supplied with timber. The capital of this circle, which bears the same name, is situated on the Pausebach, in 50° 52′ N. lat., and 16° E. long. It is a well-built town, surrounded by walls, has four suburbs, an old castle now in ruins, a spacious market-place, a Roman Catholic and a Lutheran church, besides churches attached to the hospital and barracks.

picture gallery, botanical garden, seven schools, &c. The population was 4610 in 1817; 5509 in 1831, and is at present about 5700. The manufactures of the town consist of woollen stuffs, linens, leather, stockings, tobacco, liqueurs, &c., and it has a good trade in corn, wine, woollens, &c.

FRANKENTHAL. [Rhine, Circle.]

FRANKFORT on the Main (in German Frankfurt), the capital of a small republic in the western part of central Germany, which has an area of about 91 square miles. It is bounded on the north and north-east by the province of Hanau in Electoral Hesse, on the south-east and south by the province of Starkenberg in Grand-ducal Hesse, and on the west by the duchy of Nassau and part of Grand-ducal Hesse. It is supposed to date its origin from the times of the Merovingian princes. Charlemagne built a palace in the town, in which he held a council of the church in the year 794. Lewis the Pious surrounded it with walls and ditches in 838. In consequence of the treaty of Verdun, by which Aix la Chapelle fell to the share of Lotharius, it became the capital of the empire of the Eastern Franks, and hither Lewis the German transferred the fairs held by the Austrasians. A palace, called the Roemer (Roman palace), was also built here by its sovereigns, who held their courts of ceremony under its roof from time to time, though it was not their fixed abode. In the records of the middle ages Frankfort is mentioned as one of the principal cities in the German empire, and as a mark of distinction was denominated a chamber of that empire (*Reichskammer*), which the emperor William pledged himself, in 1254, should never be mortgaged or alienated; a pledge which made it in immediate dependence of the empire itself. A golden bull confirmed the privilege which Frankfort had long enjoyed, of being the place of all imperial elections. In the early part of the 15th century, the Roemer, which had become the property of one of the burgesses about 50 years before, was purchased and converted into a town-hall by the magistrates, who about this time availed themselves of the prodigality of the German emperors to buy their monopolies and domains in and near the town. The emperor Richard conferred additional immunities on it in 1257; in 1372, Charles IV. sold the bailiffship of the empire to the magistracy; and in 1329, Lewis the Bavarian empowered them to redeem all the properties, tolls, &c., in Frankfort or its vicinity which he or his predecessors might have pawned to others. This right was subsequently turned to very good account by the magistrates. The great Easter fair, in addition to the Michaelmas fair, which had been held since the days of Lewis the German, was instituted in 1330. In 1390 the town acquired the lands on the left bank of the Main, on which Sachsenhausen now stands, by which acquisition it completed its present extent of territory. In 1555 Charles V. endowed it with the right to the free navigation of the Main. The treaty of Westphalia recognized all its immunities, and it was taken under the special protection of the empire by the imperial rescripts of 1682 and 1683. The noblemen who settled in the town and connected themselves with the wealthier class of inhabitants, gradually formed clubs, or exclusive companies, and these societies ultimately engrossed nearly the whole government; but the Congress of Vienna in 1815 put an end to the abuse. The emperor Charles VII. resided here from 1742 to 1744, and the German diets were at that period transferred to Frankfort from Ratisbon. It was the place of assembly for the states of the electorate of the Upper Rhine; and dating from A.D. 753, 21 German diets were held here. Under the settlement of the empire in 1803, called the 'Deputations-recess,' all the ecclesiastical property within the boundaries was made over to the town, on condition of its paying certain annuities to the amount of 34,000 guldens, about 3000*l.* sterling. The arch-chancellor of the empire, who had a large property in the town, became a member of the Confederation of the Rhine established by Napoleon in 1806, accepted the title of 'Prince-Primate,' and was placed at the head of the government; Napoleon reserving to himself the right of nominating his successors. This was a short-lived dignity; for Napoleon, finding it convenient to separate lay from ecclesiastical jurisdictions, put an end to the prince-primacy in February 1810, added the principalities of Fulda and Hanau, with some small exceptions, to the town and territory of Frankfort, erected the whole into the 'Grand Duchy of Frankfort,' and appointed Prince Eugene, viceroy of Italy, its sovereign. This grand duchy contained an area of about 1990 square miles, with a population of about 302,000, a revenue of 3,575,629 guldens, about 295,400*l.* sterling, and had Frankfort for its capital. It fell to pieces with the downfall of its founder, and a resolution of the congress of Vienna on the 9th of June, 1815, re-established the city of Frankfort and its former territory as a free state.

The small extent of territory, which Frankfort possesses beyond its walls, lies immediately round them on both sides of the Main; it is quite level, and its soil, a deep sand covered with a crust of lava, has been at every point brought into a high state of productiveness. It is watered by the Main, and raises corn, though not in quantity sufficient for the consumption; potatoes, vegetables, fruit, and wine; many horned cattle and sheep are also bred. The inhabitants of the eight villages are partially employed in manufacturing and mechanical pursuits within the walls of the city itself; but the most lucrative occupation they follow is that of carriers through many states of Germany. The population in 1811 amounted to 47,372; at present it is estimated at about 55,000, namely, 47,000 in the city and 8000 in the eight villages; of the whole number about 7000 are Roman Catholics and 5200 are Jews. It is composed of burgesses, in whom the sovereignty of the state is vested, domiciliated citizens who are subject to certain restrictions with regard to the application of their industry, and licensed persons, who, in virtue of the payment of a special rate, are allowed to live in the town and exercise certain callings. The Jews have of late years been admitted to enrol themselves in the class of burgesses. The majority of the inhabitants are Lutherans; the numbers of reformed Lutherans being about 3000, Roman Catholics 7000, and Jews 5200. There are 14 Lutheran places of worship (of which 7 are in the town itself), 2 reformed Lutheran, 3 Roman Catholics, and 2 Jewish.

The constitution, promulgated on the 15th May, 18[illegible] and solemnly sworn to on the 18th October following, is democratical, and vests the sovereign power in the burgesses. This power is delegated to three superior authorities: the senate, the permanent committee of burgesses, and the legislative body. The senate is composed of 20 members, with the two burgomasters as its presidents, who are elected annually; the head burgomaster draws up all reports to the senate and has the control of the military department, while the junior controls all affairs relating to the police, the corporation, and criminal proceedings. The senators discharge all the administrative functions, and compose the civic tribunal as well as a secondary court of appeal; the highest court of appeal being the supreme tribunal at Lübeck. The permanent committee is composed of 61 members, and its principal office is to control the income and expenditure. The legislative body consists of 85 members, 20 of whom are senators, and as many are members of the permanent committee; the remaining 45 are chosen from an electoral college of 65 burgesses, elected by the three civic orders; the patrician or men of letters; the merchants, and the tradesmen, mechanics, &c. They are elected for the session only, which opens in November and sits for six weeks; their sanction is requisite to all new laws as well as to the budget. The nine deputies, who are returned by the rural dependencies of Frankfort, do not assist at the deliberations, excepting when matters connected with the interest of their constituents are brought forward. The senate and permanent committee are chosen, as vacancies occur, from among the other members of the legislative body. The Jews were partially emancipated by a regulation of the 1st November, 1824, and admitted into the class of natural born subjects of the state; but they are excluded from taking any part whatever in the administration of its affairs; neither can any Jew possess more than one house and one garden, nor exercise the profession of a notary or attorney at law; nor can more Jews follow a given mechanical pursuit than in the exact proportion of the Jewish to the Christian inhabitants, who are similarly restricted with regard to the number of handicraftsmen. Only 15 marriages are allowed to be celebrated among the Jews in the course of the year.

The public income is estimated at 760,000 guldens, about 66,000*l.* sterling, and the expenditure at rather less. The debt is said to be 8,000,000 guldens, about 700,000*l.*

The armed force is composed of a battalion of troops of the line, 600 strong, and kept up by enlistment; and of the landwehr or militia, which includes all the male inhabitants between the ages of 19 and 60, and consists of two squadrons of light-horse, a company of artillery, a battalion each of carabineers, chasseurs, and marksmen, six of infantry, and a veteran corps composed of citizens between the ages of 50 and 60.

The Lutherans have a consistory, and the reformed Lutherans two presbyteries, which manage the revenues of the churches and direct all ecclesiastical affairs. The Roman Catholic clergy and flocks are comprehended in the diocese of the bishop residing at Limburg on the Lahn.

Frankfort is a member of the German Confederation, and in conjunction with the other free towns, Lübeck, Bremen, and Hamburg, occupies the 17th place in the limited council of the diet, but enjoys its independent vote in the full council. It furnishes a contingent of 479 men to the army of the confederation, and pays a quota of 500 guldens (about 44*l.*) towards the annual expenses of that body.

FRANKFORT (on the Main). The city of Frankfort is on the right bank of the Main, across which there is a stone bridge which unites it with the suburb of Sachsenhausen. It lies in 50° 6′ N. lat. and 8° 36′ E. long. The valley and the town are commanded on the north by the gentle heights of the Rœdenberg, and at some leagues distant behind them by the range of the Taunus; and on the side of Sachsenhausen, in the south, by the Mühlberg, Sachsenhäusenberg, and Lerchesberg, offsets of the Odenwald. The old walls and ramparts with their stagnant ditches were razed between the years 1806 and 1812, and the site converted into spacious park-like grounds; the glacis too is now covered with vineyards and gardens, which are externally bounded by a broad road; and beyond this road the adjacent ground is embellished with a profusion of villas, pavilions, and private gardens. Frankfort itself is about 1830 paces in length along the Main, 1380 in width, and 4000 in circuit; Sachsenhausen is about 1200 in length, but of inconsiderable breadth.

The principal public entrances are nine large gates, which formerly ran between cumbrous quadrangular towers: most of these have in modern times been replaced by handsome buildings, modelled from the antient temples of Athens and Rome, &c. Of the nine entrances Frankfort has seven and Sachsenhausen two. In front of the north-eastern entrance is the monument erected by Frederick William II., king of Prussia, to the memory of the prince of Hesse-Phillipsthal and his gallant followers, who fell at the successful storming of the town on the 2nd December, 1792: it consists of a quadrangular block of German marble, surmounted with appropriate trophies, bearing a commemorative inscription, and resting on an artificial rock. The Bockenheim gate, which is the western entrance, is built on the model of the temple of Apteral Victory at Athens, and the Upper-Main gate, on that of the porches of the Campus Militum at Pompeii. The adjacent buildings are neat structures appropriated as guardhouses and for the use of the custom-house officers. The Eschenheim gate, the north-western entrance, is the only specimen extant of the antient gates; it is a lofty massive tower, crowned by five turrets, and is a fine specimen of the German architecture of the fourteenth century.

Frankfort, inclusive of Sachsenhausen, contains nearly 4000 houses; between 400 and 500 of them being in the latter suburb. They form 6 large and 14 minor squares or open spaces, and above 220 streets and lanes, and have 115 fountains and walls. The places of worship are 17 in number; namely, 7 Lutheran, 2 Reformed-Lutheran, and 3 Roman Catholic churches, 3 chapels for Lutherans, and one meeting house for the Herrnhuthers, and one synagogue.

The city is divided into 14 quarters, numbered from A to O, 12 within the walls, and 2 in the Sachsenhausen suburb. The Belle Vue and other streets, built along the Boulevards, which form a handsome screen to the more antient part of Frankfort, have been erected since the fortifications were demolished. The largest square, called the Rossmarkt (Horse Market) is surrounded by fine buildings, and connected with the square of the theatre by a spacious avenue of lime trees and acacias. There are fountains in the centre of the Horse Market as well as in the squares of the Liebfrauen and Roemerberg. The right bank of the Main, from the upper to the lower gate, which is nearly the whole length of the city, is edged by a spacious quay, and behind this lies an uninterrupted line of buildings. During the fairs, a portion of the quay, on which rows of booths are erected, presents a scene of the most animated description.

The most remarkable buildings in the town are the 'Roemer' or Guildhall, an irregular structure, with high roofs in the old Frankish style. Under its roof are the Wahlzimmer, or Hall of Election, a spacious and handsomely furnished apartment, in which the electors and their representatives were wont to assemble and partly conduct the business of electing the emperors of Germany. It is now used for the meeting of the senate. Next to it is the Kaisersaal, or Imperial Hall, where the emperor, upon his election, held his public dinner, at which he was waited upon by the counts and the high officers of the empire. There are niches in this hall which contain portraits of the emperors of Germany from Conrad to Leopold II.; but there was not one left unoccupied for receiving the portrait of Francis II., the last of those sovereigns. A sort of ante-hall, with a painted cupola, and furnished with specimens of the pictorial talent of the Frankforters, opens into the Election Hall. Here is also the Depository of the Archives, surrounded by walls six feet in thickness. It contains, among other valuable records, the celebrated 'Golden Bull,' promulgated by Charles IV. in 1356, which is written on [illegible] sheets of parchment. The Roemer is situated on the western side of the Roemerberg, an irregular open space or square, which has also much of historical interest attached to it. This is the spot where the people collected to welcome the newly-elected emperor, bearing his crown and sceptre in solemn procession, after he had been anointed in the cathedral.

Not far from the Roemer is the new Hall of Justice with its various courts and offices; and south of it, on one side of the Fahr-gate on the quay of the Main, stands the Saal Hof, on the site of a palace built by Lewis the Pious, Charlemagne's son, in which Charles the Bald was born and Lewis the German long resided, but of which scarcely any part is extant, save the Chapel of St. Elizabeth, a vaulted chamber with columns of red sandstone, and walls six feet in thickness. The present building, which is private property, was raised in 1717. The Braunfels belongs to one of the old equestrian clubs; the court-yard is used for the Exchange, and the spacious saloons on the first floor are occupied, in the fair times, by dealers in all kinds of luxuries, &c., and are the favourite lounge for visitors. The palace of the prince of Tour and Taxis, in the north-western part of Frankfort, is a spacious structure in the French style of 1730, richly adorned with paintings, sculptures, and antient hangings: it contains 150 apartments, including two octagonal halls, and is the spot where the diet of envoys from the states of the German Confederation hold their sittings. The antient House of the Teutonic Knights in Sachsenhausen, is a sombre massive building in a low situation, but well laid out in its internal arrangements. It is at present the property of the emperor of Austria.

The two large buildings in Frankfort, which were once public arsenals, were stripped of their contents by the French, and are now appropriated to the police as a prison and for other purposes. The guard-house, which is chiefly used as a prison, is an unsightly structure of the early part of the sixteenth century, which disfigures the Parade. An old Carmelite convent, now the quarters of the garrison of the town, has cloisters covered with faded fresco paintings executed in the beginning of the sixteenth century: the Stone House, near the Roemerberg, is a fine remnant of the middle ages, and the Fürsteneck, near the bridge, may be instanced as one of the oldest buildings in Frankfort. Besides these, the theatre, public library, academy of arts and sciences, the new hospital of the Holy Ghost, a Jews hospital, and an orphan asylum, are deserving of attention.

The church of St. Bartholomew, formerly the cathedral, is in the shape of a Roman Cross, of the Gothic order, and though begun in the time of the Carlovingian princes, was not finished until the middle of the fourteenth century. Its colossal tower, 160 feet in height, is one of the latest models of the Gothic. The colossal statue of the patron saint in this church is reckoned a masterpiece of sculpture. On the right of the grand choir is the chapel, in which the electors accepted the German emperor elect as their sovereign after he had been crowned and anointed at the high altar. The tower was begun in 1415, and was finished in 1509. At a short distance north of the town, is the public cemetery, laid out like a pleasure ground of shrubs; and adjoining it an equally well arranged burial place for the Jewish community. There are four hospitals, one of which is for lunatics and epileptic persons; an orphan asylum, a house of refuge for sick poor, and several other benevolent institutions. Among the scholastic establishments are a gymnasium of six classes, conducted by a director, six professors, and nine masters; a normal school of 13 classes, 7 for boys and 6 for girls, and a variety of other seminaries. The public library contains about 60,000 volumes, among which are a complete collection of works relating to German history, and many rare MSS., early editions, and engravings.

The scientific institutions of Frankfort comprise a Medical Institute, founded in 1763 by the liberality of Dr Senkenberg, which is composed of a medical library, an anatomical theatre and lecture-rooms, and botanical garden. The Senkenberg Society of Naturalists was united to this establishment in 1817, and in the adjoining buildings possesses an extensive museum, to which Rüppell, the explorer of north-eastern Africa and the parts adjacent, who travelled partly at the society's expense, has contributed several valuable collections in natural history. Frankfort also possesses a philosophical society, a society of the useful arts, which has a mechanics' school; a society of industry; Stædel's Institute of the fine arts, which possesses a choice collection of paintings, &c., bequeathed by the founder, who left an endowment for lectures and instruction in such branches of knowledge as are connected with the fine arts; a school of design, a society for the fine arts, the Bethmann museum of antiques, a society for encouraging the study of the German language, &c. Dr. Senkenberg also endowed the town hospital. The libraries of the cathedral and the Dominicans are also rich in rare MSS. and old editions. There are twenty-two booksellers' establishments, fourteen printing-houses, and three type-foundries in Frankfort.

With regard to the present amount of the population, we have no official returns before us; by some writers it is estimated as low as 43,000, and by others as high as 48,000. It is certain however that it decreased considerably between 1817 and 1825; for in the first of these years it was officially stated to be 47,830, and in the last 41,582, including 10,360 males and females not born in the town.

With the exception of Sachsenhausen and its 5000 inhabitants, who are principally agriculturists, gardeners, and day-labourers, the citizens of Frankfort derive their subsistence from commerce, money operations, and manufactures. It is a place of considerable transit for German and foreign produce. The chief articles of trade are wines, English, French, and Italian goods, Bavarian timber, German wools, colonial produce, and German manufactures. The old anagram, 'Fanum mercatorum fundo,' (I found a temple of traders), well indicates the sources of its prosperity. The fairs, held at Easter, and in August or September, are no longer what they were in the sixteenth century, when they were frequented at times by as many as 40,000 strangers; but they still afford an animating and attractive scene. The chief manufactures are carpets, galloon, tobacco, cards, cottons, silks, printer's black, &c.

FRANKFORT, a government circle forming the eastern part of the province of Brandenburg in Prussia, is bounded on the north by Pomerania, and on the south by the kingdom of Saxony. It contains an area of about 7502 square miles, is divided into 18 minor circles, has 67 towns, 7 market-villages, and upwards of 1700 villages and hamlets, and the number of inhabitants is about 706,000, independently of the military. The soil, particularly in the south, is a deep and richly-productive sand. There are numerous woods and forests, which occupy a fourth part of the surface. The rivers which water the circle are the Oder, Neisse, Warthe, Obra, Pleiske, &c. It produces much grain, flax and hemp, hops, tobacco, timber, &c.; and there are rich meadows in the vicinity of the rivers, on which, in 1831, were fed 68,014 horses, 275,355 horned cattle, and 916,698 sheep and goats.

FRANKFORT, the capital of the government circle, as well as of a minor circle of the same name, is a town pleasantly situated on the left bank of the Oder, and surrounded on the land-side by vine-clad heights and gardens: in 52° 22′ N. lat., and 14° 46′ E. long.; at an elevation of 116 feet above the level of the sea, and at a distance of about 48 miles south-east of Berlin. It is regularly built, encircled by walls with towers, five gates, and a ditch, and has three suburbs, one of which, the Damm, lies on the left bank of the Oder, which is traversed by a bridge of wood. The number of houses is about 2450, and of the population about 22,000, besides the military: in 1817 it was 13,892. It has a market-place and six Protestant churches, a Roman Catholic chapel, and a synagogue. The Upper Church has some fine windows of painted glass. The university, founded here in 1506, was transferred to Breslau in 1810. Frankfort possesses a gymnasium with a library, an upper or grammar-school, and nine schools for the inferior classes, an obstetric seminary, an orphan asylum, two hospitals, a house of correction, and a free school for 300 soldiers' children, founded in memory of Leopold, duke of Brunswick, who lost his life here in April, 1785, while endeavouring to save a man from drowning. A monument was also erected to him at the eastern end of the bridge across the Oder. In front of the Guben gate is a three-sided pyramid, resting on a block of stone, which was raised by the freemasons' lodge in 1776, to the memory of Kleist, the poet, who fell in the battle of Kunersdorf. The manufactures of the town consist of wines, mustard, brandy, tobacco, sugar, gloves, stockings, linen, leather, &c.: its trade is extensive, and the three periodical fairs, instituted in 1253, are well frequented, particularly by Polish dealers. The inhabitants are engaged also in the navigation of the Oder, on which above 2000 vessels and craft annually pass Frankfort.

FRANKFORT, in America. [Kentucky.]

FRANKINCENSE, Common, is the produce of the Abies excelsa (Dec.), the Pinus abies (Linn.), common spruce fir, from which it either exudes spontaneously or more abundantly from incisions of the bark. When it first flows out, it is liquid, but on exposure to the air concretes, and is collected during autumn and winter. It occurs in two states, in tears (Thus, or Olibanum sylvestre), and in large irregular lumps, or compressed cakes. When recent, the colour should be white, or only inclining to yellow, subdiaphanous, soft, tenacious, and glutinous: by the action of time it becomes hard, and even friablé, the colour having deepened into an orange hue. By the heat of the hand it softens, and by a higher temperature liquefies. It possesses a turpentine-like odour and taste. It is insoluble in water, but completely soluble in alcohol with the aid of heat.

It consists of two kinds of resin mixed with oil of turpentine. By melting it in water, and straining it through strong cloths, it is deprived of much of its oil, when it is termed pix arida, or Burgundy pitch.

It is scarcely now used internally, but is irritant and diuretic. Externally it is rubefacient, and consequently enters into the composition of many plasters.

For the genuine Thus, or frankincense of the antients, see Boswellia; also Olibanum, as the substances distinguished by this name (derived from the Arabic *looban*) were of different kinds, and procured probably from Africa and Arabia, as well as from India.

FRANKLIN. [Missouri.]

FRANKLIN. In the reign of Elizabeth a franklin was a freeholder, or yeoman, a man above a vassal or villain, but not a gentleman. He is mentioned as of this description in several passages of Shakspeare's plays. In earlier times he was a personage of much more dignity, and seems to have been distinguished from a common freeholder by the greatness of his possessions. Chaucer's franklin was a rich and luxurious gentleman, a chief man at the sessions and had been sheriff, and frequently knight of the shire.

> An housholder, and that a grete was he
> Seint Julian he was in his contree.
> His brede, his ale, was alway after on;
> A better envyned man was no wher non.
> Withouten bake mete never was his hous,
> Of fish and flesh, and that so plenteous,
> It snewed in his hous of mete and drinke
> Of alle deintees that men coud of thinke,
> After the sondry sesons of the yere,
> So changed he his mete and his soupere.
> Ful many a fat partrich hadde he in mewe,
> And many a breme, and many a luce in stewe.
> Wo was his coke, but if his sauce were
> Poinant and sharpe, and redy all his gere.
> His table dormant in his halle alway
> Stode redy covered alle the longe day.
> At sessions there was he lord and sire.
> Full often time he was knight of the shire.
> An anelace and a gipciere all of silk,
> Heng at his girdel, white as morwe milk.
> A shereve hadde he ben, and a contour.
> Was no wher swiche a worthy vavasour.'

Fortescue, 'De Legibus Angliæ,' c. 29, describes the franklin as 'Pater familias—magnis ditatus possessionibus.' (Nares's *Glossary in voce*; Tyrwhitt's *Notes on the Canterbury Tales*, 4to., Oxf., 1798, vol. ii. p. 402.)

FRANKLIN, BENJAMIN, born at Boston, in New England, January 6, 1706, was the son of a tallow-chandler in humble circumstances, but intelligent and strong-minded. As a boy he had a great desire to go to sea; but he also displayed a fondness for reading, which induced his father to apprentice him to another son, who was a printer at Boston. His love of books, which he had now more means of indulging, weaned him from the love of the sea; and he practised great abstinence and self-denial, the better to improve his opportunities of study. At the same time he made himself an able workman. The two brothers however did not agree: the elder used an undue severity, which the younger, as he himself says, did something to provoke by his impertinence. These quarrels led to a step, which, with his usual candour, Franklin has plainly related, and declared to have been dishonourable. His indentures had, for certain reasons, been cancelled, under a private agreement that he should continue to serve for the full period of apprenticeship. A new quarrel arising, he took advantage of the letter of the law, and declared his resolution to quit his brother's service. The printer took care so to represent this matter that Benjamin was unable to find employment in Boston. He therefore went away secretly, without the consent of his parents, in 1723, and after a vain trial to find work at New York, engaged himself to an obscure printer in Philadelphia, named Keimer. There he lived frugally and creditably for a year and a half: but being induced by deceptive promises of patronage to think of setting up for himself as a master printer, he sailed for England, in the beginning of 1725, to purchase the necessary stock in trade. On his arrival he discovered that a cruel fraud had been practised, inasmuch as his pretended friend had neither the power nor the wish to help him; and being destitute of money or credit, he again found employment as a journeyman printer in London. His own account of this portion of his life, which offers an admirable example of frugality and industry, will be read with pleasure. Having gained the good will of Mr. Denham, a merchant of Philadelphia, he returned thither as that gentleman's clerk, in July, 1726. He now considered his prospects to be promising: but in 1727 Mr. Denham died, and Franklin being unable to do better, returned to his old trade and his old master, Keimer. In the course of two years he gained credit and friends to enable him to set up in business on his own account; and September 1, 1730, he married a young woman to whom, before his voyage to England, he had been attached.

Franklin had early renounced Christianity, nor does it appear, though he has unequivocally recorded his belief in God and in a future existence, that he ever again gave credence to revealed religion. About this time however a great change took place in his views. In London he had written a pamphlet to prove (we quote his words) 'from the attributes of God, his goodness, wisdom, and power, that there could be no such thing as evil in the world; that vice and virtue did not in reality exist, and were nothing more than vain distinctions.' Reflection on the conduct of other free-thinkers, by whom he had suffered, and on some parts of his own life, which he has candidly related and condemned, brought him to a different way of thinking; and, he says, 'I was at last convinced that truth, probity, and sincerity in transactions between man and man were of the utmost importance to the happiness of life; and I resolved from that moment, and wrote the resolution in my journal, to practise them as long as I lived.' This resolution he fully kept. His honesty and straightforwardness have passed unquestioned, even by the numerous enemies whom his religious and political opinions raised against him.

Unceasing industry, business-like habits, a large fund of disposable talent, general information, and readiness in the use of his pen, either for amusement or instruction, gradually secured to Franklin a large circle of friends, and raised him from poverty to affluence. He engaged in literature; edited a newspaper, wrote a pamphlet to advocate a paper currency; and in 1732 projected 'Poor Richard's Almanac,' of which the distinguishing feature was a series of maxims of prudence and industry, in the form of proverbs. It was continued for 25 years, and is said to have reached a circulation of 10,000 annually. These maxims, collected in one piece, called 'The Way to Wealth,' obtained uncommon popularity, and have been translated into various languages.

Franklin's turn of mind was eminently practical. He said with truth, 'I have always set a greater value on the character of a *doer of good* than on any other kind of reputation.' Not that he joined in the vulgar prejudice of setting theory and practice in opposition, for he was bold, speculative, and inquiring in physical as well as in metaphysical science. But science in his hands always bore fruit directly applicable to the uses of common life; and while he never neglected his own affairs, industry and economy of time enabled him to originate, or take an active part in supporting, a variety of projects for the public good. A list of the chief of them will show, shortly and clearly, to what sort of objects his benevolent exertions were directed.

1732. Set on foot and procured subscriptions for the first public library, incorporated in 1742 by the name of 'The Library Company of Philadelphia.'

1738. Established the first association for extinguishing fires; and, at a later period, the first Fire Insurance Company.

1749. Raised subscriptions for the foundation of a public academy, the schools of Pennsylvania being few and bad. This was the origin of the present university of Pennsylvania.

1752. Raised subscriptions and procured an auxiliary grant from the legislature to establish the first hospital in Philadelphia; a scheme suggested in the first instance by a physician of the city, who had not influence enough to work it out.

1754. Proposed a plan for a union of the American provinces against invasion, in which a germ of the future Union may be found. It was kept alive, he used to say, like all good notions, though not carried into effect at the time. It was approved by a species of congress from six of the provinces, but rejected both by the colonial assemblies and the British government.

He was also a zealous member of several societies, among them, of the Philadelphia Society for the Improvement of Prisons, and the Pennsylvanian Society for the Abolition of Slavery, both founded in 1787.

As a philosopher, his name is indissolubly linked with the history of electricity, in which he was one of the most active, patient, and successful experimenters; and his industry was rewarded by that brilliant discovery, the corner stone of his scientific fame, of the identity of the electric fluid and lightning. His attention was first turned this way in 1745, the science being then in its infancy, by the transmission of an electrical apparatus to Philadelphia, for the purpose of having the experiments which had attracted so much notice in Europe repeated in America. In 1747 he sent a series of letters to England, in which he noted the power of sharp points both to attract and to give out electric matter; and explained his theory, that instead of the phenomena observed being produced by two different electric fluids, they arose from the effort made to restore an equilibrium when one body was overcharged, and another undercharged, with electricity. A body in the former state he called positively, in the latter state negatively electrified. This theory he used to explain the action of the Leyden jar; and though not universally admitted, [ELECTRICITY, p. 336,] it at least furnishes a simple and satisfactory explanation of the phenomena of the science. (*Library of Useful Knowledge*, 'Electricity,' sect. 49.) In 1749 he had conjectured the identity of lightning and electricity, and suggested the idea of protecting houses by pointed conductors, but did not prove it till 1752. He was waiting for the erection of some lofty building, upon which an insulated iron rod might be placed, in hope that on the passage of a thunder-cloud overhead, sparks might be taken from the rod, as from a charged conductor, when it occurred to him that by flying a kite, pointed with iron, during a thunder-storm, the matter of lightning might, if his views were correct, be drawn down the string. He tied a key to the end of the hempen string, insulated the whole apparatus by adding a piece of silk to the end next the hand; and the experiment succeeded. Sparks were taken from the key, a Leyden jar was charged, and the phenomena exhibited were identically the same as if an electrical machine had been used instead of the kite. He varied the experiment by fixing an insulated iron rod at the top of his house; and immediately proceeded to turn his discovery to account by publishing a plan for defending houses from lightning by the use of pointed conductors.

His character, in reference to this branch of his pursuits has been described in the following terms by Sir H. Davy. 'A singular felicity for induction guided all his researches and by very small means he established very grand truths. The style and manner of his publication (on Electricity) are almost as worthy of admiration as the doctrine it contains. He has endeavoured to remove all mystery and obscurity from the subject. He has written equally for the uninitiated and for the philosopher; and he has rendered his details amusing as well as perspicuous, elegant as well as simple. Science appears in his language in a dress wonderfully decorous, the best adapted to display her native loveliness. He has in no instance exhibited that false dignity by which philosophy is kept aloof from common applications, and he has sought rather to make her an useful inmate and servant in the common habitations of man, than to preserve her merely as an object of admiration in temples and palaces.' (*Life*, by Dr. Davy.)

To Franklin's other scientific labours we can only allude. They treat of many branches of meteorology, maritime phenomena, shipbuilding and various subjects connected with navigation, as the Gulf Stream, and the effect of oil in stilling waves; of the proper construction of stoves and chimneys,' which, to use a common phrase, seems to have been one of his hobbies; of the art of swimming, which, being himself an excellent swimmer, he was anxious to recommend as a universal branch of education: subjects consonant to his practical character, and most of them directly applicable to the increase of human comforts. Papers on these matters nearly fill the second volume of his collected works; his electrical treatises and letters occupy the first volume, and his moral, historical, and political writings the third.

To return to Franklin's private history; the increasing estimation in which he was held, was manifested in his successive appointments to different offices. In 1736 he was made clerk to the General Assembly of Pennsylvania; in 1737, postmaster of Philadelphia; in 1747 he was elected as one of the representatives of Philadelphia in the Assembly; in 1753 he was appointed deputy postmaster-general for the British colonies.

When he first became a member of Assembly, that body and the proprietary governors, Penn's representatives [PENNSYLVANNIA], were in hot dispute, chiefly with respect to the immunity from taxation claimed by the latter. In this Franklin took an active part. 'He was soon looked up to as the head of the opposition, and to him have been attributed many of the spirited replies of the Assembly to the messages of the governors. His influence in that body was very great. This arose not from any superior powers of eloquence; he spoke but seldom, and he never was known to make any thing like an elaborate harangue. His speeches often consisted of a single sentence, or of a well told story, the moral of which was always obviously to the point. He never attempted the flowery fields of oratory. His manner was plain and mild. His style in speaking was like that of his writings, simple, unadorned, and remarkably concise. With this plain manner, and his penetrating and solid judgment, he was able to confound the most eloquent and subtle of his adversaries, to confirm the opinion of his friends, and to make converts of the unprejudiced who had opposed him.' (*Life*, p. 115.) Having thus shown his talents, he was sent to England in 1757, on the part of the Assembly, to manage the controversy before the privy council; and was successful: it was decided that the estates of the proprietaries ought to pay their fair proportion of the public burthens. He remained in England after this question was settled, as agent for Pennsylvania; and his conduct was so highly approved that Massachusetts, Maryland, and Georgia, severally appointed him their agent. By this time his name was well known to European philosophers. He was chosen a member of the Royal Society, and of several foreign scientific bodies at a later period; in 1772 he was made a foreign associate of the Académie des Sciences, and the universities of Oxford, Edinburgh, and St. Andrews, admitted him to the degree of D.C.L. On his return to America in 1762, he received the thanks of the Assembly, 'as well for the faithful discharge of his duty to that province in particular, as for the many and important services done to America in general during his residence in Great Britain.'

Being re-elected a member of Assembly, Franklin was earnest in endeavouring to procure a change in the government, by vesting directly in the king those rights and powers, which were held mediately by the proprietaries, to the injury, as he thought, of the community. Party spirit ran high on this point; and the friends of the proprietaries had influence enough to prevent his election in 1764. On the meeting of the Assembly, however, he was re-appointed provincial agent in England. He was a warm opponent of the Stamp Act: and his examination at the bar of the House of Commons in 1766, when the repeal of that unhappy measure was proposed, shows the minuteness, variety, and readiness of his information. (See his works, vol. iii., p. 245.) In the outset of the contest he seems to have been truly desirous of effecting a reconciliation between the mother country and the colonies. The rough treatment which he experienced in the course of his negotiations is reported to have changed his temper. That he should have been deprived of his postmastership, is not wonderful. On one occasion, before the privy council, being assailed by Wedderburne, then solicitor-general, in a torrent of gross personal abuse, which was received with evident pleasure by the council, he bore it in silence, and apparently unmoved. On changing his dress, however, he is reported to have said, that he never again would wear that suit till he had received satisfaction for that day's insult. His next appearance in it was on the day when, as minister of the United States, he signed the treaty by which England recognized the independence of the colonies.

In 1775, having lost all expectation of bringing about a reconciliation, he returned to Philadelphia; and the day after he landed, was elected a delegate to the Congress then assembled in that city. His character and services marked him out for the most important employments during that and the following year: among them he was sent on a fruitless mission to persuade the Canadians to join in the insurrection; and was appointed president of the convention assembled at Philadelphia, for the purpose of remodelling the government of Pennsylvania. Towards the end of 1776 he was sent to France, where in conjunction with his brother minister, Silas Deane, he succeeded in inducing the French government to form an offensive and defensive alliance with the United States, February 6, 1778. Having made several journeys to the Continent in his former visits to Europe, he was already known in person as well as by reputation to the scientific and literary men of France, by whom he was received with the highest marks of respect. Nor did his political engagements prevent his bestowing some share of his attention on science. He bore a part in exposing the impudent frauds practised under the name of animal magnetism. In 1785 he was recalled, at his own wish, and was succeeded by Jefferson. Soon after his return he was chosen member of the supreme executive council for the city of Philadelphia, and in a short time was elected president of the same. In 1787 he was delegate for the state of Pennsylvania, in the convention appointed to revise and amend the Articles of Union, and his last political act was an address to his colleagues, entreating them to sacrifice their own private views, for the sake of unanimity in recommending the new constitution, as determined by the majority, to their constituents.

After enjoying, through a long life, an unusual share of health, the just reward of temperance and activity, Franklin was compelled in 1788 to quit public life, by the infirmities of age. But he still retained his philanthropy undiminished, and his intellect unclouded; and his name appears, as president of the Abolition Society, to a memorial to Congress, dated February 12, 1789, praying them to exert the full extent of power vested in them by the constitution in discouraging the traffic in men. This was his last public act. Still he preserved his liveliness and energy, during those intervals of ease which a painful disease, the stone, afforded to him. This however was not the proximate cause of his death. He was carried off, after a short illness, by a disease of the lungs, April 17, 1790, aged 84.

Dr. Franklin's published works were collected in three volumes, with his fragment of his own life, continued by Dr. Stuber, prefixed. He bequeathed his papers to his grandson, William Temple Franklin, by whom, after long delay, an excellent 'Life of Franklin,' including many of his miscellaneous writings, and much of his correspondence, has been published. The *Biog. Universelle* contains a long memoir of him by Biot. (For some remarks as to a particular paper left behind him by Franklin, see Tucker's *Life of Jefferson*, vol. i. p. 338).

FRANKLINITE, a mineral which occurs in attached crystals, granular and massive. The primary form of the crystal is a cube; its colour is deep iron-black. Opaque. Lustre metallic. Specific gravity 4·87, 4·09. Hardness

6 0, 6·5. Streak deep red-brown. Cleavage parallel to the planes of the regular octahedron, but very indistinct. Fracture conchoidal. Magnetic, but without polarity.

The massive varieties are amorphous. Structure granular. compact. This mineral is found at Franklin, New Jersey, North America.

According to Berthier it consists of,—

Peroxide of iron	66
Oxide of zinc	17
Red oxide of manganese . .	16
	— 99

FRANKS. [France.]

FRASCA'TI, a town of the Campagna, eight miles east-south-east of Rome, situated on the north-west slope of the Tusculan Mount. On the summit of the mountain, which is 2000 feet above the sea, and about two miles above Frascati, are the ruins of antient Tusculum, a town of Latium, built long before Rome, and often mentioned in Roman history. After the subjection of Latium to Rome it was governed as a municipium. Several distinguished Roman families, such as the Mamilia and the Porcia, came from Tusculum. It was a strong place, both from its position and the solidity of its walls, which enabled it to resist the attack of Hannibal. Tusculum continued to exist after the fall of the empire, being under the rule of its counts till the end of the twelfth century, and was the residence of several popes, among others Alexander III. In 1169 the Tusculans fought and defeated the Romans; but in 1191 the Romans took Tusculum, and destroyed it. Remains of the walls of houses, and of the citadel, are still extant, as well as a small theatre, and a curious crypt, with a kind of arched roof of primitive construction. (Gell's *Topography of Rome and its Vicinity*.) The hill of Tusculum is volcanic, and is separated from the central mass of the Alban mount by the Alban valley, through which runs the Via Latina.

After the destruction of Tusculum, the inhabitants built themselves huts on the lower slope of the hill towards Rome, and covered them with 'frasche,' boughs of trees, from which the modern town has taken its name. It has some good buildings, 4000 inhabitants, and is a bishop's see. The air is wholesome, the place being above the region of the malaria, and the country around is planted with fine trees. But its villas form the great attraction of Frascati, it being a place of resort of the Roman nobility and cardinals in the summer and autumn. One of the most splendid of these residences is the Villa Aldobrandini, called also Belvedere, adorned with numerous fountains, and water-works, and paintings. The villas Taverna and Mondragone, belonging to the Borghese family, the Villa Bracciano, with frescoes by Dominichino, the Villa Conti, with its fine groves, the Villa Falconieri, and others, are also worthy of attention. The site of the Tusculanum of Cicero is not exactly known; some believe it to have been near Grotta Ferrata, on the road from Frascati to the Alban lake; others place it near La Rufinella, on the hill of old Tusculum. There are remains of antient buildings all about this neighbourhood. Grotta Ferrata is an abbey of Basilian monks, established in the eleventh century, who retain the Greek liturgy. The church is adorned with fine frescoes by Dominichino; and the convent has a library, with many Greek manuscripts. (Valéry, *Voyages en Italie*; Mattei, *Memorie Storiche dell' antico Tuscolo oggi Frascati*.)

FRATRICELLI, or Little Brethren, also called *Fratres de paupere vitâ*, a religious sect which arose in Italy towards the end of the thirteenth century. They were Franciscan monks who separated themselves from the grand community of St. Francis with the intention of obeying the laws of their founder in a more rigorous manner than they were observed by the other Franciscans. They accordingly renounced every kind of property, both common and individual, and begged from door to door their daily subsistence, alleging that neither Christ nor his Apostles had any possessions, either individual or in common; and that these were the models which St. Francis had commanded them to imitate. They went about clothed in rags declaiming against the vices of the pope and the bishops, and foretold the reformation of the church and the restoration of the true gospel of Christ by the real followers of St. Francis. As the Franciscan order acknowledges for its companions a set of men who observe the third rule prescribed by St. Francis, and were therefore commonly called Tertiarii; so likewise the order of the Fratricelli, who were anxious to be considered as the only true followers of St. Francis, had a great number of Tertiarii attached to their cause. These Tertiarii, or half monks, were called in Italy *Bizochi* or *Bocazoi*, in France *Beguins*, in Germany *Beguards* or *Beghards*. This last appellation was generally applied to them. The Tertiarii differed from the Fratricelli, not in their opinions, but only in their manner of living. The Fratricelli were real monks, subject to the rule of St. Francis, whilst the Bizochi or Beghards, as well as the Franciscan Tertiarii, excepting their dirty habits and certain maxims and observances which they followed in compliance with the rules of their patron saint, lived after the manner of other men, and were therefore considered as laymen. The Beghards were divided into two classes, the *perfect* and the *imperfect*. The first lived on alms, abstained from marriage, and had no fixed dwellings; the second had houses, wives, and possessions, and were engaged in the common avocations of life like other people. Pope Celestin V. was favourably disposed to the Fratricelli, and permitted them to constitute themselves into a separate order. They were submissive to that pope, but they violently opposed his successor, Boniface VIII., and subsequent popes who persecuted their sect. The Fratricelli were accused of great enormities, and persecuted by the court of Rome, but they found protection from princes, nobles, and towns, who respected them on account of the austerity of their devotion. The Fratricelli did not always submit with the meekness of the first Christian martyrs to their persecutors, but frequently opposed force to force, and even put to death some inquisitors in Italy. This sect continued during the fourteenth century, and spread as far as Bohemia, Silesia, and Poland. The members of it were most severely persecuted in the fifteenth century, and many of them fled from France to England and Ireland. All the persecutions directed against the sect did not however extinguish it, and some remnants of it existed till the reformation of Luther, whose doctrines they embraced. Their name is supposed to have been derived from *Fratricellus* or *Fraterculus*, an Italian nickname which was applied in the middle ages to all persons who, without belonging to any religious order, assumed a sanctimonious appearance.

FRAUNHOFER. [Optics, Practical.]

FRAUSTADT. [Posen.]

FRA'XINUS, the genus under which the common ash is comprehended, is a collection of arborescent plants, inhabiting various parts of the more temperate regions of the northern hemisphere, both in the old and new world, but unknown in a wild state in the southern. Although, if strictly limited, the species are destitute of corolla, yet the genus does, in fact, belong to the natural order of the olive and lilac, a transition to which is afforded by what are commonly called flowering ashes, the Orni of modern botanists, in which a corolla exists in the form of four long narrow petals. Both these genera have the kind of fruit called a key, or technically, a 'samara,' that is, a seed-vessel which does not open, which contains one or two cells, and which is prolonged into a thin wing at the apex. As they are all called ashes in the gardens, and are exceedingly nearly related to each other, we notice them both in this place.

1. Fraxinus, or *True Ashes*.

Of these the most important is the common ash, or *Fraxinus excelsior*, a tree inhabiting the cooler parts of Europe from Great Britain to a considerable distance through Asia. It is said to exist in Japan in a wild state, but this requires confirmation; it does not occur in North America, but species similar to it in appearance are common on that continent. The ash is one of the most useful of our British trees on account of the excellence of its hard tough wood, and the rapidity of its growth. In its appearance too it is singularly graceful for a European tree, often resembling in its slender stems and thin airy foliage the acacias of tropical regions. Every one who has seen the beautiful effect of the ashes mingled with the ruins of Netley Abbey, near Southampton, must have been struck with this peculiarity. The principal objection to the ash is the injury it does to the plants which grow in its neighbourhood, by rapidly exhausting the soil of all its organizable materials. In consequence of this few plants will thrive, or even grow very near it; and hence the impropriety of the common practice of planting the ash in hedgerows; the extent of its roots may always be distinctly traced by the languor and paleness of the crops that stand near it. Many varieties, or supposed varieties of it, are known to cultivators, and many more might easily be collected if it were worth the while; for it sports very much in a wild state The most striking of the reputed varieties are the following:—

1. The *weeping;* with all the characters of the common wild tree, except that the branches grow downwards instead of upwards, so that if grafted upon a lofty stem the head will soon reach the ground and form a natural arbour. This is said to have originated accidentally in a field at Gamlingay, in Cambridgeshire.

2. The *entire leaved;* with all its leaves simple, broad, ovate, coarsely serrated, and puckered. Nothing can well be more unlike the common ash than this, which nevertheless appears upon good authority to be merely a seedling variety. Out of leaf it is hardly distinguishable by its branches from its prototype.

3. The *curled leaved;* with very short stunted branches, and deep green crumpled leaves. If this is, as it is said to be, a mere monstrous variety of *Fr. excelsior*, it is one of the most remarkable with which we are acquainted. It has a particularly dark aspect; its leaves are so thick, and its shoots so short, that it forms a blackish round-headed tree of the smallest dimensions. Its origin is unknown; it, as well as the Ornus, is sometimes called *Fr. Theophrasti.*

4. The *warted.* In this the stems are covered over with a great number of little grayish brown tubercles; otherwise the plant has the appearance of the common ash.

Besides this, the only European ash that deserves notice is the *Fr. parvifolia*, or small-leaved ash. Its foliage is much finer and narrower than in *Fr. excelsior;* the leaflets are narrow and finely serrated, the bark is rugged, the growth slow, and instead of the toughness so characteristic of the latter species, the branches are so brittle as to be liable to constant injury from high winds. It is however a very beautiful tree, and for ornamental purposes where size is no object, it should be planted, especially as a single tree. We have now within sight of the window at which we are writing a fine old tree about thirty feet high, which, notwithstanding the damage it occasionally receives from heavy gales, is quite a beautiful object. It is possible that *Fr. rostrata* may be a variety of it: but nothing can be more erroneous than the idea that it is itself a variety of *Fr. excelsior.* It is found only in the southern parts of Europe.

In the Levant occurs the *Lentisk Ash*, Fr. lentiscifolia, a most graceful species, with long narrow leaves, composed of five or six pairs of small, distinct, sharply serrated, shining leaflets. It inhabits the country about Aleppo, and is hardy in this country, where it forms a tree of the most elegant appearance, intermediate, as it were, in appearance between a willow and an ash. The branches are deep rich purple. It is often called *Fr. Chinensis* in the nurseries. The wood-cut No. 1054 in Mr. Loudon's 'Arboretum Britannicum' does not in the least resemble this species.

With regard to the species of American ash, we have, in the first place, to remark that they are not well adapted to this climate, being in general too ill prepared by our short cold summers to bear our winters, and moreover injured by spring frosts: circumstances much to be regretted, because some of the species prove very handsome trees. In the second place, the number of species has no doubt been greatly exaggerated by writers upon garden botany; we cannot however at all agree with a modern writer upon these subjects, who believes all the American ashes to be one and the same species. The following are, we think, undoubtedly distinct.

Fr. pubescens, the black American ash, with three or four pairs of leaflets, which are nearly entire, flat, downy beneath, as well as the branches. A swamp tree in the middle States of the American Union.

Fr. Americana, the white American ash, with seldom more than three pairs of leaflets, which are smooth, flat, nearly entire, and glaucous on the under side, the branches smooth. A large tree in Canada and the northern States of America.

Fr. sambucifolia, the water-ash, with three or four pairs of leaflets, which are rugose, constantly serrated, hairy at the axils of the leaves underneath; when bruised smelling a little like elder; buds deep blue. A common tree in forests in the northern parts of North America.

Fr. quadrangulata, with the shoots distinctly and sharply quadrangular. A tree from Ohio, among the most unsuitable of the American ashes for this climate.

Fr. epiptera, with the keys very broad and wedge-shaped at the upper end, and taper at the base. A small tree, found all through the American Union.

All the foregoing can be procured in the English nurseries, and they perhaps form the only distinct species of the genus, which however most especially demands the attention of some judicious American botanist. A great many supposed species were distinguished by the late Mr. Bosc, whose names are current in collections; but they can scarcely be determined with precision, and are perhaps not worth the attempt.

2. Ornus, or *Flowering Ashes.*

The *Ornus Europæa*, or common Manna Ash, is a small round-headed tree, with leaves resembling those of the common ash, only the leaflets are elliptical, abruptly acuminated, and have a considerable collection of hairs at the base of the midrib underneath. In the summer, when the leaves are full grown, the trees become ornamented with a profusion of white delicate blossoms, which give them a strikingly beautiful appearance. The species inhabits the southern parts of Europe, especially the woods of Calabria and Apulia, and in those countries flowers in April.

Ornus rotundifolia is universally distinguished as a second species of this genus; differing in its leaves being much longer, the leaflets roundish, ovate, acute, not cuspidate, coarsely serrated, entire, and rather cuneate at the base, and not at all hairy underneath. In flowers it is much the same. It is a native of Calabria and elsewhere in the south of Europe.

These two plants are interesting as producing the sweet laxative substance known in the apothecaries' shops under the name of manna. It is a secretion from the leaves and branches; and, according to Fée, is caused either by artificial wounds, or by the puncture of an insect. Both species yield the substance, but, according to Tenore, that from *Ornus rotundifolia* is of better quality than the other. Fée thinks that it is also yielded by both *Fraxinus excelsior* and *parvifolia*, and this corresponds with the assertion of Dr Fothergill, who saw the substance collected.

'In Calabria and Sicily,' says this physician, 'in the hottest part of the summer months, the manna oozes out of the leaves, and from the bark of the trunk and larger branches of the Fraxinus, or Calabrian Ash. The Ornus likewise affords it, but from the trunks and larger branches only, and that chiefly from artificial apertures; whereas it flows from the Fraxinus through every little cranny, and bursts through the large pores spontaneously. The different qualities of the manna are from different parts of the tree.'

Besides these, some other species of Ornus exist in the north of India and China, but they are too little known to require notice here.

See an elaborate account of these genera in Loudon's *Arboretum et Fruticetum Britannicum*, p. 1213.

FREDERICK I., Emperor of Germany, surnamed Barbarossa, was born in 1121, and succeeded his uncle Conrad III. on the imperial throne in 1152. Though Conrad was not deficient, either in warlike spirit or in talents, an unhappy concurrence of circumstances had prevented him from regulating, as might have been wished, all the domestic and foreign concerns of the empire. So many important affairs, both in church and state, demanded immediate attention, so many difficulties were to be overcome, that it required a man of no common energy to accomplish such a task; and of this Conrad himself was so sensible, that he did not recommend to the princes of the empire his young son Frederick, but his nephew Frederick, son of Frederick duke of Suabia, by Judith daughter of Henry duke of Bavaria, who had already given proofs of his personal courage. Accordingly on the 17th day after the death of Conrad, Frederick was unanimously chosen his successor by the temporal and ecclesiastical princes assembled at Frankfort, and crowned at Aix-la-Chapelle five days after. In the second year of his reign, Frederick settled the dispute between Canute and Sueno, competitors for the Danish crown, in favour of the latter, whom he however compelled to do him homage as his vassal. But his chief attention was directed to Italy. Complaints were made by the Apulians against Roger king of Sicily; and some citizens of Lodi also came, and represented in strong colours the tyrannical conduct of the Milanese. Frederick sent an envoy with a letter, enjoining the Milanese to refrain from such proceedings, but they tore his letter to pieces, and his envoy saved his life by timely flight. This and other important considerations called him to Italy in 1155, where he held an assembly in the plain of Roncaglia, to receive the homage of most of the great Italian lords and principal cities. In this, his first expedition into Italy, he, in some measure, humbled the Milanese, but not choosing to attack their city took the road to Turin, received on the way the submission of many cities, and in particular inflicted severe chastisement on Asti. Having taken Tortona, after a two months' siege, he allowed the inhabitants to retire, but gave the place up to plunder, after which it was entirely burnt and destroyed. After being crowned king of Italy at Pavia, he advanced rapidly towards Rome, where Adrian IV. had just succeeded pope Anastasius. The city having been excited by Arnold of Brescia to dispute the authority of the pope, Adrian, who was a man of great resolution, excommunicated Arnold and his partizans, who were in consequence expelled by the Roman senate, and Arnold being subsequently taken prisoner, was by the emperor delivered up to the pope, who caused him to be burnt alive. Having had an interview with the pope, at which he consented to hold his holiness's stirrup, and having re-established his authority at Rome, and received the imperial crown from his hands, Frederick set out on his return to Germany. His first care was to restore the peace of the empire, which was disturbed by a dispute between the archbishop of Mentz and the count Palatine of the Rhine; he likewise ended, to the satisfaction of all parties, a most important question respecting the duchy of Bavaria. He had resolved to divorce his consort Adelaide, because she had no children; but this not being a sufficient ground for a divorce, the plea of consanguinity was set up, and a sentence of divorce was pronounced by Cardinal Joseph Orsini and several prelates. Frederick then proposed to marry a Greek princess, but this negotiation failing, he married in 1156 Beatrice, heiress of Burgundy, by which alliance he annexed that rich kingdom to his dominions. Frederick soon afterwards compelled Boleslaus duke of Poland to acknowledge himself a vassal of the empire, and in the first six years of his reign restored the empire to the same power and extent of dominion which it had under Henry III.

The affairs of Germany being settled, Frederick found it necessary again to go to Italy, where the Milanese cruelly oppressed the towns which would not submit to their orders. In 1158, Frederick with an army of 100,000 infantry and 15,000 cavalry laid siege to Milan, and the inhabitants, notwithstanding some previous successes, were reduced, after an obstinate resistance, to offer submission, which was accepted. But they again rebelled, and Frederick resolved to make an example of this haughty city, which was closely invested and compelled to surrender at discretion. Frederick's decision was that 'Milan should be a desert; that all the inhabitants should leave the city in a week, and settle in four villages, ten miles distant from each other.' It has been often asserted that the city was razed to the ground, with the exception of the churches: but this seems to be an exaggeration. The city was not plundered; the order or permission for the work of destruction extended only to the fortifications, and even of these a considerable part was left standing. But the power of Milan was broken. Its fall entirely discouraged the other cities. Brescia and Piacenza were obliged to demolish their walls; and the other cities which had joined in the insurrection were deprived of their rights and privileges.

While Frederick was thus engaged, pope Adrian, with whom he was latterly on very bad terms, died, on which a schism arose; some of the cardinals choosing Victor IV., who was inclined to the imperial interests, and the others Alexander III. Frederick, who considered himself as protector of the church, called a council at Pavia. Alexander, not recognizing this council, which consisted of fifty or sixty German and Italian bishops, it proclaimed Victor IV. as the true pope, who was acknowledged by the emperor. Alexander excommunicated the emperor and all his partizans; but though he was recognized by the kings of France and England, and the estates of Lombardy, Frederick's superiority obliged him to seek refuge in France. When the emperor returned to Germany he found that dissensions had broken out betweeen several of the princes, which he however succeeded in appeasing; and then set out to meet Louis the Young, king of France, at Lannes, near Dijon, where they had agreed that a council should be held to terminate the schism in the church, by deciding between the two popes, who were to appear, accompanied by the two sovereigns, their protectors. This plan however failed. The death of pope Victor IV. in 1164 seemed to offer a favourable opportunity for reconciliation between Frederick and Alexander III., which the former was inclined to embrace, but before his orders reached Rome his ambassador there had concerted with the cardinals to proceed to the election, and the choice fell on Guido bishop of Crema, who took the name of Paschal III., and was acknowledged by the emperor. Frederick crossing the Alps in 1165 marched direct to Rome, where Paschal was solemnly installed, and then crowned the emperor and his consort Beatrice. The power of the emperor now seemed to be greater than ever, and he hoped entirely to reduce the cities of Lombardy, which had formed a powerful league, being roused by the cruelty and boundless extortion of his officers, even in those places where his authority was still acknowledged. Frederick's plans were however defeated by a pestilential disorder, which carried off the greater part of his army, and it was with no little difficulty that he returned in 1168, from his third Italian campaign, as a fugitive. He remained six years in Germany to settle the very complicated affairs of that country, where the ambition of the several princes led to continual disputes and feuds, the most important of which was the conflict between Henry surnamed the Lion, and many princes, bishops, and counts, who formed a confederacy against him. He however defeated them, and soon afterwards married Matilda, daughter of Henry II. king of England. In 1169 Frederick prevailed on the princes of the empire to choose his son Henry, who was only five years old, king of the Romans, and he was accordingly crowned at Aix-la-Chapelle. Having appeased the disorders in Saxony, and undertaken a successful expedition against Boleslaus duke of Poland, he prepared for the fourth time to cross the Alps. The negotiations in Italy had not led to any favourable results. Soon after Frederick's return to Germany, pope Paschal died, and the cardinals in the interests of the emperor chose for his successor Calixtus III., a man very inferior in talent to Alexander. But the latter had so consolidated his power, that Frederick thought he should gain more by opposing an anti-pope to him than by attempting a reconciliation. The cities of Lombardy, encouraged by Alexander, extended their confederacy, and built a new city, which they called Alexandria in honour of him. Only Genoa and Pisa remained true to the emperor, who, to prevent matters from going too far, sent Christian, archbishop of Mentz, with a small army to Italy. The archbishop was equally distinguished as a prelate, a statesman, and a general; but he was not able to effect much towards the establishment of peace. The emperor himself having passed Mount Cenis, laid siege to Alexandria, and the united Lombard army came to its relief. Negotiations were however opened, and a truce concluded. The emperor was so sure of the result, that he sent part of the army back to Germany, which he soon had reason to repent. The Lombards grew bolder, and Henry the Lion, notwithstanding all the entreaties of the emperor, refused to proceed. A battle soon took place near Legnano, in which the emperor was defeated by the Lombards with great loss, and he himself being overpowered and supposed to be killed, his troops fled. A few days afterwards however, to the unspeakable joy of the army, he appeared again at Pavia, where the empress had already put on mourning.

This loss induced Frederick to think of peace. He treated first with Alexander, whom he acknowledged as pope, and who relieved him from the ban of excommunication. He then, by the mediation of Alexander, concluded a treaty, or rather a truce, for six years, with the cities of Lombardy, on very advantageous terms, for he in fact lost nothing essential, except that he gave up the cause of Calixtus, who obtained a rich abbey. On his return from Italy, where he passed the winter, he went to Burgundy, called a diet at Arles, and had himself and his consort crowned king and queen of Burgundy; whence he returned to Germany, much sooner and more powerful than his enemies expected. The peace of the empire being established, the princes and bishops who had sided with Alexander became reconciled to the emperor; but new troubles arose in Saxony. Henry the Lion formed great plans to extend his power, but was in the end forced to sue for peace. At Erfurt he appeared before the emperor and the German princes, to whom Frederick had made a promise to decide nothing respecting Henry without their approbation. The sentence was that he should be relieved from the ban of the empire, retain his family dominions of Brunswick and Lüneburg, but, for the preservation of peace, should go into banishment for seven years, which, at the intercession of the pope and the king of England, was reduced to three years. Henry accordingly went with his wife and children to his father-in-law the king of England.

The truce with Lombardy now approached its last year. After several occurrences in Italy, not unfavourable to Frederick, Alexander III. died in 1181, and was succeeded by Lucius III., who was much inferior to him in ability and energy. The hostile dispositions of both parties had greatly abated during the wars, and the emperor having summoned a diet of the empire at Constance, a definitive peace was concluded, honourable and satisfactory to all parties. A year after the peace of Constance, order and tranquillity everywhere prevailing, the emperor called a general diet at Mentz, one object of which was to establish his five sons. This diet presented a scene of unrivalled festivity and splendour. The Empress Beatrice, the emperor's five sons, the archbishops, bishops, princes and nobles of Italy and Germany, ambassadors from foreign sovereigns, 40,000, some say 70,000, knights from all parts of Europe, and countless multitudes of people of all classes were here assembled. Historians have recorded those brilliant days, the wonders of which have been handed down from generation to generation, and songs composed on that occasion are still sung on the banks of the Rhine. A year after this diet Frederick again went to Italy, where he was received with extraordinary honours by the cities of Lombardy, and even concluded an alliance with Milan. But new disputes arose with the papal see, through Frederick's refusal to grant to Lucius, and afterwards to his successor Urban III., the sovereignty of the territory called St. Peter's Patrimony. He however so increased his power in Italy by the marriage of his son Henry with the daughter and heiress of William king of Sicily, that the pope did not venture to proceed to extremities. In Germany Frederick had declared Lubeck and Ratisbon imperial cities, and thereby had laid the foundation of a middle estate between the princes and the emperor, by which the power of the latter was increased, and the class of citizens elevated. The separation of Bavaria from Saxony, which Henry the Lion had possessed together, added indeed to the power of the emperor, but embittered the animosity between the party of the Guelphs and Ghibelines.

Things were in this state when all Christendom was alarmed by the news of the taking of Jerusalem by the Infidels. This event led to the Third Crusade. On the exhortation of the pope, Frederick took the cross in 1188, with his son Frederick, and a number of the principal German nobles. Upon mature deliberation it was resolved that the army should go by land through Germany, Hungary, and Asia Minor. The army, consisting of 150,000 men, besides many thousand volunteers, commenced its march in the spring of 1189. Though it met with many difficulties, chiefly from the perfidy of the Greek emperor, who had secretly made a convention with Saladin and the sultan of Iconium to obstruct the passage of the Germans, Frederick penetrated into Asia, gained two victories over the Turks near Iconium, which he took, and was proceeding in his victorious career to Syria, when his eventful life was brought to a close in an attempt to swim on horseback across the river Calycadnus, where he was carried away by the current. The statement that he was drowned in the Cydnus while bathing is certainly incorrect. Frederick was a brave and liberal prince, equally firm in prosperity and adversity. These great qualities veiled the pride and ambition which were unquestionably in part the motives by which he was actuated. He possessed an extraordinary memory, and a greater extent of knowledge of different kinds than was common in that age. He esteemed learned men, especially historians, and wrote in Latin memoirs of some part of his own life, which he left to Otho, bishop of Freysingen, whom he appointed his historian. He was of noble and majestic appearance, and, notwithstanding his disputes with the popes, a friend to religion. After his death his son Frederick, duke of Suabia, took the chief command, but died of a pestilential disorder at the siege of Acre in 1191; and of the mighty army that Frederick led from Germany only a small remnant returned.

FREDERICK II., Emperor of Germany. On the death of Frederick I. he was succeeded by his son Henry, who reigned only eight years, leaving his son Frederick, a child of four years of age, who had been created king of the Romans when in his cradle. He was very carefully educated by his mother, Constance of Sicily, and acquired a degree of learning very extraordinary at that age. His hereditary dominions consisted of the kingdoms of Naples and Sicily, the duchy of Suabia, and other territories in Germany. In 1210, the emperor Otho being excommunicated by the pope, Frederick, then fourteen years of age, was declared emperor by a considerable number of the German princes, but it was not till some years afterwards, on the retreat and death of Otho, that he became peaceable possessor of the imperial throne, and was crowned at Aix-la-Chapelle in 1215. No prince in the middle ages, Charlemagne perhaps excepted, has made so distinguished a figure; the most remarkable period of those ages is connected with his name and his long reign. It was the time in which Innocent III., Gregory IX., and Innocent IV. carried Gregory VII.'s policy to an extent that had been considered as impossible: when the origin of the orders of knighthood, the foundation of the Mendicant orders, and the Inquisition became formidable pillars and supporters of the spiritual edifice; when, the nations of Europe were for the first time impressed by the Crusades with one general idea, represented by the symbol of the cross, and drawn closer together; when, after many single voices had died away unheeded or forgotten, a Protestantism of the middle ages was proclaimed by the Waldenses and the Albigenses; when chivalry attained a more elevated position, ennobled by religion and a regular organization; when the class of free citizens gradually rose in estimation and importance, and favoured in Germany by Frederick against the aristocracy, and opposed by him in Upper Italy as instruments of the popes, acquired, by means of great confederations of many cities, and, by the institution of corporate bodies, respect abroad and internal strength; when, in opposition to the club-law, a law for ensuring public peace and security was first proclaimed in the German language; when the Secret Tribunal began to act in its first, scarcely perceptible commencement; when the first universities excited a spirit of inquiry and research; and when the poetry of the Troubadours found a home in Germany and Italy, and was honoured and cultivated by emperors and kings.

Frederick, though not tall, was well made; he had a fine open forehead, and a mild and pleasing expression of the eye and mouth. The heir of all the best qualities of all the members of his distinguished race, enterprizing, brave, liberal, with excellent natural talents, full of knowledge; he understood all the languages of his subjects, Greek, Latin, Italian, German, French, and Arabic; he was austere, passionate, mild, and generous, as the occasion prompted, cheerful, magnificent, and fond of pleasure. And as his body had gained strength and elasticity by skill in all chivalrous exercises, so his mind and character, early formed in the school of adversity and trial, had acquired a degree of flexibility which those who are born to power but seldom know, and an energy which strengthened and raised him in times of difficulty. But such a body and such a mind were necessary for a man who was to combat in Germany, already divided into parties, a preponderating aristocracy; in Upper Italy a powerful democracy; in Central Italy an arrogant hierarchy; and in his own southern hereditary dominions, to reconcile, and unite by internal ties, the hostile elements of six nations; who, opposed by temporal and spiritual arms, by rival kings, by excommunication and interdict, persevered, conquering and conquered, for forty years, survived the rebellion of a son, the treachery and poison of his most valued friend, the loss of his favourite child, and did not resign the sceptre, which he had held so firmly, till the last moment of his life.

Till the year 1209, when Frederick took upon himself the government of Lower Italy and Sicily, he was under the guardianship of Innocent III.; but the empress Constance, his mother, was obliged to purchase the investiture of Naples and Sicily, and the coronation of her son, by sacrificing to the pope the most important ecclesiastical rights. The royal crown of Germany, which was adjudged by the German princes to the child when only three years of age, was taken, after the death of his father, by the duke of Suabia, his uncle, who however wore it without advantage in opposition to Otho IV. till he was murdered in 1208 by Otho von Wittelsbach; but Otho IV. displeasing the pope, Innocent himself called Frederick to the throne of Germany. In spite of all the efforts of the party of the Guelphs, Frederick arrived in Germany in 1212, and was received with open arms by the party of the House of Hohenstaufen. The possession of the crowns of Germany and Sicily inspired Frederick with hopes of making himself master of all Italy, subduing Lombardy, and reducing the power of the spiritual monarch to the dignity of the first bishop of Christendom. But he misunderstood the spirit of his age, which was far less enlightened than himself, and still cherished prejudices which he had overcome. If the conception of the plan was great, it was equalled by his prudence in gradually preparing to carry it into effect. In 1220 he caused his eldest son Henry to be chosen king of the Romans, and appeased the anger of the new pope Honorius III. by alleging that this measure was absolutely necessary before he could proceed to the crusade which he had undertaken, and by promising that he never would unite Sicily with the empire. Disregarding the refusal of the Milanese to place the iron crown on his head, he proceeded to Rome, was crowned emperor in 1220, and as such hastened to his hereditary dominions which he had left almost as a fugitive. It was there that preparations were to be made for the crusade, but first of all it was necessary to put an end to the internal troubles of the country. By the advice of Hermann von Salza, grand master of the Teutonic order, Frederick married Iolante, daughter of John of Brienne, titular king of Jerusalem, and assumed his father-in-law's title. Meantime the pope granted him a delay for undertaking the crusade; his chancellor, Peter de Vinci, compiled a new code of laws, the object of which was to settle the authority of church and state, to reconcile the nobility, clergy, citizens, and peasants, and to be adapted to many different nations, Romans, Greeks, Germans, Arabs, Normans, Jews, and French, respecting as much as possible all existing institutions. For the education of his subjects, he founded a university at Naples in 1224; and the medical school at Salerno was very flourishing. The belles lettres were cultivated at his court, and Frederick himself, some of whose juvenile poems in the Sicilian dialect, at that time the most cultivated, have been preserved to our times, may be considered as one of the first authors of the refined Tuscan poetry. Many eminent artists, Nicola, Masaccio, and Tomasi da Steffani, were patronised by Frederick; and the collections of works of art at Capua and Naples were founded.

The year 1227 being fixed for the crusade, Frederick proposed before he set out to call a general diet of the empire at Cremona, to satisfy himself of the sentiments of the Lombards and be crowned as their king. But the Milanese refused, renewed their antient league with fifteen cities, and intercepted the communication with Germany by occupying the passes of the Alps. For this they were put under the ban of the empire; but Frederick hastening to the crusade, left the management of the affair to the pope, who only proposed a general amnesty, and enjoined the Lombards to furnish 400 horsemen at their expense, for two years, to join the crusade. At this juncture Honorius died, and Cardinal Hugolinus, nephew of Innocent III., was chosen pope by the name of Gregory IX. He was then eighty years of age, and, as the emperor certifies, 'of unblemished character, equally distinguished by piety, learning, and eloquence,' and resembling, in the energy of his will, Gregory VII.: he urged the emperor, who received the cross for the second time from his hands, to fulfil his promise, and did not hesitate to censure the luxurious way of life of the emperor and his court. A great number of pilgrims had assembled in Italy, but pestilential diseases raged among them, and the emperor himself was ill when he embarked with Louis, landgrave of Thuringia. In three days Frederick grew worse, and was obliged to land at Otranto, where Louis Landgrave died. The fleet proceeded only to the coast of the Morea, and the crusade failed. Upon this Gregory excommunicated the emperor, and laid his dominions under an interdict. Frederick however, notwithstanding the death of his wife Iolante in child-bed, set out on a new crusade in 1228; but Gregory, who had not expected this, and thought it improper for a prince under excommunication to go to the Holy War, commanded the patriarch of Jerusalem and the three orders of knights to oppose the emperor in everything, and caused Frederick's hereditary estates to be occupied and laid waste by his soldiers and John of Brienne. Frederick, notwithstanding all this, by an agreement with Kamel, sultan of Egypt, succeeded in making a ten years' truce, and acquired for himself Jerusalem, the holy places, all the country between Joppa, Bethlehem, Nazareth, and Acre, and the important seaports of Tyre and Sidon.

The city of Jerusalem, where Frederick, on the 18th May, put the crown upon his own head because no priest would even read mass, was laid under an interdict, and Frederick was even betrayed to the sultan, who gave him the first information of it. Frederick hastened back to Lower Italy, and after fruitless negotiations with Gregory re-conquered his hereditary estates and defeated all the intrigues of the pope, who was at length obliged (1230) to free him from the excommunication. The Lombards alone would not hear of any terms, prevented his son Henry from going to the diet at Ravenna, and were not deceived by Gregory's exhortation to peace. While Frederick at last reconciled the pope with the Romans, the latter secretly endeavoured to induce King Henry to rebel against his father, promising that he would be received by the Lombards with open arms. Henry's party in Germany too was already considerable; but Frederick suddenly appeared, and Henry, quite abashed, fell at his feet and entreated forgiveness. When however the infatuated young man made a second attempt, he was sent with his wife and child to imprisonment for life at San Felice, in Apulia; then to Neocastro, in Calabria; and lastly, to Martorano, where he died unreconciled, in the seventh year of his imprisonment. On this event the emperor wrote to the states of Sicily, 'I confess that the pride of the living king could not bend me, but the death of the son deeply affects me; and I am not the first nor the last who suffered injury from disobedient sons, and yet wept over their graves.' It is indeed a striking contrast, that almost at the same time, when Frederick sent the son of his first wife to prison, and caused him to be formally deposed at the diet at Mentz (1235), he celebrated with much pomp his third marriage with Isabella of England. In 1236 he made preparations at Augsburg for an expedition against the Lombards, in which the friendship of Ezelino, sovereign of Verona, and that of the Ghibelline cities of Upper Italy, was to double the strength of his little army; but a contest, which was soon ended, against Frederick, duke of Austria, the last of the house of Babenburg, interrupted in 1237 the war which was already commenced, and the election of Conrad, his second son, as king of the Romans. After the recommencement of the war against the cities of Upper Italy devoted to the party of the Guelphs, the victory of Corte Nuova, on the Oglio, on the 26th and 27th November, 1237, broke the power of the Lombards; all the cities, except Milan, Bologna, Piacenza, and Brescia, submitted; but Gregory became more enraged, especially when the emperor made his natural son, Enzio, king of Sardinia, and prepared to subdue the rest of Lombardy. On Palm-Sunday, 1239, Gregory again excommunicated Frederick, who continued the war, but sustained much injury by the secret perfidy of Ezelino, of which he had no suspicion. To put a complete end to the war, he suddenly, in 1240, turned his arms against the pope himself, penetrated through Spoleto into the states of the Church, and made the pope tremble in his capital. Rome would have proved an easy prey if he could have subdued the last remnant of superstition in his breast; but here, and in his edicts against heretics, we see the ties which still bound Frederick in the fetters of his times. Nor did he know the spirit of Gregory, when he thought he could compel him to make peace. He wished rather, without proceeding to the last extremities, to have his cause decided in an assembly of bishops; but finding that only his most determined enemies were invited to it, he warned all prelates against going to Rome; and at last, when all his admonitions availed nothing, he caused the Genoese fleet to be attacked and destroyed by his son Enzio, and above 100 prelates who were on board, on their way to Rome, to be taken to Naples as prisoners. This blow at length laid the invincible Gregory on his death-bed on the 21st August, 1241; but by his death deprived the emperor of almost certain victory.

While he was engaged in these enterprises, Frederick had not been able to contend in person with the Mongols, who had penetrated into Germany, but after their victory at Wahlstadt in 1241, and their defeat at Olmutz, turned back. After the short reign of Pope Celestine IV. and a long interregnum, Frederick at length obtained the election of a pope; but Sinibald Fiesco, who, when cardinal, had been his friend, became, as Innocent IV., the most formidable of his enemies. He continued Gregory's excommunication, and dreading the vicinity of the emperor in Italy, fled in 1244 to Lyon. Frederick had now the alternative, either to appear as a criminal before the judgment-seat of a priest, or to commence the unequal conflict with the superstition of the age. The pope renewed the excommunication and summoned a general council to Lyon. Thaddeus of Suessa, the emperor's chancellor, defended his cause before this council with overpowering eloquence and truth, and refuted the most malicious, as well as the most absurd accusations. Frederick, accused of heresy, in vain suffered himself to be examined respecting his faith; however religious and pure he appeared, he was guilty, because it was resolved he should be so, and the pope pronounced against him the most dreadful anathema—released all his subjects from their oath, declared him to be deprived of all honours and dignities, as a perjurer, peace-breaker, robber of churches, a profaner of sanctuaries, and heretic; and he also declared that those who remained faithful to the emperor should be included in the same sentence. But Frederick showed that he was still emperor: he justified himself, as became a great sovereign, before the princes of Europe; and while Innocent was labouring for the election of the landgrave Henry Raspe of Thuringia, to the imperial throne, he fought successfully against the Lombards, defeated a conspiracy at his court, and did not lose his courage even when his son Conrad was defeated by his rival Henry. Conrad in the sequel obtained the victory, and Henry died in 1247. But what most deeply wounded him was the conduct of Peter de Vinears, who had long wavered in his fidelity, and when he found himself discovered, attempted to poison Frederick. This plan being defeated he was cast into prison, where, in despair, he dashed his head against the wall and was killed. It is to be observed, that Raumer, in his 'History of the House of Hohenstaufen,' considers this story of the attempt to poison the emperor very doubtful, though he does not believe that Peter was entirely innocent. The emperor, who had become mistrustful of his friends, lost Parma by an insurrection, and being defeated in a camp which he had formed before it, he lost his army, his treasures, and his friend Thaddeus of Suessa. William of Holland, though only twenty years of age, was at the instigation of Innocent elected emperor by the three Rhenish archbishops; Enzio, his son, was made prisoner by the enraged Bolognese, and Ezelin joined his enemies. His own health now declined, and he desired to die in peace; but Innocent rejected the most reasonable terms of reconciliation. Frederick's spirit was again roused: he was victorious in Lombardy, and would perhaps have humbled Innocent himself had he not been surprised by death at Fiorentino, in the arms of his natural son Manfred, on the 13th of December, 1250, in the fifty-sixth year of his age, and the forty-first of his reign.

FREDERICK III., emperor of Germany, son of Ernest, duke of Austria, was born at Inspruck, on the 21st September, 1415. He was not yet of age, when, according to the fashion of those days, he went on an expedition to the Holy Land. In 1435, in conjunction with his brother Albert the Prodigal, he assumed the government of his dominions, the revenues of which did not much exceed 16,000 marks. Being elevated to the throne of Germany, in 1440, on the death of his cousin Albert II., he appeared destined to take a decisive part in the great affairs of his age; but he was averse to every thing that took him out of his own narrow sphere, and was especially deficient in attachment to the interests of Germany. It is true there were many circumstances in the state of Germany, and in his own situation, which partly excuse him. At the very commencement of his reign he was engaged in war with his brother Albert, who reigned in Upper Austria, and was in danger of losing all his hereditary dominions. In different parts of Germany troubles arose, which required a more vigorous hand than his to put them down. He called several diets, chiefly to put an end to the schism in the church, which was not effected till 1447, when Felix was persuaded to abdicate, and Nicholas V. was acknowledged as lawful pope. In 1452 Frederick went to Italy, where he received the imperial crown from the pope, as well as the crown of Lombardy, along with his betrothed consort Eleanora, sister of the king of Portugal. But he did not thereby acquire a greater degree of moral energy, or an increase of political independence; nor did he recover any of the rights of the Empire which had been torn from it by various usurpers. In 1453 he revived the archducal title in his family, and busied himself with his botanical pursuits, while the danger on the side of Turkey became more threatening. He did not make any attempt against Milan, where, after the extinction of the male line of the Visconti, the usurper Sforza had established himself. How unfortunate and unstable he was in his external policy appears from his transactions with Hungary and Bohemia, and the manner in which, with a view to recover some crown lands of which the house of Austria had been deprived, he interfered in the internal disputes of the Swiss Cantons; but not having a sufficient force of his own, and not being supported by the Empire, he called in foreign troops from France under the Dauphin, which, having been taught a lesson by Swiss valour at St. Birs Jacob, in 1444, turned their arms in part against Germany and Austria itself. In Germany he was threatened with still greater danger. In 1449 he was entangled in a quarrel, on account of the succession to the Palatinate, with Frederick, the victorious brother to the deceased Louis, who demanded the Electorate for himself instead of his nephew Philip, and being opposed by Frederick, brought over Mentz, Treves, and a number of German princes to his side, and even held out to the Bohemian George Podiebrad a prospect of obtaining the imperial crown. When his ward Ladislaus died, without children, in 1457, Lower Austria came to Frederick, Upper Austria to Albert, and part of Carinthia to Siegmund of Tyrol; but Vienna remained to all of them in common. On this death, notwithstanding Frederick's pretensions to Bohemia and Hungary, he had the mortification to see George Podiebrad preferred to him in the former, and Matthias Corvinus in the latter. Scarcely had he recovered from this cause of vexation, when, in 1462, his brother Albert raised an insurrection against him in his capital Vienna, and Frederick, being besieged there, was delivered by his opponent Podiebrad. In this distress he at length, for once, manifested resolution, and declared that the palace should be his grave before he would yield to rebellious subjects. For many years he was engaged in contentions respecting the duchy of Austria, of the whole of which he obtained possession by the death of Albert in 1463. In 1468 he again went to Rome, and had several conferences with Pope Paul II., as to the means of opposing the progress of the Turks: nothing, however, was done, and he suffered them to penetrate in 1469 to Carniola, and in 1475 nearly to Salzburg, almost without opposition. His wavering policy caused the kings of Bohemia and Hungary to quarrel: but afterwards both turned their arms against him, and Matthias Corvinus, king of Hungary, laid siege to Vienna in 1479, and was only prevailed on to retire by Frederick's renouncing all his own pretensions to Hungary, and granting him the investiture of Bohemia, with a sum of money. It is probable that he was rendered more indifferent to the fate of his hereditary dominions by the success of his plan for the aggrandizement of his family, by the marriage of his son Maximilian with Maria of Burgundy, the rich heiress of Charles the Bald, which did not take place till 1477, after the death of Charles. In 1485 he had a new quarrel with Matthias, who took from him Vienna and all Lower Austria. Frederick withdrew to his son Maximilian in the Netherlands. In 1486 Maximilian was chosen king of the Romans, but soon afterwards was entangled in a war with France, and even with the Netherlands, on account of the guardianship of his children. In 1488 Maximilian was taken prisoner, and Frederick resolved to hasten to his assistance. On the death of Matthias in 1490 Frederick recovered Austria, but was obliged to leave the Hungarian crown to Ladislaus of Bohemia. At length, after so many defeated plans, he died on the 19th August, 1493, as some report, from a disorder contracted by a surfeit of melons; according to others, in consequence of an amputation of the leg; leaving it to his son to realise the device inscribed upon his books and his palaces, A, E, I, O, U, by which he is generally supposed to have meant *Austria est Imperare Orbi Universo.* When it is considered that Frederick died in the 78th year of his age, after a reign of fifty-eight years in Austria, and fifty-three as Emperor of Germany, it is surprising how small a share he had in the important events of that long period, which is rendered memor[illegible] by the [illegible]ng of Constantinople by the Turks—

by the revival of learning, in consequence of the influx of fugitives from Greece, and the increased number of universities in Germany and Italy,—by the invention of printing, by the visible advance of the states of Western Europe towards one political system,—by the end of the duchy of Burgundy, which gave occasion for 200 years' wars, and by the weakening of the Papal power by the treaties of Constance and Basle. The character of Frederick, as his whole reign evinces, entitled him to his surname of "the Pacific:" he was cautious, scrupulous about trifles, avaricious, but temperate, plain in his apparel, chaste and devout, and remarkably fond of astrology, alchemy, and botany—possessed, in short, of qualities which might have made him a respectable private gentleman, but wholly unequal to the task of governing an empire, especially in the state in which Germany, divided among 1500 masters, was in his age.

FREDERICK WILLIAM, elector of Brandenburg, surnamed the Great Elector, was the son of the elector George William. In the distracted state of Germany during the Thirty Years' War, and the necessary absence of his father with the army, the young prince saw but little of the splendour and indulgences of a court, and passed the first years of his life in retirement with his tutors, who were men of learning and experience, and with his mother, first at the castle of Litzlingen, in the forests of the Altmark, and afterwards at Custrin. The adventures and the singular fortunes of his mother's family (who was sister of Frederick, king of Bohemia, husband of the princess Elizabeth, daughter of James I. of England), the cruel and barbarous manner in which the war was carried on, and the dangers to which he and his family were exposed, necessarily made a deep impression on his mind. In his eleventh year he paid a visit to his father's sister, Maria Eleanora, queen of Sweden, consort of Gustavus Adolphus, whose conversation naturally dwelt on the exploits of her illustrious husband, whose mortal remains he contemplated at Wolgast only two years afterwards. At the age of fifteen he was sent to the university of Leyden, where he especially devoted himself to the classics and to history. Of modern languages he was a proficient in the French, Dutch, and Polish. He was afterwards in the camp of Frederick Henry, prince of Orange, during the siege of Breda, and was much noticed by the prince for his amiable manners and exemplary conduct, as well as for his sound understanding. About this time a society of young persons of both sexes (called Media Nocte) endeavoured to draw the prince into its circle; but his friend and tutor, the baron Schulenberg, making him aware of the immoral nature of the society, the prince resolved immediately to quit the Hague. The prince of Orange was much surprised at this self-command, and when the prince arrived in the camp before Breda, said to him, 'Cousin, your flight is a greater proof of heroism than if I took Breda; he who so early knows how to command himself will always succeed in great deeds.' These words, as he himself owned, made a deep impression on him.

His father dying in 1640, the young prince found his dominions reduced to a most deplorable condition by war and bad government. The exactions of Wallenstein in the Mark alone were estimated at twenty millions of gold florins; and in a memorial of the magistrate of Prenzlau, it is stated that the inhabitants are reduced to such dreadful extremities that they not only eat dogs, cats, and even carrion, but that both in the town and country they attack and kill each other for food. He commenced his government with a degree of prudence and wisdom rarely found in so young a sovereign. His first care was to correct many crying abuses, and to restore order in the finances. His attention was then directed to foreign affairs. In 1642 he received the investiture of Prussia from the king of Poland; in 1643 he concluded a peace with the Swedes on condition of their evacuating the greater part of his dominions. At the peace of Münster he was not able to enforce his claims to Pomerania and Silesia, but obtained Magdeburg, Wallenstadt, Minden, and part of Pomerania. It is highly to his credit that it was chiefly owing to him that the principle of equal rights and privileges for the two great divisions of the Protestant church was admitted in that famous treaty. Charles Gustavus, king of Sweden, appearing emulous of rivaling Gustavus Adolphus, the elector concluded an alliance with Holland, and sought the friendship of Cromwell and Louis XIV. He was however obliged to make in 1655 a treaty with the Swedes, in consequence of which he joined in the invasion of Poland, and greatly contributed to the victory at Warsaw. Austria, Holland, and Poland vehemently protested against this alliance with Sweden, but Cromwell, who believed the Protestant cause to be in danger from the king of Poland, sent William Jepson as his ambassador to the elector, whom in letters he compliments in the highest terms for his service to the Protestant religion. But Russia and Austria declaring in favour of Poland, he, by the mediation of Austria, concluded a convention with Poland at Wehlau, by one of the stipulations of which he obtained the entire sovereignty of Prussia; and in 1678 completed the conquest of all Pomerania by the taking of Greifswald and Stralsund. The death of Charles Gustavus freed him from an adversary who would probably have endeavoured to prevent the execution of this treaty, which was confirmed by the treaty of Oliva. Frederick, now at peace with his neighbours, directed all his attention to promote the welfare of his subjects by favouring all internal improvements; the ruined towns and villages were rebuilt, new roads made, waste lands cultivated commerce encouraged, and many useful establishments founded.

In 1672 however, Holland being threatened by Louis XIV., he concluded a treaty with the republic, engaging to furnish 20,000 men for its defence. He also contributed to induce the Emperor, Denmark, Hesse Cassel, and several German princes to join him against France. But though his advance into Westphalia induced the French to quit Holland, the campaign was rendered unsuccessful by the slowness of the Austrian general, and he was forced to abandon Westphalia to the enemy. The Austrians leaving him, and the Dutch neglecting to send him subsidies, he was obliged to make a convention with France in 1673. The French were to evacuate Westphalia and pay him 800,000 livres, he promising to withdraw from his alliance with Holland, and not to support the enemies of France; yet he reserved to himself the right of assisting the German emperor in case of attack. This happened in 1674, when he invaded Alsace with 16,000 men, and joined the Imperial army; but the Austrian general Bournonville, avoiding a battle, contrary to the advice of Frederick, Turenne receiving reinforcements, obliged the Germans to quit Alsace. In order to free themselves from Frederick, the French instigated the Swedes to invade Pomerania and the March, which they attacked in December, 1674, with 16,000 men. Frederick hastened to his dominions, and proceeding with great rapidity and secrecy at the head of only 5000 men, he totally defeated 11,000 Swedes at Fehrbellin in 1675, and freed his dominions from the enemy. Following up his successes, he took Stettin. In January, 1679, he crossed the Frische Haff and the Gulf of Courland with his army on sledges over the ice, and surprising the Swedes in their winter quarters, compelled them to quit Prussia. He did not reap any real advantage from his success, for Louis XIV. insisted that he should make peace with Sweden and give up all his conquests; and on his refusal sent an army of 30,000 men to lay waste the duchy of Cleves and city of Minden, so that he was forced to conclude the treaty of St. Germain, by which he restored all his conquests to Sweden; the French withdrew from his Westphalian dominions, and paid him 300,000 crowns. After this we do not find Frederick again in the field. He was indeed engaged in various negotiations; was involved in disputes with France on account of its unjust seizure of Strasburg and Luxemburg; and in consequence of his receiving 20,000 French protestants who left their country on the repeal of the edict of Nantes. Frederick, who had previously received from his ambassador, Von Spanheim, notice of the intended measure, had made preparations to receive the fugitives, and sent funds to his agents at Frankfort, Amsterdam, and Hamburg, for their assistance. In like manner he protected the proscribed Waldenses. Having in vain interceded for them in a very affecting letter to the duke of Savoy, he offered to receive 2000 of them into his dominions. He sent 8000 men in 1686 to assist the emperor against the Turks; having in the year preceding renewed his alliance with Holland; and when Prince William of Orange was preparing for his expedition to England, Frederick assisted him with several regiments, and Marshal Von Schomberg, who was killed at the battle of the Boyne. As another proof of Frederick's enterprising spirit, it deserves to be noticed that Spain neglecting to pay him the arrears of a subsidy promised him for his co-operation against France, he esolved to commence a war by sea against that power: e fitted out eight frigates which had been employed gainst Sweden, and sent them in 1680 to capture Spanish hips, and they actually took some rich merchantmen.

We have not space, nor is it necessary to detail the proeedings of this great prince in consolidating the prosperity f his dominions and the welfare of his subjects. He died n April, 1688, leaving to his son a well-cultivated, much nlarged territory, a well-filled treasury, and an army of 0,000 excellent troops. He was twice married; first in 647 to Louisa Henrietta, princess of Orange, a most amiable nd accomplished person, author of the celebrated German hymn, 'Jesus mein Zuversicht.' She died in 1667. In the ollowing year Frederick married Dorothea, duchess dowager f Brunswick Lüneberg; but though an excellent and irtuous princess, she was not liked by the people, chiefly ecause she was on ill terms with her step-children, especially the crown-prince. The character of Frederick, both in ublic and private life, has always been highly esteemed. He was kind, generous, fond of society, and though rather uick in his temper, extremely placable. As a sovereign, e appears to have justly merited the surname of the Great Elector. Some writers have blamed his frequent changes f party; but it must be recollected that a weak state, surounded by powerful neighbours, cannot always choose its wn line of politics.

FREDERICK I., king of Prussia after 1701, but as elector f Brandenburg, Frederick III., was born in 1657, at Königsberg, and on the death of his eldest brother became heir pparent; but being deformed, and of a very weak constitution, his education was neglected, and his step-mother ven prevailed on the elector, his father, to make a will by which he bequeathed all the acquisitions of territory which e himself had made to be divided among the children of is second wife. But this disposition did not take place, nd Frederick succeeded to the whole of his father's dominions in 1688. After the death of his first wife Elizabeth Henrietta, princess of Hesse Cassel, he married, in 684, Sophia Charlotte, princess of Hanover, sister of George I., afterwards king of England. Immediately on is succession he agreed with William prince of Orange to ssist him with 6000 men in his expedition to England. In 689 he sent 20,000 men to join the imperial army against France, whose troops laid waste the Palatinate. In 1691 e joined the grand alliance between the emperor, Spain, Holland, and England, against France, and sent 15,000 men to the Netherlands, of whom King William had the chief command. He had an interview with that monarch, which did not prove very satisfactory to either party, the characters of the two sovereigns being essentially different. William, cold, simple in his manners, and solid in his views; Frederick impatient, entertaining a high opinion of his own greatness, and punctual in the observance of all points of etiquette. He also assisted the emperor with 6000 men against he Turks for a subsidy of 150,000 dollars. At the treaty of Ryswick, the conditions of the treaties of Westphalia and St. Germain, relating to Brandenburg, were confirmed. By negotiations with various powers, or by purchase, he obtained several additions to his dominions, and a prospect of others. In 1703 he took possession of the town of Elbing, which had been already mortgaged to the Great Elector for 100,000 dollars, which sum had not been repaid. The grand object of his ambition was to obtain the title of king of Prussia, that being the only part of his dominions of which he had the absolute sovereignty. He did not make known his design till the war of the Spanish Succession, when he made it a principal condition of his assisting the emperor, that he should be recognised king of Prussia, to which the emperor consented in a treaty, signed in November, 1700. For this he renounced the arrears of the subsidy due by Austria, and engaged to maintain 10,000 men at his own expense in the war of the Succession; in all the affairs of the empire to vote with Austria; at the election of an emperor, always to give his vote to an Austrian prince; and not to withdraw his German states from their obligation to the empire. On the 18th January, 1701, he put the crown on his own head, and also on that of his consort, who was not gratified with this elevation. On this occasion he founded the order of the Black Eagle. Frederick, as the ally of Austria, sent 20,000 men to the Rhine and 6000 to Italy, who distinguished themselves in the battles of Blenheim, Turin, &c. Frederick did not live to see the end of this war, as he died on the 25th of February, 1713, before the conclusion of the peace of Utrecht. Though he was chiefly actuated by personal vanity to assume the royal dignity, his illustrious descendant speaks of this step as having eventually raised the house of Brandenburg to its independence of Austria. He was more justly to be blamed for his excessive love of external pomp, for the lavish manner in which he rewarded his favourites, and for having purchased the royal dignity on such humiliating conditions. It must be added in his praise, that in compliance with the wishes of his queen, he gave great encouragement to arts and sciences. He founded the University of Halle, and the Academy of Sculpture and Painting at Berlin. He enlarged his capital by adding to it the suburb called Friederichstadt, built the palace of Charlottenburg, in honour of his second wife, and founded in 1705 the Supreme Court of Appeal. Notwithstanding his failings and weakness, he was naturally of a kind disposition, and merits much praise for having been able, in those critical times, to preserve his dominions from the horrors of war.

FREDERICK WILLIAM I., king of Prussia, son of Frederick I., was born in 1688. At a very early age he manifested a predilection for military exercises; at the age of five years he was sent to Hanover to be brought up with the electoral prince, afterwards George II. of England. The court of his grandfather, where the mode of living was strictly economical, simple, and without the restraints of rigid etiquette, pleased the young prince much more than the formal magnificence of his father's court. He served in the allied army against the French, and distinguished himself at the siege of Menin and the battle of Malplaquet. In 1706 he married the princess Sophia Dorothea of Hanover. His character being in many respects directly the reverse of that of his father, he commenced, immediately on his accession on the 25th February, 1713, to retrench the luxury that had prevailed in the preceding reign; he reduced the salaries of persons in office, limited their number, and endeavoured to introduce order into the finances. In his own person he set an example of the utmost plainness of apparel, and laid aside all the formalities of his station; while the queen and princesses were allowed to wear only dresses of the simplest kind. He devoted himself to public business, examined everything, was easy of access, and received and answered letters from the meanest of his subjects; but he was austere and arbitrary, and carried to the utmost extent his ideas of the divine right of kings. Though he repeatedly declared the republican constitution of Holland to be a model for all states, and boasted that he was himself a true republican, he was very far from allowing any check on his own power. His reforms in the finances and expenditure enabled him to gratify his most ardent wish, of keeping a great military establishment, and he laid the foundation of that strict discipline and regularity by which the Prussian troops have been since so greatly distinguished. His childish passion for tall soldiers is well known. No expense was spared in order to gratify it; men of gigantic stature were picked up in all the neighbouring states, and many were even kidnapped or forced into his service, by which he involved himself in many serious quarrels. This economy of his internal administration enabled him to repeople those provinces which were desolated by the plague, by means of colonies from other states, which he settled on very advantageous terms. He was liberal in rewarding the industry and ability of those who introduced any new art, and many of the richest manufactories in the Prussian dominions owe their foundation to him. But he had a mortal aversion to all abstract sciences, and even to poetry and literature; and he expelled the celebrated philosopher Wolf for his metaphysical opinions. He erected many public buildings at a considerable expense, but built little, and with great economy, for himself and his court. He founded the Medico-Chirurgical College, the Charité, and the Foundling Hospital at Berlin, the Berlin Cadet Establishment, and the Orphan House at Potsdam; the emigrants from Salzburg and the Polish dissidents met with a favourable reception in his dominions. On the other hand the Berlin academy and the universities narrowly escaped dissolution. The details of his private life have been given at great length by his daughter, the Margravine of Baireuth; and his character is portrayed in a few happy touches by Voltaire (*Mémoires, &c. écrits par lui-même*). The public events of his reign were of no great importance In the treaty of Utrecht, France and Spain recognised his royal title, and the sovereignty of Neufchâtel and Valengin was given him. In the course of the war in the north, in which his father had taken no part, the Russians and Saxons, after the capitulation of the Swedish general, Steenbock, in Tönningen, resolved to occupy Swedish Pomerania. The king wished to restore tranquillity in the north by his mediation; but Charles XII., who had returned from Turkey to Stralsund, rejected his proposals, and required Prussia to give back Stettin, but refused to repay the 400,000 dollars which Frederick had advanced to indemnify the Russians and Saxons for the expenses of the war. This induced Frederick William in 1715 to declare war against Sweden, and to make an alliance with Russia, Saxony, and Denmark. In this war the island of Rügen and Stralsund were taken, but no other event of importance occurred, and after the death of Charles XII. peace was restored; Prussia retaining Hither Pomerania, Stettin, and the islands of Usedom and Wollin, and paying to Sweden 2,000,000 of dollars. Count Seckendorf, the Austrian ambassador, induced the king to withdraw from the alliance which had been concluded at Hanover, between England, Holland, and Prussia, after George II. had ascended the throne of England, and to agree in the treaty of Wusterhausen, in October, 1726, to recognise the Pragmatic Sanction, and, if necessary, to support it with 10,000 men. On the breaking out of the war in Poland in 1733, he caused king Stanislaus, the opponent of Augustus II., to be honourably received at Königsberg, when he fled from Poland, by which conduct he displeased the courts of Vienna and Petersburg, the allies of Saxony. However, when France declared war against Austria, he assisted the latter with a corps of 10,000 men upon the Rhine. The king and the crown prince were for some time with this corps; but nothing of importance was effected, and peace was concluded at Vienna in 1735. About this time Frederick William fell into a weak state of health, which increased the natural violence of his disposition. He was for a time supposed to be in great danger, but recovered and lived for some years, on the whole upon pretty good terms with his son, in whose arms he expired on the 31st of May, 1740. He left to his successor 9,000,000 of dollars in his treasury, a disciplined army of 70,000 men, and a kingdom of the extent of 2190 German square miles, with a population of 2,240,000 inhabitants.

FREDERIC II., king of Prussia, son of Frederic William I. and of Sophia Dorothea, princess of Hanover, was born on the 24th January, 1712. Distinguished by his contemporaries and posterity by the surname of the Great, he appears to have established by his talents and his success (which seem to be essential ingredients in the character of what the world calls a great man) as fair a claim to the title as the generality of those princes on whom it has been bestowed. He passed the first years of his youth under the restraints of a rigid education, the sole object of which was military exercises; but as he had received the rudiments of his education from a French lady, under whose care he acquired considerable knowledge of the language, and as she and his first tutor, M. Duhan, had great influence over him, he imbibed a taste for polite literature. These two persons, together with the queen, formed in secret a kind of opposition to his father's system of education. The prince was entirely attached to his mother, and there arose an estrangement between the father and the son, which suggested to the king the idea of leaving the throne to his younger son Augustus William. Impatient of the tyrannical conduct of his father, Frederic resolved to seek refuge in England with his maternal uncle George II. Only his sister Frederica, and his friends lieutenants Katt and Keith, were acquainted with the secret of his intended flight, which was to take place from Wesel, whither he had accompanied his father. But some indiscreet expressions which fell from Katt betrayed the prince's intention. The prince was overtaken, sent to Custrin, where he was kept in close confinement. Keith escaped, and lived in Holland, England, and Portugal, till after Frederic's accession, when he returned to Berlin. Katt was taken and beheaded. It appears certain that the king had resolved to take away his son's life, and that he was only saved by the intercession of the emperor of Austria, Charles VI., through his ambassador, Count Seckendorf. (Voltaire, *Mémoires*, &c.) The prince, after he had been released from his strict confinement in the castle of Custrin, was employed by his father as youngest member of the Chamber of Domains, and not permitted to return to court till the marriage of the princess Frederica to the hereditary prince Frederic of Baireuth. In 1733 his father obliged him to marry the princess Elizabeth Christina, daughter of Ferdinand Albrecht, duke of Brunswick Bevern. Frederick William gave her the palace of Schönhausen, and to the prince the county of Ruppin, and in 1734 the town of Rheinsberg, where he appears to have lived happily, chiefly devoting himself to literary pursuits and to music till his accession. Among the persons about him were Bielefeld, Chuzot, Suhm, Fouqué, Knobelsdorf, Keiserling, Jordan, and other learned men; likewise the composers Graun and Benda, and the painter Pesne. He had an uninterrupted correspondence with foreign literati, especially with Voltaire, whom he admired above all others. During his retirement at Rheinsberg, he composed several works, one of which was the 'Anti-Machiavel,' published at the Hague in 1740. The death of his father in 1740 placed him on the throne. Finding a full treasury and a powerful army, his thirst for military glory, which he himself acknowledges, tempted him to embrace any opportunity that might offer. But there did not appear to be any occasion for great enterprize till the death of the emperor Charles VI., on the 20th October, 1740, led the way to his extraordinary and brilliant career which changed the face of Europe. Frederic took this opportunity of asserting the claims of the House of Brandenburg to four principalities in Silesia, the investiture of which his predecessors had not been able to obtain; but he only required from queen Maria Theresa, the daughter and heiress of Charles VI., the duchies of Glogau and Sagan, promising on his side to support her against all her enemies, to vote for her husband's elevation to the imperial dignity, and to pay her 2,000,000 dollars. His proposals being rejected, he took possession of Lower Silesia in December, 1740, and defeated the Austrian army at Mollwitz, on the 27th April, 1741.

This victory, which nearly decided the fate of Silesia, raised up more enemies to Austria. France and Bavaria united with Prussia, and the war of the Austrian succession began. George II. king of England, the only ally of Maria Theresa, advised her to make peace with Prussia, because Frederic was her most active and formidable enemy. Frederic having obtained a victory at Czaslau on the 17th of May, 1742, over Prince Charles of Lorraine, peace was concluded at Berlin on the 28th of July, and the first Silesian war was ended. Frederic obtained the full sovereignty of Upper and Lower Silesia, and the county of Glatz, with the exception of Tropau, Jägerndorf, and Teschen. On his side he renounced all claims to the other Austrian dominions, took upon himself a debt of 1,700,000 dollars, with which Silesia was charged, and promised to respect the rights of the Roman Catholics in Silesia. Saxony acceded to this peace, and it was guaranteed by France and England. Frederic immediately profited by it, to organize his new conquests, and to render his army more formidable. On the death of the last count of East Friesland in 1743, he took possession of that country, to which his House had a claim ever since the year 1644. When in the prosecution of the Austrian war, the Emperor Charles VII. had been obliged to fly from his hereditary dominions, and the Austrian arms were every where victorious, Frederic feared that Silesia might be taken from him. He therefore secretly entered into an alliance with France, in April, 1744, and with the emperor, the Palatinate, and Hesse Cassel, on the 22nd of May, 1744, promising to support the cause of the emperor by invading Bohemia, but requiring for himself the circle of Königgrätz in Bohemia. On the 10th of August, 1744, he unexpectedly entered Bohemia, and took Prague; but being pressed by the Austrians, under Prince Charles of Lorraine, and the Saxons, their allies, he was obliged to leave Bohemia before the end of the year. The death of the emperor Charles VII. on the 18th of January, 1745, and the defeat of the Bavarians at Pfaffenhofen, induced his son the young elector, Maximilian Joseph of Bavaria to make peace at Füssen, with Maria Theresa, and the Frankfort union was dissolved; Hesse Cassel declaring itself neutral. On the other hand, England, Austria, the Netherlands, and Saxony, had concluded a strict alliance at Warsaw on the 8th of January, 1745, and Saxony had besides entered into a special convention with Austria against Prussia, on the 18th of May, 1745. But Frederic defeated the Austrians and Saxons on the 4th of June, at Hohenfriedburg in Silesia; then entered Bohemia, and gained another victory after a very obstinate combat at Sorr, on the 30th of September, 1745. The victory of the Prussians under Prince Leopold of Dessau, over the Saxons at Kesselsdorf, on the 15th of December, led to the treaty of Dresden, December 25, 1745, which was concluded on the basis of the treaty of Berlin; so that Frederic retained Silesia, acknowledged the husband of Maria Theresa, Francis I., as emperor, and Saxony engaged to pay to Prussia one million of dollars. Thus ended the second Silesian war.

During the eleven years' peace that followed, Frederic devoted himself with unremitting activity to the internal administration of his dominions, the organization of the army, and to literary pursuits. Among the grand improvements which he contemplated was a reform in the judicial proceedings, with a view to render them more simple and uniform, in all the different provinces of his dominions. Together with his chancellor Cocceii, he compiled the 'Frederician Code, a body of laws for the dominions of the king of Prussia, founded on reason and the Constitution of the country.' It is not easy to understand what is here meant by the word 'Constitution.' His father, it is true, drew up with great care what he called a constitution (Verfassungs-Urkunde), or instructions for the supreme general board of finance, war, and domains, which he issued in 1722. This valuable document has been discovered, and, for the first time, published in 100 pages, by Dr. Förster, in his 'Life of Frederic William I.,' but it is not likely that this is here alluded to. Frederic also wrote 'Memoirs of the House of Brandenburg,' a concise account of his House, written in a good style, with a positive declaration of impartiality, which it seems to merit; though the writer may have been at times betrayed by prejudices into unintentional misrepresentations of incidental facts. Another work, a didactic poem in six books, on the Art of War, is his most considerable poetical production, and is greatly esteemed. These, and all his other works are in French. These recreations did not divert his attention from those paramount duties which he always performed with the most persevering care. Instead of indulging in the pleasures of the chase, he made journeys to different parts of his dominions. He endeavoured to make agriculture, manufactures, and the arts flourish; and encouraged commerce, the true principles of which however he appears not to have understood. Though possessing no naval force, he insisted on the right of free navigation for his subjects, without molestation from the fleets of contending parties. One grand object was to improve his revenues, a measure necessary for the maintenance of his army, which he had increased to 160,000. He expended large sums in gratifying his taste for the arts, by decorating the palaces of Berlin and Potsdam, and in erecting many splendid edifices in those two places, in which, however, there was this incongruity, that the richest architectural decorations were often lavished on the exterior of buildings which were only barracks for the troops.

When the war broke out between England and France in 1755, the former concluded a treaty with the king, the chief object of which was to secure Hanover from invasion. This led to a secret alliance between France, Austria, Saxony, and Russia, of which Frederic, having been privately informed, chiefly through the treachery of a clerk in the Saxon chancery, became apprehensive of an attack, and of the loss of Silesia. He accordingly resolved to anticipate his enemies, and commenced operations by invading Saxony on the 24th of August, 1756; which was the beginning of the third Silesian, or, as it is generally called, 'The Seven Years' War.' This contest was the most extraordinary and important in modern times, previous to those of the French Revolution. Though Frederic is the hero, the history of the war is, in fact, the history of continental Europe. Frederic, intending to invade Bohemia, required a passage through Saxony, which the elector king of Poland anticipating, assembled his troops in an intrenched camp at Pirna. Frederic invested it, and having defeated, at Lowositz, the Austrians who came to its relief, it surrendered; and he compelled all the privates to enlist in his own army. In 1757, he advanced into Bohemia, gained, on the 5th of May, a great victory at Prague, over the Austrians, under Prince Charles of Lorraine and Marshal Brown. The Austrians took shelter in Prague, which Frederic immediately invested; but the approach of the Austrians, under Marshal Daun, changed the face of the campaign. Daun formed an intrenched camp at Kolin, which Frederic attacked, but was defeated with great loss, on which he raised the siege of Prague, and retreated into Saxony. In the mean time the French compelled the Duke of Cumberland to abandon Hanover, of which they took possession; and about the same time the Russians and Swedes invaded Prussia from the north, but though Frederic's affairs were supposed by his enemies to be desperate, he was not dismayed. He first attacked the united French and Austrian army, twice as numerous as his own, at Rosbach, and gave them a total and most disgraceful defeat. He then marched into Silesia, where the Austrians had taken Breslau, gained a great victory over them at Lissa, and recovered Breslau. The Russians and Swedes had retreated from the Prussian territories, and the Hanoverians had assembled a large force under Prince Ferdinand of Brunswick, to co-operate with the Prussians. Thus at the close of 1757 the king's affairs were so far restored, that he might have hoped for success in the next campaign, if he could have kept back the Russians; but the enmity of the empress Elizabeth was inveterate. However, the admiration which Frederic's conduct had excited in England, and confidence in his ability, induced the English government to grant him a subsidy of 670,000*l.*, which became an annual grant. In the campaign of 1758 the principal event was the sanguinary battle at Zorndorf, between the Prussians and the Russians, in which the latter were defeated, but the loss on both sides was immense. In 1759 the king's first object was to stop the progress of the Russians, who advanced to Frankfort on the Oder. On the 12th of August was fought the battle of Kunnersdorf. At the beginning of the day, the king of Prussia thought himself so sure of the victory, that he despatched a letter to that effect to the queen at Berlin; but in the end, he was obliged to quit the field, and wrote a second letter to the queen, desiring her to send away the royal family, and to have the archives removed, adding, that the city might make terms with the enemy. But Berlin was saved. Frederic's skilful conduct after his defeat induced the Russian general, instead of entering Brandenburg, to join the Austrians in Lusatia; but soon afterwards, General Finck, with 15,000 men, was taken prisoner by the Austrians, and a smaller corps shared the same fate. Frederic, however, received reinforcements, and Marshal Daun was contented to occupy the camp at Pirna and cover Dresden. In the following spring some fruitless negotiations for peace took place. In this campaign the city of Dresden suffered very severely from a bombardment, by which Frederic destroyed the finest part of the city. On the other hand, the Russians and Austrians entered Berlin, which was saved from plunder by a composition, but had to pay heavy contributions. Berlin was soon evacuated, and Frederic, who was hastening to its relief, turned into Saxony, where he was induced, by the desperate condition of his affairs, to venture to attack the Austrians, who were strongly posted at Torgau. He defeated them, after an obstinate battle, which compelled them to retreat. The Russians and Swedes also quitted his dominions, and he was able to recover strength in winter quarters in Saxony.

At the commencement of 1761 it was evident that the king of Prussia's situation was most critical. He confessed himself, that after the great losses he had sustained, his army was not equal to what it had formerly been. He accordingly occupied a strong camp in Silesia, where he remained immoveable, watching his enemies, but was unable to prevent Marshal Laudohn from taking Schweidnitz, and the Russians, Colberg. Frederic's situation was now so desperate, that he appears to have seriously contemplated suicide: in this critical state, the only event perhaps which could have saved him, occurred. This was the death of the Empress Elizabeth on the 5th January, 1762, and the accession of Peter III., who was an enthusiastic admirer of Frederic, with whom he immediately concluded a treaty of alliance. Peace was also made with the Swedes, and though Peter was soon deposed, yet Catherine, who succeeded him, observed a strict neutrality during the remainder of the war. The king and his brother, Prince Henry, gained several advantages in 1762 and 1763, and peace having been concluded between Great Britain and France, Austria was left alone, and the empress queen obliged to conclude peace with Prussia. The two powers mutually guaranteed the whole of each other's German dominions, Frederic only promising to give his vote to Joseph as king of the Romans. The king of Poland was restored to his dominions without compensation. Thus ended the Seven Years' War, which, after immense sacrifices of human life and treasure, left the political balance of Europe unchanged.

The issue of this great contest, in which the genius of Frederic had been so eminently distinguished, secured to him a decisive influence in the affairs, not only of Germany, but of all Europe. Returning to his capital after an absence of more than six years, he seriously directed his attention to repair the evils inflicted on his dominions by the war. He opened his magazines to give his subjects corn, both for food and for seed. He distributed horses among the farmers, rebuilt at his own expense the houses which had been burnt, founded colonies, erected manufactories, and made canals for the convenience of inland trade. Silesia was exempted from the payment of all taxes for six years, and the New Mark and Pomerania for two years. To relieve the nobility in those three provinces, a system of credit was introduced, by which the value of estates was raised, and the rate of interest reduced. In 1764 he founded the bank of Berlin, to which he gave eight millions of dollars as its first fund. Though he really desired to promote trade, he appears to have been unacquainted with the true principles of commerce; and this, united with his desire to increase the revenue, induced him to take measures, some of which were injudicious, and others decidedly unjust: for instance, the debasement of the current coin. Meantime he continued to maintain a very large army. In March, 1764, he concluded an alliance with Russia, by which he supported the election of the new king of Poland, Stanislaus Poniatowski, and the cause of the oppressed dissidents in Poland. In 1772 he agreed to the first partition of Poland, by which he obtained all Polish Prussia (which was ceded in 1466 by the Teutonic Order to Poland) and a part of Great Poland, as far as to the river Netz, but with the exception of Danzig and Thorn. Frederic has been accused of having first suggested the partition of Poland; but the fact is, that Frederic I. had formed a plan for the partition of Poland, drawn up in the year 1710. From that time the kingdom of Prussia was divided into East and West Prussia. In 1778, on the death of the elector of Bavaria, without children, he interfered to prevent Austria from partitioning that country. The war was, however, terminated without a battle, by the treaty of Teschen, in May, 1779, by which Austria renounced its intentions, and consented to the union of the Franconian principalities with Prussia. In 1785, the emperor having formed a plan to obtain Bavaria in exchange for the Low Countries, Frederic defeated it in conjunction with Saxony and Hanover, by concluding the alliance between the German princes, called the "Fürstenbund," which has been considered as the master-piece of his policy. In 1786 he concluded a treaty of amity and commerce with the United States of America. Though he had long suffered from gout and asthma, which terminated in confirmed dropsy, not a little aggravated by his indulgence in the pleasures of the table, he continued his unremitted attention to public affairs till within two days of his death, the approach of which he contemplated with composure; he died on the 17th of August, 1786, at his favourite palace of Sans Souci, in the 75th year of his age, and the 47th of his reign, leaving to his nephew, Frederic William II., a kingdom enlarged, from 2190 to 3515 German square miles; above 70 millions of dollars (10 millions sterling) in the treasury; and an army of 2 0,000 men.

The character of Frederic II., and his public and private life, have furnished the subject for numerous publications in all the European languages, which are perfectly familiar to most classes of readers. One of his great merits was, that he did not contract any public debt, and though he raised a very large revenue, yet a considerable part returned into the pockets of his subjects, through various channels. Among his defects may be reckoned his contempt for religious institutions, which was considered by his contemporaries a want of respect for religion itself. He was avowedly an unbeliever in revealed religion, and his notions respecting natural religion appear to have been vague and fluctuating. With respect to his temper, he seems to have been deficient in real sensibility; and though many examples of his clemency and placability are recorded, he was at times harsh and even cruel. His moral conduct was guided generally by his pleasure and his interest, and that, as well as his religion, were greatly influenced by his predilection for French literature, and especially his intimacy with and admiration of Voltaire. Proud as the Germans in general are of Frederic, they cannot help regretting his contempt of German literature, to the improvement of which he contributed nothing. It must, however, be owned that German literature, at the commencement of Frederic's life, was in a very low state, and it may be doubted whether the literature and language of Germany did not gain rather than lose by his neglect of them. Frederic was essentially a despot, and his interference with what he confessedly did not understand, would probably have done more harm than good. His voluminous works, all in French, would have entitled him to distinction in the literary world, even if he had not been a king. Besides the works already mentioned, he published military instructions, and some miscellaneous pieces in four volumes octavo. His posthumous works, in 15 volumes, contain the history of his own times, the history of the Seven Years' War, and memoirs, from the Treaty of Hubertsburg, 1763, to the end of the partition of Poland.

FREDERIC WILLIAM II., king of Prussia, was born in 1744. His father was Augustus William, second son of Frederic William I., upon whose death in 1758, his uncle Frederic the Great, declared him Crown Prince of Prussia. The young prince soon indulged in a mode of life which was highly displeasing to his uncle, and alienated them from each other for many years. Frederic II. however expressed his satisfaction to the crown prince, on his giving proofs of personal bravery in the war of the Bavarian succession, 1778. Frederic William's first wife was Elizabeth Christina Ulrica, princess of Brunswick, from whom he was separated in 1769, and afterwards married the Princess Louisa of Hesse Darmstadt. His accession in 1786 was under favourable circumstances. Prussia was engaged in no contest with foreign enemies, and the policy of Frederic II. had made him, in the latter part of his life, in some measure an arbitrator in the affairs of Europe. Political errors soon lessened his credit with foreign cabinets, and the treasure left by his uncle was wasted in useless wars, and by the extravagance of his favourites. His first interference in foreign affairs was in 1787, when he sent an army, under Duke Charles William Ferdinand of Brunswick, to Holland, where the patriots refused to recognise the right of the stadtholder, and insulted his wife, Frederic William's sister, on her way to the Hague, for which however satisfaction had been given. The Prussians advanced without opposition to Amsterdam, and the old order of things was soon restored, upon which a defensive alliance between England, Prussia, and Holland was concluded at the Hague in April, 1788. In the war between Sweden and Russia in the same year, Frederic William, in conjunction with England, prevented any further attack upon Sweden by Denmark. Being jealous of the success of Russia and Austria in the Turkish war, he concluded an alliance with the Porte in 1790, and guaranteed its possessions. This measure having given offence to Austria, a Prussian army was assembled in Silesia, on the Bohemian frontier, and an Austrian army in Bohemia. The Emperor Leopold II. did not wish for war with Prussia, and in the convention concluded at Reichenbach on the 27th July, 1790, between Austria and Prussia, with the mediation of England and Holland, he promised to restore to the Turks all his conquests, except the district of Aluta, on which conditions peace was made between Austria and the Porte at Szistowe. Some differences respecting this convention were arranged by Leopold II. and Frederick William at their meeting at Pillnitz, in August, 1794, when they entered into a closer union with respect to the affairs of France.

A part of the Polish nation, with King Stanislaus Poniatowsky at its head, proposed to establish a new constitution for the kingdom, and to make the royal dignity hereditary in the house of Saxony. In order to secure foreign aid, an alliance was concluded between Poland and Prussia, by which the latter recognised the integrity of Poland, and promised to assist it with 40,000 infantry and 4000 cavalry, in case any foreign power should interfere in its internal affairs. After making peace with the Porte, Catherine II., who, without taking any share in the war then carrying on by Prussia and Austria against France, had calculated on their efforts, contrived to reduce Frederic William to the alternative either of defending Poland against Russia by virtue of his alliance with that state, or of making a second partition of it, in conjunction with Russia. Frederic William chose the latter, and in January, 1793, sent troops, under General Möllendorf, into Great Poland, which occupied a tract of country of the extent of 1100 German square miles, with a population, including Danzig and Thorn, of 1,200,000 inhabitants. Though the diet at Grodno was obliged to agree to this accession, as well as to a similar cession of territory to Russia, the Poles rose in 1794, under Kosciuszko and Madalinsky, to recover their independence, in which insurrection the Russians and Prussians were several times defeated, till Kosciuszko was taken prisoner on the 10th October, by the Russian General Fersen, and Praga was stormed by Suwaroff on the 4th November. Hereupon the third partition of Poland followed. All that remained, after the preceding partitions, was divided between Austria, Russia, and Prussia, by which the latter acquired a large addition of territory, and the independence of Poland was annihilated. In the war against France, Prussia sent 50,000 men to the Rhine in 1792, under the duke of Brunswick, and the king soon followed, accompanied by the princes. The duke of Brunswick failed in his plan of marching to Paris, and was obliged to retreat. On the 5th April, 1795, Prussia made peace with the Republic, and left all its territories beyond the Rhine in the possession of the French. To preserve the neutrality of the north of Germany, a convention was made between Prussia and several princes, whose territories were included in what was called the line of demarcation. During this reign the margrave of Anspach and Baireuth, who was the last prince of that line of the house of Brandenburg, ceded those principalities, for an annuity of 500,000 florins, to Frederic William, who on that occasion revived the order of the Red Eagle. In the internal administration, the French system of indirect taxes introduced by Frederic II. was abolished. Many judicious arrangements were introduced, and a new code of laws for the whole kingdom published; but the toleration promoted by Frederic II. was much restricted by Wöllner and other persons about the king, by means of the religious edict of 1788 and other measures. Frederic William died on the 16th of November, 1797, and was succeeded by his eldest son, the present King Frederic William III., whose eventful reign has been distinguished by vicissitudes of ill fortune and success at least equal to those experienced by his great predecessor.

FREDERIC AUGUSTUS I. of Poland. [Augustus II., p. 96.]

FREDERIC AUGUSTUS II. of Poland. [Augustus III., p. 98.]

FREDERIC AUGUSTUS I., king of Saxony, eldest son of the Elector Frederic Christian, born at Dresden on the 23rd of December, 1750, succeeded his father 17th of December, 1763, under the guardianship of his uncle Prince Xavier, till he assumed the government in 1768. In 1769 he married the Princess Maria Amelia of Deuxponts. He began his reign with a firm resolution, to which he remained faithful under all circumstances and at all times, to do everything in his power to promote the happiness of his people. In the whole of his long reign there was no act of despotism, no violation of the rights of others. Averse from innovation, he undertook nothing through ostentation or mere imitation, but new institutions arose only when he had become convinced of their utility. He gradually diminished the debts of the country; and the strict integrity of his administration caused the Saxon funds, though the interest was low, to be several per cent. above par. He often prevented the country from contracting debts by personal sacrifices, endeavoured to decrease rather than to raise the taxes, and never suffered his interest and that of his treasury to be opposed to the interests of his subjects. During the dreadful dearth in 1772, 1804, and 1805, and the inundations in 1784, 1799, and 1804, the king gave particular proofs of his paternal care for his people. Agriculture, the improvement of the breed of cattle, especially of the sheep, made considerable progress and were encouraged by premiums. The mines, the salt-works, and the forests were improved by careful superintendence and wise laws. Manufactures were encouraged; commerce, which had suffered severely during the seven years' war and by the duties imposed, during his minority, upon foreign goods, became flourishing to a degree hitherto unknown. The army was placed upon a better footing, excellent institutions established for the education of officers, and a military penal code was compiled. Extensive support was given to the universities of Wittenberg and Leipzig, the schools of Pforta-Meissen and Grimma were reorganized, the seminaries at Dresden and Weissenfels, the institutions for the sons of soldiers at Annaberg, and the elementary mining-schools in the Erzgebirge were founded, and the mining-academy at Freiberg better organized. In his legislation Frederic's government appears in a very favourable light. Torture was abolished in 1770; the number of oaths in courts of justice was diminished; the punishment of death restricted and made less cruel. Important changes were also made with respect to several public boards; salutary police laws and a general ordinance on guardianship were issued; orphan-houses, workhouses, dispensaries, &c. were founded. The spirit of integrity, order, temperance, and fidelity so generally prevailed, that Saxony was eminently distinguished for the morality of its inhabitants. Notwithstanding his love of peace, he was more than once obliged to take part in the wars of other powers. Thus, in 1778, the claims of his mother on the succession of her brother the elector of Bavaria made him join Frederic the Great against Austria. The welfare of his country and its geographical position required him to be united with Prussia, on which account he joined the Fürstenbund. Similar considerations induced him to refuse the crown of Poland, which the Poles offered to him and his successors in 1791. He took no part in the war against France farther than furnishing his contingent as a prince of the empire; and in 1796 acceded to the armistice and treaty of Neuchatel with France, and stationed a cordon of troops on the line of demarcation, on his southern frontier. He took no part in the new war between Austria and France in 1805; but when the German empire was dissolved, on the 6th of August, 1806, he was obliged to furnish Prussia with 22,000 men against France. After the battle of Jena Saxony was abandoned to the French. Napoleon, besides various requisitions, levied a contribution of 25 millions of francs and established a provisional administration of the sequestrated revenues, but allowed the country to remain neutral; and its fate would doubtless have been very different but for the respect with which the private and public virtues of the king inspired even his enemies. Frederic assisted his distressed subjects from his private property, concluded a treaty of peace with Napoleon at Bonn in December, 1806, assumed the title of king, joined the Rhenish Confederation, and furnished 20,000 men as his contingent. By the treaty of Tilsit in 1807 he obtained a large portion of Prussian Poland, by the name of the grand duchy of Warsaw. He was bound to take part with France in its wars, but sent no troops to Spain; and in the war with Austria in 1809 he furnished only his contingent. In 1813 his dominions became the theatre of war. On the entrance of the allies into Saxony he retired to Plauen, thence to Ratisbon, and thence to Prague; but the menaces of Napoleon compelled him to return to Dresden; he afterwards followed Napoleon to Leipzig. That town being taken by the allies after the defeat of the French on the 18th and 19th of October, Alexander intimated to him that he considered him as his prisoner. The result is well known. In spite of his remonstrances and representations, and of the high estimation in which his character was held, he was deprived of a large portion of his kingdom, which was given to Prussia under the title of the grand duchy of Saxony. He returned to his capital on the 7th of June, 1815, founded, in commemoration of that event, the order of Civil Merit, and devoted all his attention to repair the injuries caused by the war. In September, 1818, he celebrated the fiftieth anniversary of his assuming the government, and in January, 1819, that of his marriage. He died on the 5th of May, 1827, in the seventy-seventh year of his age and the sixty-fourth of his reign.

FREDERIC WILLIAM CHARLES, king of Würtemberg, was born at Treptow in Pomerania in 1754, succeeded his father Frederic Eugene as duke of Würtemberg in 1797, became elector in 1803, and assumed the royal title on the 1st of January, 1806. In 1780 he married Augusta Caroline Frederica Louisa, princess of Brunswick Wolfenbüttel, by whom he had two sons, William, the present king, and Paul, and a daughter Catherine, who was married to Jerome Bonaparte, king of Westphalia. As his father was personally engaged in the seven years' war in the armies of Prussia his early education was directed with infinite care by his mother, Sophia Dorothea, daughter of the margrave of Brandenburg-Schwedt, a highly-accomplished and excellent princess. After the peace in 1763 his father was at leisure to attend to the education of his son, who possessed extraordinary natural abilities. He was however brought up in many respects on the French model, to which his four years' residence at Lausanne contributed. He spoke and wrote French with the greatest fluency and correctness; but he esteemed the literature of his own country, and spoke and wrote German in the same perfection as French. His natural eloquence was aided by an extraordinary memory; he was well versed in mathematics, natural philosophy, history, and geography, and cultivated his taste for the fine arts, especially in his journey to Italy in 1782; but with too much vivacity for calm examination, he often hastily adopted a false view, and was thus led in his subsequent life into many errors. In many points he took Frederic the Great for his model. As well as his seven brothers he entered the Prussian service, and in the war of the Bavarian succession attained the rank of major-general. After his return from Italy, whither he accompanied his sister and her husband the Grand Duke Paul of Russia, he was made lieutenant-general, and governor-general of Russian Finland. He renounced this connexion in 1787, and lived first at Monrepos, near Lausanne, and then at Bodenheim, near Mentz. He witnessed at Versailles the first proceedings of the National Assembly. When his father, after the death of two brothers without male descendants, became duke of Würtemberg, in 1795, Frederic, as crown prince, opposed in 1796 the entrance of the French into Franconia, but was defeated. After this event he lived for a time at Anspach, then at Vienna and London, where, in 1797, he married her royal highness Charlotte Augusta Matilda, princess royal of England, with whom he returned to Stuttgard in June the same year.

When he succeeded to the government, in December, 1797, his duchy, which had already suffered severely in the war with France, was 153 German (about 3000 English) square miles in extent, with 600,000 inhabitants. In 1799-1801 the sufferings of the country were still greater. Frederic however, by his interest at the courts of Vienna and Petersburg, obtained by the decision of the German diet of the 23rd of February, 1803, besides the electoral dignity, an ample indemnity for his loss of territory on the left bank of the Rhine. The chief object of his policy was to preserve and extend his dominions. On the 2nd of October, 1805, Napoleon arrived at Ludwigslust, and on the following day issued the declaration of war against Austria. Frederic was compelled to join France, and furnished 8000 men. By steadily adhering to the system of Napoleon he acquired in and after the peace of Presburg the possession of an independent kingdom of the extent of 368 (nearly 7400) square miles, with 1,400,000 inhabitants. After he had assumed the title of king, on New Year's Day, 1806, he published the organization of his greatly-enlarged dominions, by which one uniform system of administration was introduced into the old and new provinces. Desirable as this might be (and he is highly commended for it by some writers), it certainly did not give satisfaction to all his subjects. Accustomed, and indeed compelled, to act with energy in his foreign affairs, he sought to make everything in his internal government bend to his will, without regard to long-cherished prejudices or even to long-established rights. He of necessity joined the Rhenish Confederation, was at the meeting of Napoleon and Alexander and the greatest princes of Germany at Erfurt in October, 1808, and in the campaign of 1812 furnished his contingent as member of the confederation. After the battle of Leipzig he formally renounced, in November, 1813, the Rhenish Confederation, and joined the allied powers against France. He went in person to the congress at Vienna, where he was received with the greatest respect by the assembled sovereigns. In the thirteenth article of the act of congress it was enacted that representative assemblies should be introduced into all the states of Germany—a benefit for which Germany is in great measure indebted to the prince regent of England. The king of Würtemberg (though he did not accede to the German Confederation till the 1st of September, 1815) drew up a constitution, which he presented as an ordinance to the states which he had convoked; but it was unanimously rejected: the deputies required the antient constitution, and speedy relief for the miseries of the people. Accustomed to implicit obedience, and not a little astonished at this behaviour, he still redressed many grievances, and after dissolving the assembly in August, 1815, he called another in October, and unexpectedly prescribed fourteen propositions as the basis of a constitution, which were very favourably received by the people. A new constitution was drawn up; but before it could be discussed he died, on the 30th of October, 1816, in the sixty-second year of his age and the nineteenth of his reign. His character was essentially despotic, but he had too much good sense and too enlightened an understanding to be systematically a tyrant. He desired the good of his people, of the means of promoting which he conceived himself to be the best judge. It must be said to his praise that his edict of the 15th of October, 1806, secured to all his Christian subjects equal security for their rights and the free exercise of their religious worship. He introduced neither French laws nor French forms of administration; everything in Würtemberg remained *German;* and Würtemberg was happily preserved from the degradation of becoming a French province.

FREDERIC WILLIAM, Duke of Brunswick, the fourth and youngest son of Charles William Ferdinand, was born October 9, 1771, and educated for the military profession. In 1786 the king of Prussia named him successor of his uncle Frederic Augustus duke of Oels and Bernstadt, who died in 1805. He went to Lausanne, spent two years in Switzerland, and on his return was made captain in a Prussian regiment of infantry. In 1792 he was with the Prussian army in France, and was twice wounded. After the peace of Basle he obtained a regiment, and in 1804 married the princess Mary of Baden, by whom he had two sons, Charles and William. After 1806 he took part in the war against France with all the ardour which the oppression of Germany and his father's unhappy fate inspired. He was taken prisoner with Blücher at Lübeck. His eldest brother the hereditary duke dying without children in September, 1806, and his two other unmarried brothers having been declared incapable of reigning on account of incurable blindness, he would have succeeded to the government of Brunswick on the death of his father; but the peace of Tilsit and the will of Napoleon decided otherwise. From that time he lived at Bruchsal, where he lost his consort in April, 1808. At the beginning of the war between France and Austria in 1809, he raised a free corps in Bohemia. After the total defeat of the Austrians, the duke resolved to leave Germany, and with a corps of 700 cavalry and 800 infantry, commenced in July that memorable and masterly retreat which gained him such deserved reputation. After some skirmishes he reached Brunswick on the 31st of July, but did not enter the city. There was no time for rest; three bodies of troops, each much more numerous than his own, were advancing against him. On the 1st of August the Westphalian general Reubel met the duke at the village of Oelper, near Brunswick, and a battle ensued, in which Reubel's 4000 men not only yielded to the 1500 Brunswickers, but left the only way open by which they could escape. By a series of skilful manœuvring the duke deceived his pursuers, crossed the Weser, broke down the bridge behind him, and having completely baffled his enemies, reached Elsfleth on the 6th of August, where he took possession of a sufficient number of vessels in which he embarked his troops during the night, and on the 7th in the morning, hoisting English colours, sailed for Heligoland, where he arrived on the 8th, and on the 10th proceeded with his corps to England. He was received in England with the greatest joy; his troops were taken into the English service and employed in the Peninsula, where they distinguished themselves. The duke had a pension of 6000*l.* a-year granted by the parliament till he returned to his own dominions in December, 1813, where he was received with extraordinary enthusiasm, and with expectations which he was unhappily unable to fulfil. He was one of the most liberal and noble-minded princes of his age. He was sincerely desirous of promoting the welfare of his subjects; but, wanting to accomplish it at once, he overlooked the ordinary forms: finding nothing to support him in the constitution of the country, which had been completely changed, and being surrounded by interested or prejudiced counsellors, numerous mistakes were committed. His military establishment was too great for the dilapidated state of the finances, and indifference, if not aversion, took the place of the affection of his people. The rest is known. With his famous Black Hussars he joined the duke of Welington in 1815, and fell gloriously at Quatre-Bras on the 16th of June, 1815.

FREDERICK I., king of Denmark, son of Christian I., was born 1473. His father had made him duke of Sleswick, Holstein, Stormar, and Dithmarsh, but his elder brother, King John, stripped him of half his dominions. During the reign of his nephew, Christian II., he behaved with great caution, but that sanguinary tyrant being deposed in 1523, he was declared king in his stead. He was encouraged to lay claim to the crown of Sweden, but prudently made a treaty of friendship with that kingdom, where Gustavus Vasa was too firmly established to be dispossessed without a severe struggle. Frederick however succeeded in annexing the isle of Gothland to his dominions. In 1527 Frederick embraced the Lutheran religion, and established it in his dominions. He died in 1533, at the age of sixty, and is highly commended by the historians of his country for the justice and moderation of his government.

FREDERICK II., king of Denmark, was born in 1534, and succeeded to the crown on the death of his father, Christian III., in 1558. Soon after his accession he joined his brother, the duke of Holstein, in a war against the inhabitants of Dithmarsh, who had declared themselves independent, but were subdued after a brave resistance. In 1563 hostilities commenced between him and Eric king of Sweden, which were carried on with great bitterness and cruel devastation of the two kingdoms, till Eric was deposed by his own subjects in 1568. In 1570 a treaty advantageous to Denmark was concluded. Soon after this, Frederick married the daughter of the duke of Mecklenberg, and from that time gave all his care to the preservation of peace and the promotion of the welfare and happiness of his subjects. He enlarged the University of Copenhagen, and patronised learned men, among whom was Tycho Brahe, the celebrated astronomer. He was highly respected by neighbouring princes; he received the order of the Garter from Queen Elizabeth, and concluded a treaty with James VI., king of Scotland (James I. of England), for the marriage of his daughter to that prince. He died in 1588, with a high character both public and private.

FREDERICK III., king of Denmark, son of Christian IV., was born in 1609. He was made archbishop of Bremen, but his elder brother dying before their father, he succeeded to the crown, 1648. The nobles, who had become very powerful, made him enter into an agreement with them on his accession, by which his power was very much restricted. The wars of the last reign having brought the kingdom to a very low condition, one of Frederick's first measures was to make a treaty with the Dutch, whose friendship he gained by seizing a fleet of English merchantmen, laden with naval stores, in the harbour of Copenhagen. By this he obtained a subsidy, and an alliance with Holland, though it embroiled him with the Commonwealth of England. In 1657, at the instigation of the Dutch, he declared war against Sweden, whose warlike sovereign, Charles Gustavus, crossed over the ice to Zealand, and laid siege to Copenhagen, which was in a very bad state of defence; and Frederick, notwithstanding his courage and energy, was compelled to make peace on disadvantageous terms, under the mediation of England and Holland. This peace was of short duration; Copenhagen was again besieged by sea and land, and was saved only by the arrival of a Dutch fleet. The mediating powers again interfered, but peace was not concluded till after the death of Charles, 1662.

The most remarkable and important event in the reign of Frederick III. was the change of the constitution, which had been limited, and in some degree elective, into an hereditary and absolute monarchy. This change was owing to the arrogance and selfishness of the nobles, who treated the commons as their vassals, and refused to bear any part of the public burdens. The commons therefore, in conjunction with the clergy, resolved to surrender the liberties of the nation and ask the consent of the king, who readily accepted the offer, and the nobles, having been overawed by the army, were obliged to concur. The rights and privileges of the estates were solemnly surrendered, and the king and royal family received the homage of the several orders. By this bloodless revolution Frederick obtained absolute authority; and whatever we may think of the people who ventured on so hazardous an experiment, it must be owned that the Danish monarchs have not abused the confidence thus reposed in them. Frederick died in 1670, leaving a numerous family by his queen, a daughter of George duke of Brunswick Lüneburg.

FREDERICK IV., king of Denmark, was born in 1671, and succeeded his father, Christian V., in 1699, and immediately attacked the dominions of the Duke of Holstein. He laid seige to Tonningen in person, but was soon obliged to return and defend Copenhagen against Charles XII. of Sweden, brother-in-law to the duke of Holstein, whose first military exploit was this invasion of Zealand. Frederick was obliged to conclude peace, engaging to indemnify the duke of Holstein for all the loss he had caused him, and fully to recognise his title to the sovereignty of his dominions. When Charles was afterwards a fugitive in Turkey, Frederick joined the league against him, but his troops were totally defeated in Schonen. He then invaded Swedish Pomerania, in which he met with little success; and though he afterwards made himself master of the duchy of Bremen, his army, united with that of Saxony, was defeated by the Swedes under general Steenbock, who destroyed the town of Altona. In 1714 and 1718 the Danes were more fortunate, and drove the Swedes from Norway. Peace was concluded in 1720, under the mediation of England, on favourable terms, Frederick retaining the duchy of Sleswick. From him his dominions enjoyed the blessings of peace, and his whole attention was devoted to the advancement of their prosperity. He died in 1730. He was an able prince, but too much given to enterprises too great for the resources of his dominions.

FREDERICK V., king of Denmark, born in 1723, succeeded his father, Christian VI., in 1746. Continuing the judicious policy of his father, he preserved his dominions in peace, increased the wealth of his people and the public revenues, by encouraging manufactures and commerce; entered into commercial treaties with foreign powers, established a Greenland company, laid open the trade to the American colonies to all his subjects, and improved the internal prosperity of the kingdom by encouraging agriculture, &c. He was equally zealous in the promotion of the arts and sciences. He founded an academy at Soroc, and seminaries at Drontheim and Bergen for the instruction of the Laplanders. He likewise established academies of painting, sculpture, and architecture, and sent a number of learned men, among whom was the celebrated Niebuhr, to the East. He was in every respect one of the wisest and best monarchs of his age, and is said to have consoled himself on his death-bed with the reflection that he had never injured a single individual, nor had a drop of blood to answer for. He died in 1766, having been twice married, first to Louisa, daughter of George II. of England, and then to Juliana, daughter of the duke of Brunswick Wolfenbuttel.

FREDERICA. [RIBE.]

FREDERICKSBURG. [VIRGINIA.]

FREDERICKSHALL. [CHRISTIANIA.]

FREDERICKSTADT. [CHRISTIANIA.]

FREDERICKTOWN. [MARYLAND.]

FREDRO, MAXIMILIAN, palatino of Podolia, a celebrated Polish author, who died in 1676. He spent his life in serving his country, in the camp as well as in the council, and occupied many important posts. His active life gave him excellent opportunities for making observations on many subjects connected with war and politics; which he has transmitted to posterity in his works, which are chiefly in Latin. His writings are full of interesting details, his observations are shrewd, and his opinions on various subjects are remarkably sound; whilst the vigour and conciseness of his style procured for him the name of the Polish Tacitus. His principal works are, 1. 'Vir Consilii monitis ethicorum, nec non prudentiæ civilis discendum instructus;' 2. 'Monita politico-moralia et icon ingeniorum;' 3. 'Militarium seu axiomatum belli ad harmoniam togæ accommodatorum libri;' 4. 'Fragmenta Scriptorum togæ et belli;' 5. 'Considerations on the Military service,' in Polish; 6. 'Proverbs and Advice, moral, political, and military,' in Polish. This last work, which is very popular in Poland, has mainly contributed to establish the reputation of Fredro, who has here displayed an extraordinary knowledge of the world, and an intimate acquaintance with the habits and character of all ranks of society.

FREE BENCH is the widow's share of her husband's copyhold or customary lands, according to the custom of the particular manor of which the lands are holden. [COPYHOLD.] As dower is not an incident to copyhold tenure the quantity and duration of the widow's interest are regulated by the various customs; it is generally a third for her life, but in other manors it is a fourth part, and sometimes only a portion of the rent. By other customs she takes the whole for her life, and in the manor of Taunton Deane, in Somersetshire, the wife takes the inheritance. In some manors the widow has only a right to Free Bench out of the lands of which her husband died seised; in others, her right attaches upon all the lands held of the manor of which he was seised during the coverture. Frequently her estate is during widowhood only, and sometimes during chaste widowhood. In the manors of East and West Enborne in Berkshire, and Torre in Devonshire, and in some other parts of the West of England, there is the ludicrous custom that where a widow has forfeited her Free Bench for incontinency, if she will come into court riding backwards on a black ram with his tail in her hand, and repeating certain verses more significant than decent, ending with 'Therefore pray, Mr. Steward, let me have my land again,' the steward is bound to re-admit her to her Free Bench. (*Cowel's Interp.; Scriven on Copyholds.*)

FREE SCHOOL. [SCHOOL.]

FREE WILL. [WILL.]

FREEDMAN. [SLAVE.]

FREEHOLD. An estate of freehold is defined by Britton to be 'the possession of the soil by a freeman;' and by Sir William Blackstone, as 'such an estate in lands as is conveyed by livery of seisin, or in tenements of an incorporeal nature by what is equivalent thereto.' Neither of these definitions is sufficiently precise; both are the consequence of the tenure, not the tenure itself.

A freehold, 'liberum tenementum,' was simply an estate for life in tail or in fee, held by a freeman independently of the will and caprice of the feudal lord, and the term was used in contradistinction to the interest of terms for years, and lands in villenage or copyhold [COPYHOLD], which might be determined by the lord at pleasure. The older law writers distinguished freeholds as of two kinds, in deed and in law; the first being the actual possession of lands for an estate of freehold; and the other, the right to such lands before actual possession taken. Sir William Blackstone divides them also into freehold estates of inheritance, and freehold estates not of inheritance. [ESTATE.] Neither of these divisions is of any real importance. The true definition of a freehold is, an estate in lands or tenements in fee simple, in tail, for the term of the life of the holder, or for the life of another person, in dower or by the curtesy. [CURTESY; DOWER; ESTATE.] Some offices also, held for life or in fee, are of freehold tenure. (2 *Bl. Comm.; Co. Litt.*)

FREESTONE. [SANDSTONE.]

FREEZING is the solidification of fluid bodies by the abstraction of the heat necessary to their fluid form. It occurs by the effect of natural cold in many liquids; and most of them may be frozen by an artificial reduction of temperature. It is to be observed that what are termed the *freezing points* vary greatly in different fluids, and their remaining such at different temperatures depends upon the different degrees of power with which they retain the heat necessary to fluidity. Liquids may be considered as solids in combination with heat, which exists in them as latent heat, and which they give out as sensible heat when they return to the solid form.

Freezing mixtures are such as produce cold by and during the liquefaction of their solid ingredient, and the consequent absorption of the heat on which its solid form depended; such mixtures reduce the temperature of substances immersed in them on the principle of the transfer of heat, which always takes place from hotter to colder bodies when exposed to each other.

The process used by confectioners for producing cold is by the mixture of ice and common salt, which both liquefying absorb so much heat, or in other words produce as much cold as will reduce the thermometer from the usual temperature to zero of Fahrenheit, or even rather below it. If however freshly fallen snow be used instead of ice, then the fluidity is more suddenly produced and the cold is more intense.

Mr. Walker, of Oxford, published in the 'Philosophical Transactions' for 1801 an account of various frigorific mixtures for producing intense cold. The following table contains the results which he obtained by using the annexed proportions of snow and different salts and acids:—

	Parts by weight.		Thermometer sinks
Common salt Snow	1 2	From any temperature	to — 5°
Common salt Muriate of ammonia Snow	2 1 5		to — 12°
Common salt Muriate of ammonia Nitrate of potash Snow	10 5 5 24		to — 18°
Common salt Nitrate of ammonia Snow	5 5 12		to — 28°

It will however be observed that by using the snow with a fluid dilute acid, and by the consequent more rapid solution, the degrees of cold produced are much more intense than when a solid salt is employed with snow.

It is found that ice or snow, though exceedingly convenient substances for the production of artificial cold, are by no means necessary to it. By referring to Mr. Walker's paper already quoted, it will be found that any salts which dissolve rapidly in water, and when very finely powdered in order to increase that effect, are powerful freezing mixtures. Mixtures of muriate of ammonia and nitrate of potash, and of these with phosphate of soda, act strongly in this way; and so do various other salts: thus 9 parts of phosphate of soda, 6 of nitrate of ammonia, and 4 of diluted nitric acid, reduced the thermometer from + 50 to − 21° or 71°; 5 parts of sulphate of soda and 4 of diluted sulphuric acid from + 50° to + 3°; and nitrate of ammonia by solution in an equal weight of water merely reduced the thermometer from 54° to + 4° or 46°. By using a mixture of snow and chloride of calcium the writer of this article assisted many years ago in an experiment by which 50 pounds of mercury were rendered perfectly solid.

	Parts by weight.	Thermometer sinks	Degrees of cold produced.
Diluted sulphuric acid, ½ water Snow	2 3	+ 32° to − 23°	55°
Concentrated muriatic acid Snow	5 8	+ 32° to − 27°	59°
Concentrated nitrous acid Snow	4 7	+ 32° to − 30°	62°
Chloride of calcium crystald. Snow	5 4	+ 32° to − 40°	72°
Crystald. chloride of calcium Snow	3 2	+ 32° to − 50°	82°
Fused potash Snow	4 3	+ 32° to − 51°	83°
Diluted sulphuric acid Snow	10 8	− 68° to − 91°	21°

The 3rd and 4th vols. of the *Philosophical Magazine and Annals of Philosophy* for 1828 contain two communications from Mr. Walker, about 40 years after the appearance of his first paper in the *Philosophical Transactions*. the papers in the 'Philosophical Magazine' contain a description of very useful apparatus for experiments with frigorific mixtures.

Leslie's apparatus for freezing will be considered under HEAT.

FREEZING AND MELTING POINTS. The following table, taken principally from Dr. Ure, will show the freezing and melting points of several liquids and solids that is, the degrees of Fahrenheit's thermometer at what the former solidify and the latter liquefy. The solidifying temperature of the bodies above tallow is usually called their *freezing or congealing point;* and of tallow and the bodies below it, the *fusing or melting point.* There are added the fusing points of some metals, as determined by Professor Daniell, by means of his register pyrometer (*Phil. Trans.*, 1830.) —

Sulphuric æther		− 46°
Liquid ammonia		− 46
Nitric acid	spec. grav. 1·424	− 45·5
Sulphuric acid	do. 1·641	− 45
Mercury		− 39
Nitric acid	spec. grav. 1·407	− 30·1
Sulphuric acid	do. 1·8064	− 25
Nitric acid	do. 1·3880	− 18·1
Ditto	do. 1·2583	− 17·7
Ditto	do. 1·3290	− 2·4
Brandy		− 7
Sulphuric acid	spec. grav. 1·8376	+ 1
Pure hydrocyanic acid		4 to 5
Common salt	25 +75 water	4
Ditto	22·2+77·8 do.	7·2
Sal ammoniac	20 +80 do.	8
Common salt	20 +80 do.	9·5
Ditto	16·1+83·9 do.	13·5
Oil of turpentine		14
Strong wines		20
Rochelle salt	50 +50 water	21
Common salt	10 +90 do.	21·5
Oil of bergamot		23
Blood		25
Common salt	6·25+93·75 water	25·5
Epsom salt	41· 6+53·4 do.	25·5
Nitre	12· 5+87·8 do.	26
Common salt	4·16+95·84 do.	27·5
Copperas	41· 6+58·4 do.	28
Vinegar		28
Sulphate of zinc	53·3+46·7 water	28·6
Milk		30
Water		32
Olive oil		36
Sulphur and Phosphorus, equal parts		40
Sulphuric acid	spec. grav. 1·741	42
Ditto	do. 1·780	46
Oil of anise		50
Concentrated acetic acid		50
Tallow (Dr. Thomson)		92
Phosphorus		108
Stearin, from hog's lard		109
Spermaceti		112
Tallow (Nicholson)		127
Margaric acid		134
Potassium		136
Yellow wax		142 to 149
White wax		156
Sodium		190
Sulphur (Dr. Thomson)		218
Sulphur (Dr. Hope)		234
Tin (Crichton)		442
Cadmium (Stromeyer)		about 442
Bismuth (Crichton)		497
Lead (Crichton)		612
Zinc (Daniell)		773
Antimony		809 ?
Silver	(Daniell)	1873
Copper		1996
Gold		2016
Iron, cast		2786

FREIBERG is situated on the Münzbach, which flows into the Mulde, a mile and a quarter lower down; the market-place being 1200 and the Mining Academy 1231 feet above the level of the sea. It lies among the northern declivities of the Saxon ore-mountains, in 50° 55′ N. lat. and 12° 21′ E. long.; about 25 miles south-west of Dresden. Freiberg is the capital of the Erzgebirge, or ore-mountains circle in Saxony, and is the centre of administration for the Saxon mines. It is surrounded by walls; the streets are regular, well-built, and paved; and it has a suburb, besides the Freudenstein or Freistein, an old castle, now used as a storehouse for mining produce. It contains about 1300 houses, with many handsome buildings among them, and a population of about 12,900. In 1801 it was 8,737; but in 1540 nearly 40 000. There are six churches, to which a Roman Catholic church was added in 1831; and of these the High-church (once a cathedral) is a fine specimen of the architecture of the middle ages, and has a portal, called the golden door, in the true Byzantine style, a handsome stone chancel, and one of Silbermann's largest and finest organs. There is a chapel in this church in which the bodies of several Saxon dukes and electors, who were of the Protestant faith, from Henry the Pious, who died in 1541, to John George IV., who died in 1694, are interred. The High-church contains a handsome monument in memory of the brave prince Maurice of Saxony, who fell in the battle of Sievershausen in 1553, from the chisel of Cornelius Florus of Antwerp, and another to the memory of Werner, who died in 1817. There are other buildings of note in the town, among which are the town-hall, and the high school, in which the elector Augustus studied in his early years, and which is at present attended by nearly 500 pupils. The Mining Academy, which has attained considerable repute, is a spacious building: it was opened in 1767, and comprises class and lecture-rooms, the Wernerian museum, a bequest of its founder, which contains rich collections in mineralogy, &c., a geographical and a geognostic cabinet, a museum of models of mining machines, and philosophical and chemical apparatus, and an extensive library. Werner and A. Von Humboldt were pupils of this academy, which is conducted by seven professors and other teachers. The old corporation of mining officers, mechanics, and labourers, which had several electors among its members, had become nearly extinct towards the beginning of the present century, but was renovated with much solemnity at Easter, 1826. Freiberg has also a mining school for educating miners in general, a school for teachers, a Sunday and an infant school, several primary schools, and a number of benevolent institutions, among which are an hospital, an orphan asylum, a house of industry, and infirmaries.

The manufactures consist principally of articles in imitation of gold and silver ware, brass wares, white lead, gunpowder, iron and copper wares, linen, woollens, gold and silver lace, ribbons and tape, leather, and laces.

Freiberg was founded by Otto the rich, duke of Saxony, and was not only endowed by him with many immunities, whence he named it 'the mountain of the free,' but was fortified with walls and a ditch by him, in the year 1176. It suffered much in the Thirty Years' War, during which it underwent four sieges; and its vicinity was the theatre of the closing conflict of the Seven Years' War, on the 29th October, 1762, when the Imperialists were defeated by prince Henry of Prussia. It was the cradle of the Reformation in this part of Saxony; Protestantism having been planted here by Henry the Pious, in 1537.

About three miles out of the town are the extensive amalgamation works for this rich mining district; and near them are the machinery, which raises craft about fifty feet from the Mulde into the canal, as well as an old aqueduct, resting on stone columns, and in other respects similar to the Roman aqueducts, which runs between two hills, but is no longer in use. In the immediate neighbourhood are the large mines of Himmelsfürst, near Brand, the 'Old Hope of God,' near Voigtsberg, which lies at a depth of 60 feet below the level of the sea; Frederic Augustus's mine, near Gross-Schirma; the Beschert-Glück, and Old Elizabeth's. (ERZGEBIRGISCHE KREIS.)

FREIBURG, a town and university in the circle of the Upper Rhine, in the southern part of the grand duchy of Baden, situated on the Treisam, about 100 miles to the S.W. of Carlsruhe, stands at an elevation of about 940 feet above the level of the sea, and was formerly the capital of the Breisgau; 47° 59′ N. lat. and 7° 53′ E. long. It contains about 1350 houses, and 15,100 inhabitants, exclusive of the students, whose numbers are about 450 or 500, but inclusive of the adjoining villages of Herdern and Wichre or Adelshausen, the inhabitants of which are burgesses of Freiburg; the population is upwards of 19,000. Twenty years ago the population was 10,208. The town has walls, with three gates, a fourth having been removed, and one suburb, called Stephanie; it is in general open and well built, the 'Kaiserstrasse' or street of the emperor in particular being broad, and lined with handsome houses. Among the public edifices we notice the former house of assembly for the states, which is at present the archbishop's palace; the grand duke's palace, on the site of the former citadel; the government buildings; the edifice containing the courts of justice and post-office; the old and the new university buildings, the latter of which was once a college of Jesuits; the town-hall, museum, granary, theatre, and house of correction. Freiburg has several open places or squares, in the centre of one of which, the fish-market, is a fountain surmounted with a statue of Duke Berthold III., the founder of the town, represented in the habiliments of his time. Besides three Catholic churches and one Lutheran, the religious establishments have several churches and chapels attached to them. The most attractive feature in the town is the cathedral or minster, probably the most beautiful and perfect specimen of Gothic architecture in Germany. It is a work of the twelfth century, begun in 1122, and not completed until 160 years afterwards; the tower, which is 386 feet high, is peculiarly remarkable for its hardy lightness and elegance. Though not quite so lofty as St. Stephen's at Vienna, or the cathedral at Strasburg, it is deemed to excel both in purity of style, symmetry of proportions, and boldness of construction. It is built of red sandstone, in the form of a cross, and contains several windows of finely-painted glass, as well as the sarcophagi of the dukes of Zähringen, a holy supper, sculptured in stone, and paintings by Grien, Holbein, and other artists. Holbein's Ascension of the Virgin, which forms the altar-piece, is esteemed his *chef d'œuvre.*

The university, which was founded under the name of 'the Albertina' by the archduke Albert VI. of Austria, in the year 1454, enjoys endowments to the extent of upwards of 2500*l.* a-year, and is possessed of a library of more than 100,000 volumes, as well as a museum, an anatomical theatre and clinical establishment, a botanic garden, &c. It is likewise supported by an annual grant of about 3400*l.* from the States. There are also a gymnasium, with a prefect and seven teachers, a normal school, with five teachers, a civic school, many private seminaries, several Sunday and holiday schools, in which apprentices and others are taught reading, writing, arithmetic, and other branches of knowledge suitable to their vocations; a girls' Sunday-school, institutions for boarding and educating indigent girls, and a garden of industry, where the management of forests, orchards, and gardens is taught. There are a town, a university, and a military hospital, and an orphan and foundling asylum, besides an institution for the relief of the poor.

The manufactures of Freiburg consist of leather, succory, sugar, starch, tobacco, bells, musical instruments, &c.

The town was founded by Berthold III. in 1118, and the fortifications were levelled by the French, in 1754.

FREIGHT. The charge made for the carriage of merchandize in a ship, and the amount of which is generally specified in the bill of lading. [Bill of Lading.] It frequently happens that the whole ship is hired by a merchant for the performance of the voyage, and in this case a certain amount of freight is paid without reference to the quantity of goods actually put on board, which may be sufficient to fill the ship, or any quantity short of the same. In such cases the mode of payment is part of the matter of agreement between the ship-owner and the merchant, and the instrument by which this and other stipulations are set forth is called a charter-party. Where no such instrument exists, and the shipper of goods does not stipulate for the right of using the entire portion of the ship appropriated to the reception of her cargo, the amount of the freight, as well as the mode of payment, may be inserted in the bill of lading. Where this is not done, the freight is by law considered due on the part of the merchant on the delivery of the goods, and the owner or master of the ship may, if so minded, demand payment of the same, package by package, as the same are delivered. In almost all branches of trade, however, some custom in this respect has arisen which is ordinarily pursued, and the legal rights of the ship-owner are not enforced in this respect. In London, where the greater part of the merchandise brought from foreign countries is delivered into the custody of one or other of the incorporated dock companies, a custom has arisen of arresting the goods in their hands, so that they cannot pass away from the original importer until the ship-owner, or some person acting on his behalf, has signified in writing that the freight has been paid. If goods are damaged on board the ship, through the carelessness or wilful neglect of those in whose charge she and her cargo are placed, so that the owner of the ship is held to be liable for the amount of the damage, this cannot, but with the consent of the owner or master, be set off against the amount of the freight, which must under all circumstances be paid, and the merchant must afterwards substantiate his claim to compensation for the amount of the damage.

FREINSHEIM, JOHN, was born at Ulm, in 1608, and studied at Strasburg, where he became librarian to Matthias Bernegger, a wealthy philologist, who gave him his daughter in marriage. He was afterwards appointed professor of eloquence in the university of Upsal, where he remained five years, after which he was made librarian to Queen Christina, with a handsome salary. But his health and the rigour of the climate of Sweden obliged him to return to Germany in 1655, when the elector palatine appointed him honorary professor in the university of Heidelberg, and his councillor at the same time. He died at Heidelberg in 1660. Freinsheim wrote a supplement to Livy, with the intention of replacing the lost books of that historian. The first part of this work was published at Strasburg, in 1654, and the remainder appeared in Doujas's edition of Livy ad usum Delphini. Freinsheim endeavours to imitate Livy's style, and he regularly quotes the authors from which he derived the materials for his narrative. He also wrote a Supplement to Quintus Curtius, besides a Commentary on the same writer, as well as on Florus and Tacitus. Freinsheim wrote also: 'De calido potu Dissertatio,' 'De Præcedentia Electorum et Cardinalium,' and other learned works.

FRE'JUS, an episcopal town in France, in the department of Var, on the coast of the Mediterranean Sea, near the mouth of the river Argens, on the road from Paris by Aix and Brignolles to Antibes and Nice, 553 miles from Paris, in 43° 25′ N. lat. and 6° 45′ E. long.

Fréjus is supposed to have been originally a colony of the Phocæans of Massilia, now Marseille, but the time of its foundation is unknown. It took its Roman name, *Forum Julii*, from Julius Cæsar, who may possibly have commenced the excavation of the port which was completed in the time of Augustus, who established here the station of a fleet destined to protect the coast of Gaul; a Roman colony was fixed here, and the town became wealthy and populous. It is at present a place of small importance.

By the advance of the land (formed by the alluvium of the Argens) upon the sea, the port of Fréjus was converted into a pestilential marsh, and at a later period into dry land, half a mile from the sea. In the centre of it there is still a small étang or pool, into which a canal for irrigation, dug from the Argens, flows, and which communicates by another channel with the sea. The limits of the antient port may be traced along the whole length of the quay which surrounded it, and which yet remains, barely elevated above the marshy soil of what was once the harbour. A rude mass of masonry indicates the site of the Pharos or light-house which anticntly stood at the entrance of the port. The harbour was twice as large as that of Marseille, being above 1700 feet from the entrance to the deepest recess, and about 1600 feet wide.

There are some remains of the antient ramparts, which appear to have enclosed a site five or six times as large as that occupied by the present town. Two of the Roman gates yet remain: one called 'the gate of Cæsar,' the other 'the gilded gate,' from some gilt-headed nails found there; the latter was the gate communicating with the antient port. There are some remains of aqueducts, and the ruins of an amphitheatre, faced with little squared stones and bricks: this amphitheatre is considerably smaller than that of Nîmes. Many other remains of Roman edifices exist.

The present town is small and ill built. The population in 1831-2 was 2487 for the town, or 2665 for the commune.

The diocese of Fréjus is said to have been established in the fourth century; the bishop was and still is a suffragan of the archbishop of Aix: his diocese formerly included Lower Provence; it now comprehends the department of Var.

The name Fréjus is a corruption of Forum Julii; in the Dictionary of Expilly, published in the middle of the last century, it is called Fréjuls.

FRENCH BERRIES, or the Grains of Avignon, the berry of the *rhamnus infectorius*, which is gathered before it is ripe; it affords a pretty fine yellow, but the colour is not permanent. It may be used, according to Berthollet, by preparing the cloth in the same way as for dyeing with weld. As this berry is rich in colour, it is often substituted for weld in calico-printing, although it is inferior in quality.

FRENCH ECONOMISTS. [POLITICAL ECONOMY.]

FRERET, NICHOLAS, born at Paris, in 1688, was the son of a solicitor. He studied the law to please his family, but devoted his attention chiefly to the study of history and chronology. His first publication, 'Origine des Français et de leur Etablissement dans les Gaules,' is written with a boldness and candour unusual at that time; but it caused his confinement in the Bastille for a short time by order of the Regent d'Orleans. He was made a member of the Academy of the Inscriptions, and wrote numerous memoirs, chiefly upon difficult questions of antient history and chronology. His principal works are: 'Recherches Historiques sur les anciens Peuples de l'Asie;' 'Observations sur la Génealogie de Pythagore;' 'Observations sur la Cyropédie de Xénophon;' 'Défense de la Chronologie fondée sur les Monumens de l'Histoire ancienne, contre le Système chronologique de Newton.' This last work was edited after Freret's death by Bougainville, who added to it a biographical notice of the author. Freret, while discarding the enormous antiquity attributed by some to Egyptian and Chinese history, and showing the accordance of the authentic records of those nations with the Mosaic chronology, throws back the dawn of the historical times of Greece several centuries further than Newton. He wrote also on the religion and geography of he antients. Freret was a man of very extensive erudition and of indefatigable application, and he rendered considerable service to history. He died at Paris in 1749. His scattered works have been published together: 'Œuvres complètes de Freret,' 20 vols. 12mo, Paris, 1796. Long after Freret's death, two or three works of an anti-Christian endency were published under his name by Naigeon, a lisciple of Diderot, and others of the same school; but hese works are so different in their style and spirit from ll those that are known to be his, and their authenticity has been so little proved, that they are generally regarded s apocryphal. This question is discussed at length in he *Biographie Universelle*, art. *Freret*. Other compilaions, and the old Encyclopédie among the rest, have reely attributed to Freret the works above alluded to.

FRERON, ELIE CATHERINE, was born in 1719, nd educated by the Jesuits. He made himself conspicuous by his literary journal, which he began to edit in 746, under the title of 'Lettres à Madame la Comtesse.' Being suppressed on account of some bitter attacks on everal writers, Freron changed its title, in 1749, into hat of 'Lettres écrites sur quelques sujets de ce temps.' n 1754 he again changed the name of his journal to that f 'Année littéraire,' which he continued till his death in 774. Freron directed his attacks against the philosophers f the eighteenth century, and particularly against Voltaire. His bitter invectives were more than retaliated by is adversaries, who succeeded in making Freron's name synonymous with that of a scurrilous reviewer. Freron's on (Louis Stanislas), who continued the 'Année littéraire' ll 1790, became notorious during the French revolution as violent Jacobin. He died in 1802, at St. Domingo, where e accompanied General Leclerc, being nominated sousréfet of that island.

FRESCO, an Italian word signifying *fresh*, is employed denote a particular manner of painting upon a ground of laster, or the like compound, because it is usual to lay on e colours while the ground is still wet and fresh. If the icture be retouched after it is dry, it is liable to change, to e uneven in the tints, or to suffer other injuries. No more round is therefore prepared at a time than the painter can over in a day. The colours used are chiefly earths. The icture is generally designed on cartoons (so called from *rtone*, the augmentative of *carta*, the Italian for paper), nd traced upon the soft plaster with a hard point. Neverheless, with every aid, it requires the firm bold hand, the orrect eye, and the consummate judgment of a master, to xecute a picture thus in detached pieces; and to finish ach part at one painting, so as to commit no error, and reserve the harmony of the whole.

A similar style of painting was known to the antients, ut Winckelmann observes that they did not trace off the utline with a hard point, and that they painted, 'for the reater part,' upon the ground dry. Fresco was in use at e period of the revival of the arts in Italy; and it improved with the progress of painting, until it attained its erfection in the time of the great masters of the Roman nd Florentine schools. Most of the finest works of Raphael and Michel Angelo are painted in fresco, and are at Rome. With the decline of the art, fresco painting fell gradually into disuse.

To expect great softness, delicacy, or finish from such materials, would be obviously absurd; richness and depth of colour are equally impossible. But the very want of the inferior beauties obliges the painter to rely upon the highest—composition, drawing, and expression; and the absence of that transparent lustre which belongs to oils allows of the point of view to be taken at any angle without a glare of reflected light, and displays every part of the design with the utmost distinctness and force. Fresco is however susceptible of great brightness and purity of colour. The great size which it admits of, and even demands, requires courage, skill, and power to conceive and execute. It is therefore the triumph of the great painter, but an exposure for the poor one. Michel Angelo held oil painting as fit only for 'women and children,' in comparison with fresco painting. The works of Raphael alone, who had the larger intellect, afford abundant examples to disprove this arrogant saying; for indeed genius, as Michel Angelo himself showed, when he handled the chalks and a scrap of paper, is independent of materials. Yet fresco is undoubtedly, in the words of the earnest Vasari, 'truly the most virile, most sure, most resolute, and durable of all other modes,' and thus the best fitted for the purposes of history painting in its most exalted form.

FRESCOBALDI, GIROLAMO, a most distinguished composer for and performer on the organ, was a native of Ferrara, and at the age of twenty-three became organist of St. Peter's at Rome. He may be considered as the father of the true organ style, and his writings have been more or less imitated by every orthodox composer of the kind of music in which he so much excelled. 'His first work,' says Dr. Burney, 'entitled *Ricercari e Canzoni Francese, fatte sopra diversi oblighi in Partitura*, contains the first compositions we have seen printed in score, and with bars. They are likewise the first regular fugues that we have found upon one subject, or of two subjects carried on at the same time, from the beginning of a movement to the end.' Sir J. Hawkins unhesitatingly tells us that Frescobaldi was born in 1601, and this date may be correct, if what Gerher states be accurate, namely, that his first work was published in 1628. But Dr. Burney, with apparent confidence, dates the work 1615, in which year it is highly improbable that compositions of so elaborate a nature should have been published by the author, had his age then been only fifteen. However, in 1641, according to Della Valle, Frescobaldi was living.

FRESNOY, CHARLES ALPHONSE DU, was born at Paris, in 1611. His father, who was an apothecary, gave him a classical education, with a view to bringing him up as a physician. But an inclination for painting induced the son to act in opposition to the wishes of his friends, and he devoted himself to the study of the art, firstly under Perier, and afterwards with Vouët. At the age of one-and-twenty he went to Rome, where he supported himself with difficulty by taking views of ruins and buildings. Subsequently he was joined by his fellow-student, Mignard, whose assistance bettered his circumstances. The two were employed to copy pictures in the Farnese gallery. Du Fresnoy afterwards visited Venice. He returned to France in 1656, whither he was followed by Mignard in 1662, and they again lodged together. He died paralytic in 1665, in the house of his brother, at Villiers-le-bel, near Paris. He was never married, and left no pupils. He executed very few pictures, and they are not remarkable for anything beyond correctness. He is best known as the author of a didactic poem, 'De Arte Graphica,' in Latin verse, which has been translated into several languages. There are three English translations: by Dryden, in prose; by Wills, a painter, in very poor verse; and by Mason, in rhyme. The last is accompanied by annotations written by Sir Joshua Reynolds. The work is rather a critical treatise on the practice of painting, with general advice to the student, than a manual for the art. It is dry, and not remarkable for elegance, imagination, or originality. Had it been in prose, it would probably not have survived the author; but the circumstance of its being in verse, and in Latin, perhaps added a zest to its perusal in the shape of a little difficulty, and gave it an extrinsic importance. Sir Joshua's notes are pertinent and useful, but not so instructive as his lectures. The work will not suffice in the smallest degree to teach the theory or the practice of painting, but it repeats some useful precepts, which cannot be too much insisted on. (Mason; *Biographie Universelle.*)

FRET, in musical instruments of the stringed kind, is a wire fixed round the neck, for the purpose of marking the exact part of the finger-board to be pressed for the purpose of producing certain sounds. Frets are now never applied to any instruments except guitars, lutes, &c.

FREYBURG. [FREIBURG.]

FREYBURG or Fribourg, the Canton of, one of the cantons of the Swiss Confederation, is bounded on the north and east by the canton of Bern, south by the canton of Vaud, and west by the canton of Vaud and the lake of Neuchâtel, which divides it from the canton of Neuchâtel. Its length from north to south is 40 miles; its breadth, which is very unequal, is about 28 miles in the widest part; its area is reckoned at 26¾ German, or 588 English square miles; and its population in 1834 was 89,192, including resident strangers. The south part of the canton is very mountainous, being covered by offsets from the great Alpine chain which divides the waters that fall into the Rhône and the lake of Geneva from those which flow into the Aar. The canton of Freyburg belongs to the basin of the latter river, being watered in its length from south to north by the Sarine or Saane, one of the principal affluents of the Aar; the general slope of the ground is towards the north and north-west, down to the plains which border the lakes of Morat and Neuchâtel. There is but a very small fraction of the south-west part of the canton which slopes southwards towards the lake of Geneva along the course of the stream of Vevayse. The highest summits in the south part of the canton, and on the left bank of the Sarine, are the Moléson, 6000 feet, and the Dent de Jaman on the borders of Vaud, which is 4500. On the right or east bank of the Sarine the highest, the Dent de Brenleire, is above 7000 feet, and la Berra is about 5300 feet. Besides the Sarine and its affluents, which drain more than two-thirds of the territory of Freyburg, the Broye, which has its source on the borders of Vaud, runs northwards, crossing the western part of the canton, enters the lake of Morat, and issuing from it at the opposite end, empties itself into the lake of Neuchâtel.

The climate is cold in winter and subject to sudden changes of temperature in the spring and autumn. The principal productions of the soil are wheat, rye, barley, and oats; good pasture, both natural and artificial, some vines and other fruit trees, especially in the lowlands near the lakes of the Morat and Neuchâtel, tobacco plantations, and timber or forest trees. In common years the canton produces sufficient corn for its own consumption. Potatoes are also cultivated. In 1834 the number of cattle was as follows:—43,339 heads of black cattle; 21,150 sheep; 6352 goats: 20,158 pigs; 11,140 horses; with a few asses and mules. The consumption of butcher's meat throughout the canton during the same year was 587 bullocks, 4613 cows, 5971 calves, 7686 sheep, 913 goats, and 11,034 pigs. The cheeses made in the canton of Freyburg are among the best in Switzerland. The cheese called Gruyère is made in an Alpine district on the left bank of the Sarine, in the south part of the canton. It is estimated that about 40,000 cwt. of cheese is made yearly, which is worth about 75,000*l.* sterling.

The manufactories, which are not very considerable, consist of straw-platting, tanning of leather, distilleries of kirschwasser, tobacco-manufactories, iron-works, glass-works, and paper-mills. Coals are dug at Weibelsried, in the valley of Bellegarde, on the right bank of the Sarine, and are sold at Freyburg for about 3*s.* 6*d.* the hundredweight; an inferior sort is found at Semsale, on the left bank, which sells for half the price. Turf is cut in the marshes of Morat and elsewhere.

The game consists of hares, chamois, red partridges, woodcocks, wild ducks, &c. Wolves and bears have become very rare, and stags and boars are extinct. The rivers and lakes abound with trout, carp, pike, tench, and eels.

The natives of the canton are generally robust and well made, especially in the highlands; they are sociable, intelligent, simple in their manners, docile, and inclined to superstition. The Roman Catholic is the only religion of the canton, with the exception of the district of Morat, which contains 8400 inhabitants who are protestants of the Helvetic church. There are also some protestants in the town of Freyburg, who obtained in 1835 permission to have a chapel and a school. The Catholic secular clergy consists of 250 members. There are besides about 200 monks and 280 nuns, possessing a capital of about 100,000*l.* sterling. Popular education has been greatly neglected till lately; there are now 213 elementary schools, which in 1834 were attended by 11,000 children of both sexes. A school for teachers has been also established. There is a college at Freyburg under the direction of the Jesuits, attended by about 500 students, a boarding-school also kept by the Jesuits, a grammar-school also at Freyburg, founded in 1835, a Protestant college at Morat, and several institutions for girls in various parts of the canton. Over the greater part of the canton several French, or rather Romance dialects are spoken, but the educated people speak real French; in the northern and eastern districts, which approach Bern, a Swiss German dialect is spoken. The territory composing the canton of Freyburg, together with the neighbouring parts of Bern, was known in the middle ages by the name of Œdland, Uechtland, and Desertum Helvetiorum, the country having been utterly desolated by the irruptions of the Alemanni and other barbarous hordes, after the fall of the Western empire. It formed part of the kingdom of Burgundy till the 11th century; it was afterwards governed as a fief of the empire by the hereditary dukes of Zähringen, who were the benefactors of the country: they built towns, among others Freyburg 'free town,' to which they gave a municipal government, independent of the neighbouring petty feudal lords. After the extinction of the House of Zähringen, Freyburg passed under the House of Kyburg, and from this into that of Habsburg. Rudolph of Habsburg, the founder of the Austrian dynasty, confirmed and increased the municipal liberties of Freyburg in 1274. At that time the territory of Freyburg extended only about [illegible] miles round the town, and is still known by the name of 'alte landschaft, 'the old country.' In 1450 the Duke Albert of Austria, styled the prodigal, being unable to give assistance to Freyburg, which was assailed by Bern and the other Swiss cantons, released the citizens from their oath of allegiance, and left them to shift for themselves, after having plundered them of all their silver and plate. Freyburg then remained for some years under the protection of the Dukes of Savoy. In the war of Burgundy it took the part of the Swiss against Charles the Bold, in recompense for which it was received into the confederacy as a sovereign canton or state in 1481. By that and the subsequent wars, Freyburg increased its territory to its present extent at the expense of the neighbouring lords and of the dukes of Savoy.

The government, which was originally a popular municipality like that of Bern, all the burghers having the elective franchise, became, as the town increased its territory, aristocratic towards its new subjects, and even in the town of Freyburg and its old territory the Great Council or legislature came to be a self-renewing body, the seats in which were monopolized by a limited number of patrician families exclusively. It was in reality the most close and narrow oligarchy of all Switzerland. After the political changes of 1798—1815, a fourth part of the seats in the Great Council was given to the country members, the rest remaining in the possession of the patricians. In December, 1830, the country people, joined by many of the citizens, loudly demanded a total change in the government, and after some demur the Great Council complied; a new constitution was framed, by which all bourgeois, of either town or country, having the freedom of a commune, aged 25, and who are neither servants nor in the service of a foreign state, have the right of voting in the primary assemblies, which assemblies choose the electors in the proportion of one for every 100 souls. The electors assemble in the head town of their respective districts, forming what is called the electoral colleges, which elect the members to the Great Council or Supreme Legislature, in the proportion of one for every 1000 souls. The members are appointed for nine years. The Great Council holds two ordinary sessions every year, in May and November. It appoints the council of state, or executive, composed of 13 members for eight years, and the court of appeal of 13 judges for life. The Avoyer is president of the council of state and is elected by its members for two years. The canton is divided for administrative purposes into 13 districts.

Morat, the head town of one of the districts, situated on the right bank of the lake of the same name, has about 1600 inhabitants, carries on a considerable trade, has a college, a public library, a subscription library, an hospital, an orphan asylum, and a castle, built in the 13th century. Near [illegible] a pyramid raised in 1822, in commemoration of the battle against Charles of Burgundy, the old chapel and ossuary having been destroyed by the French in 1798.

The lake of Morat, in German Murtensee, is about five miles long and two broad, and about 160 feet in its greatest depth; it abounds with fish. It is subject to floods, at which times it overflows the neighbouring plains, which are mostly towards the north, in the direction of the lake of Bienne.

Every district has a prefect, appointed by the council of state for six years, and a court of première instance. The communal administration varies greatly according to the temper and instruction of the respective populations. Several of the communes have divided their communal lands, have established common dairies, have formed savings' banks, in order to get rid of the scourge of pauperism, but others still continue in their careless mode of administration, wasteful of their communal lands and forests, and are encumbered with beggars. A few have taxed themselves for the support of their poor. The 'heimathlosen,' or men without a settlement, who amount to 390 families, and strangers, called 'habitans,' who pay a slight yearly tax, have no share in municipal offices. By a law of 26th May, 1834, natural children have been admitted to the same political rights as legitimate ones. The roads, which were proverbially bad in this canton, begin to improve; in 1834, the Great Council voted a loan of 600,000 francs, 24,000*l.* sterling, for this object. A new civil code has been compiled, and the obligatory registry of mortgages has been established. A commission has been appointed for the revision of the penal laws, which were barbarous, as in most other cantons in Switzerland. Torture has been abolished. In the year 1834, the list of crimes which came before the court of appeal was as follows: forty-one thefts or robberies; eleven assaults and battery; two forgeries; two frauds, and one dereliction of an infant. In the same year the number of births was 2825, of which 138 were illegitimate.

The revenues of the canton are derived from the dîmes or tithes on land, from the feudal rights and dues with which many properties are still encumbered, and which are collected by the state, though by a law of 1833 the proprietors have the power of redeeming themselves; from the forests belonging to the state, from the interest of capital, from customs and other indirect taxes, from fines, and from the mint, post-office, and other rights called regalia. The whole of the revenues in 1834 amounted to 412,386 Swiss francs (a Swiss franc is equal to 1½ French francs), and was nearly all absorbed by the expenditure, of which the principal items were: general administration, 56,640 francs; department of justice, 47,780; military, 47,917; general police, gendarmerie, prisons, &c., 68,969; bridges and highways, 95,947; public instruction, 6277; miscellaneous expenses, 83,000.

The militia of the canton consists of 2565 men, of whom some companies perform duty by turns, and all must be in readiness to march when called out. There is besides, the landwehr, consisting of all the men capable of bearing arms in case of necessity.

The French is now adopted as the language of the government but all laws, decrees, and resolutions, must be published both in French and German. The press is free, but subject to laws against abuses of it.

There are about 100 holidays kept in the year, including Sundays; dancing, a favourite diversion of the people, was formerly allowed only on certain days, but now a greater freedom is allowed.

(Leresche, *Dictionnaire Géographique Statistique de la Suisse*, 1836; *Gemälde der Schweiz, der Canton Freiburg*, St. Gall, 1835; Dandolo, *Svizzera Occidentale, Cantone di Friburgo.*)

FREYBURG, Fribourg in French, the capital of the canton, is built on several steep hills on both banks of the river Sarine, and its appearance is extremely bold and picturesque. Part of the houses rise along the slope of the hills, others are supported by massive substructions and buttresses, and separated from each other by deep ravines. Naked rocks, gardens, trees, and green fields are seen intermixed with churches, convents, and other buildings, the whole being surrounded by ramparts flanked with towers. Four bridges join the two banks of the Sarine, one of which, an iron suspension-bridge, erected in 1834, is one of the finest in the world; its length is 885 feet, and it stands 170 feet above the level of the river. The other remarkable structures in the town are: 1, the town-house, built in the sixteenth century, in which the great council meets; 2 the collegiate church of St. Nicholas, built in the twelfth century; 3, the college of St. Michel, kept by the Jesuits, with an establishment for boarders, in which several hundred young men, mostly foreigners, are educated; 4, the monastery of the Ursulines; (these nuns keep the female elementary schools); 5, the Lyceum, opened in 1805; annexed to which are collections of medals, mineralogy, zoology, &c.; 6, the Chancellery, in which the council of state sits, and the archives and other offices of government are kept; 7, the convent of the Franciscans, of which Father Girard, the zealous promoter of popular education, was an inmate; and several other convents and churches. The population of Freyburg, in 1834, was 8535, including about 1000 natives of other cantons of Switzerland, and 833 foreign residents. The manufactories are few: the principal are woollens, pottery, tobacco, and straw hats; there are also two printers and six booksellers. The scientific societies are the following: those of archæology, of natural sciences of medical science, and of public economy; a literary club, and a mechanics' institution. A savings' bank was established in 1829, and the deposits in 1835 amounted to 75,000 Swiss francs. A market is held every Saturday, besides five fairs in the course of the year. Freyburg lies 16 miles south-west of Bern, and 32 miles north-east of Lausanne.

FRIARS, from the French *frères*, a term in strictness meaning the brethren of a community, but more particularly applied to a new order of religious persons, who mostly sprang up at the beginning of the thirteenth century, and were encouraged in the hope of restoring respect to the monastic institution, the ample endowments of which had led it to degenerate from its primitive austerity, and yield to luxury and indulgence.

These Friars consisted of Dominicans, Franciscans, Trinitarians or Maturines, Crossed or Crutched Friars, Austin Friars, Friars of the Sac, Bethlemites, Friars of the Order of St. Anthony of Vienna, Friars de Pica, and Bonhommes or Good Men. These last were brought into England by Edmund, Earl of Cornwall, in 1283, and a colony of them was placed at Ashridge in Buckinghamshire. The Capuchins and Observants were distinctions of the Franciscan Friars.

Warton, in his 'History of English Poetry,' speaking of the Mendicants (for such they were called from their begging, being destitute of fixed possessions), says, these societies soon surpassed all the rest, not only in the purity of their lives, but in the number of their privileges, and the multitude of their members. Not to mention the success which attends all novelties, their reputation quickly arose to an amazing height. The popes, among other uncommon immunities, allowed them the liberty of travelling wherever they pleased, of conversing with persons of all ranks, of instructing the youth and the people in general, and of hearing confessions without reserve or restriction; and as on these occasions, which gave them opportunities of appearing in public and conspicuous situations, they exhibited more striking marks of gravity and sanctity than were observable in the deportment and conduct of the members of other monasteries, they were regarded with the highest esteem and veneration throughout all the countries of Europe. In the mean time, they gained still greater respect by cultivating the literature then in vogue with the greatest assiduity and success. Giannone says, that most of the theological professors in the university of Naples, newly founded in the year 1220, were chosen from the mendicants. They were the principal teachers of theology at Paris, the school where this science had received its origin. At Oxford and Cambridge, respectively, the four great orders (the Franciscans, Dominicans, Carmelites, and Augustines) had flourishing monasteries The most learned scholars in the university of Oxford, at the close of the thirteenth century, were Franciscan friars, and long after this period the Franciscans appear to have been the sole support and ornament of that university.

The buildings of the mendicant monasteries, he adds, especially in England, were remarkably magnificent, and commonly much exceeded those of the endowed convents of the second magnitude. As these fraternities were professedly poor, and could not from their original institution receive estates, the munificence of their benefactors was employed in adorning their houses with stately refectories and churches, and for these and other purposes they did not want address to procure multitudes of patrons, which was facilitated by the notion of their superior sanctity. It was fashionable for persons of the highest rank to bequeath their bodies to be buried in the friary churches, which were consequently filled with sumptuous shrines and superb monuments. In the noble church of the Grey Friars in London, finished in the year 1325, but long since destroyed, four queens, besides upwards of six hundred persons of quality, were buried, whose beautiful tombs remained till the Dissolution. These interments imported considerable sums of money into the mendicant societies. It is probable that they derived more benefit from casual charity than they would have gained from a regular endowment. The Franciscans indeed enjoyed from the popes the privilege of distributing indulgences, a valuable indemnification for their voluntary poverty.

On the whole, two of these mendicant institutions, the Dominicans and the Franciscans, for the space of near three centuries, appear to have governed the European church and state with an absolute and universal sway; they filled, during that period, the most eminent ecclesiastical and civil stations, taught in the universities with an authority which silenced all opposition, and maintained the disputed prerogative of the Roman pontiff against the united influence of prelates and kings, with a vigour only to be paralleled by its success. The Dominicans and Franciscans were, before the Reformation, exactly what the Jesuits have been since. They disregarded their monastic character and profession, and were employed not only in spiritual matters, but in temporal affairs of the greatest consequence; in composing the differences of princes, concluding treaties of peace, and concerting alliances; they presided in cabinet councils, levied national subsidies, influenced courts, and managed the machinery of every important operation and event, both in the religious and political world.

From what has been here said, it is natural to suppose that the mendicants at length became universally odious. The high esteem in which they were held, and the transcendent degree of authority which they had assumed, only served to render them obnoxious to the clergy of every rank, to the monasteries of other orders, and to the universities. Their ambition was unbounded, and their arrogance intolerable. Their increasing numbers became, in many states, an enormous and unwieldy burthen to the commonwealth. They had abused the powers and privileges which had been entrusted to them, and the common sense of mankind could no longer be blinded or deluded by the palpable frauds and artifices which these rapacious zealots so notoriously practised for enriching their convents. The esteem for them degenerated greatly on the Continent. In England, at the dissolution of religious houses, they fell as unpitied as the rest of the monasteries.

(Warton's *History of English Poetry*, 4to. edit. vol. i. pp. 289, 293; Tanner's *Notitia Monastica*, edit. Nasm. pref. pp. xiii. xiv.)

FRICTION. If the surfaces of two solid bodies in contact be conceived to be perfectly smooth or geometrical surfaces, and to be subject to the action of any external forces, the determination of the circumstances both of their equilibrium and motion requires that we take into consideration their mutual reactions, as a moving force, acting in the opposite directions of the common normal, at the point or points of contact. This force is strictly proportional to the pressure mutually exercised, which in the case of equilibrium is the resultant of the external forces applied, and to or from which in curvilinear motions we must add or subtract the pressure arising from centrifugal force.

But as all natural surfaces have certain degrees of roughness arising from the innumerable small asperities with which they are covered, it becomes necessary to attend to the force of *friction* acting in the tangent plane of the surfaces in a direction opposite to that in which the surfaces move or tend to move. Friction is therefore a retarding force capable of destroying but incapable of generating motion; giving a greater extent to the limits of equilibrium, and capable of acting powerfully as a mechanical force, of which the tendency is to bestow stability. It is therefore of great importance in the useful arts of life to be acquainted with its laws, to know how to increase it, as in the construction of arches, and how to diminish it, as in the machinery of clocks, and in all works in which it is an object to economise the expense of force

The attempt to discover the laws of friction from abstract considerations on the constitution of bodies has not led, nor could have been expected to lead, to trust-worthy results. This research belongs properly to the province of experiment. The objects are within our reach, and the proper modes of experimentalizing are sufficiently obvious. But the great variety of solids of different physical properties would lead us to anticipate a corresponding variety of results; it is therefore necessary to aim at properties connected with causes independent of the constitution of the substances; in fact, to know how far friction may be influenced by the time or duration of contact, by the actual pressure of the surfaces, by the extent of the surfaces in contact, and by the velocity of the motion.

These questions were answered in a very contradictory manner by Amontons, Euler, Muschenbroëk, Desaguliers, &c.; the reason for which disagreement was, that abstract notions and hypotheses took, wholly or partly, the place of experiment, and the little of experiment which was admitted was very indifferently executed.

The importance and uncertainty of the subject at length attracted the notice of the French Academy of Sciences, and Coulomb published, in 1781, the results of an extensive series of experiments (in the 'Mémoires des Savans Etrangers') which were commenced in 1779. The high character of Coulomb as a sagacious experimentalist has preserved this memoir in great repute to the present time, and some of the laws which he inferred have been gradually confirmed, while others have been modified or rejected.

Professor Vince, of Cambridge, a few years after the publication of Coulomb's memoir, made several experiments as to the uniformity of the retarding power of friction, and affirmed that when cloth and woollen are employed, an increase of retardation accompanies an increase of velocity. To Mr. Southern are due some experiments of a similar nature, but the machinery was not sufficiently simple to secure certainty to his conclusions. Several able experimentalists, as Wood, Tredgold, Rennie, Morin, &c., have continued the same class of valuable researches up to the present date: and though the results on the quantity of friction compared with the pressure still exhibit great discrepancies, some few laws of friction may be regarded as being nearly if not altogether established. The subject still offers a vast field of research.

The following appear to be the most general results which have been yet obtained by observations on friction:—

1. Friction is increased by time; thus it requires the application of a greater force to move a weight along a horizontal plane from its position of rest than to keep it afterwards moving on the same plane.

This law renders one of the methods of estimating friction rather uncertain. The method alluded to consists in placing the weight on a plane of which the position at first is horizontal, and gradually elevating one extremity of the plane to an inclination sufficient to cause the imposed weight to glide down the plane; this angle accurately observed determines the ratio of the friction to the pressure; but during the operation, before the weight commences to move, its asperities become more deeply involved between those of the plane than when first placed on or when in motion; and it has been observed that by giving a light tap to the plane, the small vibrations produced are sufficient to free the weight from the acquired hold of the plane, when it would descend at a much lower inclination corresponding to its true index of friction. In other methods for attaining the same object, the distinction of the true friction, and that which only exists at the commencement of the motion, has not been sufficiently attended to, and must therefore have vitiated the results: this uncertainty is not removed even in the experiments of Mr. Rennie afterwards noticed.

2. Between substances of the same nature the friction is proportional to the pressure; thus, if a block of oak be of double the weight of another, and both, having equal surfaces of contact, are placed on one plane of uniform nature, the force necessary to move the first will be double of that requisite for the second.

3. The amount of friction is independent for one and the same body of the extent of the surface of contact.

In verifying this law it will be necessary to take care that the arrangement of the fibres may be similar in the different trials which are mutually compared; for when a rectangular block of oak is placed on an oak table so that the fibres in both lie parallel, the friction is greater than in the case where the fibres of the block lie transversely to those of the table.

4. The friction is independent of the velocity, at least when the velocity is neither very small nor very great.

By this law it follows that friction is a constant retarding force, and consequently when a body is drawn on a plane by the action of gravity, or by the intervention of a pulley and cord, which causes it to communicate with a vertically descending weight, the spaces it passes over will be proportional to the square of the time measured from the origin of its motion.

There are other modifications of friction besides that of simple attrition, which belong to various heads, as Rigidity of Ropes, &c. We shall now give some account of the most recent and carefully conducted experiments which have been published on this subject.

In the 'Philosophical Transactions' for 1829, Mr. George Rennie published his experiments on the friction of attrition relative to several solid substances, such as ice, from its resistance to sledges, &c.

Cloth, because of its anomalous properties compared with other solids.

Leather, of so much use in the pistons of pumps, &c.

Wood, in its application to pile-driving, carpentry, &c.

Stones, from their importance in arches and other constructions.

And metals, from their extensive application to machinery, carriages, rail-roads, &c.

We must refer to the memoir itself for the tabulated results of experiments, and the author's valuable remarks thereon; and we shall only extract some of the experiments on wood and metals, as they are of the most extensive employment in machinery. Without undervaluing the experiments by the inclined plane, we decidedly prefer those referring to traction on a horizontal plane, which is to be understood in the following tables.

Friction of Woods two inches square.

Red teak on red teak.					Black beech on black beech.					Norway oak on Norway oak.				
Weight on surface.	Weight required to move it.		Proportion.	Average.	Weight on surface.	Weight required to move it.		Proportion.	Average.	Weight on surface.	Weight required to move it.		Proportion.	Average.
cwt.	lbs.	oz.			cwt.	lbs.	oz.			cwt.	lbs.	oz.		
½	6	14	8·14		½	8	6	6·68		½	8	3	6·83	
1	14	2	7·92		1	15	5	7·31		1	14	5	7·82	
2	23	3	9·66		2	28	0	8		2	26	4	8·53	
3	38	1	8·82		3	45	3	7·43		3	41	3	8·17	
4	52	3	8·58		4	69	7	6·45		4	56	7	7·93	
5	64	2	8·73		5	83	3	6·73	7·13	5	67	3	8·33	7·67
6	71	12	9·36	8·82	6	100	4	6·70		6	80	4	8·37	
7	84	3	9·31		7	115	11	6·77		7	102	0	7·68	
8	90	8	9·90		8	124	10	7·18		8	164	3	5·45	
9	120	11	8·35		9	132	3	7·62						
10	126	5	8·86		10	148	11	7·53						
11	141	15	8·67											
12	154	2	8·71											
13	170	10	8·53											

Comparative Amount of the Friction of different Metals under an average Pressure of from 54·25 lbs. *to* 69·55 lbs.

Names of metals.	Average weight.	Proportion.	Weight per square inch.	
	lbs.		lbs.	oz.
Brass on wrought iron	69·55	7·312	11	12·4
Steel upon steel	69·55	6·860	11	12·5
Brass upon cast iron	54·25	6·745	8	0.5
Brass upon steel	69·55	6·592	11	12·5
Hard brass upon cast iron	54·25	6·581	6	15·9
Wrought iron upon wrought iron	69·55	6·561	11	12·5
Cast iron upon cast iron	54·25	6·475	8	0·5
Cast iron upon steel	69·55	6·393	11	12·5
Cast iron upon wrought iron	69·55	6·023	11	12·5
Brass upon brass	69·55	5·764	11	12·5
Tin upon tin	69·55	4·305	11	12·5

The preceding table is a little abridged.

From hence it would appear that hard metals have less friction than soft ones, and that the friction of hard against hard may be generally estimated at about one-sixth of the pressure.

From his experiments on the friction of axles without unguents, Mr. Rennie remarks that when gun-metal is loaded with weights varying from one to ten hundred weight, the friction varies nearly in the proportion of $\frac{1}{7\cdot 20}$ to $\frac{1}{5\cdot 16}$ of the pressure, and is scarcely affected by time; that it was increased when yellow brass, and decreased when cast iron was tried; and still more so when black-lead was used between the three different metals.

Relative to unguents the experiments show that for gun-metal on cast-iron with oil intervening, and a weight of ten hundred weight, the friction amounted to $\frac{1}{35}$ of the pressure, but on diminishing the insistent weights the friction was diminished to $\frac{1}{37\cdot 33}$; cast-iron, under similar circumstances showed less friction, which was also diminished by hog's lard when loaded.

From hence it may be inferred that the lighter the insistent weight, the finer and more fluid should be the unguents, and *vice versâ*.

His experiments on hide-leather soaked in water, compared with dry leather, show that the soaking causes the friction to be subjected much more to the influence of time and weight.

Amongst the conclusions which Mr. Rennie draws, the following are perhaps the most important.

With fibrous substances, such as cloth, &c., friction is increased by surface and time, and diminished by pressure and velocity.

With harder substances, such as woods, metals, and stones, the amount of friction is simply as the pressure, without regard to surface, time, or velocity.

Friction is greatest with soft, and least with hard substances. The diminution of friction by unguents depends on the nature of the unguents, without reference to the substances moving over them.

Subsequent to the publication of Mr. Rennie's memoir, M. Arthur Morin, captain of artillery, commenced a series of experiments on friction at Metz, in 1831, which he continued by another series in 1832; they form the subjects of two memoirs in the volume of the 'Mémoires de l'Institut' for 1833. The author's object was to repeat the experiments of Coulomb, with the view of either verifying, or correcting them. The amounts of friction which he obtains differ greatly from those given by Coulomb, who, in his opinion, must have frequently employed materials improperly prepared, and committed other oversights, whence he accounts for the errors into which he has fallen. The results of M. Morin's experiments go completely to establish the four laws of friction mentioned at the beginning of this article.

The description of the apparatus which he employed would be too long to be inserted here, but it seems very ingenious and well adapted to obtain that precision and nicety of measurement which are requisite to render observations of this nature valuable. The motions were horizontal by means of a cord and pulley, but the most curious part of the apparatus is a dynamometer, to measure the tensions of the cord by the inflexions of an elastic lamina attached to it and to the moving train; the state of which was determined by a pencil-trace on paper laid on a circular plate of copper, having a uniform rotation. He was thus enabled to compare the spaces described, whether in retarded, uniform, or accelerated motions of the train, with the time elapsed, and he confirms the conclusion that friction is a uniformly retarding force. The relations between the radii vectores of the curve described, with the corresponding angle at the centre, which is proportional to the time, enabled him in the various cases to represent by a curve with rectangular co-ordinates the relation between the space and time, the latter curve being generally a parabola; the idea of this invention, he says, was suggested to him by M. Poncelet. His results however differ in amount so greatly from those of Coulomb, and most others who have made friction the subject of experiment (though leading to, and confirming, the same general laws), that it may be permitted to doubt whether a source of error may not be somewhere concealed in the dynamometer employed.

In the following tables we give some of the more important results of his first memoir; the first referring to surfaces which have been for some time in contact; the second giving the friction during motion; and in both cases without the employment of unguents.

I. Friction of plane surfaces which have been some time in contact.

II. Friction of plane surfaces in motion.

Table I.				Table II.
Names of the surfaces in contact.	State of surface.	Disposition of the fibres.	Ratio of friction to pressure.	Ratio of friction to pressure.
Oak upon oak .	Dry.	Parallel.	0·60 to 0·65	0·48
Do. .	Do.	Perpendicular.	0·54	0·32
Do. .	Wet.	Do.	0·71	0·25
Elm upon oak .	Dry.	Parallel.	0·69	0·43
Do. .	Do.	Perpendicular.	0·57	0·45
Ash upon oak .	Do.	Parallel.	0·50	0·40
Fir upon oak .	Do.	Do.	0·52	0·36
Beech upon oak .	Do.	Do.	0·53	0·36
Wild pear upon oak . .	Do.	Do.	0·44	0·40
Service-tree on oak . .	Do.	Do.	0·57	
Wrought iron upon oak .	Do.	Do.	0·62	0·62
Yellow copper upon oak .	Do.	Do.	0·62	0·62
Black copper upon oak .	Do.	Do.	0·74	0·27
Hemp cord upon oak . .	Do.	Do.	0·64	0·52

The substances in Table II., and their condition and disposition, are the same as in Table I.

Some of the above ratios are three times as great as those given by Coulomb. M. Morin's second memoir is more particularly directed to surfaces with unguents, or coatings; and here he coincides more nearly with Coulomb, attributing the difference to the mode in which the latter conducted his experiments, and which may possibly have permitted some of the lighter unguents to escape from the surfaces during the process. The very complete table with which he concludes his paper is far too long for insertion here: the following is an abridgment, having reference to substances which are of frequent usage, or of small friction.

Table III. Surfaces in Motion.

Names of the surfaces in contact.	State of the surfaces.	Disposition of the fibres.	Ratio of friction to pressure.
Oak upon oak . .	Coated with lard.	Parallel.	0·067
Do. . .	Oiled.	Do.	0·108
Iron upon oak . .	Tallow coating.	Do.	0·256
Elm on cast iron . .	Do.	Parallel to the direction of motion.	0·066
Yoke-elm on cast iron .	Coating of hog's lard and black lead.		0·055
Tanned ox-hide on brass	With oil of olives.		0·191
Brass on brass . .	Do.		0·058
Cast iron on brass .	With lard.		0·070

M. Morin received every facility from his government in the pursuit of these important researches, while his industry testifies that he well merited such assistance. The uncertainties and discrepancies of observations would soon disappear if other nations produced the same ardour in individuals and the same regard for the true advance of useful knowledge.

FRICTION WHEELS. [Wheels.]

FRIDAY. [Week.]

FRIEDLAND. [Bonaparte.]

FRIENDLY, or TONGA ISLANDS, are situated in the Pacific, between 18° and 23° S. lat., and 173° and 176° W. long. They consist of three separate groups, which are said to contain more than 150 islands. Fifteen of them rise to a considerable height, and 35 attain a moderate elevation. The remainder are low. The most southern group, the Tonga-tabu Islands, were discovered by Tasman in 1643. The largest of them, Tonga, is about 20 miles long and 12 miles wide, in the broadest part. It rises about 80 ft. above the sea, and its summit is a level plain. On the northern side an excellent roadstead was discovered by Cook. The central group, called the Hapai islands, is composed of a considerable number of small islands. The largest of them is Lefooga, about 8 or 9 miles long, and 4 wide. All these islands are low and very fertile. The most northern group is formed by the Vavaoo islands, which are likewise small and low, except the island of Vavaoo, which is about 36 miles in circumference; its surface is uneven, and on the northern side it rises to a considerable elevation. On its southern side is Curtis Sound or Puerto de Refugio, one of the most spacious and safest harbours in the Pacific. The most northern island belonging to this group is Amargure or Gardner island in 17° 57′ S. lat. The most southern of the Friendly Islands is Pylstaart, in 22° 26′ S. lat.

These islands are remarkable for the mildness of their climate, their fertility, and the great variety of their vegetable productions. For food, there are cultivated and planted cocoa-nut trees, bread-fruit trees, bananas, yams, sugar-cane, and sago; the Chinese paper mulberry-tree is cultivated for its inner bark, from which the clothing of the inhabitants is made. Hogs and dogs are numerous, and both are used for food. Fish is plentiful, and also different kinds of birds, as fowls, pigeons, parrots, and the tropic bird whose beautiful feathers here, as in other islands, are used as an ornament.

Cook called these islands the Friendly Islands, because he was received by the inhabitants in a very friendly manner; but it is now well known that they intended to kill him and to seize his vessels. They are a very industrious people, and pay great attention to the cultivation of the soil. They apply themselves also to fishing, and evince much ingenuity in the manufacture of their clothing, and of their domestic utensils. They have a complete religious system, priests and festivals, and sometimes they sacrifice men, but they do not eat them. Missionaries have now for some time been established on these islands, but we are not yet acquainted with the results of their labours. The inhabitants belong to the Malayan race, and speak a language which does not materially differ from that spoken in many other islands of the Pacific. The political constitution is a despotism supported by an hereditary aristocracy. The number of the inhabitants is estimated to amount to 200,000. (Cook's *Voyages*; Mariner's *Account of the Natives of the Tonga Islands*; Krusenstern's *Atlas de l'Océan Pacifique*.)

FRIENDLY SOCIETIES. These institutions, which if founded upon correct principles and prudently conducted, are beneficial both to their members and to the community at large, are of very antient origin. Mr. Turner, in his 'History of the Anglo-Saxons,' notices them in these words: 'The guilds, or social corporations of the Anglo-Saxons, seem on the whole to have been friendly associations made for mutual aid and contribution to meet the pecuniary exigencies which were perpetually arising from burials, legal exactions, penal mulcts, and other payments or compensations.' These 'social corporations' of our ancestors differed from the friendly societies of modern times, both as regarded the quality of their members, who were not confined to the poor or working classes, and also as regarded their objects. It is now no longer necessary to establish a mutual guarantee against legal exactions and penal mulcts, and the objects of friendly societies are now limited to an insurance against the natural contingencies of sickness, infirmity and death.

Until a comparatively recent period, the principles upon which these societies should be conducted were ill understood, and as their management was confided to persons of insufficient attainments, the common result was a speedy dissolution. One friendly society exists in London, which is said to have been established in 1715; but this fact rests only upon tradition, and is unsupported by any records in possession of the body.

The earliest occasion upon which the objects contemplated by these associations can be said to have received the sanction of either branch of the English legislature was in 1773, when a bill brought into the House of Commons by Mr. Dowdeswell, and supported by Sir George Savile, Burke and others, passed that house, but was thrown out by the Lords: its object was 'the better support of poor persons in certain circumstances, by enabling parishes to grant them annuities for lives upon purchase, and under certain restrictions.' A bill with a similar object met with the like fate in 1780, having passed through the Commons, but being thrown out by the Lords. A bill introduced in 1793 by the late Mr. George Rose passed into a law, which is known by his name, and was extensively acted upon. This act recited 'that the protection and encouragement of Friendly Societies in this kingdom, for securing, by voluntary subscription of the members thereof, separate funds for the mutual relief and maintenance of the said members in sickness, old age, and infirmity, is likely to be attended with very beneficial effects, by promoting the happiness of individuals and at the same time diminishing the public burthens.' This act authorized any number of persons to form themselves into a society of good fellowship, for the purpose of raising funds, by contributions or subscriptions, for the mutual relief and maintenance of the members in old age, sickness, and infirmity, or for the relief of the widows and children of deceased members. A committee of members was authorised to frame regulations for the government of the society, which regulations, after being approved by the majority of the subscribers, were to be exhibited to the justices in quarter-sessions, and if not repugnant to the laws of the realm, and conformable to the true intent and meaning of the act, were to be confirmed and made binding upon the subscribers.

Among other provisions, it was allowed to impose reasonable fines upon such members as should offend against the regulations; such fines to be applied to the general benefit of the society. By this act it was declared unlawful 'to dissolve or determine any such society, so long as the intents or purposes declared by the society remain to be carried into effect, without the consent and approbation of five-sixths of the then existing members and also of all persons then receiving or entitled to receive relief from the society, on account of sickness, age, or infirmity.' Societies thus constituted were relieved from the payment of certain stamp-duties, and were empowered to proceed for the recovery of monies, or for legal redress in certain cases, by summary process, without being liable to the payment of fees to any officer of the court; and to aid them, the court was required to assign council to carry on the suit without fee or reward. An act was passed in 1795, which extended the privileges of Mr. Rose's act to other 'benevolent and charitable institutions and societies formed in this kingdom for the purpose of relieving widows, orphans, and families of the clergy and others in distressed circumstances.' Several other acts were passed between 1795 and 1817 affecting the proceedings of these societies, but not in any matter of importance. In the last-mentioned year the 'Savings' Bank Act' was passed, and under its provisions the officers of friendly societies were allowed to deposit their funds in any savings' bank, by which means they got security for their property and a higher rate of interest than they could otherwise obtain. This act has been of essential benefit to these associations. Another law, making provisions for the further protection and encouragement of friendly societies, and for preventing frauds and abuses in their management, was passed in 1819; but as this and all other acts previously passed with the same object were repealed and superseded by the act of 1829 (10 Geo. IV. c. 56), which with two acts passed in 1832 and 1834 (2 Wm. IV. c. 37, and 4 and 5 Wm. IV. c. 40), contain the law as it now stands for the regulation of friendly societies, it is unnecessary to detail here the alterations effected in 1819.

In the years 1825 and 1827, select committees were appointed by the House of Commons to consider the laws relating to friendly societies. The reports made by these committees have thrown considerable light upon the subject, and prepared the way for the enactment of 1829, already mentioned, which, with the subsequent acts of 1832 and 1834, we now proceed to analyze.

The law of 1829, in the first place, authorizes anew the establishment of societies within the United Kingdom, for raising funds for the mutual relief and maintenance of the members, and gives protection to all such societies then existing, while it affords encouragement for the formation of like associations for the mutual relief and maintenance of all and every the members thereof, their wives or children, or other relations, in sickness, infancy, advanced age, widowhood, or any other natural state or contingency whereof the occurrence is susceptible of calculation by way of average.' The members of such societies are to meet together to make such rules for the government of the same as shall not be contrary to the intent of the act nor repugnant to the laws of the realm, and to impose such reasonable fines upon the members who offend against any of such rules as may be necessary for enforcing them; and these rules, which must be passed by a majority of the members present, may be altered and amended from time to time by the same authority. But before these original or amended rules shall be confirmed by the justices of the county at the general quarter-sessions, they must have inserted in them a declaration of the purposes for which the society is established, and the uses to which its funds shall be applied, stating in what shares and proportions and under what circumstances any member of the society or other person shall be entitled to the same; and further it is required that the rules so passed 'shall be submitted, in England and Wales and Berwick-upon-Tweed, to the barrister-at-law for the time being appointed to certify the rules of savings' banks; in Scotland to the lord-advocate or any of his deputies; and in Ireland, to such barrister as may be appointed by her majesty's attorney-general in Ireland, for the purpose of ascertaining whether such rules are in conformity to law and to the provisions of this act.' The officers here mentioned are respectively to settle such rules, and make them conformable to law and to this act of parliament, giving a certificate of this regulation having been complied with. The rules so certified are then to be deposited with the clerk of the peace for the county wherein the society is formed, and by him to be laid before the justices at quarter-sessions, who are required to confirm the same, after which the rules and certificate are to be filed with the rolls of the sessions of the peace, and a certificate of such enrolment, signed by the clerk of the peace, is to be sent to the society. If the barrister or other officer above mentioned shall refuse to certify the rules offered for his approval, the society is allowed to submit the same to the court of quarter-sessions, together with the reasons assigned for refusal, when the justices may, if they see fit, confirm the rules notwithstanding the disapproval of the revising officer. Before these directions are complied with, no society is entitled to enjoy any of the privileges or advantages communicated by the act; but when the rules shall have been enrolled, and until they shall have been altered and the like confirmation shall have attended such alteration, they shall be binding upon the members of the society, and a certified copy of them shall be received in evidence in all cases. The treasurer of each society must give bond to the clerk of the peace for the county, with two sufficient sureties, for the faithful performance of his trust, and must, on the demand of the society, render his accounts and assign over the funds of the society at the demand of a meeting of the members. The property of the society is to be vested in the treasurer or trustees of the society, who may bring and defend actions, 'criminal as well as civil, in law or in equity,' concerning the property, right, or claim of the society, provided they shall be authorized to do so by the vote of a majority at a meeting of the members.

In case any person shall die intestate whose representatives shall be entitled on his account to receive any sum from the funds of the society not exceeding 20*l*., the treasurer or trustees may pay the money to the persons entitled to receive the property of the deceased, without its being necessary to take out letters of administration.

It is not lawful to dissolve any friendly society, so long as any of the purposes declared in its rules remain to be carried into effect, 'without obtaining the votes of consent of five-sixths *in value* of the then existing members, and also the consent of all persons then receiving or then entitled to receive relief from such society; and for the purpose of ascertaining the votes of such five-sixths in value, every member shall be entitled to one vote, and an additional vote for every five years that he may have been a member, provided that no one member shall have more than five votes in the whole.'

The rules of the society are to contain a declaration whether, in the event of any dispute or difference arising between the society and any one or more of its members, the matter shall be referred to the decision of a justice of the peace or of arbitrators; if to the latter, the arbitrators must be chosen or elected in sufficient number at the first meeting of the society which shall be held after the enrolment of its rules; they must not be in any way interested in the funds of the society; and whenever the necessity for their employment shall arise, a certain number, not exceeding three, are to be chosen by ballot from among the arbitrators for the settlement of the dispute, and justices are empowered to enforce compliance with the decision of the arbitrators. If the rules of the society direct the application, in cases of disputes, to justices of the peace, any justice is empowered to summon the person against whom complaint is made, and any two justices may hear and determine the matter, their sentence or order being final and conclusive. Minors, if they act with the consent of parents or guardians, may become members of friendly societies having authority to act for themselves on the one hand, and being held legally responsible for their acts on the other.

A statement, attested by two auditors of the funds belonging to each society, shall be made annually to its members, every one of whom may receive a copy of the statement on payment of a sum not exceeding sixpence.

Every friendly society enrolled under this act is obliged, within three months after the end of the year 1835, and again within three months after the expiration of every five years, to transmit to the clerk of the peace for the county in which the society is situated a return of the rate of sickness and mortality, according to the experience of the society during the preceding five years, such returns to be made in a prescribed form to insure uniformity; and the clerks of the peace are directed, within one month after the periods just named, to transmit these returns to the Secretary of State, with a view to their being laid before parliament. In case the officers of any society shall neglect to transmit these returns within the time specified, the clerk of the peace shall call upon them to make the return within 21 days; and should they neglect to comply with this demand, the society shall cease to enjoy the benefits of the act, unless sufficient reason shall be assigned to the justices at the next ensuing quarter-sessions, why such returns could not be made.

The provisions and privileges of this act were extended to all such existing societies as should conform to its provisions within three years from its date, after which time all friendly societies which should not so conform were to cease to be entitled to the privileges granted to friendly societies by this or by any other act of parliament.

The act of 1832 extended to Michaelmas, 1834, the time during which existing societies might conform to the provisions of the act of 1829, and declared its privileges to extend to all societies formed for the relief of the widows, orphans, and families of clergymen, both of the established church and of dissenters.

The provisions of the act of 1834 are for the most part confined to matters of regulation which it is not necessary to notice here. The returns relating to sickness and mortality are by this act directed to be made to the barrister appointed to certify the rules of these societies, and not to the clerks of the peace, as ordered in the act of 1829.

Societies thus constituted and privileged must be acknowledged as a great improvement upon the benefit clubs, which, under various denominations, such as sick clubs and burial societies, previously existed throughout the country. The periodical meetings of these clubs were ordinarily held in public-houses, where a part of that money was spent in present enjoyment which should have gone towards a future provision against the casualties of the members. It frequently happened that these societies were got together by the landlord of the public-house in which the meetings were to be held, and that he was constituted its secretary or treasurer, keeping the funds in his own possession, or too frequently dissipating them. Where even this evil did not arise, a temptation was held out to obtain members by the smallness of the contributions, which proved in the course of years wholly inadequate to answer the demands that were then sure to arise, although the income of the society had at first, while the members continued young, been sufficient for the purpose. The mischief thus fell upon them when they had become old and infirm, and had no means of relieving themselves from it: this evil is now prevented by the compulsory adoption of tables prescribing such rates of contributions and allowances as experience has demonstrated to be sufficient and equitable.

The considerations by which benefit societies recommend themselves to the community were so well pointed out by the Committee of the House of Commons which sat in 1825, that it will be sufficient for this purpose to insert a short extract from its report.

'It has been observed that the hostility to friendly societies has been nowhere more strong and controversial than among the patrons of savings' banks. Of these institutions your Committee will only say, that they are undeniably calculated for many very useful purposes, some of which cannot possibly be secured by institutions of mutual assurance; but your Committee affirm without hesitation, as equally undeniable, that it is *by the contribution of the savings of many persons to one common fund, that the most effectual provision can be made for casualties affecting, or liable to affect, all the contributors.* This proposition, which is indeed obviously true, has been well illustrated by a writer on friendly societies, who asks whether the advocates of a separate and exclusive saving will be easily persuaded to save their annual premium, instead of insuring their house against fire?

'Whenever there is a contingency, the cheapest way of providing against it is by uniting with others, so that each man may subject himself to a small deprivation, in order that no man may be subjected to a great loss. He upon whom the contingency does not fall does not get his money back again, nor does he get for it any visible or tangible benefit; but he obtains security against ruin, and consequent peace of mind. He upon whom the contingency does fall gets all that those whom fortune has exempted from it have lost in hard money, and is thus enabled to sustain an event which would otherwise overwhelm him.

'The individual depositor, not the contributor to a common fund, is really the speculator. If no sickness attacks him during his years of strength and activity, and he dies before he is past labour, he is successful in his speculation; but if he fall sick at an early period, or if he live to old age, he is a great loser, for his savings, with their accumulations, will support him but a short time in sickness; or even if he retain something in old age, after having provided for his occasional illness, the annuity which he can then purchase will be very inferior indeed to that which he would have obtained if he had entitled himself to the benefit of the accumulated savings of all those who, having contributed for many years to a superannuation fund, have never reached an age to require it.'

The rules adopted by different friendly societies vary in many particulars of minor importance. The following abstract comprises most of the practical points aimed at by such institutions, and is inserted in order to afford a general idea of the principles upon which they are based.

Rule I. The object of this society is to assure to persons between the ages of twenty-one and fifty-five, who may become members thereof,

1st. An allowance, not exceeding 20s. per week, during sickness, until the age of 70;

2nd. An allowance not exceeding in the whole £2 per month, from and after the ages of 55, 60, 65, or 70, as may be previously agreed on, to continue during life; and

3rd. A payment at death, not exceeding £20.

Rule II. The contributions for these assurances shall be paid monthly, and shall be regulated by the ages of the members, at the time of admission, conformably to tables inserted at the end of the rules. Each member assuring an allowance during sickness to pay an additional contribution of 2s. per annum to entitle himself to medical attendance and medicines when needed.

Rule III. A single contribution may be paid on admission, or at any subsequent times, the amount of which is given in the tables added to these rules, which contribution shall redeem the whole of the monthly contributions which would otherwise have been payable.

Rules IV. to XI. relate to the contributions of honorary subscribers, and the appointment and duties of officers, the times and places of meeting, and other matters of regulation.

Rule XII. provides for ascertaining, through the examination of the surgeon, the state of health of persons applying to become members; and further provides for the periodical visits of the same officer to every member while receiving an allowance in sickness, for the purpose of ascertaining the state of his health.

Rules XIII. to XVI. prescribe the duties of the clerk of the society, the stewards, auditors, and voluntary visitors, which it is needless to detail here.

Rule XVII. provides that the treasurer and clerk shall give security to the committee for the faithful performance of their duties.

Rule XVIII. directs how special meetings may be called upon any emergency.

Rule XIX. relates to the admission of members. All candidates must be recommended by two members, and upon admission must produce a register of baptism, or other satisfactory proof of age, together with a certificate signed by the surgeon of the society, stating his opinion as to the health of the candidate. He must also sign a declaration of the kind and amount of insurance for which he intends to provide by his monthly contributions, and also of his acquiescence in, and adherence to, the rules of the society.

Rules XX. to XXII. prescribe the form of application, and the mode of paying the allowance during sickness, so framed as to guard the society, as far as possible, against fraud on the part of the members.

Rule XXIII. disqualifies members from claiming any allowance in sickness until one year after admission to the society, or until all contributions that may be due shall have been paid up; and provides for withholding the allowance where the disease or infirmity has been contracted through profligacy, quarrelling, or drunkenness, or if the member should be imprisoned upon any criminal conviction.

Rule XXIV. suspends the allowance in sickness if the claimant refuses to be seen by the medical or other officers of the society; or if by any wilful act or misconduct, such as drinking in a public-house, he shall delay the recovery of his health.

Rule XXV. provides that the sum assured at death shall be forfeited, if the member shall die by his own hand, or by the hands of justice.

Rule XXVI. provides that, *if any member shall be convicted of felony*, or shall by any false or fraudulent representation or demand obtain, or attempt to obtain, any allowance from the funds of the society, or if he shall enter the army or navy, or go abroad, he shall be excluded from the society, and all his interest and monies therein shall be forfeited; but those members who have been excluded because of their joining the army or navy may be re-admitted on the cause of exclusion ceasing, provided their health is good, and the contributions for the time of exclusion be paid, with interest.

Rule XXVII. fixes the amount of forfeits that shall be payable, if the contributions of members fall into arrear; and also the period at which, owing to such default, they shall cease to be members; eligible, however, to be reinstated, upon sufficient cause for the default being assigned, and upon the arrears and certain fines being paid.

Rule XXVIII. fixes the last Saturday in each month for the payment of annuities to the members.

Rule XXIX. enables the trustees to pay to the relatives of persons dying intestate, and for whose effects no letters of administration shall be taken ent, the amount which may have been insured, in such manner as they shall think most beneficial.

Rule XXX. authorizes the society to purchase from any of its members the interest they may have in its funds.

Rule XXXI. facilitates the transfer of insurances from one friendly society to another, in the event of any member removing beyond the limits of the original society.

Rules XXXII. to XXXVII. relate to minor points of internal management.

The tables containing the rates of monthly contributions, which follow, are not applicable to the circumstances of all friendly societies, but will be found very near to the average rates generally adopted.

Table showing the sum to be contributed monthly by persons of the following ages when admitted, until they shall reach the age of seventy, to entitle them to receive 20*s.* weekly during sickness, at any time after one year from the time of admission to the age of seventy:—

Age next Birth-day.	Monthly payment. *s.*	*d.*	Age next Birth-day.	Monthly payment. *s.*	*d.*	Age next Birth-day.	Monthly payment. *s.*	*d.*
20	2	1	32	2	9¾	44	4	2¾
21	2	1½	33	2	10¾	45	4	5
22	2	2	34	2	11¾	46	4	7
23	2	2½	35	3	1	47	4	9½
24	2	3¼	36	3	2¼	48	4	11¾
25	2	4	37	3	3½	49	5	2¼
26	2	4¾	38	3	4¾	50	5	5½
27	2	5½	39	3	6¼	51	5	8½
28	2	6	40	3	7¾	52	5	11½
29	2	7	41	3	9½	53	6	3
30	2	7¾	42	3	11¼	54	6	6¾
31	2	8¾	43	4	1	55	6	10¾

If the sum, the receipt of which it is desired to insure during sickness, should be less than 20*s.* per week, the contributions must be made in proportion. To entitle the member to receive 15*s.* per week, the payments must be three-fourths the above rate. For 10*s.* per week, the contributions are one-half the rates stated in the table, and so on. This rule is likewise applicable to the two following tables.

Table showing the sum to be contributed monthly by persons of the following ages when admitted, to secure the payment to them of a monthly annuity of 2*l.*, to commence from their attaining the respective ages of either 55, 60, 65, or 70, as agreed at the time of joining the society; the contributions to cease when the annuity commences:—

Age next Birth-day at the time of admission.	Monthly Contributions which will insure an annuity of 2*l.* paid monthly.							
	To begin at the age of 55.		To begin at the age of 60.		To begin at the age of 65.		To begin at the age of 70.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
18	3	8¼	2	2¼	1	3	0	7¼
19	3	11	2	4¼	1	3¼	0	8
20	4	2	2	5¾	1	4¾	0	8¼
21	4	5¼	2	7¼	1	5¾	0	9
22	4	8¼	2	9¾	1	6¾	0	9¼
23	5	0	2	11¼	1	7¾	0	10
24	5	4	3	1¼	1	9	0	10½
25	5	8	3	4	1	10¼	0	11½
26	6	0¼	3	6¼	1	11¼	1	0
27	6	5¼	3	9¼	2	1	1	0¾
28	6	11	4	0¼	2	2¾	1	1¼
29	7	5	4	3¼	2	4¾	1	2¼
30	7	11¼	4	7	2	6¼	1	3¼
31	8	6¼	4	10¼	2	8¼	1	4¼
32	9	2¼	5	3	2	10¼	1	5¼
33	9	11	5	7¼	3	0¾	1	6¼
34	10	8¼	6	0¼	3	3¾	1	7¼
35	11	7¼	6	5¼	3	6	1	9
36	12	7¼	6	11¼	3	9	1	10¼
37	13	9	7	6¼	4	0¾	2	0
38	15	0¼	8	1¼	4	3¾	2	1¼
39	16	5¼	8	9¾	4	7¾	2	3¼
40	18	1¼	9	7	5	0	2	5¼
41	.	.	10	5¼	5	5	2	7¼
42	.	.	11	4¾	5	10¼	2	10
43	.	.	12	5¼	6	4¾	3	0¼
44	.	.	13	8¼	6	10¾	3	3¼
45	.	.	15	1¼	7	6¾	3	7
46	.	.	.	.	8	2¾	3	10¼
47	.	.	.	.	8	11¾	4	2¼
48	.	.	.	.	9	10¼	4	7
49	.	.	.	.	10	10¾	5	0
50	.	.	.	.	12	0¾	5	5¼
51	.	.	.	.	.	.	6	0
52	.	.	.	.	.	.	6	7¼
53	.	.	.	.	.	.	7	3¼
54	.	.	.	.	.	.	8	1¼
55	.	.	.	.	.	.	9	0¼

Table showing the sum to be contributed monthly by persons of the following ages when admitted, until they shall reach the age of seventy, to insure the payment of the sum of 20*l.* at the time of death:—

Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*	Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*	Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*	Age next birth-day at the time of admission.	Monthly Contribution. *s.*	*d.*
16	0	6½	26	0	9¼	36	1	0¾	46	1	6¼
17	0	7	27	0	9½	37	1	1¼	47	1	7¼
18	0	7¼	28	0	9¾	38	1	1¾	48	1	8½
19	0	7½	29	0	10¼	39	1	2¼	49	1	9½
20	0	7¾	30	0	10½	40	1	2¾	50	1	10½
21	0	8	31	0	10¾	41	1	3¼	51	1	11½
22	0	8¼	32	0	11¼	42	1	3¾	52	2	0¾
23	0	8½	33	0	11½	43	1	4½	53	2	2
24	0	8¾	34	1	0	44	1	5	54	2	3½
25	0	9	35	1	0¼	45	1	5	55	2	5½

The number of friendly societies enrolled by the clerks of the peace in each county in Great Britain from the year 1829 to 1836, both inclusive, in conformity with the act passed in that year last mentioned, are as follow:—

Bedford	27	Brecon	53
Berks	15	Cardigan	26
Bucks	33	Carmarthen	32
Cambridge	38	Carnarvon	17
Chester	83	Denbigh	47
Cornwall	52	Flintshire	33
Cumberland	14	Glamorgan	112
Derby	53	Merioneth	19
Devon	187	Montgomery	20
Dorset	53	Pembroke	27
Durham	57	Radnor	8
Essex	59		
Gloucester	41	Total of Wales	394
Hants	38		
Hereford	20	Aberdeen	5
Hertford	51	Ayr	17
Kent	87	Dumbarton	3
Lancaster	189	Dumfries	1
Leicester	38	Edinburgh	46
Lincoln	21	Fife	2
Middlesex	346	Forfar	4
Monmouth	62	Kincardine	2
Norfolk	69	Lanark	25
Northampton	6	Linlithgow	2
Northumberland	30	Perth	1
Nottingham	27	Renfrew	11
Oxford	30	Ross	1
Rutland	4	Stirling	1
Salop	84	Wigton	1
Somerset	87		
Stafford	180	Total of Scotland	122
Suffolk	60		
Surrey	75		
Sussex	36	Total in England	2438
Warwick	58	Wales	394
Wilts	34	Scotland	122
Worcester	68		
York	26	Total in Great Britain	2954
Total of England	2438		

No friendly societies have been enrolled in Huntingdon, Westmoreland, and Anglesea. The returns from Scotland comprise only those societies from which returns of sickness and mortality have been received. Of the above societies there were enrolled in England and Wales—

	England.	Wales.	Total.
In 1829	55	3	68
1830	272	32	304
1831	400	49	449
1832	606	99	705
1833	346	64	410
1834	223	56	279
1835	416	72	488
1836	126	19	145
	2444		
Ceased	6		
	2438	394	2832

The above-mentioned societies do not comprise all, or nearly all, those which are in existence in Great Britain, and no similar account has been given for Ireland. According to a return printed by order of the House of Commons the number of friendly societies, the rules of which were filed by the clerks of the peace in England and Wales, and equivalent officers in Scotland and Ireland, between the beginning of 1793 and the end of 1832, were—

In England	16,596
Wales	769
Scotland	2,144
Ireland	274
Total in the United Kingdom	19,783

Many of the societies included in this return have ceased to exist, but it is known that there are many still in being which have not been enrolled under the act of 1829; in fact the number which have deposited their funds with savings' banks very greatly exceeds those so enrolled. The number having made these deposits, and the amount of the sums deposited by them, as they stood on the 20th of November, 1836, were as follow:—

	Number of Societies.	Amount of Deposits.	Average by each Society.
		£	£
England	4782	658,424	138
Wales	269	40,728	151
Scotland	92	11,521	125
Ireland	266	16,622	63
Total	5409	727,295	134

It is to be regretted that hitherto no use has been made of the returns of sickness and mortality made under the act of 1829, of which it is understood that great numbers are deposited in the office of the Secretary of State, and with the barrister appointed to certify the rules of friendly societies. Several of these societies are composed of persons engaged in some particular calling; and if a careful analysis of the returns were made, it might, among other interesting and useful points of information, afford data for estimating the comparative healthiness of different trades, a matter hitherto very imperfectly understood or investigated. The experience of different Life Assurance Offices has made us pretty well acquainted with the rate of mortality among the higher and middle walks of life, and the general table of mortality, although hitherto very imperfectly kept, affords a tolerable view of the law of human life in the aggregate in this country; but it is very desirable to know as accurately as possible the experience, in regard both to sickness and mortality, of institutions, the members of which are taken from the working classes, since there could perhaps be no surer test discovered whereby to judge of the progress of civilization than this, which would mark the greater or smaller approximation made by the great bulk of the people following different employments and placed in different localities, towards the substantial and necessary comforts enjoyed by the easier classes.

To supply this deficiency 'The Society for the Diffusion of Useful Knowledge' prepared various schedules, and distributed the same to friendly societies in most of the counties in England, and obtained in consequence a considerable number of returns applying to the five years that occurred between the beginning of 1823 and the end of 1827. These returns were placed in the hands of Mr. Charles Ansell, actuary to the Atlas Insurance Company, who has made them the groundwork of a 'Treatise on Friendly Societies, in which the Doctrine of Interest of Money, and the Doctrine of Probability, are practically applied to the Affairs of such Societies.' It is not necessary in this place to borrow from Mr. Ansell's elaborate calculations more than the following table, which exhibits the amount of sickness and mortality that actually occurred during five years among all the friendly societies from which returns were obtained, and affords the most precise information that has yet been given concerning the casualties to which the working men of England are liable. An additional column is given, deduced from the 'experience' of the Equitable Society, drawn from the actual duration of all the lives assured by that corporation from 1762 to 1829, a period extending over two-thirds of a century; and this will serve to show the great discrepancies exhibited in Mr. Ansell's table, which unavoidably arise from the limited materials with which that gentleman was furnished.

Age	Mean annual quantity of Sickness, expressed in weeks and decimals of a week.	Annual rate of Mortality, showing out of what number one would die.	Annual rate of Mortality, showing out of what number one would die, according to the Equitable experience.	Age.	Mean annual quantity of Sickness, expressed in weeks and decimals of a week.	Annual rate of Mortality, showing out of what number one would die.	Annual rate of Mortality, showing out of what number one would die, according to the Equitable experience.	Age.	Mean annual quantity of Sickness, expressed in weeks and decimals of a week.	Annual rate of Mortality, showing out of what number one would die.	Annual rate of Mortality, showing out of what number one would die, according to the Equitable experience.
18	·500	—	130·88	45	1·308	56·48	78·76	72	14·167	7·83	13·65
19	·574	—	135·60	46	1·390	48·48	77·76	73	8·279	6·17	12·65
20	·671	—	136·50	47	1·379	48·05	75·17	74	4·321	6·50	11·65
21	·725	138·50	139·60	48	1·508	48·56	72·65	75	14·262	7·00	10·74
22	·785	165·00	138·61	49	1·816	45·88	70·22	76	24·719	19·00	10·19
23	·861	186·50	137·60	50	1·784	42·59	66·55	77	41·111	—	9·54
24	·888	110·22	136·60	51	1·706	29·86	61·98	78	31·095	14·00	8·85
25	·850	108·82	131·61	52	1·875	37·63	57·82	79	30·636	11·00	8·35
26	·712	125·27	130·61	53	2·040	95·67	53·16	80	23·571	—	7·52
27	·614	122·15	129·41	54	2·110	55·40	50·53	81	1·400	—	6·74
28	·711	96·95	128·61	55	2·526	38·64	48·03	82	1·000	7·00	6·08
29	·930	81·69	127·61	56	2·869	24·91	44·34	83	—	6·00	5·10
30	·828	74·59	123·—	57	2·758	22·24	40·45	84	3·000	—	4·76
31	·753	80·19	122·—	58	2·436	31·08	37·45	85	18·333	—	4·52
32	·927	109·32	117·64	59	2·675	24·86	34·28	86	21·250	8·00	4·30
33	·992	98·29	113·75	60	3·042	23·67	31·77	87	31·428	7·00	3·93
34	·939	83·25	109·52	61	3·782	27·67	30·09	88	44·000	—	3·62
35	·903	60·06	108·52	62	4·553	29·75	28·77	89	52·000	—	4·04
36	·898	51·24	104·76	63	5·180	21·20	27·17	90	52·000	—	3·72
37	1·093	60·07	101·17	64	5·385	14·69	25·62	91	34·666	—	3·50
38	1·291	53·03	95·41	65	5·423	16·18	23·39	92	14·000	—	3·18
39	1·226	55·89	92·21	66	5·615	17·22	21·32	93	—	—	3·00
40	1·127	75·—	91·21	67	6·222	18·14	19·76	94	—	—	2·28
41	1·023	74·56	88·16	68	8·852	26·50	18·25	95	—	—	1·80
42	1·094	51·60	87·16	69	12·420	17·60	16·65	96	—	—	1·33
43	1·249	48·69	86·16	70	13·930	14·50	15·65	97	—	—	1·00
44	1·328	58·71	85·27	71	14·402	14·50	14·65				

FRIENDS. [QUAKERS.]

FRIESLAND, or **VRIESLAND**, the most northerly province of the kingdom of Holland, is situated between 52° 40′ and 53° 28′ N. lat., and 5° 24′ and 6° 46′ E. long., and is bounded on the north by the North Sea, on the east by the provinces of Groningen and Drenthe, on the south and south-east by that of Oberyssel, and on the west and south-west by the North Sea and Zuidersee. It is sometimes called West Friesland, in order to distinguish it from East Friesland in Hanover: but is not called by that name n Holland itself. The area of Friesland is about 1027 square miles, and the population, which was 176,554 in the year 1818, 207,425 in 1831, and 217,882 in 1835, is now estimated at about 221,000. The surface, as well as the soil itself, are so identified in character with those of the province of North Holland that there cannot be a doubt that they formed one and the same country antecedently to the convulsion out of which the Zuidersee, which now separates them, arose. There are many parts of Friesland which, like North Holland, lie lower than the level of the sea, and are protected from the storms of the North Sea by costly artificial dykes. The whole land is flat and intersected by canals: nor is there an eminence throughout it excepting some mounds, here called "terpen," on which the antient Frisians were accustomed to take refuge in seasons of marine inundations. In all parts there are deep swamps and marshy bogs, between which, especially in the south and east, tracts of sand and moor, or low meagre woodlands, occasionally interpose. The canals, which are frequently higher than the land they drain (the water being pumped up into them), and have enabled human industry to bring it under cultivation, mostly join the great canal, which begins at Haarlingen, a port in the west, and leads through Franeker, Leeuwarden, and Dokkum to Groningen. The lowlands near the coast, particularly in the north-west, are mostly appropriated to the feeding of cattle; and the interior of the province, where the ground is somewhat more elevated, to the growth of corn. Friesland has no river of any note excepting the Lauwers, which falls into the gulf of that name, after forming the boundary in part between this province and Groningen. Of the other streams, the Baare, Linde, Paassens, &c., the first only is navigable for small craft: the others are broad rivulets of inconsiderable lengths. There are a multitude of small lakes, called Meeren, the majority of which have been formed by extensive diggings for turf, and are well stocked with fish. Of late years many of them have been drained either in part or wholly, and converted into polders, or inclosures of arable and pasture land. The principal occupation of the people is breeding cattle, growing corn, fishing, and digging and preparing turf for fuel. The stock of cattle is about 170,000, and above 5,000,000 pounds of butter and 1,000,000 of cheese are annually exported, but the quality is inferior to that of the western provinces of Holland. There are numerous flocks, but they are of an inferior breed, and the wool is coarse. A great quantity of lambs are exported; and a considerable number of horses are bred: the stock of the latter is about 30,000; they are strong limbed and stand high, and are much sought after as carriage horses. Swine are reared everywhere, and fed with a view to the production of lard rather than for meat. The agricultural produce of Friesland is more than adequate to its consumption, and some corn is exported: the chief articles of growth are wheat, rye of superior quality, remarkably fine pease, potatoes, buckwheat, and clover seed, which last is exported largely. One of the effects of the extensive cultivation of clover is that the honey of Friesland stands in great repute. There are few manufactures: they include wooden clocks, woollen stuffs, linen, sail cloth, salt, paper, and tiles. Ship-building is also carried on.

The inhabitants are principally adherents of the Reformed Lutheran church; there are 207 cures of souls attached to this persuasion, 58 to the Mennonite, and 24 to the Roman Catholic, besides 2 Lutheran congregations. Their language has a greater similarity to the German than the Dutch: in this respect, indeed, as well as in their dress and manners, they have retained much that was common to their ancestors, the Frisians. In the larger towns Dutch is spoken.

Friesland contains 11 towns, 1 market village, and 336 other villages and hamlets; and is divided into 3 circles, Leeuwarden in the north, and Sneek and Herrenveen in the south, and 30 gritenien, or bailiwicks. The chief town is Leeuwarden [Leeuwarden], about 21,000 inhabitants, in the west; Franeker, on the canal from Leeuwarden to Haarlingen, an old town, with about 400 houses and 4200 inhabitants, a high school, botanic garden, and tile manufactories; Haarlingen, a seaport on the Zuidersee, with about 1200 houses, and a population of about 7600, 5 churches, and manufactures of sailcloth, paper, salt, &c., and a brisk foreign trade; Dokkum, a well-built town, with about 600 houses and 3600 inhabitants, 2 churches, a handsome town-hall with a steeple, manufactures of beer, brandy, salt, &c., and a brisk trade in butter and cheese. The preceding towns, as well as the islands of Ameland, with 3 villages and a population of about 3000 employed in navigation, fishing, cattle-breeding, and agriculture, and of Schiermonikoog, with about 1600 inhabitants, are in the circle of Leeuwarden. In that of Sneek are the chief town of that name, on the canal between Lemmer and Leeuwarden, with 2 churches, about 1100 houses, and 6000 inhabitants, a town-hall, manufactures of pottery, linen, deals, oil, &c., and much trade in corn and butter; Staveren, a seaport on the most south-westerly point of Friesland, once the residence of the Frisian kings, with about 2000 inhabitants; and Workum, a port on the Zuidersee, with about 3000 inhabitants, chiefly engaged in shipping and fisheries. In the circle of Herrenveen is the market-village of that name, and chief place of the circle, built in the midst of moors of turf, with a population of about 1200: and Langezwaag, a village of about 5000 inhabitants.

The portion of Friesland on the west side of the Ems, commonly called West Friesland, was annexed to the United Provinces, now the kingdom of Holland, on the establishment of their independence in 1609.

FRIESLAND, EAST. [Aurich.]

FRIEZE. [Civil Architecture; Column.]

FRIGATE. [Ship.]

FRIGATE (Zoology). [Pelecanidæ.]

FRIGIDA'RIUM. [Bath.]

FRINGE TREE, the English name of the American shrub Chionanthus virginica.

FRINGI'LLIDÆ (ornithology), the family of Finches. This, according to Mr. Vigors, contains, in addition to *Alauda* [Lark], to which *Emberiza* (the Buntings) and its affinities, he observes, seem nearly allied, the greater part of the Linnæan *Fringillæ*, together with the Linnæan *Tanagræ* [Tanager], which approach them in their external characters and in their habits, as far as has hitherto been ascertained. These latter groups contain many natural genera which may be traced, in his opinion, from the point of their connexion with the Linnæan *Fringillæ*, back, by a gradual increase of the base of the bill in breadth and height, to the family of *Loxiadæ* [Loxiadæ], which unites with them at the opposite extremity of the series of families which compose the tribe. The *Fringillidæ*, again, according to the same author, by means of the sharp-pointed and lengthened bill of *Carduelis*, and by the extension of the *culmen* of the upper mandible in an angular form for some extent upon the front of the head, conduct us, on the other side, to the genus *Icterus*, Briss., which commences the succeeding family. Here, Mr. Vigors thinks that the genus *Ploceus* of Cuvier also seems to hold an intervening station between the two groups, so as to render it difficult to decide in which of them it should be placed. There is also, he states, another decided line of relationship between the two families, viz., that which some species of the Linnæan *Alauda*, particularly *A. Capensis*, bear to the *Sturnus Ludovicianus*, or *Crescent Stare* of Dr. Latham. This latter bird is well known as the *Alauda magna* of Linnæus, and of the American ornithologists. But its still stronger affinity to the *Sturni* and *Icteri* necessarily places it among them. The former relationship appears to Mr. Vigors to be one of analogy, not of affinity; while the direct passage between the families is found in *Ploceus* (the Weaver Birds). [Weaver Birds.] Mr. Vigors makes *Fringillidæ* the first, and *Loxiadæ* the last family of the *Conirostres*. Mr. Swainson makes the *Fringillidæ* (including *Loxia* apparently—for his Conirostres consist of the *Corvidæ*, *Sturnidæ*, *Fringillidæ*, *Musophagidæ*, and *Buceridæ*, omitting *Loxiadæ*)—the third family; and the order of the names given will show the position he assigns to it. 'No group in the ornithological circle,' writes Mr. Swainson in his *Classification of Birds*, vol. i., 'exhibits this powerful structure (strength of the bill), so much as that of the *Fringillidæ*,' where the bill is short and nearly conic; both mandibles are equally thick, and when closed their height and breadth are nearly the same. In many of the Finches (as in the subgenera *Amadina*, *Coccothraustes*, &c.) the thickness of the bill at its base in comparison to the size of the head is enormous; but in the *Loxia ostrina* of Vieillot, a rare and most extraordinary bird from Western Africa, the bill is not much inferior to the size of the head. It is well known that all these 'hard-billed' birds, as the old writers aptly called them, feed entirely upon seeds and nuts; and the harder these are the stronger are the bills of such species as are appointed to derive nourishment from the different sorts; whenever an insectivorous and frugivorous diet is united, as is the case with most Tanager finches, the upper mandible is notched for the obvious purpose of more firmly securing that part of their food which can escape.'

M. Lesson, in his 'Table Méthodique,' places the *Fringillidæ* as the third family of the *Conirostres*, and makes it consist of the following genera —*Emberiza* of Linnæus, *Emberizoïdes* of Temminck, *Fringilla* of Linnæus, viz., *Pyrgita, Fringilla,* and *Carduelis* of Cuvier, *Linaria* of Bechstein, *Vidua* of Cuvier, *Coccothraustes* of Brisson, *Pyrrhula* of Brisson, *Loxia* of Brisson, *Psittirostra* of Temminck, *Corythus* of Cuvier, *Colius* of Brisson and Linnæus, *Phytotoma* of Molina, and *Ploceus* of Cuvier.

Cuvier, in his 'Règne Animal,' arranges the Buntings (*Emberiza* of Linnæus) immediately after the Titmice (*Parus* of Linnæus); and, next to the Buntings, he places the Sparrows, *les Moineaux* (*Fringilla* of Linnæus).

Cuvier designates the Buntings as possessing an extremely distinct character in their conical, short, straight bill, the narrower upper mandible of which, entering within the lower, has on the palate a hard and projecting tubercle; and as granivorous birds which have little caution, and readily enter the snares prepared for them. Those Buntings which have an elongated nail on the hind toe like the larks, are distinguished by Meyer under the generic name of *Plectrophanes*.

The *Sparrows* (*Fringilla*) are characterized by Cuvier as having a conical bill more or less large at its base, but not angular at the commissure. They subsist principally on seeds, and are subdivided by that zoologist as follows:— The *Weavers* (*Ploceus*, Cuv.), a form found in both the old and the new continents. Those of the old world make a nest by interweaving very skilfully the fibres of vegetables, whence their name. Such are the *Toucnam Courvi* of the Philippine Islands (*Loxia Philippina* of Linnæus), with its pendulous nest, having a vertical canal opening below, which communicates laterally with the cavity where the young are laid, and the *Republican* (*Loxia socia* of Latham), which builds in society, and whose conjoined nests form one large continuous mass with numerous compartments. Among the Weavers of the new continent Cuvier places *Le Mangeur de riz, petit Choucas de Surinam, de la Jamaïque, Cassique noir,* &c. (*Oriolus niger, Or. oryzivorus, Corvus Surinamensis,* Gm.), which, in countless flocks, lay waste the fields of many of the warm parts of America. Next to the *Weavers* are placed the *Sparrows*, properly so called (*Pyrgita* of Cuvier), of which the well known *Common*, or *House Sparrow* (*Fringilla domestica* of authors, *Pyrgita domestica* of Cuvier), the companion of civilized man on a large portion of the globe, may serve as the type. Cuvier makes the *Finches, les Pinçons* (*Fringilla* of Cuvier), follow. These have the bill rather less arched than the sparrows, and a little longer and stronger than the linnets. Their habits are more gay, and their song more varied than those of the sparrows, and the *Chaffinch, le Pinçon ordinaire* (*Fringilla cœlebs* of Linnæus), may be taken as an illustration of the genus. [CHAFFINCH.] The *Linnets* and *Goldfinches* (*les Linottes, Linaria* of Bechstein) and *Chardonnerets* (*Carduelis* of Cuvier) come next, and the *Serins*, or *Tarins*, Canary birds, for example. [CANARY BIRD.] Then come the *Whidah Finches, Widow Birds,* as they are popularly called (*Vidua* of Brisson and other authors), and next to them the *Grosbeaks, Gros-becs* (*Coccothraustes* of Brisson and others), to which Cuvier considers there is a gradual passage from the linnets without any assignable interval, and whose completely conical bill is only distinguishable by its excessive size: of these the *Common Grosbeak* (*Loxia Coccothraustes* of Linnæus) may be considered as the type. *Pitylus*, to which Cuvier assigns certains foreign species, succeeds. It has, as well as *Coccothraustes*, a large bill, which is slightly compressed, arched above, and sometimes has a salient angle in the middle of the edge of the upper mandible. The *Bullfinches* (*Pyrrhula*) conclude the tribe.

After the *Sparrows* Cuvier places the *Crossbills* (*Loxia* of Brisson), and the *Durbecs* (*Corythus* of Cuvier, *Strobilophaga* of Vieillot), observing that they cannot be placed at a distance from the bullfinches and crossbills. The bill of *Corythus*, convex all round, has its point curved above the lower mandible. *Colius* he considers as nearly approaching the preceding.

M. Temminck thus defines the character of the *Buntings* (*Emberiza* of Linnæus). *Bill* short, strong, conical, compressed, trenchant, without a notch, mandibles having their edges included (the upper mandible being smaller than the lower), and a little distant from each other at the base *Nostrils* basal, rounded, surmounted by the frontal feathers which partially cover them. *Feet* with three anterior and one posterior toe, the anterior toes entirely divided, and the posterior toe with a short and curved nail: in a small number of species this nail is straight and long. *Wings* with the first quill rather shorter than the second and third, which are the longest. *Tail* forked or slightly rounded.

It will be observed that in this generic character M. Temminck has omitted the projecting tubercle on the palate; and gives as a reason for this omission, that it is not visible externally.

Food, Habits, Reproduction.—The principal food of the Buntings consists of farinaceous seeds, to which insects are occasionally added. The greater number haunt woods and gardens, and build their nests in bushes. Those which have the posterior nail or claw long, live among the rocks, or in the plains, and do not frequent the woods. In almost all the species the sexes present a marked difference, the males being variegated with lively and well defined colours. The young may be distinguished from the females, which they much resemble by their more sombre colouring, and a greater number of deep spots. None of the indigenous species moult twice, but the greater part of the foreign species do so regularly, and the colours of the males change considerably in these two moults: in the summer they are adorned with brilliant colours; in the winter they put on the modest livery of the females. (Temminck.)

The same ornithologist divides the Buntings into two sections.

I.

The Buntings properly so called.

These have the posterior claw short and curved, and live in the woods and gardens. They appear to moult but once a year. Some parts of their plumage which are coloured with lively tints in the summer are clouded in winter by the ashy shading with which the feathers are terminated: these colours are without mixture in the spring, especially the deep black, till it becomes clouded with reddish after the autumnal moult. The common *Yellow Hammer* (*Emberiza citrinella*) may be taken as an example of this section, which also contains, among other species, the *Ortolan* (*Emberiza hortulana* of Linnæus, *Ortolan Bunting* of Latham) and the *Cirl Bunting* (*Emberiza Cirlus* of Linnæus).

II.

The Spur Buntings (*Bruans Eperonniers, Plectrophanes* of Meyer).

This section has the back claw long and but very slightly arched. The species composing it live always on the ground in open places. Their moult is simple and ordinary, but the colours of the plumage change considerably by rubbing and the action of the air and light, so that their summer dress appears very different from that which these birds assume in the autumn.

The numerous genera into which, as we have seen, the genus *Fringilla* of Illiger has been subdivided do not accord with M. Temminck's views; and as this excellent ornithologist has as much practical experience as any of those who have made this interesting branch of natural history their study, and perhaps more, we think it right to put the student in possession of his opinions on this subject.

M. Temminck, then, thus defines his genus *Gros-bec* (*Fringilla* of Illiger). *Bill* short, strong, convex, straight, and completely conical; upper mandible swollen as it were, a little inclined towards the point, without any *arête*, and with the upper part depressed, often prolonged into an angle between the frontal feathers *Nostrils* basal, round, placed near the front, behind the horny elevation of the swollen part of the bill, partially hidden by the feathers of the front. *Feet* with the tarsus shorter than the middle toe; the anterior toes entirely divided. *Wings* short; the second or third quills graduated, the third or fourth longest. *Tail* varying in form.

Food, Habits, Reproduction, &c.—These birds, says M

Temminck, feed on all sorts of seeds and grains, which they open with the bill, at the same time rejecting the husk; it is only very rarely that insects are added to this diet. They inhabit all the countries of the globe, but particularly the regions of the torrid zone and warm latitudes. They raise many broods annually, collect together in numerous flocks, and migrate in associated flights. Of all the winged class they are, after the Pigeons and Gallinaceous Birds, the most easily domesticated. The greater number of foreign species and some European undergo a double moult. When this takes place, the male assumes in winter the livery of the female. The young of the year differ from the old ones before the autumnal moult; but after that period it becomes impossible to distinguish them.

Upon this extensive genus M. Temminck proceeds to remark that methodists have essayed to class these birds in many genera, under the designations of *Strobilophoga*, *Coccothraustes*, *Fringilla*, *Passer*, *Pyrgita*, *Vidua*, *Linaria*, and *Carduelis*. The manners of all these birds being, with some slight shades of difference, absolutely the same, it is impossible, in his opinion, to have recourse to the invention of new names as the means of subdividing this great group. M. Temminck declares that he took the greatest pains to compare more than a hundred foreign species with our indigenous species, and the result of this examination confirmed him in the conclusion that there exists a gradual passage, without any demarcation, from one species to another. This natural series has, he observes, been recognised by Illiger, who unites all these birds with a thick and conical bill (*à bec gros et conique*) in one great genus under the name of *Fringilla*, comprising the Bullfinches (*Pyrrhula*) therein. M. Temminck, however, thinks that these last ought to be classed in a distinct genus, in consequence of the form of the bill, certain habits, and perhaps, also, with reference to the countries they inhabit. The genus *Loxia*, he remarks, has been restored by Illiger to the limits assigned to it by Brisson; and he adds that he (M. Temminck) has separated from the genus *Loxia* of Linnæus a species singularly characterized by the form of the bill, under the name of *Psittirostra*. M. Cuvier, he goes on to observe, has, in the *Règne Animal*, indicated, rather than established characteristically, many genera and subgenera. M. Cuvier allows that there is a gradual passage, without any assignable interval, from the *Linnets* to the *Grosbeaks*. The species of his genus *Vidua*, or *Widow Birds*, are distinguished by some of the upper coverts of the tail being excessively elongated in the males. This distinction, available for recognising the males only, disappears in the moult; for in winter they have no conformation of the tail differing from that of the females; and at that season it would be difficult to pronounce whether they were Linnets, Sparrows, or Finches (*Pinsons*). M. Temminck agrees that to facilitate the methodical arrangement of the great number of species composing this genus, it is necessary to have recourse to an artificial classification, by the aid of which the species may be easily found. The simplest method, in his opinion, is to form three sections in the genus *Fringilla*, under indications which have more or less reference to the three different groups of bills, which may be separated into *Laticones*, *Breviconeѕ*, and *Longicones*. In the first section may be comprised, he thinks, the greater number of the pretended *Loxiæ* of authors, some soi-disant *Bengalies*, and the *Sparrows* (*Moineaux*), which resemble ours in the colours of their plumage; in the second, some *Sparrows* (*Moineaux*) of authors, the Finches (*Pinsons*), the Linnets (*Linottes*), and those indicated as *Widow Birds* (*Viduæ*), *Bengalies*, and *Senegalies*; in the third the *Tarins*, some *Senegalies*, and the *Chardonnerets*.

I.

The Laticones.

(Bill large, convex, more or less swollen on the sides.)

The *Grosbeak*, *Haw Grosbeak* or *Hawfinch* (*Loxia coccothraustes* of Linnæus, *Fringilla coccothraustes* of Temminck) is placed by that author at the head of this section, which contains, among other species, the *Green Grosbeak* or *Greenfinch* (*Loxia Chloris* of Linnæus, *Fringilla Chloris* of Temminck) and the Common Sparrow.

II.

The Brevicones.

(Bill in the shape of a cone, more or less short, straight, and cylindrical, often conical throughout.)

M. Temminck commences this section with the *Chaffinch* The *Linnets* also belong to it.

III.

The Longicones.

(Bill in the form of a straight cone, long and compressed: points of the two mandibles sharp.)

The *Citril Finch* (*Fringilla Citrinella* of Linnæus) appears at the head of this section, which also comprises, among other species, the *Siskin* (*Fringilla spinus* of Linnæus), the *Lesser Red Pole*, and the *Goldfinch*.

In the second volume of his 'Classification of Birds,' lately published (1837), Mr. Swainson makes the *Coccothraustinæ* the typical group, a subfamily composed of the hawfinches, weavers, goldfinches, and linnets. They live entirely upon trees, and have the bill very strong and entire. Genus, Coccothraustes; subgenera, *Pyrenestes*, Sw., *Coccoborus*, Sw., *Coccothraustes*, Briss., *Spermophaga*, Sw., *Dertroides*, Sw. Genus, Ploceus; subgenera, *Vidua*, Cuv., *Euplectes*, Sw., *Ploceus*, Cuv., *Symplectes*, Sw. Genus, Amadina, Sw., (*Bengaly*); subgenera, *Estrelda*, Sw., *Amadina*, Sw., *Spermestes*, Sw., *Erythura*, Sw., *Pytelia*, Sw. Genus, Tiaris, Sw.; Genus, Carduelis, Sw.; Genus, Linaria, Briss.; subgenera, *Linaria*, *Leucosticte*, Sw., *Chloris*, Sw. The second or subtypical group he makes to contain the *Tanagrinæ*. Genus, Tardivola, Sw.; Genus, Tanagra, Linn.; subgenera, *Pitylus*, Cuv., *Tanagra*, Linn., *Ramphopis*, Vieill. Genus, Phœnisoma, Sw.; subgenera, *Lamprotes*, Sw., *Phœnisoma*, Sw., *Tachyphonus*, Vieill., *Leucopygia*, Sw. Genus, Nemosia, Vieill.; Genus, Aglaïa, Sw.; subgenera, *Euphonia*, Sw., *Tanagrella*, Sw. Genus, Pipillo, Vieill.; subgenera, *Arremon*, Vieill. The third consists of the *Fringillinæ* or true finches, differing materially from the two former; their bills are generally smaller, but more perfectly conic; seeds form their food almost entirely; and they chiefly live upon the ground. Genus, Pyrgita, Antiq.; subgenera, *Aimophila*, Sw., *Leucophrys*, Sw. Genus, Fringilla, Linn.; subgenera, *Passerella*, Sw., *Fringilla*, *Zonotrichia*, Sw., *Ammodramus*, Sw., *Chondestes*, Sw. Genus, Emberiza; subgenera, *Emberiza*, Linn., *Fringillaria*, Sw. Genus, Leptonyx, Sw.; subgenus, *Melophus*, Sw. Genus, Plectrophanes, Meyer; subgenera, *Miliaria*, Sw., *Plectrophanes*, Meyer. Genus, *Agrophilus*, Sw. The fourth contains the *Alaudinæ*. Bill much more slender than in any of the preceding; hind claw always more or less lengthened. Genus, Alauda, Linn.; Genus, Calendula, Linn.; subgenera, *Myafra*, Horsf., *Bra conyx*, (Brachonyx?) Sw. Genus, Agrodroma, Sw.; Genus, Macronyx, Sw.; Genus, Certhilauda, Sw. Mr. Swainson considers that the *Alaudinæ* pass into, fifth, the *Pyrrhulinæ* (Bullfinches). Genus, Pyrrhulauda, Smith; genus, Pyrrhula; subgenera, *Crithagra*, Sw., *Spermophila*, Sw Genus, Psittirostra, Temm.; Genus, Corythus, Cuv.; Genus, Hæmorrhous, Sw.; Genus, Loxia, Linn.

On the 10th January, 1837, Mr. Gould (who, in his great work on the Birds of Europe, adopts the Genus *Erythrospiza* of the Prince of Musignano) exhibited to the Zoological Society, from Mr. Darwin's collection, a series of *Ground Finches*, so peculiar in form that he was induced to regard them as constituting an entirely new group, containing 14 species, and appearing to be strictly confined to the Gallapagos Islands; and he proposed the following generic names for them: *Geospiza*, *Camarhynchus*, *Cactornis*, and *Certhidea*, giving at the same time their characters. On a subsequent evening, Mr. Darwin remarked that these birds were exclusively confined to the Gallapagos Islands; but their general resemblance and their indiscriminate association in large flocks rendered it almost impossible to study the habits of particular species. In common with nearly all the birds of these islands, they were so tame that the use of the fowling-piece in procuring specimens was quite unnecessary. They appeared to subsist on seeds deposited on the ground in great abundance by a rich annual crop of herbage. (*Zool. Proc.*, 1837.)

Having thus endeavoured to give the student a general sketch of this family of birds, and the views of some of the leading ornithologists with regard to them, we shall hereafter, as far as our limits will permit, give a description of a few of the most remarkable forms of the species which compose it. Our own woods, hedges, and plains afford ample materials for every observer who would study the characters of this widely-diffused group

FRISCHES HAFF, an inclosed arm of the Baltic, lying between 54° 12′ and 54° 48′ N. lat. and 19° 10′ and 20° 31′ E. long. It belongs to the province of Eastern Prussia its length from Holstein, a village at its N.E. extremity, about 42 miles W. of Königsberg, to its south-western extremity near Yungfer, a village N.E. of Elbing, is about 60 miles: its mean breadth is about 11½, and its greatest about 18½ miles; and it occupies an area of about 310 square miles. It is separated from the Baltic by a narrow tongue of land or sandbank called the Frische Nehrung, on which are the hamlets of Neuburg, Kahlberg, and Prebhenau, and at the north-eastern extremity of which, opposite to Pillau, there is a narrow strait, 12 feet deep and 3000 feet wide, called the Gatt. This passage was formed by an inundation of the waters of the Haff in the year 1510. In consequence of the shallowness of water in the Frische Haff, particularly in summer, no large vessels can navigate it, and Pillau is therefore the port both of Königsberg and Elbing. Among the numerous streams which find an outlet in this Haff, are the Pregel, Frisching, Passarge, Baude, and two arms of the Vistula, of which the most southernly, on quitting the main channel of that river, takes the name of the Nogath and flows past Elbing. The towns of Fischhausen, Brandenburg, Frauenburg, and Tolkemit, are on the northern and western banks of the Haff.

FRISCHLIN, NICODEMUS, born in 1547, was the son of a Protestant clergyman in the duchy of Würtemberg. He showed at an early age a great aptitude for the study of languages, became an accomplished scholar, and was made professor in the university of Tübingen, where he wrote his Paraphrases of Virgil's Bucolics and Georgics, and of Persius, as well as a great quantity of original poetry, and several dramas, for one of which, entitled 'Rebecca,' he was crowned with a gold laurel crown by the Emperor Rudolf II. at the Diet of Ratisbon, with the title of poet laureate. But his satirical humour made him enemies, and being charged with adultery, he was obliged to leave Tübingen. After visiting several towns of Germany, he at last settled at Mayence, where he published some of his works. In consequence, it would seem, of fresh satirical effusions from his pen, the duke of Würtemberg caused him to be arrested at Mayence, and shut up in a tower, from whence he attempted to escape, but fell in so doing from a great height, and died of the fall in November, 1590, being 43 years of age. He wrote a great number of works, the principal of which are: 1. 'De Astronomicæ Artis cum Doctrinâ Cœlesti et Naturali Philosophia convenientiâ;' 2. 'Institutiones Oratoriæ;' 3. Several Orations; 4. A work on education entitled 'De Ratione instituendi Puerum ab anno ætatis sexto vel septimo ad annum usque sextumdecimum;' 5. 'Dialogus Logicus contra P. Rami Sophisticam pro Aristotele,' and other treatises against the schoolmen; 'Facetiæ Selectiores,' many of them licentious; 7. 'Quæstionum Grammaticarum, libri octo;' 8. 'In Tryphiodori Ægyptii Grammatici librum de Ilii excidio, interpretatio duplex et notæ ad textum Græcum;' 9. 'Notes on Callimachus;' 10. 'Aristophanes repurgatus a mendis et interpretatus;' 11. 'In ebrietatem Carmina;' and a quantity of verses, elegies, satires, epigrams, besides the dramas and the paraphrases of classic authors above mentioned.

(Teissier, *Eloges des Hommes Savans*; Moreri's *Dictionary*, art. 'Frischlin.')

FRISIANS, a people of Germany, who formed part of the nation of the Ingævones. Their name has been by some derived from the low German word 'fresen,' to shake or tremble, in allusion to the nature of their country, the soil of which is an unstable or shaking moor. They were divided into Frisii Minores, who inhabited the lands north of the island of the Batavi—the present provinces of Oberyssel, Gelders, and Utrecht, and the greater part of the province of Holland, inclusive of the Zuidersee, which at that time was mostly dry land; and the Frisii Majores, who inhabited the land between the Yssel, Ems, and the country of the Bructeri—that is, the present provinces of West Friesland and Groningen. The old Rhine separated them from the Batavi, and the Ems from the Chauci. According to Tacitus (*Ann.* ii. c. 24) they were the most steadfast allies whom the Romans possessed in this quarter; they aided Drusus and Germanicus in their campaigns against the Cherusci, and saved the Roman fleet from destruction at the mouth of the Ems. But this state of amity was broken off upon the Romans making an attempt to treat them as subjects; they thenceforward became declared enemies of Rome, and razed, with one exception, all her strongholds in these parts, having in the 28th year A.D., when Olennius was the Roman lieutenant, turned upon the Romans, slain about 900 of them near the woods of Baduhenna, and freed themselves from their dominion. (*Tacit. Ann.* iv. c. 72, 73.) Corbulo, the Roman general under Claudius, A.D. 47, reduced them to obedience, and Nero drove them out of some districts on this side of the Zuidersee, which they had invaded. (*Tacit. Ann.* xiii. c. 54.) From this period until the fourth and fifth centuries, when they appear as members of the great confederacy of the Saxons, no mention of them occurs. We find them at this time holding the sea-coasts from the Schelde to the Elbe and Eyder, whence it has been conjectured that a variety of tribes were then comprehended under the name of Frisians. They now passed over into Britain, in company with the Angles and Saxons, and aided them in its conquest. Under the emperor Julian they made themselves masters and retained possession of the island of the Batavi, on which spot they were sorely humbled by Pepin, major-domo of the Franks, who put Radbod their king to flight, and wrested the whole of their western lands from them as far as the mouths of the Rhine. Poppo, Radbod's successor, made a fruitless attempt to recover the lost territory, and was driven back by Charles Martel. Charlemagne hereupon brought the eastern dominions of the Frisians under subjection, and appointed his own dukes over them, whose office subsequently merged into that of chieftain (häuptling.) The result of continued struggles for the mastery between these chieftains, who called themselves counts, was, that count Edzard prevailed, and established himself in that part called East Friesland in 1458. In 165 count Enno acknowledged it as a fief of the empire under the emperor Ferdinand, and was raised by him to the dignity of a sovereign prince; but both his power and that of his descendants was jealously limited by the national states. The last prince died in 1744, and by virtue of an imperial grant in 1690, Prussia took possession of East Friesland. It was wrested from her in 1808, and transferred to Holland; in 1810 it became a province of the French empire; in 1813 Prussia recovered it, and in 1815 she ceded it to Hanover.

The western part of the Frisian territory, or West Friesland, is a province of the kingdom of Holland.

The antient Frisians resembled the Germans in their habits and mode of living, and according to Tacitus, the only tribute they could afford to pay the Romans consisted of skins. They were governed by two princes, whose authority was extremely confined. Their descendants are settled among the small islands on the western coast of the duchy of Schleswig, and preserve not only the name of Frisians, but many vestiges of their customs and dress. They wander in quest of a livelihood to Holland and the neighbouring countries, and return home with the produce of their labours. (Tacitus' *Annals*; Wiarda's *History of E: Friesland.*)

FRIT. [Glass.]

FRITH, or FIRTH, is used on the eastern coast of Scotland to indicate what on the western is called a Loch. It is doubtless derived from the language of the settlers, who came from the northern parts of Europe; for it corresponds to the *fiord* of the Danes and Norwegians, and the *fiördur* of the Icelanders. It is a term properly used to indicate a narrow and deep inlet of the sea, especially in a rocky and elevated coast, and is, perhaps, preferable to the term *sound*, which is generally used for such inlets.

FRIU'LI, the most eastern province of Italy, forming part of the Venetian territory, is bounded on the north by the Carnic Alps, which divide it from the valley of the Drave in Carinthia; on the north-east by the Julian Alps, which divide it from the valley of the Save; on the north-west by an offset of the Carnic Alps, which divides it from the valley of the Piave in the province of Belluno; on the west by the province of Treviso, from which it is divided by the river Livenza; on the south, partly by the Dogado, or province of Venice, and partly by the Adriatic sea; and on the east by the government of Trieste or of Istria. The former limits between Venetian Friuli and the Austrian district of Trieste were marked by the river Isonzo, but the boundary is now placed farther west, running from Palmanova to the mouth of the Ausa, leaving out Aquileia and Grado, which make part of the circle of Istria. [Aquileia.] The boundaries of Italy on this side are not strongly marked by nature the chain of the Alps does not approach so near the sea as on the western frontiers of Genoa, and the main ridge or Julian Alps turns off to the eastward a considerable distance inland between the sources of the Isonzo and those of the Save. The valley of the Isonzo also and its tributaries present an opening into Carniola, and the coast of the Adriatic affords an easy access to Italy from Istria, Croatia, and other parts of Illyricum. Many centuries ago Paulus Diaconus and other writers had observed that Italy was most accessible to foreign armies on its eastern frontiers on the side of Illyricum and Pannonia, and this may explain, in part, why the Germans have always found greater facility than the French in maintaining a footing in the Peninsula. Accordingly this was the road by which the Goths, the Heruli, the Huns, the Longobards, and the Hungarians, successively invaded Italy.

The name of Friuli appears to be a corruption of Forum Julii Carnorum, the name of a Roman colony said to have been founded by Cæsar, now Cividal di Friuli, on the river Natiso, one of the affluents of the Isonzo, which flows along the western side of an offset of the Julian Alps which bounds Friuli to the north-east. Numerous and important remains of the Roman colony have been lately excavated by the Canon Della Torre (*Giornale Arcadico*, vol. xvii. pp. 400-11). Alboin, who entered Italy on this side, after conquering the plains of the Po, placed his nephew Gisulfus as governor or duke of Friuli. From that time Friuli formed one of the principal duchies of which the elective monarchy of the Longobards was composed. When Charlemagne overthrew that monarchy in the eight century, he left Friuli to its Longobard duke Rotogaldus, but Adelgisus the fugitive son of Desiderius having re-appeared in Italy with troops, the duke of Friuli joined him, for which he was attacked by Charlemagne, defeated and executed. Charlemagne then gave the duchy to a Frenchman of the name of Henri, adding to his government the territories of Styria and Carinthia. Henri was assassinated A.D. 799; after which several dukes followed in succession, and among others Berengarius, who obtained the crown of Italy after the extinction of the Carlovingian dynasty. Berengarius was assassinated A.D. 924. Mention is made however of subsequent dukes of Friuli till the beginning of the 11th century, when Conrad the Salic, emperor of Germany and king of Italy, gave both the duchy of Friuli and the marquisate of Istria to his chancellor Poppo, patriarch of Aquileia. Poppo's successors held Friuli as sovereign princes, though nominal feudatories of the Empire till the year 1420, when the patriarch being at war with Venice, the Venetians conquered Friuli and annexed it to their territories, leaving to the people of the towns their municipal laws and magistrates, and to the feudal lords their jurisdictions and allowing them to retain a considerable degree of independence. The county of Gorizia and the territory of Monfalcone, on the east bank of the Isonzo, belonging to the old duchy of Friuli, were given up to Austria. Friuli remained subject to Venice, till the fall of that republic in 1797; it was then ceded to Austria, by the peace of Campoformio; was afterwards annexed to the kingdom of Italy in 1806, but was reconquered by Austria with the other Venetian provinces in 1814. It now forms a province of the Lombardo-Venetian kingdom, called 'Delegazione di Udine.'

Friuli, though little visited by travellers, is a very fine and interesting part of Italy. Its length is about 60 miles from the sources of the Tagliamento to the sea, its breadth is about 45 miles, and its area about 2500 English square miles. Its population amounts to 339,000, a greater number than that of any other Venetian province. The country is watered by numerous rivers, and has considerable plains in its southern part, producing abundance of corn and very good wine, while the northern part is hilly and affords excellent pasture and plenty of game. The climate is healthy, the inhabitants are robust and spirited, and were considered as very good marksmen in the time of the Venetian rule. They speak a dialect of the Italian, different from the Venetian; on the borders however German and Sclavonian are spoken. (Da Porto, *Lettere Storiche dall anno* 1509 *al* 1512; *lettera* xxi. *descrizione della Patria del Friuli.*) For a further description of the country see UDINE, PROVINCE OF.

FROBEN, or FROBE'NIUS, JOHN, was a native of Hammelburg in Franconia, where he received his earliest education. He afterwards went to the university of Basle, and there acquired the reputation of being an eminent scholar. With the view of promoting useful learning, he applied himself to the art of printing; and becoming master of it, opened a shop in Basle, probably about 1491. He was the first of the German printers who brought the art to perfection; and one of the first who introduced into Germany the use of the Roman character. Being a man of probity and piety as well as skill, he would never suffer libels, or any thing that might hurt the reputation of another, to go through his press for the sake of profit. He thought such productions disgraceful to his art, disgraceful to letters, and pernicious to religion and society. Froben's great reputation was the principal motive which led Erasmus to fix his residence at Basle, in order to have his own books printed by him. The connection between them grew close and intimate, and was one of the sincerest cordiality. Erasmus loved the good qualities of Froben, as much as Froben admired the great ones of Erasmus.

There is an epistle of Erasmus extant, which contains so full an account of this printer, that it forms a very curious memoir for his life. It was written in 1527, on the occasion of Froben's death, which happened that year; and which, Erasmus tells us, he bore so extremely ill, that he really began to be ashamed of his grief, since what he felt upon the death of his own brother was not to be compared to it. He says, that he lamented the loss of Froben, not so much because he had a strong affection for him, but because he seemed raised up by Providence for the promoting of liberal studies. Then he proceeds to describe his good qualities, which were indeed very great and numerous; and concludes with a particular account of his death, which was somewhat remarkable. He relates, that, about five years before, Froben had the misfortune to fall from the top of a pair of stairs, on a brick pavement; which fall, though he then imagined himself not much hurt by it, was thought to have laid the foundation of his subsequent malady. The year before he died, he was seized with excruciating pains in his right ancle; but was in time so relieved from these, that he was able to go to Frankfort on horseback. The malady however, whatever it was, was not gone, but had settled in the toes of his right foot, of which he had no use. Next, a numbness seized the fingers of his right hand; and then a dead palsy, which taking him when he was reaching something from a high place, he fell with his head upon the ground, and discovered few signs of life afterwards. He died lamented by all, but by none more than Erasmus, who wrote his epitaph in Greek and Latin. Both these epitaphs are at the end of his epistle.

A large number of valuable authors were printed by Froben, with great care and accuracy; among which may be enumerated, the works of St. Jerome, 5 vols. folio, 1516, reprinted in 1520 and 1524; those of St. Cyprian, fol. 1521; Tertullian, fol. 1521, reprinted in 1525; the works of Hilary, bishop of Poictiers, fol. 1523, reprinted in 1526; St. Ambrose, 4 vols. folio, 1527. All of these were edited by Erasmus. Froben formed a design to print the Greek Fathers, which had not then been done; but death prevented him. That work, however, was carried on by his son Jerome Frobenius, and his son-in-law Nicholas Bischof, or Episcopius, who, joining in partnership, carried on the business with the same reputation, and gave very correct editions of those fathers. (Chalmers' *Biogr. Dict.*, vol. xv., p. 137; *Biogr. Universelle*, tom. xvi., p. 90; Jortin's *Life of Erasmus*, vol. i., p. 433; Erasmi *Epist.*, fol. Lugd. Bat. 1706, ep. 922—see also 917.)

FROBISHER, SIR MARTIN, an enterprising English navigator, who, as Stow informs us, was born at Doncaster, in Yorkshire, of parents in humble life, but it is not known in what year. Being brought up to the sea, he very early displayed the talents of a great navigator, and was the first Englishman who attempted to find out a north-west passage to China. He made offers for this purpose to different English merchants for fifteen years, without effect; but being at last patronized by Ambrose Dudley, earl of Warwick, and other persons of rank and fortune, he engaged a sufficient number of adventurers, and collected such sums of money as enabled him to fit himself out for his voyage. The ships which he provided were only three; namely, two barks of about twenty-five tons each, called the Gabriel and the Michael, and a pinnace of ten tons. With these he sailed from Deptford, June 8th, 1576; and the court being then at Greenwich, the queen beheld them as they passed by, 'commended them, and bade them farewell, with shaking her hand at them out of the window.' Bending their course northward, they came on the 24th within sight of Fara, one of the islands of Shetland; and on the 11th July discovered Freeseland, bearing W.N.W., which stood high, and was covered with snow. They could not land by reason of the ice, and great depth of water near the shore. The east point of this island Capt. Frobisher named 'Queen Elizabeth's Foreland.' On the 28th they had sight of Meta Incognita, being part of New Greenland, on which also they could not land, for the reasons just mentioned. Aug. 10th Frobisher went on a desert island, three miles from the continent, but staid there only a few hours. The next day he entered into a strait which he called, and it still retains the name of Frobisher's Strait. On the 12th, sailing to Gabriel's island, they came to a sound, which they named Prior's Sound, and anchored in a sandy bay there. On the 15th they sailed to Prior's bay; the 17th to Thomas Williams's island, and the 18th came to anchor under Burcher's island. Here they went on shore, and had some communication with the natives, by whose treachery they lost a boat and five of their men. Frobisher having endeavoured in vain to recover his men, set sail again for England the 26th August; came again within sight of Freeseland 1st September; and notwithstanding a terrible storm on the 7th of the same month, he arrived at Harwich on the 2nd of October.

Frobisher took possession of the country he had landed upon in queen Elizabeth's name, and, in token of such possession, ordered his men to bring to him whatever they could first find. One among the rest brought a piece of black stone, in appearance like sea-coal, but very heavy. Having at his return distributed fragments of it among his friends, the wife of one of the adventurers threw a fragment into the fire, which being taken out again, and quenched in vinegar, glittered like gold; and being tried by some refiners in London, was found to contain a portion of that rich metal. This circumstance raising prodigious expectations of gold, great numbers of persons earnestly pressed, and soon fitted out Capt. Frobisher for a second voyage, to be undertaken in the following spring. The queen lent him a ship of the royal navy, of two hundred tons, with which, and two small barks, of about thirty tons each, he fell down to Gravesend, May 26th, 1577, where the minister of the parish came aboard the greater ship, the Aid, and administered the sacrament to the company. Two days after they reached Harwich, whence they sailed on the 31st May.

The whole complement of gentlemen, soldiers, sailors, merchants, miners, &c., who accompanied the expedition, was a hundred and forty, furnished with victuals and all other necessaries for seven months. They arrived in St. Magnus Sound, at the Orkney islands, upon the 7th of June, whence they kept their course for the space of twenty-six days, without seeing land. They met, however, with great drifts of wood, and whole bodies of trees, which they imagined to come from the coast of Newfoundland. On the 4th of July they discovered Freeseland, along the coasts of which they found islands of ice, of incredible bigness, some being seventy or eighty fathoms under water, and more than half a mile in circuit. Not having been able safely to land in this place, they proceeded to Frobisher's Strait; and on the 17th of the same month made the north foreland in it, otherwise called Hall's island, as also a smaller island of the same name, where they had in their previous voyage found the ore, but could not now get a piece as large as a walnut. They met with some of it, however, in other adjacent islands. On the 19th they went upon Hall's greater island to discover the country, and the nature of the inhabitants, with some of whom they trafficked, and took one of them, neither in a very just nor handsome manner; and upon a hill here they erected a column of stones, which they called Mount Warwick. They now sailed about, to make what discoveries they could, and gave names to different bays and islands; as Jackman's Sound, Smith's Island, Beare's Sound, Leicester's Isle, York's Sound, Ann countess of Warwick's Sound and Island, &c.

Frobisher's instructions for this voyage were principally to search for ore in this neighbourhood; he was directed to leave the further discovery of the North-west passage till another time. Having therefore in the countess of Warwick's island found a good quantity, he took a lading of it. He set sail the 23rd of August, and arrived in England about the end of September. He was most graciously received by the queen; and as the gold ore he brought had an appearance of riches and profit, and the hope of a North-west passage to China was greatly increased by this second voyage, her majesty appointed commissioners to make trial of the ore, and examine thoroughly into the whole affair The commissioners did so, and reported the great value of the undertaking, and the expediency of farther carrying on the discovery of the North-west passage. Upon this, suitable preparations were made with all possible despatch; and because the mines newly found out were sufficient to defray the adventurers' charges, it was thought necessary to send a select number of soldiers, to secure the places already discovered, to make farther discoveries into the inland parts, and to search again for the passage to China. Besides three ships, as before, twelve others were fitted out for this voyage, which were to return at the end of the following summer, with a lading of gold ore. They assembled at Harwich, 27th May, 1578, and sailing thence the 31st, they came within sight of Freeseland on the 20th June, when Frobisher, who was now called lieutenant-general, took possession of the country in the queen of England's name, and called it West England, giving the name of Charing Cross to one of the high cliffs. On July 4th, they came within the mouth of Frobisher's Strait, but being obstructed by the ice, which sank one of their barks, and driven out to sea by a storm, they were so unfortunate as not to hit the entrance of it again. Instead of which, being deceived by a current from the north-east, and remaining twenty days in a continual fog, they ran sixty leagues into other unknown straits before they discovered their mistake. Frobisher, however, coming back again, made for the strait which bore his name; and on the 23rd July, at a place within it, called Hatton's Headland, found seven ships of his fleet. On the 31st of the same month, he recovered his long-desired port, and came to anchor in the Countess of Warwick's Sound; but the season of the year being too advanced to undertake discoveries, after getting as much ore as he could, he sailed with his fleet for England, where, after a stormy and dangerous voyage, he arrived in the beginning of October.

We have no account how Frobisher employed himself from this time to 1585, when he commanded the Aid, in sir Francis Drake's expedition to the West Indies. In 1588 he commanded the Triumph, and exerted himself very bravely against the Spanish armada on July the 26th, in which year he received the honour of knighthood, on board his own ship, from the lord-high-admiral, for his valour. In 1590 he commanded one of two squadrons upon the Spanish coast. In 1594 he was sent, with four men-of-war, to the assistance of Henry IV. of France, against a body of the leaguers and Spaniards, then in possession of part of Britany, who had fortified themselves very strongly at Croyzon, near Brest. Here, in an assault upon that fort, on Nov. 7th, he was wounded by a ball in the hip, of which he died soon after he had brought the fleet safely back to Plymouth, and was buried in that town. Stow says, the wound was not mortal in itself, but became so through the negligence of his surgeon, who only extracted the bullet, without duly searching the wound, and taking out the wadding, which caused it to fester. (Hakluyt's *Collect. of Voyages*, vol. iii. pp. 29, 32, 39; Stow's *Annales*, edit. 1631, p. 109; *Biogr. Brit.* vol. iii. p. 2044.) There is a good portrait of Sir Martin Frobisher in the picture gallery at Oxford; and many of his letters and papers, with others relating to him, are preserved in the Cottonian and Harleian collections of manuscripts in the British Museum. The instructions given to him for the voyage of 1577 are printed in the Archæologia, vol. xviii. p. 287, from one of Sir Hans Sloane's MSS. His last letter, reporting the taking of the fort of Croyzon, dated Nov. 8th, 1594, is preserved in the Cottonian MS., Calig. E. ix. fol. 211. A Latin translation of the account of his voyage of 1577, under the title of *Historia Navigationis Martini Forbisseri*, by Joh. Th Freigius, was published at Hamburg, in 4to. 1675.

FRODSHAM. [CHESHIRE.]

FROGS, FROG-TRIBE. Terms applied by zoologists to a natural section of the *Batrachians*, Cuvier's fourth order of Reptiles.

The Batrachians differ essentially from the other three orders, viz.: *Chelonians* or Tortoises, *Saurians* or Lizards, and *Ophidians* or Serpents. They have no ribs, or rudiments of ribs only. Their skin is naked, being without scales; they have feet. The male has no external organ of generation, and there is consequently no intromissive coïtus. In the Frog-tribe the ova are fecundated on their exclusion from the body of the female: they are shelless and generally laid in the water. The young, when hatched, breathe by means of *branchiæ* or gills, very much after the manner of fishes, being in their early stage of growth quite unlike their parents, and, in that state, forming a natural passage to the last-named class of animals. These branchiæ disappear as the higher Batrachian proceeds towards maturity, and the order has therefore been named the *Caducibranchiate Amphibia*,* which have been divided into, 1st, the *Anurous* or *Tailless Batrachians*, having no tails except in their young state, including the frogs and toads; and 2nd, the *Urodeles* or *Tailed Batrachians*, such as the *Salamanders* [SALAMANDER]. The first-named branch will form the subject of the present article; and, among these animals, the transformations of the young (which undergo a complete metamorphosis in the greater part of their organs, and an entire change in their habits and mode of life) are most distinctly manifested.

ORGANIZATION.

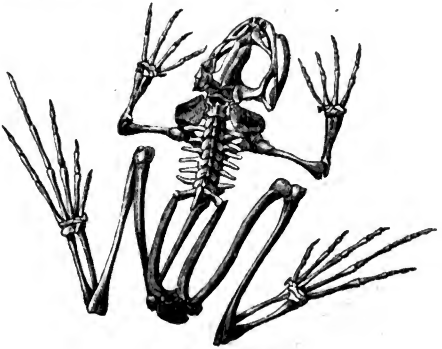
Skeleton.—The skull, in the reptiles, generally, is made up of the same parts nearly, as that of the mammiferous animals, though the proportions are different. But the lower Batrachians, which approach the fishes in this particular, have not the internal cavity corresponding so completely with the surface of the encephalon as the other reptiles. The skull is very much flattened; and small as the cerebral cavity is, it is by no means filled with the brain. It is narrower and more elongated in the species which pass their whole lives in the water than it is in the Anurous Batrachians or True Frogs.

The vertebral column commences at the posterior part of the head, and, unlike the rest of the reptiles, the Batrachians, like the Rays, the sharks, and the mammiferous animals, possess two condyles situated on the sides of the vertebral hole. In the tadpole the vertebræ are of the same calibre throughout, but a difference takes place when the limbs are developed. At this period, the vertebral canal diminishes gradually in length, the spinal marrow contracts and no trace of the canal is left in the elongated coccyx. It is in the tailless Batrachians that the vertebral column is shortest, for the frogs have only ten and the pipas but eight vertebræ.

As a general rule, the anterior extremities are shorter than the posterior limbs; but in some of the frogs, especially, the lower extremities are twice or thrice as long as the anterior feet, as might be expected in animals whose progression is principally effected by leaps. Ribs there are none; but the sternum is highly developed and a large portion is very often cartilaginous. It receives anteriorly, or in its mesial portion, the two clavicles and two coracoids which fit on to the *scapula*. The whole makes a sort of band which sustains the anterior extremities, and an elongated disk which forms a support for the throat, and assists in the offices of deglutition and respiration. Another disk extending backwards, being for the insertion of the recti muscles, protects the abdominal viscera in some species. The pelvis is well developed in the frogs, especially in the Pipa, and though apparently deprived of all traces of a tail after undergoing their last transformation, there remains, internally, a true coccygeal piece, most frequently even moveable and elongated, but without anything like vertebral form.

The bone of the arm or *humerus* is single, and is long in proportion to those of the fore-arm, which are united throughout their length, their duality being manifested by a simple furrow or depression. These bones are distinct in the reptiles generally, and the radius is generally rather the longest; the ulna is prolonged backwards into a kind of *olecranon*, and sometimes this apophysis is distinct, and becomes a sort of sesamoïd-bone in the thick part of the tendon of the extensor muscles. The pipas, the tortoises, and the greater part of the saurians have this conformation The bones of the *carpus* or Wrist exhibit nothing extraordinary in their structure; nor do those of the fingers, which are without nails or claws, require particular notice.

The bones of the well-developed *pelvis* present considerable differences in the various genera of Anurous Batrachians. Thus in the Frogs (*Rana*) and the Tree Frogs (*Hyla*), the *ossa ilii* are very much elongated, articulated in a moveable manner on the *sacrum*, and very much approximated below towards the cotyloid cavity; so that the two heads of the thigh-bones seem to be placed in contact, a conformation which much influences the action of the posterior limbs upon the trunk in the execution of the motions of swimming and leaping. In the *Pipa*, or *Surinam Toad*, the *ossa ilii* are very much widened at the point of junction with the *sacrum*, which is, itself, dilated, forming a strong union by means of a true symphysis. The *femur*, or thigh-bone, is very much elongated, and slightly curved in the form of the letter S in the Frogs (*Rana*), and in the Tree Frogs (*Hyla*); it is a little shorter in the Toads (*Bufo*), and is flattened in the *Pipa*. The bones of the leg (*tibia* and *fibula*) are, in the Reptiles, generally distinct; but in the Anurous Batrachians, *Rana*, *Hyla*, and *Pipa*, for instance, they are so soldered together as to form but a single articulation with the *femur* and *tarsus*, and to present the appearance of a single very much elongated bone, which some have erroneously considered as a supernumerary bone, or second *femur*. The knee-joint and articulating bones are so disposed that the feet have always a direction outwards. In the Reptiles, generally, the posterior feet are more developed than the anterior limbs; and this modification is particularly observable in the Anurous Batrachians, which have the *tarsus* so much elongated as to induce some to consider the first bones composing it to be a *fibula* or *tibia*. The bones of the *metatarsus* correspond to the number of toes.



Skeleton of the Common Frog.

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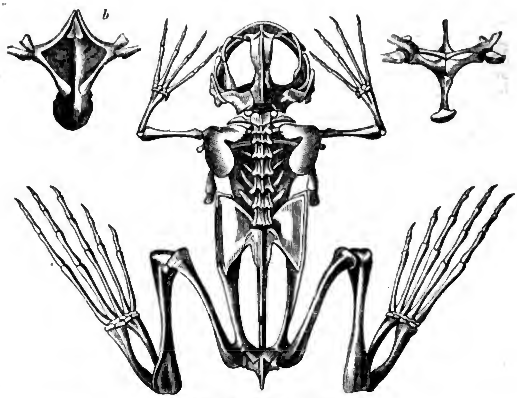
* The *Axolotl* (see the title) is an example of the *Perennibranchiate Amphib*



Skeleton of Dactylethra Lalandii.

The figures on each side show the difference of the sternum in the Common Frog, and in the Dactylethra; *a* represents the sternum of the former; *b* that of the latter.

Muscular system, particularly as relating to locomotion.—The muscles destined to give activity to the framework, examples of which are given above, are, like those of all the Reptiles, remarkable for their irritability. There are not wanting zoologists who have seen Toads, Salamanders, Tortoises, and Serpents, deprived of their heads and skins, but kept moist, display muscular motion for whole weeks. In the Anurous Batrachians, the Frogs especially, the muscles of the abdomen are more developed than in the other Reptiles, offering in this particular some analogy to the abdominal structure of the Mammifers. But it is in the disposition of the muscles of the thigh and leg in the Frogs and other Anurous Batrachians, that the greatest singularity is manifested. These, whether taken conjointly or singly, present the greatest analogy with the muscular arrangement of the same parts in Man. We find the rounded, elongated, conical thigh, the knee extending itself in the same direction with the thigh-bone, and a well-fashioned calf to the leg, formed by the belly of the *gastrocnemii* muscles. It is impossible to watch the horizontal motions of a frog in the water, as it is impelled by these muscles and its webbed feet, without being struck with the complete resemblance in this portion of its frame to human conformation, and the almost perfect identity of the movements of its lower extremities with those of a man making the same efforts in the same situation.

We have seen that the ribs are absent in the Anurous Batrachians, and the functions of respiration, as well as those of deglutition, being carried on by means of particular muscles, as we shall presently have to notice, those bones would have been mere incumbrances. In the *Frogs*, the muscles are not attached to the skin, which envelops the whole muscular arrangement in a sort of insulated, insensible, moveable bag: in the *Urodeles*, on the contrary, the integuments serve as the point of insertion to almost all the active organs of motion.

The locomotion of the Anurous Batrachians on land consists in walking, running, and leaping, in its various modifications; the latter being the motion most prevalent. The greater part of them are excellent swimmers; and when they betake themselves to this exercise, the body is extended horizontally, and the animal is propelled by the mechanism of the lower extremities alone, a mechanism admirably adapted to this mode of progression, as well as to the other varieties of movement which the necessities of the animal require. By the aid of these well-developed lower limbs, and the prodigious power of their muscular and bony levers, a frog can raise itself in the air to twenty times its own height, and traverse, at a single bound, a space more than fifty times the length of its own body.

Digestive Organs.—The Anurous Batrachians, in their adult state, are, like the greater part of the existing Reptiles, carnivorous, and swallow their living prey without mastication. The mouth in many of them is very wide; so wide, indeed, in some (the large Frogs and Pipas, for instance), as to admit of their swallowing vertebrated animals: but insects, annelids, and small mollusks form the chief of their food. They have no true fleshy lips, nor indeed have any of the Reptiles; but the freshwater tortoises are furnished with folds of skin as a covering for their cutting jaws, and perhaps as a more complete apparatus for shutting the mouth. The same conformation is observable in the greater number of the tadpoles of the Batrachians, the larger portion of which, in their adult state, have the lower jaw received under a soft skin which covers and edges the mandible. The branches of the lower maxillary bone are rarely soldered at the symphysis, and sometimes, as in the genera *Rana* and *Hyla*, there is, at the point of junction, a mere cartilage which admits of a certain amount of motion. In the *Frogs* and the *Urodeles*, the number of pieces composing each of the branches amounts to three. One of these pieces corresponds with the symphysis, and is armed with teeth, the second serves for articulation, and the third is situated backwards, and prolonged below. On the palate of many of the Anurous Batrachians are certain processes which may be termed teeth; but these are pointed, and not tubercular, as the old error of naming some of the teeth of fossil fishes *Bufonites* might lead us to suppose. These palatal teeth form a part of the bones to which they are attached, as in the case of fishes.

The tongue performs a leading part in the capture and deglutition of the prey. In the greater portion of the Anurous Batrachians the structure of this organ is altogether anomalous, and its insertion is equally at variance with the mode adopted in the other vertebrated animals. It is very soft, fleshy almost throughout, and is not supported at its base by an *os hyoides*. Its attachment is the reverse of that generally seen, for it is fixed in the concavity which is formed by the approach of the two branches of the lower jaw towards the symphysis. In a state of repose, and when the mouth is shut, this tongue, which has its root, so to speak, in the interior edge of the anterior part of the lower jaw, has its free extremity in the back part of the mouth and before the aperture of the air-passages; but when the animal puts it forth, it is considerably elongated and thrown sharply out of the mouth, as if by an effort of expulsion.. The end reaches to a considerable distance, as, turning on the pivot of its anterior fixure, it is reversed in such a manner that the surface which was below when the tongue was in the mouth, and in a state of repose, is, whe it is thrown out, above; and, when the tongue is returned into the mouth, the surface, which was an instant before above, resumes its original position, and is again beneath. The organ is armed with a tenacious viscous secretion; and when it touches the prey, the latter adheres so firmly to it, that it is carried back with the tongue into the mouth. There it is, in most cases, compressed, involved again in a glutinous sort of saliva, and almost instantly submitted to the act of deglutition. The motion of throwing out and returning the tongue is often performed with a rapidity which the eye can hardly follow. If any one will observe a toad in a melon-frame, he will see the ants or other insects which come within shot of its tongue disappear; but his vision must be very acute and prompt to detect the action of the tongue. The muscles, whose office it is to move the bones, cartilages, and other parts of the mouth, act more especially upon the lower jaw, upon the bone of the mandible, and upon the tongue, which, after being shot forth as we have endeavoured to describe, is returned and swallowed, as it were, with the captured prey, and the act of deglutition is continued till the food is lodged in the stomach.

The *pharynx* in mammiferous animals consists of that backward cavity of the throat into which the lower orifices of the nostrils, the orifice of the mouth, the canal of the ear, the *larynx* and the *œsophagus* open: but in the Reptiles there cannot be said to be any true *pharynx*, for the nostrils, as well as the *glottis*, open into the mouth, the œsophagus commences immediately behind the nostrils, and the muscles that act more especially upon these parts and upon the tongue are those that begin the act of deglutition; we shall presently see that these same muscles are also put in requisition to force the air necessary for respiration into the *glottis* and *trachea*, in order to supply the cavity of the lungs. The stomach of the Anurous Batrachians does not require any particular notice; but the maxim that the more carnivorous an animal is, the shorter and the less flexuous is its intestinal canal, is well illustrated in that tribe. The tadpole, which lives upon vegetables, possesses an extremely long digestive tube; but in its perfect state, and when its appetite has become altogether carnivorous, the intestines become very much shortened, losing four-fifths of the length which distinguished them when the animal was in its early stage of existence. The vent in the Anurous Batrachians is rounded and wrinkled. The liver generally consists of three lobes, and the gall-bladder adheres to and is hidden in the concavity of the liver, very high up. The spleen in the frog and toad is rounded, not of large dimensions, and situated in the mesial region, under the intermediate lobe of the liver. There is also a pancreas, and the chyliferous veins may be distinctly traced. Thus far we have endeavoured to give a mere outline of the digestive organs in the Anurous Batrachians, in their perfect state: but these organs, as might be expected, vary considerably in the tadpole. In this early stage, they have a mouth furnished with lips, and horny cutting processes, that act as jaws in the division of the vegetable food which forms their principal nourishment, and their intestinal canal is coiled spirally within their large rounded abdomen. The metamorphosis is complete, internally as well as externally, when this armed little mouth is changed into the widely-opening gape, which reaches beyond the eyes, and the animal swallows its living prey entire. In this their last stage, they can endure a long abstinence; they grow slowly, and they live to a considerable age. The soft skin which edges their jaws is soft, and forms a sort of gum or external lip; their under-jaw is received into a kind of rim or groove, which runs along the upper-jaw, and its two branches are slightly moveable towards the symphysis: this junction of the jaws is as complete as the shutting of the well-fitted lid of a snuff-box. The tongue, as we have seen, adheres in the adults to the anterior part of the gums: but this must be taken as a general rule, to which there is, at least, one exception; for, in *Dactylethra* (Voigt), which has no externally visible ear-drum, the tongue is fastened to the back of the mouth; and in *Pipa*, the tongue is wanting.

The *œsophagus* is a large thin canal, with longitudinal folds, and may be considered as a kind of crop or first stomach; and the intestinal canal is hardly 1½ the length of the whole body, whilst in the tadpole it is more than seven times as long. We must not omit to notice here the remarkable folds of the *peritoneum*, in the thickness of which folds a fatty matter is either deposited or secreted generally of a yellow colour, and varying much with regard to its disposition in the different species: the use of this substance is supposed to be a provision for the support of the animal during the period of its lethargic hybernation in the cold months.

In the museum of the Royal College of Surgeons, there is a preparation (No. 669, Gallery, Physiological Series), showing a portion of the small and great intestine of a frog (*Rana temporaria* of Linnæus), injected, exhibiting the peculiar reflected course of the former, and its oblique termination in the latter, which is suddenly dilated.

Circulating System.—The circulation in the Anurous Batrachians varies with the different metamorphoses which the animal undergoes. In the early or tadpole stage, the whole of the blood is driven by the heart into the branchial vessels, the circulation at that period being the same as it is in fishes. The *apparently* single auricle (for according to the observations of Dr. Davy and of MM. Saint Ange and Wébert, it is in fact separated into two divisions), or rather the partition which exists at the point where the oxygenated blood arrives through the pulmonary veins, can hardly be said to be distinct, and the venous blood, which is poured into it by the large *vena cava*, penetrates finally into the single ventricle, which contracting, pushes the blood into the single arterial trunk, which is furnished at its base, near the valvules, with a sort of bulb, or contractile swelling. This artery, which contains the black or venous blood, is divided into two trunks, one directed to the right, the other to the left, and these are then subdivided into two, three, or four branches, according to the number of the branchial leaflets: on their arrival there, they inosculate with the venous trunks, and by that time the blood has assumed its arterial quality and colour. These arterial veins unite successively, so as to form, by means of two principal trunks, the origin of one great artery or *aorta descendens*, which is, at the point of its formation, placed near the head, to which it gives off many branches, and continues to descend down the vertebral column.

But when the time of metamorphosis arrives, and when the animal which had been breathing by means of gills is to respire through the medium of lungs, an entire and necessary change takes place. In proportion as the *branchiæ* of the tadpole are destroyed and absorbed, the calibre of the venous arteries, which were distributed to them, diminishes gradually, till they are at last entirely obliterated. The first of these vessels then develops itself, and receives on each side the whole of the blood, giving off three principal trunks,—one for the head, corresponding to the carotid artery—one for the anterior limbs, or a brachial artery—and one, the longest of all, for the cellular lung, which is of considerable volume. The rest of the principal trunk follows the mesial line, and unites with its congener, so as to form a true *aorta* for the supply of the viscera and lower extremities, which acquire their large dimensions at this period.

Respiratory System and *Vocal Organs.*—The absence of the ribs prevents any application of costal influence upon the respiratory organs of the Anurous Batrachians, as is the case with the mammiferous animals: but though their form, as well as the medium in which they live, is so totally different in the early and late part of their life, the principal of action on these organs is nearly the same. The young may be said to swallow water, or at least to receive it into the cavity of the mouth, before they force it into the branchial vessels; and though the mode of breathing is so entirely changed in after-life, the operation consists in the perfect animal of a succession of deglutitions of air.

When the Batrachian leaves the egg, its *branchiæ* appear externally, like little coloured fringes on each side of the neck, and so they remain in the Urodeles, as long as their lungs are not sufficiently developed to serve for complete respiration. But in the Frogs and other Anurous Batrachians, the first stage of the animal's life endures but a short time. It soon assumes the tadpole form, with an enormous belly and head, in one undistinguished outline, and a long tail. At this period the branchiæ, or gills, are hidden, being contained in a cavity, and then the water enters the mouth by the orifice of the nostrils, which are supplied with valves. When in the cavity of the mouth, which is well closed on all sides, with the exception of the throat, where are placed the branchial slits, the water, acted upon by the muscles which cover them, traverses these spaces, and bathes the branchiæ before its exit through the branchial holes. The blood which is pushed into these branchiæ is then distributed, as it is in the fishes, and passes, as we have seen, from the arterial venous vessels into the arteries which unite to form the aorta.

On acquiring their perfect form, and when the obliteration of certain points, and the development of the others, have adapted the Anurous Batrachian for breathing air, by means of its two large lungs, the muscles employed in deglutition are the great agents for carrying on the respiration. The anterior nostrils, as we have before stated, open nearly straight, by means of simple apertures in front of the palate; the tongue is applied as a kind of stopper upon the back nostrils, and the trachea is terminated by a glottis opening into the mouth. The air thus imprisoned, is forced or pumped at each gulp through the glottis, to be distributed over the lungs.

In the museum of the Royal College of Surgeons, are the following preparations, illustrative of the aëration of the blood, by means of branchiæ, in the early stage of *Rana paradoxa*. No. 1067 is a larva, with the cavity of the mouth laid open to show the branchial and laryngeal orifices: the abdomen is also exposed, to show the rudimentary lungs *in situ*, with bristles placed in them. No. 1068 is the head of another larva of the same species, exhibiting on one side the branchial and laryngeal apertures, and on the opposite side the three series of tufted branchiæ, projecting from the membranous arches, and exposed by the reflection of the opercular fold of membrane. No. 1069 shows the lungs of the larva of the same species, and a bristle is passed from the laryngeal aperture directly into the right lung, there being no intervening trachea.

The following are illustrative of the mode of respiration in the adult Anurous Batrachians. No. 1098 exhibits a Frog (*Rana temporaria*, Linn.), with the lungs injected *in situ*. The left lung is laid open to show the cellular parietes, and the extent to which they encroach upon the cavity of the lung. No. 1099 is a single lung of the Frog, injected and laid open; and 1100, a single lung of a Toad (*Bufo vulgaris*, Linn.): it will be observed that the parietes, like those of the Frog, are cellular, but thinner. No. 1101 shows the lungs of a large Batrachian, one of them laid open, and exhibiting a more minutely cellular structure than the preceding. No. 1102 is a preparation of the lungs and larynx of a Bull-frog (*Rana pipiens*, Linn.), and a small accessory pouch will be seen appended to each pulmonary sac. A Surinam Toad (*Pipa monstrosa*, Linn.), is numbered 1103. The ventral parietes of the abdomen are reflected to show the thin membranous lungs *in situ*: they are of considerable breadth, and extend downwards to the pelvis, as in the Chelonian Reptiles. The lower portion of one of the lungs is preserved in the bottle No. 1104, and shows its large cells, and their dense and slightly vascular parietes, being adapted at that part to serve as a reservoir of air.

The activity of respiration is increased in proportion to the elevation of the temperature of the surrounding air. M. Delaroche found that frogs exposed to a temperature of 27° (centigrade) absorbed four times as much oxygen as those submitted to a temperature of 6° or 7° only.

The organs of the voice in the Anurous Batrachians are only put in action, generally speaking, at the season of reproduction, and then principally by the males: their croakings and cries seem intended to make the one sex sensible of the presence of the other. The *trachea* is, indeed, very short in the frog; but it is longer in the male than it is in the female, and the *rima glottidis* is also longer in the former. But, in some frogs, the males are distinguished by peculiar membranous bags. Thus, the Green Frog has two cheek pouches, which are inflated by the animal in the breeding season, by means of two apertures close to the *rima glottidis*; and the *chordæ vocales* are very large and distinct in many species. The glottis bears, apparently, considerable analogy to the upper larynx in Birds; but in the birds, the voice receives its modification only from the edges of the glottis, which shuts the trachea at the point where it opens into the mouth; the sounds being produced by the lower larynx, which is formed at the point of junction of the two branches which constitute the origin of the trachea. When the air-passages of the Reptiles emit sounds, they are produced by the single larynx and the glottis: from the absence of moveable lips, and the *velum palati*, or their inconsiderable development, those sounds cannot be much modified. Nevertheless, the vocal powers of the species of Anurous Batrachians vary very much, according to the varying mechanism manifested in each. The cries of the different species of *Rana*, from the well known croaking of the *common Frog* to the bellowing of the *Bull Frog*; the shrill trebles of the species of *Hyla*, of the males especially; the flute-like and metallic sounds occasionally given out, and the sort of seemingly ventriloquous grumbling which some species of Toads exert, are vocal sounds emitted above the larynx—a sort of falsetto or *voce di testa*—from the buccal cavity, or some of the accessory sacs.

As connected with the phænomena of breathing, it must not be forgotten that the naked skin of the Frogs, and indeed of the Batrachians generally, has the power of acting upon the air in such a way as to fulfil, in a great degree, the functions of the lungs, and that aërated water may be made subservient to this cutaneous respiration. The experiments made on Frogs which have been kept in vessels, and under water charged with air renewed from time to time, and on Toads which have been kept alive for months in nets sunk under running water, at a low temperature, without any direct access to atmospheric air, prove this. These powers, the faculty of enduring long abstinence, their hybernation, and the age[*] to which the Anurous Batrachians are said to attain, naturally lead us to the consideration of the stories told of the discovery of toads, 'antediluvian toads' as they were once called, inclosed in solid rocks and in the heart of trees, where they had been supposed to have existed for centuries, deprived of the possibility of access to either food or air; though, when found, they were alive and vigorous. Nor do these stories rest solely on the doubtful hearsay evidence of uneducated persons. Thus Smellie, in his 'Philosophy of Natural History,' alludes to the account in the 'Memoirs of the Academy of Sciences' for the year 1719, of a toad found alive and healthy in the heart of an old elm; and of another discovered in the year 1731, near Nantz, in the heart of an old oak, without any visible entrance to its habitation. From the size of the tree, it was concluded that the animal must have been confined in that situation at least eighty or a hundred years. He adds, that, in the many examples of toads found in solid rocks, exact impressions of their bodies, corresponding to their respective sizes, were uniformly left in the stones or trees from which they were dislodged; and he asserts that it was said that there existed, when he wrote, a marble chimney-piece at Chatsworth with a print of a toad in it; and that there was a traditionary account of the place and manner in which it was found.

'These and similar facts,' adds the author last above quoted, 'are supported by authorities so numerous and so respectable, that it is unnecessary to quote them. Many abortive attempts have been made to account for an animal's growing and living very long in the situations above described, without the possibility of receiving nourishment or air; especially as, like all other animals, when put into an exhausted receiver, the toad soon loses its existence. Upon this subject I shall only hazard two observations. The toad, it is well known, when kept in a damp place, can live several months without food of any kind; though, in its state of natural liberty, it devours voraciously spiders, maggots, ants, and other insects. Here we have an instance, and there are many, of an animal whose constitution is so framed by nature, that it can exist several months without receiving any portion of food. According to our ideas of the necessity of frequent supplies of nourishment, it is nearly as difficult for us to conceive an abstinence of four or six months as one of as many years, or even centuries. The one fact, therefore, may be as readily admitted as the other. The same remark is equally applicable to the regular respiration of air. The toad, and many other animals, from some peculiarity in their constitution, can live very long in a torpid state without seeming to respire, and yet their principle of life is not entirely extinguished. Hence the toad may, and actually does, live many years in situations which exclude a free intercourse with the external air. Besides, almost all the above, and similar facts, must, from their nature, have been discovered by common labourers, who are totally unqualified for examining every circumstance with the discerning eye of a philosopher. In rocks there are many chinks as well as fissures, both horizontal and perpendicular; and in old trees nothing is more frequent than holes and vacuities of different dimensions. Through these fissures and vacuities the eggs of toads may accidentally be conveyed by water, the penetration of which few substances are capable of resisting. After the eggs are hatched. the animals may receive moisture and small portions of air through the crevices of rocks, or the channels of aged trees. But I mean not to persuade, for I cannot satisfy myself. All I intend is, to recommend to those gentlemen who may hereafter chance to see such rare phenomena, a strict examination of every circumstance that can throw light upon a subject so dark and mysterious; for the vulgar, ever inclined to render uncommon appearances still more marvellous, are not to be trusted.'

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[*] The age which the Anurous Batrachians may reach seems to be great. Mr. Arscott remembered the pet toad, which had been long kept in his family for thirty-six years; and, when he was first acquainted with it, his father used to mention it as the 'old toad.' The animal was supposed to have died at last in consequence of an injury which it received from a tame raven.

Upon the above observations it will only be necessary to remark, that the general impression on the mind of the writer seems to have been against the alleged discoveries, whilst the reasoning which he puts forth in its favour is, to say the least, very vulnerable, and in some points at variance with itself. It is difficult, indeed, to assign limits to suspended animation; but it is very improbable that where, as we have seen, it is probable that nature has made a provision for the ordinary period of hybernation, the animal should continue to exist for many years after the supply must have become exhausted. The theory of the conveyance of eggs by water is very feeble, and its extreme improbability will be manifest to those who will consider for a moment the mode of reproduction, and the metamorphoses which the creature undergoes. With regard to positive assertion, we could adduce many instances to show the careless way in which people—aye, even well-educated people—will relate as facts those appearances which they think they have seen. We once heard a person, of no mean attainment in one branch of Natural Philosophy, but no zoologist, give an account of a zoological phenomenon which we had witnessed, and had our reasons for watching narrowly. His statement was, in some points, entirely the reverse of the truth; and yet he did not intend to deceive: but his mind being filled with foregone conclusions, and his observation —if observation it might be called—being inaccurate, the result was error, which he was unconsciously disseminating.

That frogs, toads, snakes, and lizards 'occasionally issue from stones that are broken in a quarry, or in sinking wells, and sometimes even from strata of coal, at the bottom of a coal-mine,' may be readily admitted: but, as Dr. Buckland well observes, in the paper recording his experiments on this subject—and to these we shall presently allude—'the evidence is never perfect to show that the reptiles were entirely enclosed in a solid rock; no examination is ever made until the reptile is first discovered by the breaking of the mass in which it was contained, and then it is too late to ascertain, without carefully replacing every fragment (and in no case that I have seen reported has this ever been done), whether or not there was any hole or crevice by which the animal may have entered the cavity from which it was extracted. Without previous examination, it is almost impossible to prove that there was no such communication. In the case of rocks near the surface of the earth, and in stone quarries, reptiles find ready admission to holes and fissures. We have a notorious example of this kind in the lizard found alive in a chalk-pit, and brought alive to the late Dr. Clarke.' The same author remarks, that the first effort of the young toad, as soon as it has left its tadpole state, and emerged from the water, is to seek shelter in holes and crevices of rocks and trees. 'An individual, which when young may have thus entered a cavity by some very narrow aperture, would find abundance of food by catching insects, which like itself seek shelter within such cavities, and may have soon increased so much in bulk as to render it impossible to go out again through the narrow aperture at which it entered. A small hole of this kind is very likely to be overlooked by common workmen, who are the only people whose operations on wood and stone disclose cavities in the interior of such substances.'

Without, then, attempting to throw discredit upon the observations published upon this curious subject by authors whose character for veracity is unquestionable,—those of Guettard, in 1771[*], of Edwards, 1824[†], and of Mr. Thomas, in Silliman's Journal, in addition to those above alluded to for example,—we may conclude with Dr. Buckland, in his remarks on the last publication, that the several authentic and well-attested cases to be found in such memoirs, 'amount to no more than a repetition of the facts so often stated and admitted to be true, viz., that reptiles occur in cavities of stone, and at the depth of many feet in soil and earth; but they state not anything to disprove the possibility of a small aperture by which these cavities may have had communication with the external surface, and insects have been admitted. The attention of the discoverer is always directed more to the toad, than to the minutiæ of the state of the cavity in which it was contained.'

Dr. Buckland commenced his experiments in November, 1825. He caused twelve circular cells to be prepared in a large block of coarse oolitic limestone, from Heddington quarry, near Oxford. Each cell was about one foot deep, and five inches in diameter, and had a groove or shoulder at its upper margin, fitted to receive a circular plate of glass, and a circular slate to protect the glass; the margin of this double cover was closed round, and rendered impenetrable to air and water, by a luting of soft clay. Another block of compact siliceous sandstone (Pennant grit, of the Bristol coal formation), was made to contain twelve smaller cells, each six inches deep and five inches in diameter, and each under the same double cover as the first-mentioned cells. A live toad was placed in each of these twenty-four cells on the 26th Nov., 1825, and the double cover of glass and slate was placed over each of them, and cemented down by a luting of clay. Dr. Daubeny and Mr. Dillwyn, who were present, ascertained and noted the weight of each toad (they had all been imprisoned together in a cucumber frame, some of them for two months previously), as it was immured. The largest weighed 1185 grains; the smallest 115 grains; and they were distributed equally, small and large, among the limestone and sandstone cells. The blocks were buried in the earth of Dr. Buckland's garden, three feet deep. On the 10th of December, 1826, these blocks, which had remained unopened from the period of their inhumation, were examined. Every toad in the smaller cells of the sandstone block was dead, and so much decayed, that they must have been dead for some months. The greater part of those in the larger cells of the oolitic block were alive. No. 1, which weighed when placed in its cell 924 grains, was reduced to 698 grains. No. 5, whose weight at the same period was 1185 grains, had increased, it is asserted, to 1265 grains. Dr. Buckland observes, that the glass cover over this toad's cell was slightly cracked, so that minute insects might have entered; but none were discovered therein. In another cell, the glass of which was broken, and its tenant dead, there was a large assemblage of minute insects; and a similar assemblage was observed also on the outside of the glass of a third cell. In the cell No. 9, a toad which weighed at its entrance 988 grains, had increased to 1116 grains. The glass cover of this cell was entire, but the luting that secured it was not attentively examined; and Dr. Buckland observes, that it is probable that there was some aperture by which small insects found admission. No. 11 had decreased from 936 to 652 grains.

The result of Dr. Buckland's experiments was, that all the toads, both large and small, inclosed in sandstone, and the small toads in the limestone, were dead at the end of thirteen months, a fate which befel all the large ones also, before the expiration of the second year: these last were examined several times during the second year, through the glass covers of their cells, but without removing them to admit air; they appeared always awake, with open eyes, and never in a state of torpor; but at each successive examination they became more and more meagre, till at last they were found dead. The two toads which when first examined had increased in weight, and were at the end of the first year carefully closed up again, were not exempt from the common annihilation, but were emaciated and dead before the expiration of the second year.

When Dr. Buckland enclosed these toads in stone, he at the same time placed four other toads, of moderate size, in three holes cut for that purpose, on the north side of the trunk of an apple-tree. Two were placed in the largest cell, and each of the others in a single cell, the cells being nearly circular, about five inches deep and three inches in diameter. These were carefully closed with plugs of wood, so as to exclude access of insects, and were apparently air tight. Every one of the toads thus 'pegged' in the knotty entrails of the tree was found dead and decayed at the end of the first year

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[*] Mémoire sur différentes parties des Sciences et des Arts. Tom. iv.

De l'Influence des Agens physiques sur la Vie.

Four toads were, at the time the others were shut up, each placed in a small basin of plaster of paris, four inches deep and five inches in diameter, having a cover of the same material luted over them: these were buried at the same time and in the same place with the blocks of stone, and on being examined at the same time with them, in December, 1826, two of the toads were dead; the other two alive, but greatly emaciated.

Dr. Buckland concludes from the experiments generally, that toads cannot live a year excluded totally from atmosperic air; and from the experiments made in the larger cells in the oolite, that there is a probability that those animals cannot survive two years entirely excluded from food. ('Zoological Journal,' vol. v. p. 314.)

These experiments bring us to faculties more especially possessed by the Reptiles in general, and especially by the Anurous Batrachians.

Absorption of Air and Water, Exhalation, and Transpiration.—A rapid process of absorption and evaporation of fluids, by the pores of the skin, gives to the Anurous Batrachians the power of resisting heat. If a frog be plunged into water, of a temperature of 40° (centigrade), it will not, it is asserted, live more than two minutes, though the head be left out so as to enable it to respire freely; yet a frog will sustain the action of humid air heated to the same temperature, for four or five consecutive hours. A sudden transition however, from a low temperature to a high one, is generally speedily fatal to these animals. Their proper balance of animal heat is kept up by a regulation of the evaporation of liquid absorbed, or by the transpiration of the matter, the quantity of which is augmented in proportion as the external heat is more intense; and the animal resists it as long as the moisture is not desiccated by the air. When it can no longer repair the loss of the moisture already taken up, by a fresh absorption of liquid, it perishes. The frogs, in this particular of their organization, have been compared to the vessels called Alcarazas, used for cooling water, by the transudation permitted by their porous structure. Dr Townson, who made observations to some extent upon this subject, and had two frogs, which he named Damon and Musidora, found that a frog would sometimes absorb in half an hour as much as half its own weight in water, and, in a few hours, nearly its entire weight: when the animal so filled was placed in a warm and dry situation, it gave off this fluid nearly as rapidly as it had accumulated it. He contends that the frog tribe never drink, and general observation goes to prove that the frogs, tree frogs, and salamanders do not *swallow* liquids, being supplied by the process before mentioned. The meagreness of some of these animals, in a state of comparative desiccation, and their apparent plumpness after they have renewed their supply of moisture, is very striking. If, when so supplied, they are suddenly surprised, they can get rid of their load instantaneously. Few who have come on a frog by surprise, in a moist meadow, have not observed that, during its first leap, it emits a quantity of liquid from its vent. "Whatever this fluid may be," says Dr. Townson, "it is as pure as distilled water and equally tasteless; this I assert, as well of that of the toad, which I have often tasted, as that of frogs." This fluid is the liquid absorbed, by the skin of the abdomen principally, and for which toads and frogs are ever on the look-out. The dew on the herbage is a frequent source of this necessary supply, and in dry seasons toads will bury themselves in moist sand or earth for the purpose of sucking up through their skin any aqueous particles which may be around them. The fluid is contained in a sac, generally consisting of two lobes, situated in the lower part of the abdomen under the viscera, and is conducted to the receptacle by particular vessels, which are certainly not the ureters or urinary canals from the kidneys: these urinary canals have their exit lower down in the cloaca. Blumenbach, and even Cuvier, in his "Leçons d'Anatomie Comparée," considered this bilobated bag as the urinary bladder in the frog and toad; but Townson shows that it has no connexion with the ureter, which, as we have seen, has its posterior opening lower down in the cloaca, while these receptacles terminate in the front of that intestine.

Brain, Nervous System, and Senses.—The brain and nervous system of the Anurous Batrachians are, as in the reptiles generally, composed of an encephalon consisting of a *cerebrum*, *cerebellum*, and *medulla oblongata*; a spinal chord; and the nerves which are given off from these sources to the different organs of the body. So far the system is modelled upon that of mammiferous animals and birds, but the cerebellum is proportionally much less. The reptiles have also a ganglionary nervous system, or a great double sympathetic nerve.

Touch.—The naked skin and its sensibility to variations of temperature would seem to indicate a considerable degree of perception, as to the physical and even chemical nature of the bodies with which it comes in contact. But *touch*, properly so called, can hardly exist in a high state of development in the greater part of the Anurous Batrachians. They have, indeed, no nails on their toes, which are much longer in the frogs than in the toads; and in many of the genera and species the toes are terminated by fleshy appendages, as in *Pipa*, which has also an elongated fleshy muzzle; the tree frogs also (*Hyla*), have the extremities of their toes dilated into fleshy disks, which, like the acetabula of the *Sepiadæ*, adhere by their circumference. These enable the animals to walk in all directions upon flat surfaces, and to adhere to them even when they are of the smoothest nature. The sense of touch is probably more highly developed where this organization is manifested.

Taste.—Probably not at all acute. The tongue, as we have seen, is an organ for the capture of the prey, which is swallowed entire almost in the same moment that it is taken.

Smell.—This sense would seem to be almost rudimentary in the Batrachians. A simple opening pierced from the end of the muzzle to the front of the palate, with a fleshy and concave membrane at its external extremity, moving in unison with the respiratory action, is strongly contrasted with the intricate and beautiful structure of the nasal organs, which are so highly developed in the carnivorous mammalia and birds.

Hearing.—There is a considerable difference in the structure of the organ of hearing among the Anurous Batrachians. The *Pipas*, for instance, have a sort of small valve upon the tympanum, somewhat similar to that possessed by the crocodiles, and probably intended to protect the membrane against the pressure of the water when the animal resorts to great depths. *Hyla* and *Rana* have the tympanum distinctly manifested by the delicacy of its structure when compared with the other integuments of the head. In the toads the tympanum is not apparent. The reader will find a good example of the organ of hearing in a preparation (No. 1575), in the Museum of the College of Surgeons. It is the head of a bull-frog (*Rana pipiens*, Linn.), showing the free and wide external communication, or "meatus" of the organ, and the thin, semi-transparent vibratile membrane, or drum of the ear, which is stretched across the entrance of the meatus, and is adapted to respond to the impulse of sound conveyed through air. The cavity of the tympanum is laid open on the left side from below, showing the long, slender bone (*columella*, or *ossiculum auditus*) which forms the medium of communication between the membrana tympani and the labyrinth or internal ear. The wide vertical passage, or Eustachian tube, by which the cavity of the tympanum communicates with the fauces, is also laid open on the left side, but is seen entire on the right. This communication preserves the equilibrium between the air in the cavity of the tympanum and the atmosphere without; and an equable pressure is consequently sustained by the membrana tympani under every barometrical variation. 'It may be observed,' continues the learned author of the Catalogue, 'that the extent and freedom of the Eustachian passage are in relation to the size and exposed condition of the tympanic membrane, and perhaps also to its form, which is convex externally, and therefore the more liable to be affected by undue pressure from without, being only supported behind at a small part of its superficies.'—(*Cat. Gallery Physiol. Series*, vol. iii., part 1.)

Sight.—The precision with which a toad measures the distance of an insect, and captures it with its tongue the moment the victim is within reach of that organ, shows a high and accurate development of the organs of sight, as applicable to short distances at least. The pupil is, in general, round, but in the Anurous Batrachians, whose habits are nocturnal (the toad, for instance) it is angular or linear. The humours vary in their proportions in the different genera, but the crystalline humour has been noticed of greater density and of a more spherical figure in the aquatic species. The orbits are generally incomplete, and sometimes protected, as in *Ceratophrys*, by folds of thickened cuticle

In the Anurous Batrachians there are lachrymal glands, and the *tunica conjunctiva* is so pierced as to permit the tears to run into the cavity of the mouth.

Reproduction.—The male organs of generation in the Anurous Batrachians consist of true testicles situated in the cavity of the abdomen below the kidneys, and the deferent canals terminate in the cloaca, there being no external male organ. The ovaries in the females correspond in situation with that of the testicles of the males, and are of considerable volume. Their free extremity forms a sort of trumpet-shaped opening, and the oviduct terminates in the cloaca, whence the eggs are excluded. Blumenbach describes the frogs of his country as having a large uterus divided by an internal partition into two cavities, from which two long convoluted oviducts arise, and terminate by open orifices at the sides of the heart. The ovaria, he says, lie under the liver, so that it is difficult to conceive how the eggs get into the above-mentioned openings. The uterus, he adds, opens into the cloaca. The toads, according to him, have not the large uterus; but their oviducts terminate by a common tube in the cloaca.

At the season of reproduction, besides the vocal manifestations, there are others which visibly distinguish the male in many of the Anurous Batrachians. At each croak, the male green frogs project from the commissure of the mouth two globular bladders into which the air is introduced and the throat swells and becomes coloured. In the males of the red frog the thumbs of the anterior feet become considerably swollen and covered by a black and rugose skin at this period. The usual mode of union of the male and female, which generally takes place in the water, is too well known to require description; the former excites the latter to exclude the eggs, and fecundates them as they are protruded. These eggs are enveloped in a sort of delicate, mucous, permeable membrane; they are, when excluded, most frequently agglomerated either in glutinous masses or chaplets, and increase considerably after they are plunged in the water. There are however some curious modifications of the disposition of the eggs in certain species of the Anurous Batrachians. The accoucheur toad (*Bufo Obstetricans* of Laurenti), for instance, assists the female in excluding the chaplets of eggs, and disposes them round his thighs, something in the form of a figure of 8. He is then said to carry them about till the eyes of the embryo become visible. At the proper period for hatching, he conveys his progeny to some stagnant piece of water, and deposits them, when the eggs break and the tadpole comes forth and swims about. The male *Pipa*, or Surinam toad, as soon as the eggs are laid, places them on the back of the female, and fecundates them. The female (see the cuts at the end of this article) then takes to the water, and the skin of her back swells, and forms cellules, in which the eggs are hatched, and where the young pass their tadpole state, for they do not quit their domicile till after the loss of their tail and the development of their legs; at this period the mother leaves the water, and returns to dry land.

Swammerdam gives the number of eggs in a female frog as 1400, and M. de Montbeillard counted 1300. In these eggs there is a greenish albumen which is not easily coagulable. The yolk or vitellus is absorbed by the embryo, and an abdominal cicatrice indicates the umbilicus in young individuals. It is not rare to meet with double germs in a single egg, but most of these prove abortive, though some give birth to monsters with two heads, six legs, and two tails, as well as to hermaphrodites. The act of copulation is of considerable duration, both in the Chelonians and Anurous Batrachians; and is recorded as being prolonged from a period of eighteen days to thirty-one and upwards before the male quits the female. There seems to be a preponderance of males over females; and to this most probably may be ascribed the frequent occurrence of frogs and toads sticking on the heads of fishes, such as carp and tench. In our climates, the early part of the spring is the season of reproduction, when the frogs and toads of both sexes quit the localities of their late hybernation and their ordinary haunts, and move instinctively to those stagnant waters which are proper for their purpose, and where they are then collected in swarms.

The young Anurous Batrachian enters life under an entirely different form from that which it is afterwards to assume; and undergoes, like the insects, a series of metamorphoses or transformations till it arrives at its perfect state. In their first stage, the young have an elongated body, a laterally compressed tail and external branchiæ; their small mouth is furnished with horny hooks or teeth for the separation of vegetables, and they have a small tube on the lower lip by which they attach themselves to aquatic plants, &c. The external branchiæ next disappear, and become covered with a membrane, being placed in a sort of sac under the throat; and the animal then, as we have observed when treating of its respiration, breathes after the manner of fishes. The head, which is furnished with eyes and nostrils, is confounded with the large globular trunk distended with the great extent of the digestive canal, and it has a large tail for swimming. In this state it is called in English a *tadpole*, and in French *têtard*, from the great apparent volume of the head. Soon the posterior limbs are gradually put forth near the origin of the tail, and are developed first; the anterior feet then begin to show themselves; the tail gradually becomes less and less, shortens, shrinks, and seems at last to be absorbed; the mouth widens, and looses its horny processes or jaws; the eyes are guarded by eye-lids; the belly lengthens and diminishes in comparative size; the intestines become short; the true lungs are developed, and the internal branchiæ are obliterated; the circulation undergoes an entire change; and the animal, hitherto entirely aquatic and herbivorous, becomes carnivorous, and for the most part terrestrial.

Mr. Thomas Wharton Jones (*Zool. Proc.*, March, 1837) observes, that when the right gill of the tadpole disappears, it is not, as is usually supposed, by the closure of the fissure through which it protrudes, but by the extension of the opercular fold on the right side towards that of the left, forming but a single fissure, common to the two branchial cavities, through which the left gill still protrudes. He also remarks, that conditions analogous to those which occur during several stages of this process exist in the branchial fissures of the anguilliform genera, *Sphagebranchus*, *Monopterus*, and *Synbranchus*.

In the museum of the Royal College of Surgeons there are numerous instructive preparations illustrative of the reproductive function in the Anurous Batrachians; they are at present unnumbered, but their numbers will be soon attached, and their descriptions published in the fourth volume of the 'Physiological Series' (Gallery). In this interesting collection will be found the male organs in *Rana*, *Bufo*, and *Pipa* (*Asterodactylus* of Wagler), and the female organs in the same genera, both in the unexcited and procreative state. There is a very complete series of the metamorphic stages of *Rana paradoxa*, with dissections demonstrative of the internal branchiæ, the convoluted intestine, and the rudimental extremities. We would particularly draw the student's attention to a female *Pipa* with the cells fully developed, containing the tadpoles in different stages, and a section showing that the cells are only skin deep, and that the cutis is separated from the subjacent muscles by large lymphatic reservoirs. Another female specimen shows the cells in progress to disappearance after their function has been performed.

Particular Excretions.—The alleged venom of the common toad, so long a subject of popular belief, had been rejected by many modern naturalists, among whom Cuvier may be particularly mentioned. Dr. Davy however found the venomous matter to be contained in follicles, chiefly in the true skin and about the head and shoulders, but also distributed generally over the body and on the extremities. Pressure causes this fluid to exude or even spirt out to a considerable distance, and a sufficient quantity may be thus collected for examination. Dr. Davy found it extremely acrid when applied to the tongue, resembling the extract of aconite in this respect; and it even acts upon the hands. With a small residuum it is soluble in water and in alcohol: acetate of lead and corrosive sublimate do not affect the solutions. It remains acrid on solution in ammonia; and when dissolved in nitric acid, it imparts a purple colour to it. Combined with potash or soda, it becomes less acrid, apparently in consequence of partial decomposition. It is highly inflammable as left by evaporation of its aqueous or alcoholic solutions; and the residuum which appears to give it consistence seems to be albumen. More acrid than the poison of the most venomous serpents, it produces no ill effect when introduced into the circulation. A chicken inoculated with it was not affected. Dr. Davy conjectures that this 'sweltered venom' is a defence to the toad from carnivorous animals; and we have seen a dog, when urged to attack one without hesitation, drop the animal from its mouth in a manner that left no doubt that he had felt the effects of this excretion, which Dr. Davy thinks may be auxiliary in decarbonizing the blood.

The toads are also said to possess, besides, two glandular masses (parotids), which, when pressed, exude through small holes a yellowish thick humour of a musky odour. The other odours also which many species of toads produce, it does not seem yet ascertained from what source, are very remarkable. Roesel, author of the beautiful work on Frogs, compares some of these to the smell of garlick or of volatilized sulphur of arsenic, or even ignited gunpowder; others again, he says, produce an effect on the nose like the vapour of horseradish, mustard, or the leaves of monk's-hood rubbed between the fingers. In one instance only he states it to be probable that this emanation comes from the cloaca; and such seems to be the opinion of M. Duméril, who states that he has been assured that, in certain instances, the water in which some of these animals had been placed and there purposely irritated or excited, had become so acrid that the tadpoles of frogs and salamanders introduced therein hardly survived the immersion.

Geographical Distribution and Habits.—Warm and temperate but moist climates are the localities most favourable to the Anurous Batrachians. Extreme cold is fatal to them, and so is extreme dry heat. They are unable to sustain violent and sudden changes of temperature. In moderately warm climates, and those where there is a considerable degree of cold during a part of the year, they bury themselves, in winter, either under the earth or in the mud at the bottom of the water, and there pass the season of hybernation without taking food or air, till the spring calls them forth; when the same frog which had passed so many months without respiration would expire in a few minutes if prevented from shutting its mouth and so supplying itself with air by deglutition. The general habits of the tribe may be collected from the different sections of this article, and from the descriptions of those forms in it which may be noticed in the course of this work.

NATURAL HISTORY AND SYSTEMATIC ARRANGEMENT.

Aristotle appears to have been well acquainted with such of the Anurous Batrachians as fell within the scope of his observation. He separates the marsh-frogs from the toads and tree-frogs, and gives a good account of their organization, habits, and reproduction, excepting that he seems to have been of opinion (*Hist.* lib. v. c. 3) that there was intromission on the part of the male. (*Hist.* lib. i. c. 1; lib. ii. c. 1, 15; lib. iii. c. 1, 12; lib. iv. c. 5, 9, 11; lib. vi. c. 14; lib. viii. c. 2, 28, &c.) Pliny, whose Natural History is little better than a collection of ill-digested notes,* and who borrowed most largely from Aristotle, treats of the Reptiles in book xi., and describes with sufficient accuracy the tongue and voice of frogs (c. 65, 112).

Bélon, Rondelet, Salviani, and Gesner, are the first authors who claim our attention after the long dark period which began to brighten about the commencement of the sixteenth century. The latter, who devoted thirty-four folio pages to the natural history of frogs, accumulated a vast mass of facts, and deserves the praise lavished upon him by such men as Boerhaave and Tournefort. Aldrovandi followed towards the close of the same period, and, at his death, in 1605, left materials for fourteen volumes, in folio, which were afterwards published. A considerable portion of his first book on digitated oviparous quadrupeds is occupied by his history and commentaries on the frog tribe. Jonston notices them, but comprises his compiled history within the compass of two not very long articles.

Our countryman Ray appears at the head of the systematic writers on the subject, and though his 'Synopsis' cannot be considered as much more than a sketch, it deserves attention as an attempt at natural classification.

Linnæus, at first, made his 'Amphibia' consist of animals whose body was either naked or scaly, whose teeth were pointed and which had no grinders, and no radiated fins. He afterwards added the *Diodon*, and the greater part of the cartilaginous fishes, under the designation of 'Amphibia Nantes.'

The first classification was the result of his own views, and he appears to have been misled into the second by the assertions of Dr. Garden. In the last edition of the 'Systema Naturæ' (the 12th) he places the great genus *Rana* between the genera *Testudo* and *Draco*, making it the second genus of his first order, *Reptilia*, of his third class, *Amphibia*. The *Reptilia* he shortly characterizes as 'pedati, spirantes ore,' and admits into it the genus *Lacerta* in addition to the genera above stated. The 'Amphibia Serpentes' and 'Amphibia Nantes' form the other two orders.

Passing by Klein (1751) we come to the work published with the name of Dr. Laurenti,* which has done so much for this branch of zoology. The class 'Reptilia' comprehends, in this book (1768), three orders only, viz. the *Salientia*, *Gradientia*, and *Serpentia*. The *Salientia* comprise the Anurous Batrachians, consisting of the following genera: the Pipas (*Pipa*), the Toads (*Bufo*), the Frogs (*Rana*), and the Tree-Frogs (*Hyla*). The author adds the genus *Proteus*, founded on the larva of *Rana paradoxa*.

Before the appearance however of the 'Specimen Medicum' of Laurenti, Roesel published his magnificent work on the Frogs of his country (Nuremberg, 1758). He is justly noticed by Cuvier as one of the most ingenious observers and elegant designers of subjects of natural history.

Scopoli (1777) varies so little in arrangement from Linnæus, though the characters are differently but not better worded, that he need not detain us from the work of Lacépède, published (1788, 1790) as a continuation of Buffon, under the title of 'Histoire Naturelle des Quadrupèdes Ovipares et des Serpens.' Under the second class of his oviparous quadrupeds he ranges the Frog tribe in three genera, *Les Grenouilles*, *Les Raines*, et *Les Crapauds*, and these genera comprise 33 species.

M. Alex. Brongniart (1799, 1800, 1803) divides his class *Reptiles* into four orders, viz. *Chelonians*, *Saurians*, *Ophidians*, and *Batrachians*: in this fourth order he admits the genera *Grenouille*, *Crapaud*, *Raine*, and *Salamandre*.

Latreille (1801, 1825) makes the *Amphibia* a class, which he divides into two orders, the *Caducibranchiata* and *Perennibranchiata*. The Caducibranchiate Amphibia he subdivides into the *Anurous* or tailless, and the tailed (*Urodèles*). The first subdivision comprises the genera *Pipa*, *Bufo*, *Rana*, and *Hyla*.

Daudin, in his 'Traité Général' (1802, 1803), adopts the method of Brongniart, and seems to have bestowed much research on the Anurous Batrachians, of which he has left an 'Histoire Particulière,' in one vol. 4to. with 38 plates representing 54 species.

Cuvier (1798, 1817, 1829) admits the following genera among the Anurous Batrachians in his last edition of the 'Règne Animal:'—*Rana*, *Ceratophrys*, *Dactylethra*, *Hyla* (*Calamita* of Schneider and Merrem), *Bufo*, *Bombinator* (*Rhinella* of Fitzinger, *Oxyrhynchus* of Spix), the *Otilophes*† (Cuv.), *Breviceps* of Merrem (*Engystoma* of Fitzinger in part), and *Pipa*.

M. Duméril, who states that he has made Reptiles his particular study, and who succeeded to the chair of M. Lacépède, has published much on the subject, and promises at the end of the last volume on the 'Reptiles' (*Suites à Buffon*) to present a complete table of arrangement. This work has not yet advanced to the Batrachians.

Oppel, besides his two memoirs in the 19th vol. of the 'Annales du Muséum de Paris,' one of which was upon the Batrachians, published in 1811 his 'Prodromus,' in 4to. His third order of 'Naked Reptiles or Batrachians' is divided into the Apoda (*Cecilia*), the *Ecaudata* or Anurous Batrachians (Frogs), and the *Caudata*, *Urodèles* or Tailed Batrachians. *Bufo*, *Pipa*, *Rana*, and *Hyla*, are the genera of the Anurous Batrachians.

Merrem (1790, 1820, 1821) makes his second class, the Batrachians, consist of three orders, viz.: 1, *Apoda* (*Cecilia*), 2, *Salientia*; and 3, *Gradientia*. Among the *Salientia* which are the Anurous Batrachians, are comprised the genera *Hyla* or *Calamita*, *Rana*, *Breviceps*, *Bombinator*, *Pipa*, and *Bufo*.

M. de Blainville (1816, 1828) divides the Reptiles into two classes, the second of which, *Ichthyoïd Amphibians* or *Nudipelliferous* (naked-skinned) *Reptiles*, has for the first of its four orders the *Batrachians*, which consist of the four leading generic forms of Anurous Batrachians, and are separated into two suborders according to their habits, the first being the Aquiparous, and the second the Dorsigerous (*Pipa*).

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* 'Un auteur sans critique, qui, après avoir passé beaucoup de temps à faire des extraits, les a rangés dans certains chapitres, en y joignant des reflexions qui ne se rapportent pas à la science proprement dite; mais qui offrent alternativement les croyances les plus superstitieuses unies aux declamations d'une philosophie chagrine.' (Cuvier.)

* There are those who attribute this leading work to Winterl, a chemist, and the companion of Laurenti's studies.

† Typo, Rana Margaritifera.

Mr. Gray (1825, 1831) considers the *Amphibia* a separate class, and, like Fitzinger (1826), divides them into those which undergo a metamorphosis and those which do not. He subdivides the *Ranidæ* into the genera *Rana, Ceratophrys, Hyla, Bufo, Rhinella, Dactylethra, Bombinator, Strombus, Breviceps*, and *Asterodactylus* (Wagler), or the *Pipas*. In 1835 he introduced to the Zoological Society a toad (*Bombinator Australis*) from Swan River, observing that the form had not been previously met with out of Europe.

The zoological divisions of MM. Carus and Ficinus appeared about the same time, and they adopt, with regard to the Reptiles, very nearly the classification of Merrem and the views of Oken, whose works were published in 1809, 1816, and 1821.

Dr. Harlan, in 1825, published his account of the American Reptiles, which he divides into Batrachians, Ophidians, Saurians, and Chelonians. Several species of the Caudated Batrachians are enumerated, and they are followed by the Tailless Batrachians, as *Rana, Bufo, Hyla*.

Mr. Haworth, in his dichotomous or binary method (1825), divides the *Batrachia* into *Apoda* and *Pedata:* the latter he subdivides into *Salientia*, as *Pipa, Hyla, Bufo, Bombinator, Breviceps, Rana;* and *Gradientia*, which he subdivides into the *Mutabilia* (those which undergo a metamorphosis, *Salamandræ* for instance) and the *Immutabilia* (those which do not, *Proteus* and the *Sirens*).

Fitzinger (1826) separates the Reptiles into the *Monopnoa* and *Dipnoa*, and the latter he subdivides into—1, the *Mutabilia;* 2, the *Immutabilia*. In the first subdivision are found the *Ranoïds*, the *Bufonoïds*, the *Bombinatoroïds*, the *Pipoïds*, and the *Salamandroïds*. The four first embrace the whole of the Anurous Batrachians. The *Pipoïds* are characterized as having no tongue, an organ which exists in the three other families. In the *Bombinatoroïds* the tympanum is hidden, whilst it is perceptible in the *Bufonoïds*, which have no teeth, and are thus distinguished from the *Ranoïds*, where the teeth are distinct.

Ritgen (1828) divides the Anurous Batrachians or *Pygomolgi* into the Tree-Frogs, *Bdallipodobatrachians;* the Frogs, *Phyllopodobatrachians;* and the Toads, *Diadactylobatrachians*.

The system of Wagler (1830) takes organization as the basis of its arrangement, and he makes the class *Amphibia* consist of eight orders, viz.: the *Tortoises*, the *Crocodilians*, the *Lizards*, the *Serpents*, the *Orvets*, the *Cecilias*, the *Frogs*, and the *Ichthyodes*.

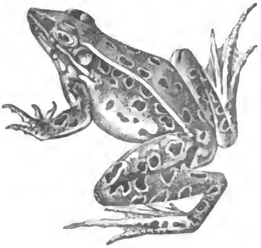
He then characterizes the seventh order, that of the Frogs (*Ranæ*), as having no penis, and undergoing a metamorphosis; and divides them into two families, the first consisting of those without a tongue (*Aglossæ*), and the second of those which possess a tongue (*Phaneroglossæ*). The first of these consists of but one genus, *Asterodactylus* (*Pipa*); the rest of the genera of the Anurous Batrachians belong to the second. Such are *Xenopus* (Wagler), *Microps* (Wagler), *Calamita* (Fitzinger), *Hypsiboas* (Wagler), *Auletris* (Wagler), *Hyas* (Wagler), *Phyllomedusa* (Wagler), *Scinax* (Wagler), *Dendrobates* (Wagler), *Phyllodytes* (Wagler), *Enydrobius* (Wagler), *Cystignathus* (Wagler), *Rana* (Linnæus), *Pseudis* (Wagler), *Ceratophrys* (Boïé), *Megalophrys* (Kuhl), *Hemiphractus* (Wagler), *Systoma* (Wagler), *Chaunus* (Wagler), *Paludicola* (Wagler), *Pelobates* (Wagler), *Alytes* (Wagler), *Bombinator* (Merrem), *Bufo* (Linnæus), *Brachycephalus* (Fitzinger).

Müller (1832) divides the Amphibia into two great orders, the *Scaly* and the *Naked*. The Anurous Batrachians belong of course to the latter. He thus places the characters of the two orders in opposition to each other.

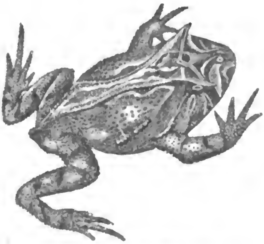
Scaly.	*Naked.*
Occipital condyle simple . .	Double.
True ribs	None or mere rudiments.
Auricle of the heart double .	Simple.*
Internal ear with fenestræ ovalis and rotunda . .	Fenestra ovalis only.
Cochlea (*limaçon* of the French), distinct . .	None.
Penis, simple or double . .	None.
No metamorphosis .	Generally a distinct metamorphosis.
No branchiæ	Distinct branchiæ, with either persistent or non-permanent holes.
Skin scaly, escutcheoned, or cuirassed	Naked.

Schinz (Naturgeschicte und Abbildungen der Reptilien, Leipzig, 1833) follows for the most part the classification of Waglor. There are numerous plates, collected from the best authorities, and it may be considered a good class-book.

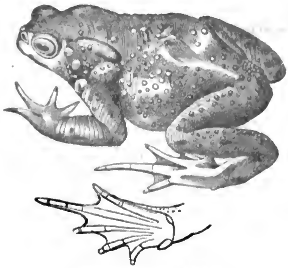
The following cuts will convey to the reader an idea of some of the leading forms among the Anurous Batrachians in their adult state.



Rana palustris (two thirds nat. size).
Europe.



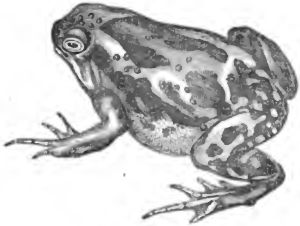
Ceratophrys granosa (two-thirds nat. size).
America.



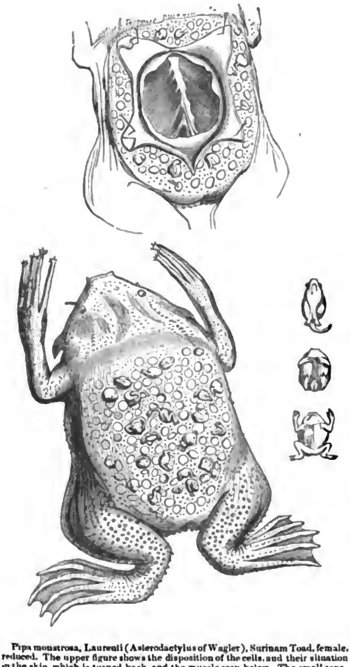
Bufo vulgaris (half nat. size).
Europe.
With an under view of the foot

Dr. Davy and MM. Saint Ange and Wébert have, as we before stated, ascertained that the auricle, which is apparently simple, is in reality separated into two divisions by a complete partition.

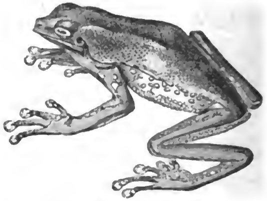
Oxyrhynchus bicolor
South America.



Engystoma marmoratum
India.



Pipa monstrosa, Laurenti (Asterodactylus of Wagler), Surinam Toad, female, reduced. The upper figure shows the disposition of the cells, and their situation in the skin, which is turned back, and the muscle seen below. The small separate figures are tadpoles, in different stages of development.



Hyla bicolor (half nat. size).
South America.

Fossil Frogs.

Fossil frogs have been found in the coal-formation of the Rhine (*Papier-kohl*) in company with the fishes *Leuciscus macrurus* and *L. papyraceus*. Two species have been described, and there are many examples in the museum at Bonn. In this country specimens are to be found in the collections of Lord Cole and Sir Philip Egerton, bart.

FROGSBIT, the common name of a wild water-plant, called Hydrocharis Morsus Ranæ.

FROISSART (JEAN, or JOHN), was born at Valenciennes about 1337. He was the son, as is conjectured from a passage in his poems, of Thomas Froissart, a herald-painter, no inconsiderable profession in the days of chivalry. The youth of Froissart, from twelve years upwards, as he himself informs us, was spent in every species of elegant indulgence. In the midst of his dissipation however, he early discovered the ardent and inquisitive spirit to which we owe so much; and even at the age of twenty, at the command of his 'dear lord and master, Sir Robert of Namur, lord of Beaufort,' he began to write the history of the French wars. The period from 1326 to 1356 was chiefly filled up from the chronicles of Jean le Bel, canon of Liége, a confident of John of Hainault, and celebrated by Froissart for his diligence and accuracy. It is reasonable to believe that this work was interrupted during a journey to England in the train of Philippa of Hainault, the heroic wife of Edward III., and mother of the Black Prince. Froissart was for three or four years secretary, or clerk of her chamber, a situation which he would probably have retained but for a deep-rooted passion for a lady of Flanders, which induced him to return to that country; a circumstance equally favourable to the history of the Continent, and unfortunate for that of Britain. During his residence in England he visited the Scottish mountains, which he traversed on a palfrey, carrying his own portmanteau, and attended only by a greyhound. His character of historian and poet introduced him to the court of David II., and to the hardly less honourable distinction of fifteen days' abode at the castle of Dalkeith with William, earl of Douglas, where he learned personally to know the race of heroes whose deeds he has repeatedly celebrated. He was in France at Melun-sur-Seine about April 20th, 1366; perhaps private reasons might have induced him to take that road to Bordeaux, where he was on All Saints' day of that year, when the princess of Wales was brought to bed of a son, who was afterwards Richard II. The prince of Wales setting out a few days afterwards for the war in Spain against Henry the Bastard, Froissart accompanied him to Dax, where the prince resided some time. He had expected to attend him during the continuance of this great expedition, but the prince would not permit him to go farther; and shortly after his arrival sent him back to the queen his mother. Froissart could not have made any long stay in England, since in the following year, 1368, he was at different Italian courts. It was this same year that Lionel, duke of Clarence, son of the king of England, espoused Joland, daughter of Galeas II., duke of Milan. Froissart, who probably was in his suite, was present at the magnificent reception which Amadeus, count of Savoy, surnamed the Count Verd, gave him on his return: he describes the feasts on this occasion, and does not forget to tell us that they danced a virelay of his composition. From the court of Savoy he returned to Milan, where the same count Amadeus gave him a good *cotardie*, a sort of coat with twenty florins of gold; from thence he went to Bologna and Ferrara, where he received forty ducats from the king of Cyprus, and thence to Rome. Instead of the modest equipage he travelled with into Scotland, he was now like a man of importance, travelling on a handsome horse, attended by a hackney. It was about this time that Froissart experienced a loss which nothing could recompense—the death of queen Philippa, which took place in 1369. He composed a lay on this melancholy event, of which, however, he was not a witness; for he says, in another place, that in 1395 it was twenty-seven years since he had seen England. According to Vossius and Bullart, he wrote the life of queen Philippa; but this assertion is not founded on any proofs.

Independently of the employment of clerk of the chamber to the queen of England, which Froissart had held, he had been also of the household of Edward III., and even of that of John king of France. Having however lost his patroness, he did not return to England, but went into his own country, where he obtained the living of Lestines. Of all that he performed during the time he exercised this ministry, he tells us nothing more than that the tavern-keepers of Lestines had five hundred francs of his money in the short space of time he was their rector. It is mentioned in a manuscript journal of the bishop of Chartres, chancellor to the duke of Anjou, that, according to letters sealed December 12, 1381, this prince caused to be seized fifty-six quires of the 'Chronicle' of Froissart, rector of the parish of Lestines, which the historian had sent to be illuminated, and then to be forwarded to the king of England, the enemy of France. Froissart attached himself afterwards to Wenceslaus of Luxembourg, duke of Brabant, perhaps in quality of secretary. This prince, who had a taste for poetry, commissioned Froissart to make a collection of his songs, rondeaus, and virelays; and Froissart, adding some of his own pieces to those of the prince, formed a sort of romance, under the title of 'Meliador; or, the Knight of the Sun;' but the duke did not live to see the completion of the work, for he died in 1384.

Immediately after this event, Froissart found another patron in Guy count de Blois, who made him clerk of his chapel, for which Froissart testified his gratitude by a pastoral and epithalamium on a marriage in the family. He passed the years 1385, 1386, and 1387 sometimes in the Blaisois, sometimes in Touraine; but the count de Blois having engaged him to continue his history, which he left unfinished, he determined in 1388 to take advantage of the peace which was just concluded to visit the court of Gaston Phœbus count de Foix, in order to gain full information of whatever related to foreign countries and the more distant provinces of the kingdom. His journey to Ortez, the chief residence of the count de Foix, in company with Sir Espaing du Lyon, is one of the most interesting parts of Froissart's 'Chronicle.' The count de Foix (of whom we have already spoken in a former article) received and admitted him as a member of his household. Here Froissart used to entertain Gaston after supper by reading to him the romance of 'Meliador,' which he had brought with him. After a long sojourn at the court of Ortez he returned to Flanders by the route of Avignon. We learn from a poem referred to by Monsieur de St. Palaye, that on this occasion the historian, always in quest of adventures, met a personal one with which he could have dispensed, being robbed of all the ready money which his travels had left him. After a series of journeys into different countries for the sake of obtaining information, we find him in 1390 in his own country, solely occupied in the completion of his history, at least until 1393, when he was again at Paris. From the year 1378 he had obtained from pope Clement VII. the reversion of a canonry at Lille, and in the collection of his poetry, which was completed in 1393, and elsewhere, he calls himself canon of Lille; but pope Clement dying in 1394, he gave up his expectations of the reversion, and began to qualify himself as canon and treasurer of the collegiate church of Chimay, which he probably owed to the friendship of the count de Blois

In 1395 Froissart revisited England, where he was received with marks of high favour and affection by Richard II. and the royal family. Here he went on collecting for his history, and had the honour to present his 'Meliador' to the king, who was much delighted with it, 'for he could speak and read French very well.' After a residence of three months Froissart left England, and at his departure received from the king a silver goblet containing a hundred nobles. He finally settled at his benefice of Chimay, and employed as usual the hours of his leisure in arranging and detailing the information collected in his travels. Four years brought him to 1399, when the melancholy fate of his benefactor Richard II. became the subject of his latest labours. It is uncertain how long Froissart survived the death of Richard and the conclusion of his 'Chronicle;' he was then about sixty years old, and died shortly after at Chimay, according to an entry in the obituary of the chapter.

The period of history embraced in Froissart's 'Chronicle' is from 1326 to 1400. The best of the old editions of the original is that of Lyon, in four volumes, in folio, 1559. The latest is that in the 'Collection des Chroniques Nationales Françaises, avec Notes et Eclaircissements, par J. A. Buchon,' in fifteen volumes, 8vo., Paris, 1824-1826. Froissart's 'Chronicle' seems to have been first printed at Paris by Ant. Verard, without date, 4 vols. in folio, and was reprinted by Guill. Eustace, Par. 1514. There are two English translations; one by Bourchier lord Berners, made 'at the high commandment' of king Henry VIII., fol. Lond., Pinson, 1525-6; reprinted in two volumes, 4to., Lond., 1812, under the editorial care of E. V. Utterson, Esq.; the other, 'with additions from many celebrated MSS.,' translated by Thomas Johnes, Esq., appeared 'from the Hafod press,' in four volumes, 4to., 1803-1805.

The principal particulars of Froissart's life have been here condensed from that by St. Palaye, translated and edited by Mr. Johnes, 8vo., Lond., 1801, and revised and re-published in 4to., Hafod, 1810.

There are several splendidly illuminated manuscripts of Froissart's 'Chronicle,' quite or nearly contemporary, preserved in the British Museum: one a complete copy, belonging to the old royal library of the kings of England, 14 D. ii.-vi.; another consisting of the second and fourth books in the same collection, 18 E. i. and ii.; a third in the Harleian Library, MSS. 4379 and 4380, containing the fourth book only; the fourth copy is in the Arundel collection lately transferred from the library of the Royal Society, No. 97, containing the first, second, and third books; but this MS. is mutilated, and has lost many of its illuminations.

FROME, a town in the parish of Frome Selwood and hundred of Frome, and in the county of Somerset, 105 miles west-by-south from London. It is agreeably situated on the river Frome, a branch of the AVON, and on the north-east declivity of several hills contiguous to the forest of Selwood, whence the town is frequently called Frome-Selwood. It is lighted with gas, but irregularly built, and the streets are narrow and ill-paved. The borough of Frome was not represented before the passing of the Reform Act; it now returns one member. It is not incorporated. It was formerly governed by a bailiff, but is now under the superintendence of the county magistrates. Frome is in the diocese of Bath and Wells. The parish church, dedicated to St. John Baptist, is a handsome structure, surmounted by a quadrangular tower with a neat stone spire. The average net income of the vicarage is 720*l.*; patron, the marquis of Bath. The town is said to be prospering, and contains several extensive manufactures of woollen cloth, mills for rolling iron, and some considerable breweries. According to the census taken in 1831, its population was 11,240. There is a grammar-school of the foundation of Edward VI., besides several other institutions, among which is a good charity-school. The market-day is Wednesday. The cattle-fairs are held 24th February, 22nd July, 14th September, and 25th November.

(Carlisle's *Top. Dict.*; Collinson's *Hist. and Ant. of the County of Somerset*, Bath, 1791; *Beauties of England and Wales*; *Parliamentary Papers*, &c.)

FROME, river. [SOMERSETSHIRE.]

FROND, a botanical term intended to express such organs as are composed of a stem and a leaf combined; the leaves of ferns and palms were thought to be of this nature; but as it is now known that the leaves of such plants are in no important respect different from those of other plants, the term frond has ceased to have any precise meaning, and is disused by the best botanists.

FRONDE, the name of a political faction in France during the minority of Louis XIV., which was hostile to the prime minister, Cardinal Mazarin, and to the queen regent, who supported him. In consequence of some disputes between the parliament of Paris and the court, on the occasion of some new taxes levied by the minister, the car dinal ordered the arrest of the president and of one of the councillors of the parliament in August, 1648, and this act was the signal of a civil war. The party opposed to the court affected to declare themselves not against the queen's government, but only against the cardinal, whom they attacked by accusations and lampoons, from which they derived the name of 'Frondeurs,' 'censurers,' or 'jeerers.' They had for leaders the duke of Beaufort, the duke of Némours, the prince of Conti, the duke de Vendôme, the abbé de Retz (afterwards cardinal), marshal Turenne, and other men of the first rank, as well as ladies, among others the duchess de Longueville, who was a most conspicuous and violent partisan. The people of Paris took part with the Frondeurs: they drew chains across the streets, attacked the troops, and obliged the queen to liberate the two members of the parliament. This was called 'the day of the barricades.' A kind of truce took place, but the parliament continued refractory, the court hostile, and the people tumultuous; and the queen regent seeing herself obliged, in January, 1649, to remove from Paris with her son to St. Germain, charged the duke of Orleans and the prince of Condé with the task of reducing Paris by blockade. Louis XIV. was then little more than ten years of age, but he never forgot the humiliation of being obliged to leave his capital, and this was the first cause of his subsequent hostility towards the parliament. That court, in the mean time, exercised sovereign power in the capital, levied troops, and passed a resolution declaring cardinal Mazarin a public enemy, and outlawing him. ('Histoire du Parlement de Paris,' Amsterdam, 1769.) After some fighting in the neighbourhood of Paris a truce was made, a general amnesty was granted by the queen, the parliament retained full liberty to assemble, and the queen, king, and minister re-entered Paris in the month of August. The disturbances, however, continued in the provinces, especially in Provence and Guienne, where the local parliaments resisted the authority of the respective royal governors. In 1650 the queen, hurt by the overbearing tone and high pretensions of the prince of Condé, made her peace with some of the Frondeur leaders, and caused the princes of Condé and Conti to be arrested. Upon this the duchess of Longueville, marshal Turenne, and others, raised the standard of revolt in the provinces, and were joined by the Spaniards from Flanders. The war, which now assumed a more serious aspect, continued till 1653, when Turenne made his peace with the court, and Mazarin returned in triumph to Paris.—[CONDE', LOUIS DE.]

FRONDICULA'RIA. [FORAMINIFERA.[*]]

FRONDI'PORA. [MILLEPORIDÆ.]

FRONTIGNAN. [HERAULT.]

FRONTI'NUS, SEXTUS JULIUS, born of a patrician family, was prætor of Rome, A.D. 70, and about five years later was sent by Vespasian to Britain, where he seems to have remained three years, during which he conquered the Silures. (Tacitus, *Agricola*, 17.) About A.D. 78 he was succeeded by Agricola in the command of the troops in Britain. On his return to Rome he wrote, under the reign of Domitian, his work 'Strategematica,' in four books, in which he gives short anecdotes of numerous Greek and Roman generals, illustrative of the practice and resources of war. Nerva entrusted him with the superintendence of the supply of water to Rome, and while filling this office, which he retained under Trajan, he wrote his work on the aqueducts, which has been printed in the earlier editions under the title of 'De Aquis quæ in Urbem influunt,' but is now generally known by the title 'De Aquæductibus.' It contains much valuable information on the mode in which antient Rome was supplied with water, and on everything that concerned this important part of the economy of that city. Frontinus died under Trajan, about A.D. 106. Several other works have been attributed to him, such as 'De Coloniis,' 'De Limitibus,' 'De Qualitate Agrorum,' but seemingly without foundation. See the Bipontine edition of his works, with a life of Frontinus, 8vo., 1788. His work 'De Aquæductibus' was translated into French and illustrated by engravings, 4to., Paris, 1830.

FRONTISPIECE, the front or principal face of a building; the front-view; anything seen in or at the front. Johnson says, 'id quod in fronte conspicitur.' Hence, by a figure, we call the engraved title of a book or the print which faces the title-page a frontispiece.

FRONTO, MARCUS CORNELIUS, born at Cirta, in Africa, of an Italian family, after studying in his own country, came to Rome in the reign of Hadrian, and acquired great reputation as a rhetorician and grammarian. Antoninus Pius appointed him preceptor to his two adopted sons, Marcus Aurelius and Lucius Verus, whose confidence and affection he gained, as is proved by their letters. After being consul, Fronto was appointed to a government in Asia, which his bad health prevented him from filling. His learning and his instructive conversation are mentioned with praise by Aulus Gellius, the historian Appian, and others of his contemporaries. He died in the reign of Marcus Aurelius, at an advanced age. Until of late years we had nothing of his works, except fragments of his treatise 'De Differentia Verborum,' being a vocabulary of the so-called synonymes; but in 1815 Angelo Mai having discovered in the Ambrosian library at Milan a palimpsest MS. on which had been originally written some letters of Fronto to his two pupils, deciphered the text wherever the writing was not entirely obliterated, and published it with notes. It happened, by singular good fortune, that Mai, being some years after appointed librarian of the Vatican, discovered in another palimpsest volume another part of Fronto's letters, with the answers of Marcus Aurelius and Verus. Both the volumes came originally from the convent of St. Columbanus, at Bobbio, the monks having written them over with the Acts of the 1st council of Calchedon. It happened that one of the volumes was transferred to Milan, and the other to Rome. Mai published the whole in a new edition: 'M. Cornelii Frontonis et M. Aurelii imperatoris epistulæ: L. Veri et Antonini Pii et Appiani epistularum reliquiæ Fragmenta Frontonis et scripta grammatica,' 8vo., Rome, 1823. These letters are very valuable, as throwing additional light on the age of the Antonines, confirming what we know of the excellent character of Marcus Aurelius, and also showing his colleague Verus in a more favourable light than he had been viewed in before. The affectionate manner in which both emperors continue to address their former preceptor is very touching. Two or three short epistles of Antoninus Pius are also interesting. There are besides many letters of Fronto to various friends, a few of which are in Greek. The work was translated into French, and published with the text and notes, 2 vols. 8vo., Paris, 1830.

FROSINO'NE, DELEGAZIONE DI, a province of the Papal state, is bounded on the north and west by the Comarca or province of Rome, east by the Terra di Lavoro in the kingdom of Naples, and south by the Mediterranean. Its greatest length from north to south, from the ridge north of Anagni, which divides the valley of the Sacco from that of the Anio, which latter makes part of the province of Rome, to Monte Circello, which is the most southern point of the Papal state, is about 40 miles; its greatest breadth is about 30 miles, and its area is reckoned to be 1360 square miles. (Neigebaur, *Gemälde Italiens.*) Its population in 1830 was 123,300. (Calindri, *Saggio Statistico dello Stato Pontificio.)* This province includes also in its jurisdiction the small district of Ponte Corvo, which is in the valley of the Liris, within the territory of Naples, but belongs to the pope. The province of Frosinone consists of four natural divisions: 1. The Valley of the Sacco, which is fertile; 2. The mountains north of it, the Hernica Saxa, or Rocks of the Hernici, which are mostly barren; 3. The Mounts Lepini, Volscorum Montes, south of the valley of the Sacco, which are partly cultivated; and 4. The Pomptine Marshes, extending south of the Mounts Lepini to the sea-coast as far as Monte Circello and Terracina. The province contains 7 towns and 45 terre, or villages, having a communal council, and 24 hamlets. (Calindri.) Frosinone, built on a hill above the junction of the river Cossa with the Sacco, is the capital of the province, and the residence of the delegate. An account of the principal towns of this province is given under CAMPAGNA DI ROMA.

FROST. [FREEZING.]

FROST-BEARER, or Cryóphorus, an instrument invented by Dr. Wollaston for exhibiting the freezing of water in vacuo, and at a distance from the source of cold; his directions for making it and for its use are nearly thus given in the 'Philosophical Transactions' for 1813:—

Let a glass tube be taken, having its internal diameter about one-eighth of an inch, with a ball at each extremity of about one inch in diameter, and let the tube be bent to a right angle at the distance of half an inch from each ball. One of these balls should contain a little water, but if it is more than half full, it will be liable to be burst by the expansion of the water in freezing; the remaining cavity should be as perfect a vacuum as can be readily obtained. One of the balls is made to terminate in a capillary tube, and when water admitted into the other has been boiled over a lamp for a considerable time, till all the air is expelled, the capillary extremity, through which the steam is still issuing with violence, is held in the flame of the lamp till the force of the vapour is so far reduced, that the heat of the flame has power to seal it hermetically.

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[*] In this article '*Rahizopoda*' is erroneously printed for '*Rhizopoda*,' in the first column; and 'stirated' for 'striated' in two places in the second.

When an instrument of this description has been successfully exhausted, if the ball that is empty be immersed in a freezing mixture of salt and snow, the water in the other ball, though at the distance of two or three feet, will be frozen in the course of a very few minutes. The vapour contained in the empty ball is condensed by the common operation of cold, and the vacuum produced by this condensation gives opportunity for a fresh quantity to arise from the water in the opposite ball, and with so great a reduction of its temperature, that the water freezes.

According to the doctrine which does not admit of the existence of positive cold, we should represent the heat of the warmer ball to be the agent in this experiment, generating steam as long as there remains any excess of heat to be conveyed. But if we should express the cause of its abstraction, we must say that the cold mixture is the agent, and may observe in this instance, that its power of freezing is transferred to a distance by what may be termed the negative power of steam.

FROZEN OCEAN, a term used to indicate the seas surrounding the Poles, in which great masses of ice swim about. It is consequently synonymous with Icy Sea, and in some degree also with what are called the Arctic and Antarctic Seas or Oceans.

FRUIT, in botanical language, signifies that part of a plant in which the seed is lodged, whatever its size, colour, or texture may be, so that the seed-like grain of a sage, the grain of corn, the nut of a chestnut, the dry capsule of a lilac bush, are as much fruits as those of a peach, an apple, or a pine-apple. In the ordinary acceptation of the term however the word fruit is exclusively applied to seed cases which are eatable, and generally to such as require no preparation to render them fit for food.

The eatable fruits known in this climate are of so much importance to the comfort as well as luxury of society, that without entering much into details we shall here introduce some general observations, which will inform our readers what are the kinds most deserving of cultivation in select or confined gardens. In doing which we have the advantage of producing in a condensed form the important results of the laborious and costly investigations conducted for so many years in the garden of the Horticultural Society of London at Turnham Green. These have already been made known to the public in the second edition of the 'Catalogue of Fruits,' cultivated in that establishment; and our only task is to make a judicious selection from the thousands of varieties included in the Society's list.

The species of cultivated fruits are far from numerous; and most of those of the temperate regions have been introduced, at one period or another, into Britain. The genera from which these have sprung are comparatively few, and chiefly included in the natural orders Rosaceæ, Vitaceæ, Urticaceæ, and Grossulaceæ. To the first of these are to be referred the genera producing the species called apples, pears, plums, cherries, apricots, peaches, and nectarines, quinces, medlars, raspberries, and strawberries; to the second, the vine; to the third, the fig and mulberry; and to the fourth, the gooseberries and currants. Moreover there are chestnuts and filberts belonging to Corylaceæ; walnuts to Juglandaceæ, and the melon and pine-apple respectively to Cucurbitaceæ and Bromeliaceæ.

In this place we shall briefly enumerate what may be considered the most valuable varieties of each as objects of cultivation.

Apples are the most numerous class in cultivation. It has been conjectured that they were brought to this country by the Romans; but it is doubtful whether the varieties then introduced would succeed in this climate, presuming on the fact that the *Malo di Carlo*, well known as being so exceedingly beautiful and delicious in the North of Italy, has, in one of our finest English summers, proved pale and insipid, and that the apples of the South of Europe are generally worthless in England. A hardier breed, it is more than probable, was introduced by the Normans, especially of such as were suited for the manufacture of cider.

Apples are usually divided into three principal sorts, according as they are fitted for dessert, for kitchen use, or for cider. For dessert, the following are early varieties Early Red Margaret, Early Harvest, Oslin, Kerry Pippin, and Summer Golden Pippin. In succession to these, the Wormsley Pippin, King of the Pippins, Golden Reinette, Ribston Pippin, Court of Wick, Pearson's Plate, a remarkably handsome dessert apple, Golden Harvey, one of the very highest excellence, Hughes's Golden Pippin, Herefordshire Pearmain, Lamb Abbey Pearmain, Court-Pendu plat, which blossoms late, thereby escaping the spring frosts, Reinette du Canada, Old Nonpareil, and Scarlet Nonpareil. For early kitchen use: Dutch Codlin, Keswick Codlin, Hawthornden, Nonesuch, which last deserves particular notice on account of its beautiful transparency when made into apple jelly, for which purpose it is the best sort known. For winter and spring use, from many excellent varieties, the following are selected: Blenheim Pippin, which may be also used at dessert, Dumelow's Seedling, Bedfordshire Foundling, Alfriston, Gloria Mundi. Royal Russet, Brabant Bellefleur, Northern Greening, Norfolk Beaufin, from which the 'Beaufins,' or 'Beefins,' so generally to be seen in the London shops, are prepared; and French Crab, which will keep above a year. For cider, Siberian Bitter-Sweet, Foxley, Red Streak, Fox Whelp, Golden Harvey, Coccagee, Hagloe Crab, and Cooper's Red Streak, are amongst the most celebrated.

Of the varieties of Pears, few, till lately, have originated in this country; most of the kinds in former cultivation were from France, but they generally required the protection of walls. The greater intercourse with the continent consequent upon the establishment of peace in 1815, led to the introduction of a number of new and hardy varieties o this fruit from Belgium, where its cultivation and improvement had been, and still are, attended to with great assiduity. These new varieties, with some of equal merit, and even superior hardiness, raised within the last few years at Downton castle, in Herefordshire, now compose the principal part of the most select lists, and are at the same time rapidly excluding the old French varieties from cultivation.

Pears are divided into three classes, dessert, kitchen, and perry. The following are amongst the finest: for dessert, Citron des Carmes, Jargonelle, which requires a wall; Summer St. Germain, Ambrosia, Fondante d'Automne, White Doyenné, if grown as an open standard; Seckle, Louise Bonne (of Jersey), Marie Louise, Beurré Bosc, Gansel's Bergamot, which also requires a wall; Duchesse d'Angoulême, Beurré Diel, Nelis d'Hiver, Althorp Crassane, Winter Crassane, Napoleon, Glout Morceau, Passe Colmar, Knight's Monarch, Neplus Meuris, Easter Beurré, Beurré Rance. These are enumerated in their order of becoming fit for use. For kitchen use: Bezi d'Heri, which is excellent for stewing and very free from grittiness; Bequêne Musqué, Spanish Bon Chrétien, Double de Guerre, Catillac, Uvedale's St. Germain. For perry: Oldfield, Barland, Longland, Teinton Squash.

The best varieties of Plums for the dessert are, the Green Gage, Washington, Reine Claude, Violette, Drap d'Or, Kirke's, Coe's Golden Drop, Blue Imperatrice. For kitchen use: Orleans, White Magnum Bonum, Shropshire Damson, which last is excellent for preserving, as are also the St. Catherine, Coe's Golden Drop, Green Gage, and Quetsche; the latter is the sort of which the German Prunes of the shops are made, by slow and repeated drying in an oven.

Cherries, it is said, were first cultivated in this country at Sittingbourn, in Kent, where they are supposed to have been introduced about the time of Henry VIII. That county is still famous for a sort called the Kentish cherry, identical with some of the varieties of the Montmorency cherries of the French. They are round, bright red, and acid, and much used for pies. They have also the peculiar property of the stalk adhering so firmly to the stone that the latter may be drawn out without breaking the skin, excepting at the base. The fruit is then dried in hair sieves in the sun, or otherwise placed in a gently heated oven; the cherries will then keep for a year, and have the appearance of raisins. The best cherries for dessert are the Elton, Downton, May Duke, Royal Duke, Knight's Early Black, Early Purple Guigne, Bigarreau, Florence For preserving, the Kentish and Morello are best.

Apricots in cultivation are of few varieties compared with any of the preceding kinds of fruits, and of those the most useful are the following: Large Early, Breda, Moorpark, Royal, and Turkey. The Breda is the best for standards, and when the season is favourable, the fruit on such, although smaller than that grown against a wall, is, notwithstanding, higher flavoured. A variety called the *Musch-Musch* may be noticed, although not recommended for cultivation in this climate. It is the sort grown in the oases in Upper Egypt, where it produces in great abundance, the fruit being dried, and in this state forming an article of commerce for exportation. The apricot blossoms earlier than any other fruit-tree cultivated in this country; hence, most probably, it was called Precocia among the Romans, a corruption of which name is traceable in the modern one of Apricot. In consequence of the tree blossoming so early, its blossoms, particularly in the case of young trees, are extremely liable to drop off in setting. This is not to be wondered at, when it is considered that the ground is frequently at the time (March) in as cold a state as at any period of the whole season, neither the sun's heat nor the warm rains having reached so far below the surface as to warm the soil in contact with the roots; and thus, whilst the latter are in a medium perhaps a little above freezing, the tops, exposed to a bright sun against a wall, are at that period of the season occasionally in a temperature as high as 90° or 100° Fahr. The injurious effects of this disparity must be sufficiently obvious to every one, and the only remedy to be adopted is to have a very complete drainage below the roots, and the whole soil of the border, not retentive, but of a pervious nature. If it could also be kept perfectly dry previous to the commencement of vegetation, and then only allowed to receive the rain when warm, avoiding the cooling effects of melting snow and hail, the tree would thus be placed under circumstances comparatively more natural.

Peaches and **Nectarines** require the aid of a wall to bring them to perfection in this climate; and in the more northern counties of Britain the protection of glass is also requisite. They likewise rank among the kinds of fruits which are considered of sufficient value to be forced. A selection of the best varieties of peaches is as follows:—Noblesse, Red Magdalen, Royal George, Grosse Mignonne, Bellegarde, Late Admirable. The two very best nectarines are the Elruge, which has little or no red at the stone; and the Violette Hâtive, the flesh of which is rayed with red near the stone: this serves as a principal distinction between these two varieties. For the sake of variety, the Pitmaston Orange and the White Nectarine may also be included. A selection of peaches for forcing may consist of the Bellegarde, Noblesse, Grosse Mignonne, Royal George, Royal Charlotte, and Barrington. Nectarines for the same purpose are the Elruge and the Violette Hâtive.

The best variety of **Quinces** is the common one. The Portugal Quince is distinct; but its fruit does not ripen so well in this climate as the common quince. Its wood however swells more in conformity with that of the pear, and it therefore is preferable as a stock for pears.

The principal varieties of the **Medlar** are the Large or Dutch, the Upright or Nottingham, and the Stoneless. The first is esteemed for its size, and sometimes for the form of the tree, on account of the rustic crooked appearance which it assumes. The second is of better quality as regards flavour; and the third is small without stones or seeds, and keeps longer than the others.

Raspberries compared with many of the fruits mentioned above, differ little in their character as cultivated varieties from that of the botanical species *Rubus idæus*, from which they have arisen: for instance, the difference between the wild sloe and the green gage is very great; whereas the wild raspberry growing in the woods differs only slightly in flavour, and not widely in size and form from those cultivated in gardens. Good varieties are the Red Antwerp, Yellow ditto, Barnet, Cornish, and Red Globe.

Strawberries are now considerably reduced in regard to the number of varieties in cultivation. By the introduction of 'Keen's Seedling,' the very coarse sorts have been mostly banished even from the streets of London; this variety having proved the best of all for the market, combining very good flavour with the properties of being of a large size and very prolific. Other varieties deserving cultivation are the Grove End Scarlet, Roseberry, American Scarlet, and where wanted for confectionary, the Old Scarlet, which retains a fine colour, Downton, Elton, Old Pine, Prolific or Conical Hautbois, and the Large Flat. The alpine and wood strawberries require to be occasionally renewed from seeds; the best varieties are the Red Alpine and the White Alpine. Keen's Seedling, Roseberry and Grove End Scarlet, are proper for forcing.

Grapes are brought to high perfection in this country by the aid of hothouses; in favourable situations some kinds ripen pretty well, even on walls in good seasons: the open vineyard culture is not practised to any extent in England at the present time, nor is it likely ever to become profitable. Varieties of wine grapes therefore need not be noticed here, farther than by stating that they are very numerous; many of them form small compact bunches like the 'Miller's Burgundy,' which is indeed one of them, and is the sort of black cluster grape with woolly, mealy leaves commonly seen on the walls of houses near London. The following are suitable for a vinery:—Black Frontignan, Black Prince, Black Hamburg, West's St. Peter's, Black Morocco, Red Frontignan, White do., Grizzly do., Red Muscadine, Chasselas Musqué, White Muscat of Alexandria; the last requires a strong heat. For walls, perhaps none fruits better, or forms a handsomer bunch than the Royal Muscadine; it is preferable to the Sweetwater, which generally forms a ragged bunch in consequence of a great number of the berries being small and abortive; the Black Prince and Esperione will sometimes succeed; and the Early Black July and Burgundy Black Cluster will ripen still better, but the bunches of the latter are very small.

The only fruits still remaining to be noticed, the varieties of which are of any importance, are figs, gooseberries and currants, and pine-apples.

In some parts of England the **Fig** bears in the open air; but in order to ensure its doing so, a warm, or more strictly speaking, a dry subsoil is absolutely necessary, *whether* it be grown as a standard in the open ground or against a wall, or forced under glass. Wherever the soil is retentive of water, it will retain the coldness of winter till late in the spring. In fact, if the subsoil be very wet, its temperature will approximate to that of spring water, which in England is little above 50° Fahr. throughout the whole year: an amount of cold which the roots of the fig are certainly not accustomed to in summer in its native climate in Asia and Barbary, or even where it has been naturalised in the South of Europe. Or, if the springs should fall so low during summer, as to leave the roots of the Fig tree unaffected by their presence, the temperature of the surface will be suddenly raised by the first rain that falls. This often takes place towards the end of summer, and a superabundant growth ensues, too late for being completed before winter. Figs succeed well in Sussex, where the subsoil is chalk, and the rain passes off as it falls; and in preparing borders for it, the whole should be composed of such materials as are pervious to water. Some of the finest varieties of figs for this climate are the Brown Turkey, Brunswick, White Marseilles, Nerii, Pregussata, White Ischia, Brown Ischia, Yellow Ischia. The Brown Turkey is well adapted for forcing, for which purpose the Pregussata, White Marseilles, and the White, Brown, and Yellow Ischias are also proper.

Gooseberries are brought to greater perfection in Britain than in any other country. The varieties are numerous, and many of them have been raised in Lancashire, chiefly by the manufacturing population, with a view to prizes. It is to be regretted that the latter have generally been awarded solely with reference to weight; hence a number of large but coarse sorts have been brought into cultivation. In making the following selection, flavour and not size has been kept in view.

Fruit, red: Red Champagne; Red Warrington; Keen's Seedling Warrington; Rough Red, used for preserving; Red Turkey; Rob Roy; Ironmonger. *Fruit, yellow:* Yellow Champagne; Early Sulphur; Rumbullion, which is much used for bottling. *Fruit, green:* Early Green Hairy; Pitmaston Green Gage; Green Walnut; Parkinson's Laurel; Massey's Heart of Oak; Edwards's Jolly Tar. *Fruit, white:* White Champagne; Early White; Woodward's Whitesmith; Taylor's Bright Venus; Cook's White Eagle; White Honey.

The varieties of **Currants** preferable for cultivation are very few. Of black currants, the Black Naples and the Black Grape are the best. The White Dutch, Red Dutch, Knight's Sweet Red, and Knight's Large Red, are the best sorts of white, and red currants.

The Pine-Apple is the only tropical fruit which is cultivated to any extent in this country. The best varieties are the Queen, Moscow Queen, Black Jamaica, Brown Sugarloaf, and Black Antigua; the Enville and White Providence are cultivated more for their size than flavour.

FRUITS, PRESERVATION OF. The apple and pear, the two staple fruits of this country, are of so much importance to great numbers of persons, that we shall not dismiss this subject without giving some information concerning the best means of preserving them during the autumn and winter; for it is an object of no little moment to be able to prolong the duration of the season of these fruits even for a single month.

A few early varieties may be eaten from the tree, or when recently gathered; but the greater and by far the most valuable portion require to be kept for some time until they acquire a proper degree of mellowness: thus, most pears are extremely hard when gathered: some even remain so during the winter, and only become melting, or of a buttery consistency, in the spring. Apples, although it is their property to remain a long time nearly as crisp as when gathered, yet are at first too acid for the dessert, and require to be stored up in the same manner as pears, until their juices acquire a rich sugary flavour. Many varieties indeed permanently retain their acidity, but such are only proper for culinary purposes, for which indeed their briskness renders them eligible.

With regard to the gathering and storing of apples or pears, having in view their most perfect preservation, it is necessary that the gathering should be performed in all cases when the trees and fruit are perfectly dry. No precise time can be specified as to the period of the season when any particular variety ought to be taken; for this is influenced variously by circumstances connected with soil, climate, and situation. The best general rule is, to gather when the fruit-stalk separates easily from the spur, on the fruit being raised by the hand from its natural or pendulous position. There are scarcely any exceptions to this rule, unless as regards a few of the summer and early autumn varieties, in which the flavour is improved by gathering a little earlier than is indicated by the above criterion.

The treatment of the fruit after gathering is by no means uniform; some lay it directly on the shelves of the fruit-room, or wherever else it is intended to remain till fit for use; others cause it to undergo a process of fermentation, called sweating, by throwing it in a heap, and covering it with some dry substance, generally straw; in some instances even blankets have been used for this purpose. After it has perspired for ten days or a fortnight, it is spread out at a time when the air is dry, in order to expedite the evaporation of the moisture. All unsound specimens, or even such as are suspected of being so, are then separated. In the case of particularly valuable sorts, it has been recommended to wipe off the moisture with flannel; but this proceeding, for reasons hereafter to be explained, is not advisable.

With regard to the final storing up, as it has been proved by experience that certain methods successfully practised by some, have turned out a failure when attempted by others, and as these fruits are extensively cultivated by persons variously circumstanced, some of whom are compelled by necessity to practise perhaps not the very best mode, but the best they can command, it will be proper to detail the various methods that have hitherto been tried, in order that such as are most deserving of recommendation may be pointed out, as well as those which ought to be avoided in every possible case

The following are the different modes in which apples and pears have been deposited for winter use:—1. In single layers on the bare shelves of a fruit-room. 2. In the same manner, but covered with light canvass, which must be dried occasionally, as it absorbs the evaporation. 3. In close drawers; one layer, or several layers in depth. 4. In dry casks without any interposing material; a few weeks after they are first put in they require to be carefully picked over, the casks made perfectly dry and re-filled, the head closely fitted, and the fruit on no account disturbed till unpacked for use. 5 In boxes, casks, large garden pots, or jars, with pure and dry sand interposed between the layers of fruit. 6. In jars in which no sand or other substance is allowed to come in contact with the fruit, the mouths of the jars being covered with a piece of slate, and the whole plunged in a quantity of dry sand, so as to be several inches from the free atmosphere. The sand being a slow conductor of caloric, the sudden changes of temperature and their powerful effects in causing the decay of fruits are avoided. 7. In heaps in a dry airy loft, a slight covering of straw being given to protect them from frost. 8. In baskets lined with straw. 9. In close cellars excluded from the light, which is in all cases injurious. 10. In dark but airy vaults. 11. On a small scale, under a bell-glass cemented down air-tight; this must not be done on wood the least resinous, for even the white deal, which, when made into open shelves, communicates none of its flavour to the fruit, yet when supporting a close bell-glass, strongly taints whatever fruit is placed in it, by the confined and accumulating exhalation. 12. Buried in a box placed on four bricks, under another box inverted, in an excavation so deep that the upper portion of the fruit may be 1½ or 2 feet below the surface of the earth. 13. In threshed grain, or in corn stacks. 14. Reposing on wheat straw, with or without a covering of the same. 15. In chaff of wheat or oats. 16. In flax-seed chaff. 17. In powdered charcoal; this, if it cannot prevent, will in no degree contribute to decay, either internally or externally. It is the substance in which the imported Newtown pippins are frequently packed, and they would arrive much sounder than they do were it not for the bruises they evidently appear to have received previous to exportation. 18. In dried fern leaves.

Amongst so great a variety of modes, it is obviously of considerable importance to ascertain not only which are the best, but which experience has proved to be the worst. This inquiry is most advantageously pursued by settling in the first instance what the circumstances are that have been universally found detrimental to the preservation of fruits. As was remarked when mentioning the sixth mode, atmospheric changes have very great, if not the most powerful influences: firstly, as regards their calorific effects, and secondly, their hygrometrical. In the former respect, the expansion and condensation occasioned by the rise and fall of temperature must work a change in the state of the juices, doubtless often at variance with the gradual chemical change which these juices naturally undergo; hence, those fruits that are most exposed to vicissitudes of temperature are found to be most apt to fail in attaining their full sugary mellow perfection. Again, when warm weather suddenly succeeds cold, the air in the room is of a higher temperature than the fruit, until such time as the latter acquire from the former an equality of temperature; and until such time as this takes place, the fruit, from its coldness, acts as a condenser of the vapour existing in the warmer atmosphere by which it is surrounded, and the surface consequently becomes covered with a great deposition of moisture, as will be the case with a glass filled with water colder than the atmosphere of a room into which it is brought. The more smooth and glossy the variety of apple or pear, the greater is the condensation on its surface. Russeted apples and pears exhibit the least effects in this way, their rough dry coat being in less immediate contact with the cold juices of the fruit.

From the above it is sufficiently evident that variations in the state of the atmosphere, as regards its temperature, have injurious effects by the expansion and condensation of the juices, and by the deposition of moisture on the surface, partly owing to atmospheric humidity, but chiefly to the circumstance of the latter being condensed upon the fruit, as above explained. This deposition of moisture tends to decompose the skin and to render it less efficacious as a protector. It therefore follows, that where fruit is not kept closely packed, it should be exposed to as little change of temperature as possible, and should also be preserved from the full effects of an atmosphere saturated with moisture. If a circulation of air could be secured of a uniform temperature and dryness, or nearly so, there is no doubt as to the superiority of flavour which the fruit would acquire. The watery particles would exhale, and at the same time shrivelling would not take place to any great extent for this chiefly occurs in consequence of expansion and contraction, and alternate moisture and dryness of the surface, the results of irregularities in the state of the atmosphere. It may be here observed, that wiping the fruit is injurious. The skins of fruits are more or less covered with a secretion, technically called the *bloom*, which every one will have observed on grapes and plums, on both of which it is very conspicuous, and although less so on apples and pears, yet it does exist on them, and its use is to protect, in a great measure, the skin from the effects of moisture. Some fruit-growers are so well aware of this that they will not even handle their most choice wall-pears in gathering, except by the stalk.

Light is found to be injurious; all agree that fruit keeps best in total darkness. This arises from a specific stimulus being exercised upon the vegetable tissue by this agent. If a leaf, a green branch, or such a green surface as that of an apple or pear be exposed to light, even in the most diffused state, evaporation takes place; but as soon as the stimulus of light is withdrawn, evaporation ceases. Speaking of plants in general, evaporation from the green parts takes place all day long and ceases at night.

The preceding observations will explain the reason why a fruit-room is best in a dry situation, on the north side of a wall or other building where the sun's heat will not readily disturb the temperature. The roof should be double, and the walls hollow; the windows small. There should be a full command of ventilation; but the room should also be capable of being entirely shut up.

Ventilation should be used only when the air, owing to the exhalations from the fruit, is not perfectly sweet; when this is not the case, air must be admitted in whatever condition it may happen to be; but it would be most desirable to admit air copiously *only when it is of an equal temperature with that of the interior of the room.* The latter should be in two or three compartments, in order to keep the late sorts entirely free from the contaminating effects of exhalations of fruit in a fully ripe state.

These being the conditions under which the ripening, decay, and preservation of apples and pears always take place, the reader will have no difficulty in judging of the relative advantages of the 18 methods already named. It is obvious that Nos. 1, 2, 3, 4, 5, 6, 7, are plans in which the circumstances essential to the preservation of fruit are nearly completely complied with. Nos. 8, 11, 14, 15, and 16, are bad, either because of the liability of the material in which they are packed to decomposition, by which the fruit acquires a tainted musty taste, or because they can only be applied on a very small scale. Nos. 9 and 12 are chiefly objectionable because, owing to the almost total absence of evaporation, the fruit, although well preserved and plump, is apt to be watery and tasteless. No. 17 is a troublesome and dirty practice; Nos. 13 and 18 are excellent when opportunity occurs of practising them; but No. 10, in dark but airy vaults, is undoubtedly that which most completely complies with the conditions necessary for preservation, and is much the best. We have known apples, that are usually decayed in February, preserved till Midsummer in this manner, in all their freshness and colour, and nearly all their flavour.

With regard to nuts and walnuts, the only precaution that it is necessary to take for their preservation is to maintain the air in which they are placed in a constant state of moisture. Burying in the earth, placing in a damp cellar, mixing with damp sand, and many such plans have been recommended; but they are all objectionable, either because they keep the fruit too moist, or do not offer any impediment to its becoming mouldy. We believe the best of all plans is to pack them in glazed earthen jars, throwing a small quantity of salt on the last layer before the jar is closed.

Apples and pears dried in ovens may be preserved for years. Bosc states that he has tried the latter, after three years' preservation, and found them still good; but they are best during the first year. They are placed in the oven after the bread is drawn. The process is repeated a second, third, or fourth time, according as the size or nature of the fruit may require. The heat must not be so great as to scorch, nor must the fruit be dried to hardness. When properly done, they are kept in a dry place. Another method, chiefly practised on the rousselets, and of these the rousselet de Rheims is the best for the purpose, is to gather the fruit a little before maturity; after being half boiled in a small quantity of water, they are peeled and drained. They are then placed in the oven, and heated to a suitable degree, for twelve hours. They are then steeped in syrup, to which have been added brandy, cinnamon, and cloves. They are again returned to the oven, which is heated to a less degree than at first: this operation is thrice repeated.

The flattened dried apples, called *beaufins*, so abundant in the London shops, are prepared in Norfolk, from a variety of apple called the Norfolk beaufin: it has *a thick* skin, which resists, without bursting, the heavy pressure to which the apples are subjected in the oven, during the slow and lengthened process of drying.

FRUME'NTIUS. [Abyssinian Christians; Axu

FRUSTUM, a portion cut off from any solid figure. The term is most frequently applied in the case of the cone and conoidal surfaces of revolution. By 'frustum of a cone' is meant any part cut off from a cone which does not contain the vertex. This distinction is drawn because any part of a cone which contains the vertex is another cone.

FU'CINUS. [Celano.]

FUCOI'DEÆ. [Pseudozoaria.]

FUCUS. [Sea Weed.]

FUEGO [Mozambique.]

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